Goldbacher (Ern.)

1851–1878.

ILLUSTRATED CATALOGUE

AND

PRICE LIST

OF

OPTICAL, METEOROLOGICAL

AND

MATHEMATICAL INSTRUMENTS,

Manufactured and Imported

BY

ERNEST GOLDBACHER,

Optician,

No. 98 FULTON ST., NEW YORK.

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GLASSES AS ASSISTANTS OF VISION.

The visual organs are subject to a great number and variety of diseases, to which their delicate structure and unavoidable exposure to sudden and violent extremes of light and temperature, naturally predisposes them. The treatment of those of an organic character, such as involve considerable alterations of the tissues, belongs to the domain of operative surgery. Their occurrence is fortunately infrequent when compared with the functional derangements characterized chiefly by defect of vision, and amenable to alleviation, if not cure, by means of the painless artificial appliances of the optician. Spectacles are used chiefly in the following disorders:

1st. Myopia; near or short-sightedness.
2d. Hypermetropia; natural far-sightedness.
3d. Presbyopia; far-sightedness incident to old age.
4th. Astigmatism; irregular refraction of the cornea or lens.
5th. Asthenopia; weak sight.
6th. Strabismus; squinting.
7th. Diplopia; double sight.
8th. Photophobia; aversion to light.

Myopia, the first mentioned disorder, is ordinarily brought on by long confinement of the eyes to close or fine work, until their range of vision becomes contracted and they are unable to discern objects at a distance. Students, literary people, watchmakers, engravers, and artisans accustomed to a prolonged use of the eyes at short distances are especially liable to this disorder. In common with many other acquired infirmities this may be and frequently becomes hereditary, and is transmitted to the offspring of affected parents.

Recent extended examination of the eyes of students of the colleges of Europe and this country disclose an astonishing prevalence of Myopia, and have in numerous instances detected its existence where such a defect of vision had been wholly unsuspected. Near-sightedness is either stationary or progressive; the latter is by far the more prevalent form, and great care should be exercised in the selection and use of appropriate glasses in order to retard this tendency; in the lower forms of Myopia, in which comparatively weak glasses are required to restore normal vision, it occasionally occurs that their use may be dispensed with in advancing years; but the tendency to the progressive form is always strong in the higher degrees of Myopia, and when attended with "flashes" of light and flushing of the eyes, the use of any glasses should be temporarily discontinued and perfect rest enjoined. The possibility of alleviation of this malady lies chiefly, if not wholly, in

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the direction of a diminution of degree, which can be accomplished only by a judicious and scientific adaptation of the proper glasses.

The following rules for the guidance of near-sighted persons are nearly as applicable to all whose sight is impaired or defective:

1st. Avoid using the eyes in reading or fine work by gas or other unsteady or flickering light.

2d. Avoid stooping or other constrained postures; sit erect, with the head thrown back, and adjust the book or work to suit this position.

3d. Never read in a car, stage, or carriage where the eyes are compelled to constant readjustment.

4th. Avoid reading during any severe illness, or even during convalescence until health is perfectly restored.

5th. When hot or irritated the eyes should be bathed in pure, cold water, which is the best possible application.

6th. In all cases of sudden loss of sight, great pain or inflammation in or about the eyes, the attendance of a skillful oculist should be secured without delay, as neglect may, in a short time, render all curative means of no avail.

In Myopia the eye is too long from front to back, and, consequently, the image of distant objects is formed most distinctly at some point in front of the retina. In Hypermetropia a precisely opposite condition prevails, the focal point being behind the retina, which receives an indistinct image proportionate to the degree of the disease. This affection is nearly always inherited, and common to many members of the same family. Except in a few extreme cases, in which the professional services of a skilled oculist are needed to avert Strabismus and Asthenopia, to which neglect or mistreatment of Hypermetropia strongly tends, the true and only remedy for this peculiar defect of vision is to be found in properly adjusted glasses.

Presbyopia, or the long-sightedness incident to advancing years, is by far the most common of all the defects of vision, few, if any, escaping it, who, having good, normal sight, attain the age of thirty-five or forty years. Its presence is first indicated by an increasing difficulty in reading small print at the usual distance of ten or twelve inches, or in the imperfect light of evening; an inclination to place the book or object further from the eyes; a desire for a stronger light and a sense of fatigue, before unknown, after using the eyes even moderately.

Glasses of weak power should be resorted to as soon as these inconveniences are observed. Any attempt to postpone their use after the eyes demand such assistance entails an extent of suffering and discomfort easily avoided, without any advantage to compensate for the fatigue, heat and occasional irritation always caused by such a strain upon the accommodative power of the eyes; whatever is attempted to be gained by delay in this matter is always lost thereafter, and glasses, much stronger than those used by persons beginning at the proper time are rendered imperative. At

first it will be necessary to wear glasses in the evening only; afterwards, when they are required, in the daytime, those hitherto used in the evening may be taken, and stronger ones taken to replace them. An injurious popular mistake is made in the use of glasses of too great power; such as magnify or increase the size of objects, are wholly unnecessary, and, in fact, soon become injurious by augmenting the evil they were expected to remedy, since they entail the use of glasses of several different powers to suit various distances where the accommodative faculties of the eyes have been overtaxed and abused.

Astigmatism is caused by irregular refraction, arising from difference in the focal length of the meridians of the eye and may be remedied by properly ground and skillfully adjusted cylindrical glasses.

Asthenopia, or weak-sight, is caused by the straining of Hypermetropic eyes in endeavoring to focus the rays of light from objects near the eyes, fatigue follows, the accommodative powers become, at first, partially, then entirely relaxed, the eyes begin to require more frequent rest, until ever recurring confusion compels their temporary disuse. The inconvenience of this form of Asthenopia may be readily obviated by the use of properly fitted glasses; but that form which arises from muscular weakness must be referred to the skilled oculist.

Strabismus, or squinting, is sometimes alleviated by the use of suitable glasses, which, in such cases, are usually prescribed by the attending oculist.

Diplopia, or double vision, is corrected by the use of ingeniously-adjusted prismatic glasses.

Photophobia, or intolerance of light, usually accompanies all inflammations of the tissues of the eye. The large curved neutral tint or London smoke glasses provide the best protection from strong lights, affording more perfect relief than blue or green glasses. All glasses for this purpose should be ground so that their two sides are perfectly parallel, since the object is to temper the light without changing the direction of the rays.

Glasses for spectacles are ground—

Spherical.	*Cylindrical.*	*Prismatical.*
Bi-convex and concave.	Bi-convex and concave.	Convex
Plano convex and concave.	Plano convex and concave.	and
Periscopic convex and concave.	Sphero-cylindrical.	Concave.

Of the many who use or require such assistants to vision, comparatively few understand or appreciate the importance of properly-adjusted and well-fitting spectacles and eye-glasses. Many who live at a distance from large cities are compelled to purchase such as are offered by country dealers and peddlers. Others ruin their eye-sight irreparably by wearing inferior spectacles, because cheap, and only discover the error of their false economy when too late; frequently unprincipled dealers sell inferior glasses, which apparently or temporarily assist the sight, to persons who have organic diseases, which should be treated by the physician, and to whom any glasses

whatever are a positive injury. Not even gross ignorance furnishes an excuse for neglecting or trifling with such an important and invaluable function.

The absolute purity of the material used in the manufacture of glasses, and the excellence of the polish of the surfaces, are almost equally indispensable to assure *perfection*. The material should be always the hardest, clearest glass, or, better still, rock crystal or Brazilian pebble, which, because of its superior clearness and hardness, is capable of receiving and retaining a better and more enduring polish than any artificial glass whatever, does not become blurred or scratched; it is demonstrably cooler to the eyes, and does not induce the hot and irritated sensation sometimes caused by the best artificial glasses.

To those at a distance this catalogue will, it is expected, prove of great assistance, for by following the simple rules for testing sight herewith given, and with our aid in the selection, they can be fitted with the appropriate glasses which they require. A single trial will suffice to show those who have been accustomed to purchase of unskillful dealers, simply because the prices were apparently cheap, how small an outlay will purchase a safe, superior, and reliable article, adapted to the uses of such an important and indispensable aid to perfect vision.

Many will, as has always been the case, apply for glasses whose condition demands medical treatment. To such the very best advice will be promptly and always gratuitously given.

The reputable character of the house, gained by more than a quarter of a century of honorable dealing, will be, as heretofore, carefully and sedulously maintained in every instance.

All goods enumerated in this catalogue are warranted strictly as represented, and the prices given will not be deviated from.

The imported articles are purchased directly from the leading manufacturers in each branch, and all the advantages of buying for cash are fully enjoyed. The cash basis is in every instance strictly adhered to and the customers of the house may fully and confidently rely upon obtaining the best quality of goods and the full value of their investment.

Parties ordering Spectacles or Eye-Glasses will please observe the following directions:

1st. State if glasses have been used, and for what purpose, reading or walking.

2d. If glasses have not previously been used, state whether vision is defective for near objects, for distant objects, or for both near and distant objects.

3d. State the number of the smallest of the following Test Types which can be seen plainly in a good light at each of the following distances: 1 foot, 2 feet, 5 feet, 10 feet, 20 feet.

TEST TYPES.

No. 1.

We again turn from the siege of Boston, to the invasion of Canada, which at that time shared the anxious thoughts of Washington. His last accounts of the movements of Arnold, left him at Point Levi, opposite to Quebec. Something brilliant from that daring officer was anticipated. It was his intention to cross the river immediately. Had he done so, he might have carried the town by a *coup de main;* for terror as well as d'saffection prevailed among the inhabitants. At Point Levi, however, he was brought to a stand; not a boat was to be found there. Letters which he had dispatched some days previously by two Indians, to Generals Schuyler and Montgomery, had been carried by his faithless messengers to Caramhe, the lieutenant-governor, who, thus apprised of the impending danger, had caused all the boats of Point Levi to be either removed or destroyed. Arnold was not a man to be disheartened by difficulties. With great exertions he procured about forty birch canoes from the Canadians and Indians, with forty of the latter to navigate them; but stormy winds arose, and for some days the river was too boisterous for such frail craft. In the mean time the garrison at Quebec was gaining strength. Recruits arrived from Nova Scotia. The veteran Maclean, too, who had been driven from the mouth of the Sorel by the detachment under Brown and Livingston, arrived down the river with his corps of Royal Highland Emigrants, and threw himself into the place. The Lizard frigate, the Hornet sloop-of-war, and two armed

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No. 3.

Emigrants, and threw himself into the place. The Lizard frigate, the Hornet sloop-of-war, and two armed schooners were stationed in the river, and guard boats patrolled at night. The prospect of a successful attack upon the place was growing desperate. On the 13th of November, Arnold received intelligence that Montgomery had captured St. Johns. He was instantly roused to emulation. His men, too, were inspirited by the news. The wind had abated; he determined to cross the river that very night. At a late hour in the evening he embarked with the first division, principally riflemen. The river was wide; the current rapid; the birch canoes, easy to upset, required skillful management. By four o'clock in the morning, a large part of his force had crossed without being perceived, and landed about a mile and a half above Cape Diamond, at Wolfe's Cove, so called from being the landing place of that gallant commander. Just then a guard-boat, belonging to the Lizard, came slowly along shore and discovered them. They hailed it, and ordered it to land. Not complying, it was fired into, and three men were killed. The boat instantly pulled for the frigate, giving

No. 4.

vociferous alarm. Without waiting the arrival of the residue of his men, for whom the canoes had been dispatched, Arnold led those who had landed to the foot of the cragged defile, once scaled by the intrepid Wolfe, and scrambled up it in all haste. By daylight he had planted his daring flag on the far-famed heights of Abraham. Here the main difficulty stared him in the face. A strong line of walls and bastions traversed the promontory from one of its precipitous sides to the other; inclosing the upper and lower towns. On the right, the great bastion of Cape Diamond crowned the rocky height of that name. On the left was the bastion of La Potasse, close by the gate of St. Johns, opening upon the barracks; the gate where Wolfe's antagonist, the gallant Montcalm, received his death-wound. A council of war was now held. Arnold, who had some knowledge of the place, was for dashing forward at once and storming the gate of St. Johns. Had they done so, they might have been successful. The gate was open and unguarded. Through some blunder and delay

No. 5.

a message from the commander of the Lizard to the lieutenant-governor had not yet been delivered, and no alarm had reached the fortress. The formidable aspect of the place, however, awed Arnold's associates in council. They considered that their whole force was between seven and eight hundred men; that nearly one-third of their fire-arms had been rendered useless, and much of their ammunition damaged in their march through the wilderness; they had no artillery, and the fortress looked too strong to be carried by a *coup de main*. Cautious counsel is often fatal to a daring enterprise. While the council of war deliberated, the favorable moment passed away. The lieutenant-governor received the tardy message. He hastily assembled the merchants, officers of militia, and captains of merchant vessels. All promised to stand by him; he had strong distrust, however, of the French part of the population and the Canadian militia; his main reliance was on Colonel Maclean and his

No. 6.

Royal Highland Emigrants. The din of arms now resounded through the streets. The cry was up—"The enemy are on the Heights of Abraham! The gate of St. Johns is open!" There was an attempt to shut it. The keys were not to be found. It was hastily secured by ropes and handspikes, and the walls looking upon the heights were soon manned by the military, and thronged by the populace. Arnold paraded his men within a hundred yards of the walls, and caused them to give three hearty cheers; hoping to excite a revolt in the place, or to provoke the scanty garrison to a sally. There were a few scattered cheerings in return; but the taunting bravado failed to produce a sortie; the governor dared not venture beyond the walls with part of his garrison, having too little confidence in the loyalty of those

No. 7.

who would remain behind. There was some firing on the part of the Americans, but merely as an additional taunt; they were too far off for their musketry to have effect. A large cannon on the ramparts was brought to bear on them, and matches were procured from the Lizard, with which to fire it off. A few shots obliged the Americans to retire and encamp. In the evening Arnold sent a flag, demanding in the name of the United Colonies the surrender of the place. Some of the disaffected and faint-hearted were inclined to open the gates, but were held in check by the mastiff loyalty of Maclean. The veteran guarded the gate with his Highlanders; forbade all communication with the besiegers, and fired upon their flag as an ensign of rebellion. Several days elapsed.

No. 8.

Arnold's flags of truce were repeatedly insulted, but he saw the futility of resenting it and attacking the place with his present means. The inhabitants gradually recovered from their alarm, and armed themselves to defend their property. The sailors and marines proved a valuable addition to the garrison, which now really meditated a sortie. Arnold received information of all this from friends within the walls; he heard about the same time of the capture of Montreal, and that General Carleton, having escaped from that place, was on his way down to Quebec. He thought at present, therefore, to draw off on

No. 9.

the 19th to *Point aux Trembles* (Aspen-tree Point), twenty miles above Quebec, there to await the arrival of General Montgomery with troops and artillery. As his little army wended its way along the high bank of the river toward its destined encampment, a vessel passed below, which had just touched at Point aux Trembles. On board of it was General Carleton, hurrying on to Quebec. It was not long before the distant booming of artillery told of his arrival at his post, where he resumed a stern command. He was unpopular among the inhabitants; even the British merchants

No. 10.

and other men of business, were offended by the coldness of his manners, and his confining his intimacy to the military and the Canadian noblesse. He was aware of his unpopularity, and looked round him with distrust; his first measure was to turn out of the place all suspected persons, and all who refused to aid in its defence. This caused a great "trooping out of town," but what was lost in numbers was gained in strength. With the loyally disposed who remained, he busied himself in improving the

No. 11.

defences. Of the constant anxiety, yet enduring hope, with which Washington watched this hazardous enterprise, we have evidence in his various letters. To Arnold, when at Point Levi, baffled in the expectation of finding the means of making a dash upon Quebec, he writes: "It is not in the power of any man to command success, but you have done more, you have deserved it; and before this time (December 5), I hope

No. 12.

you have met with the laurels which are due to your toils, in the possession of Quebec. I have no doubt but a junction of your detachment with the army under General Montgomery, has been effected before this. If so, you will put yourself under his command, and will, I am persuaded, give him all the assistance

No. 13.

in your power to finish the glorious work you have begun." In the month of December a vessel had been captured, bearing supplies from Lord Dunmore, to the army at Boston. A letter

No. 14.

on board, from his lordship to Gen. Howe, invited him to transfer the war to the southern colonies, or at all events to send them to the

No. 15.

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No. 16.

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No. 17.

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No. 19.

CROSS THE RIVER AT ONCE. HAD HE DONE SO, HE

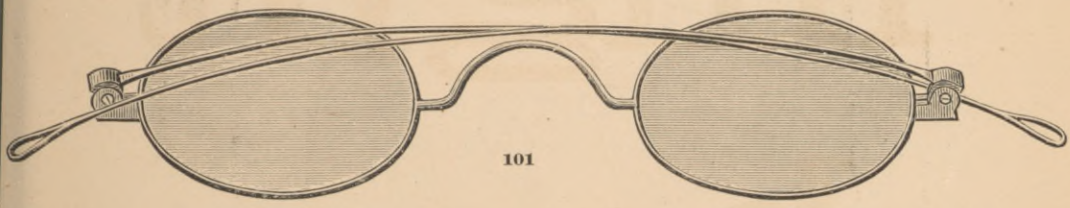
No. 20.

might have carried the town

Steel Spectacles, with Single or Straight Temples.

All Spectacle and Eye-Glass Cuts are full size and exact reproductions, as far as possible, of the article represented thereby.

A handsome leather case is furnished with each Spectacle, and a similar case and silk cord accompanies each Eye-Glass without extra charge.



101

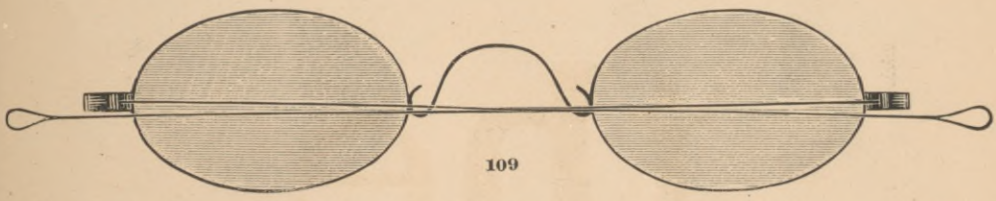
Price per pair.

101	Steel Spectacle, heavy frames, common glasses	$0 75
103	" " good glasses	1 00



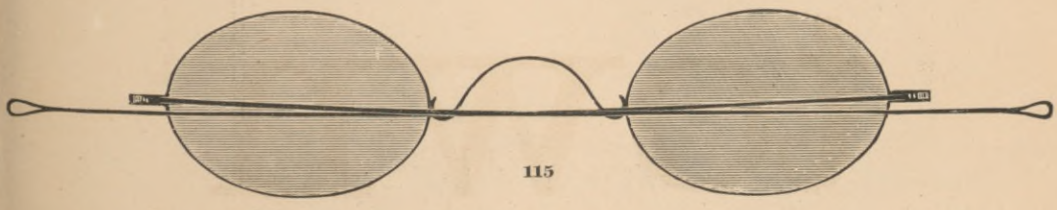
105

105	Steel Spectacle, medium frame, good glasses	1 50
107	" " best glasses	1 75



109

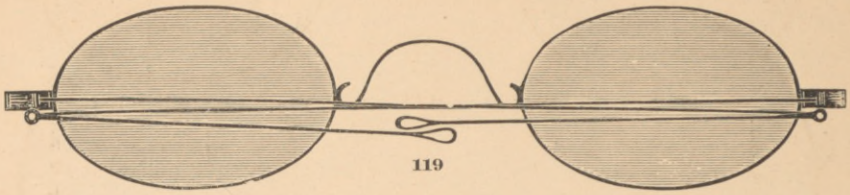
109	Steel Spectacle, light frame, good glasses	2 25
111	" " best glasses	2 50
113	" " " Brazilian Pebbles	4 00



115

115	Steel Spectacle, lightest frame, best glasses	3 00
117	" " Pebbles	4 50

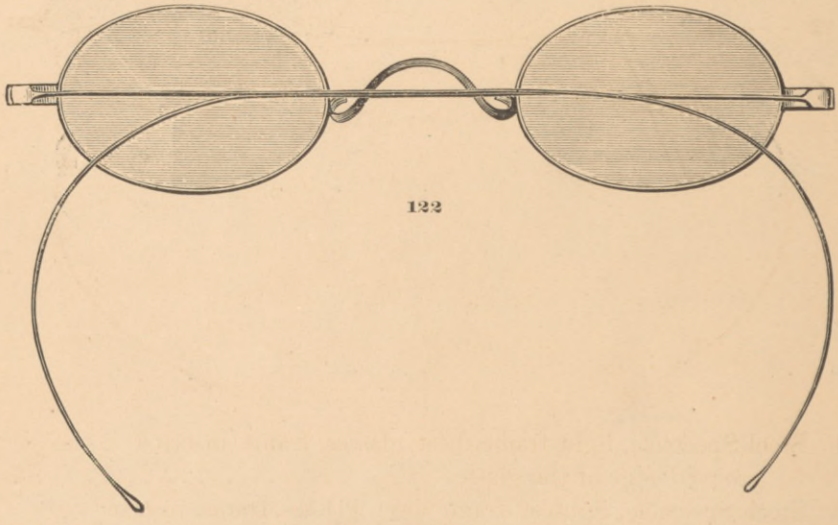
Steel Spectacles, with Double or Turn-pin Temples.



119

Nos. 101, 103, 105, 107, 109, 111, 113, 115, 117, will be furnished with turn-pin temples as per cut No. 119, without extra charge.

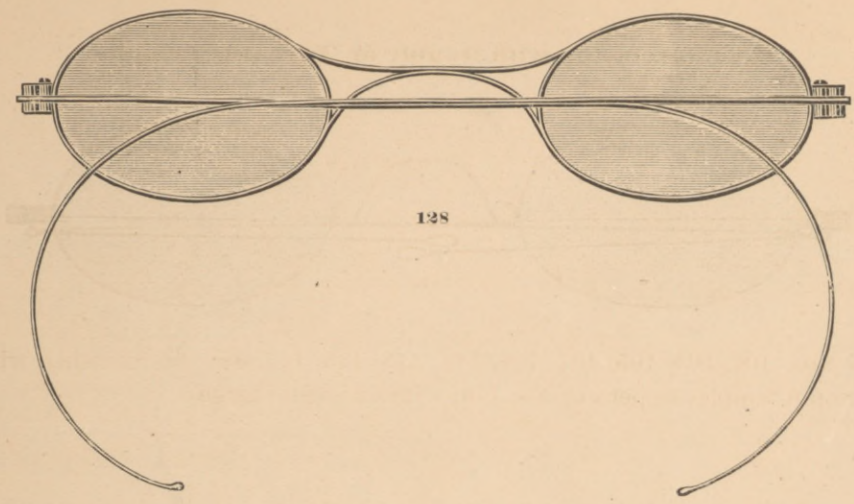
Steel Spectacles, with Riding or Hook Temples.



122

Price per pair.

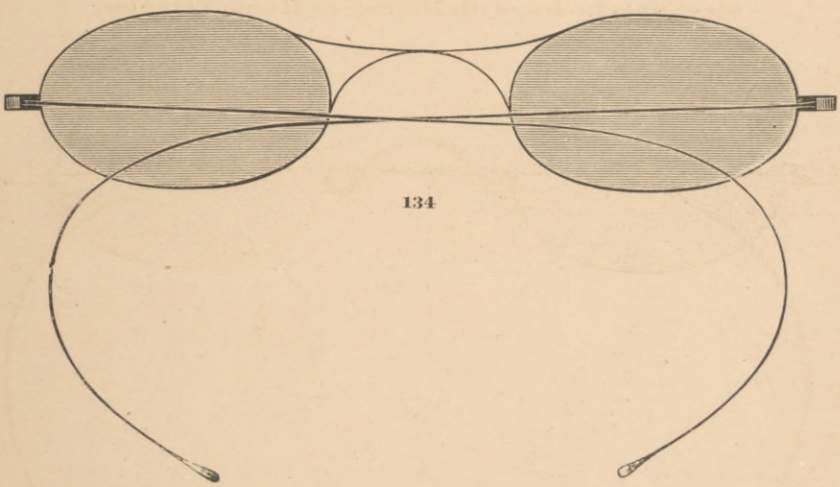
122	Steel Spectacle, heavy frame, good glasses	$1 50
124	" medium " best glasses	2 00
126	Steel Spectacle, fine frame, best glasses, frame inserted in the grooved edge of glasses	3 00



128

Price per pair.

128 Steel Spectacle, heavy frame, good glasses..... $1 50
130 " medium " best " 2 00
132 Steel Spectacle, fine frame, best glasses, frames inserted in the grooved edge of glasses..... 3 00



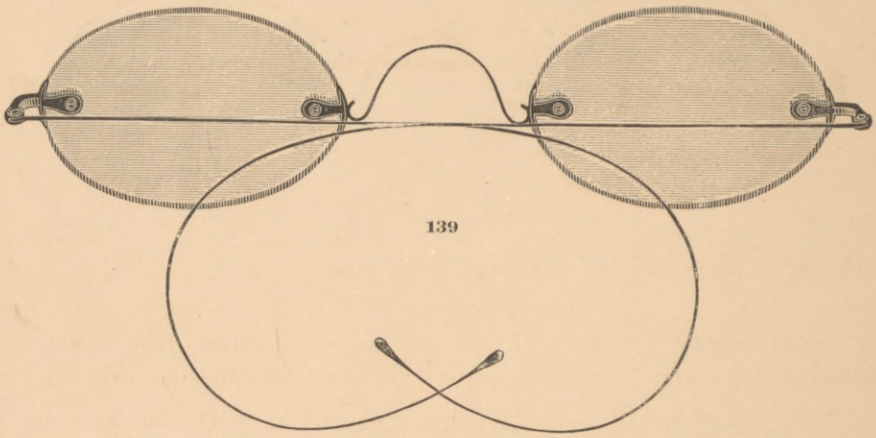
134

134 Steel Spectacle, light frame, best glasses, frame inserted in the grooved edge of the glasses..... $3 50
136 Steel Spectacle, lightest frame, best glasses, frame inserted in the grooved edge of the glasses..... 5 00

Nos. 122, 124, 128, 130, will be set with the best Brazilian Pebbles at an additional cost of $2.00.

Nos. 126, 132, 134, 136, will be set with the best Brazilian Pebbles at an additional cost of $3.50.

Steel Spectacles, Frameless or Rimless Eyes, with Riding or Hook Temples.

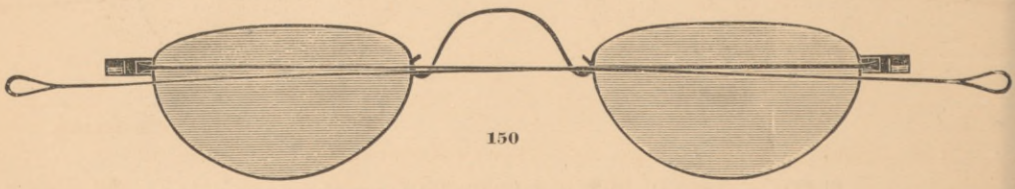


139

Price per pair.

139	Steel Spectacle, frameless eyes, good glasses.....	$2 50
141	" " " best "	3 50
143	" " " " Brazilian Pebbles.....	7 00

Steel Spectacle, Half Eyes, Single or Straight Temples.



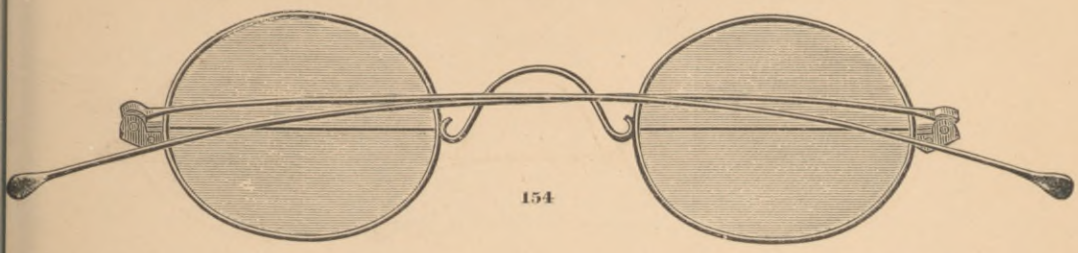
150

Price per pair.

145	Steel Spectacle, half eyes, heavy frames, good glasses.....	$1 50
148	" " medium frames, best glasses.....	2 00
150	" " light " "	2 50

Nos. 145, 148, 150, will be furnished with Turn-pin or Double Temples as per cut No. 119, without extra charge, and with Riding or Hook Temples as per cut No. 122, at an additional cost of 50 cents.

Steel Spectacles, Double Focus or Franklin Glass, S. T.



154

Price per pair.

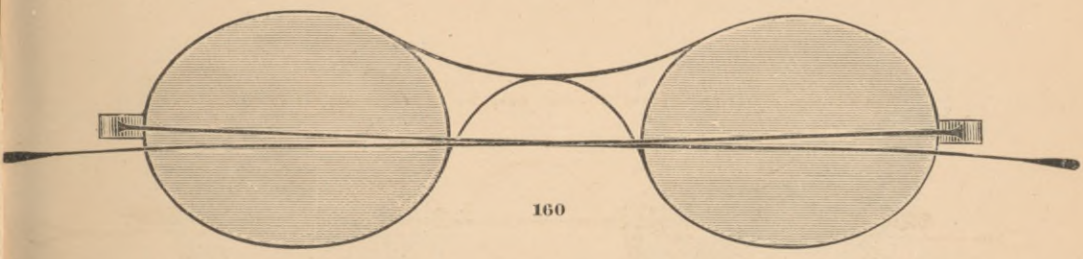
152 Steel Spectacle, heavy frames, good glasses..... $2 00
154 " medium " best " 2 50

These frames are set with two (2) pairs of glasses, the upper half intended for distant, and the lower half for close objects. See No. 190.

Nos. 152, 154, will be furnished with Turn-pin or Double Temples as per cut No. 119, without extra charge, and with Riding or Hook Temples as per cut No. 122, at an additional cost of 50 cents.

Plane, Smoke, Blue, or Green colored glasses will be inserted in any Spectacle or Eye-glass, in place of focused glasses, without additional charge, and colored focused glasses at an additional cost of 50 cents.

Steel Spectacle, with Coquille Glasses, Single or Straight Temples.



160

Price per pair.

156 Steel Spectacle, large eyes, heavy frames, with Coquille or curved glasses of blue or smoke color..... $0 75
158 Steel Spectacle, large eyes, medium frames, with good Coquille glasses of blue or smoke color..... 1 50
160 Steel Spectacle, large eyes, light frames, with the best ground Coquille glasses of smoke or blue color..... 2 50

Nos. 156, 158, 160, will be furnished with Turn-pin or Double Temples as per cut No. 119, without extra charge, and with Riding or Hook Temples as per cut No. 122, at an additional cost of 50 cents.

Price per pair.

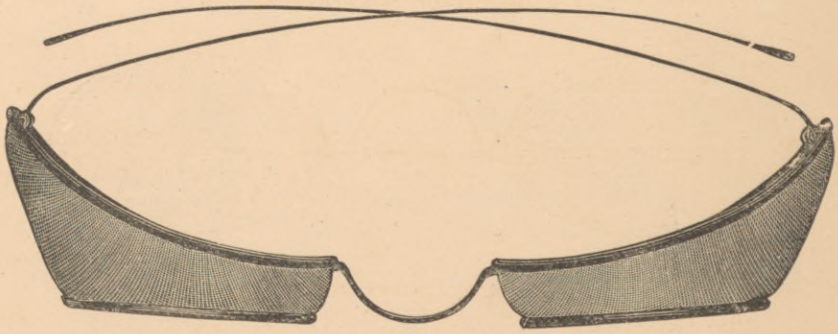
161 Steel Spectacle, large eyes, light frame, with the best ground Coquille glasses of smoke or blue color, frame inserted in grooved edge of glasses, with Riding or Hook Temples as per cut No. 122 ..... $3 50

162 Steel Spectacle, frameless or rimless, large size eyes, with the best ground Coquille glasses of smoke or blue color, with Riding or Hook Temples, as per cut No. 139..... 3 50

163 Millers' or Stone Cutters' Spectacles, heavy iron frame, large eyes of thick white glass, without focus, to protect the eyes from flying chips, etc..... 75

165 Shooting Glasses, Steel frames with colored glasses having a small transparent disc in centre..... 1 50

Steel Railroad or Eye Protector Spectacles.



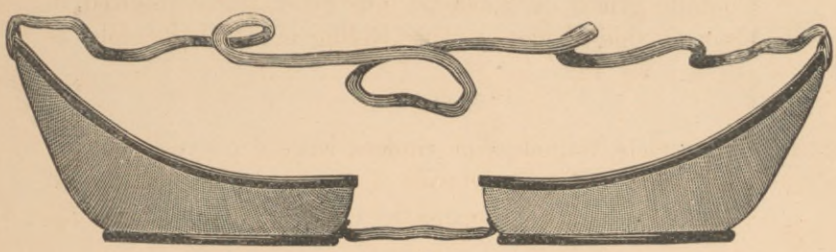
170

Price per pair.

168 Steel Spectacle, heavy frames, coarse wire screens, with blue, green or smoke colored, or white glasses, either Single or Double Temples..... ..... $1 50

170 Steel Spectacle, light frames, fine wire screens, with the best blue, green or smoke colored, or white glasses, with Single or Double Temples..... 2 50

Eye Protectors or Goggles.



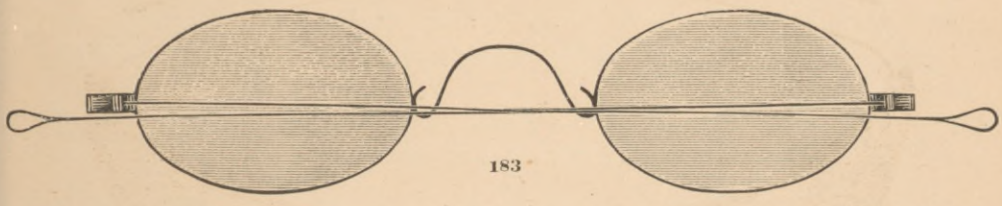
178

Each.

172 Drivers' Eye Protectors..... $0 25
174 Iron Wire " 50
176 Medium Wire Eye Protectors, with green, blue, or smoke colored glasses..... 75
178 Fine Wire Eye Protectors, with green, blue, or smoke colored glasses..... 1 00
180 Finish Wire Eye Protectors, with green, blue, or smoke colored glasses..... 1 50

Any of the Steel Spectacles will be heavily plated with Nickel at an additional cost of 50 cents.

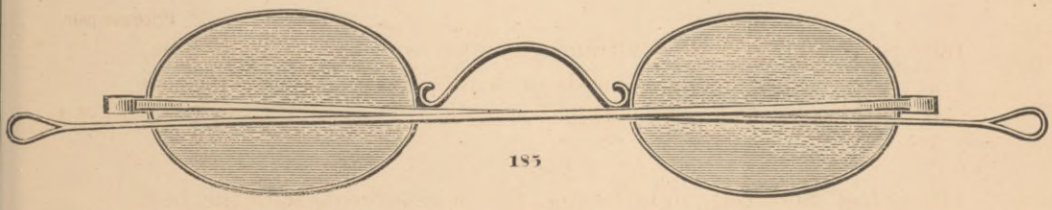
Coin Silver Spectacles.



183

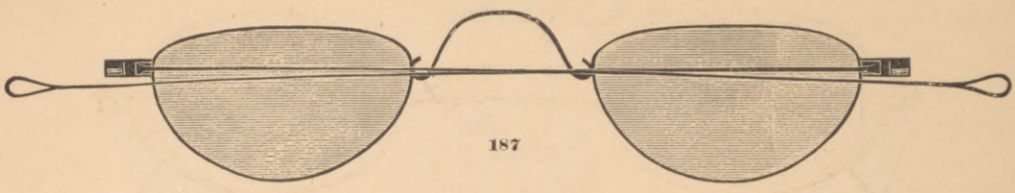
Price per pair.

183 Coin Silver Spectacle, light frames, Single Temples, with best glasses..... $2 50



185

185 Coin Silver Spectacles, heavy frames, Single Temples, best glasses..... 3 00



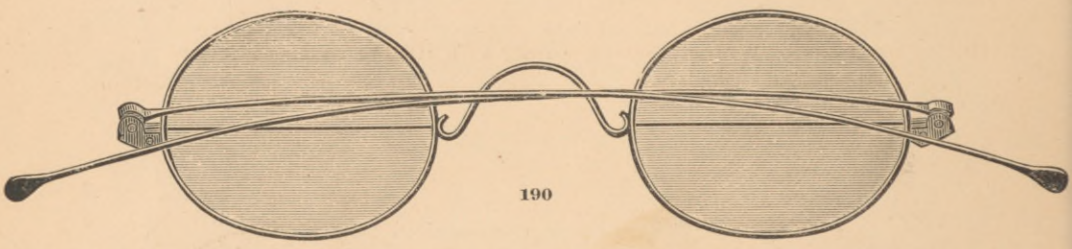
187

Price per pair.

187 Coin Silver Spectacle, half-eyes, light frames, best glasses..... $3 00

This peculiar form of glass enables the wearer to look at distant objects without the usual awkard and inconvenient inclinations of the head; also see No. 150.

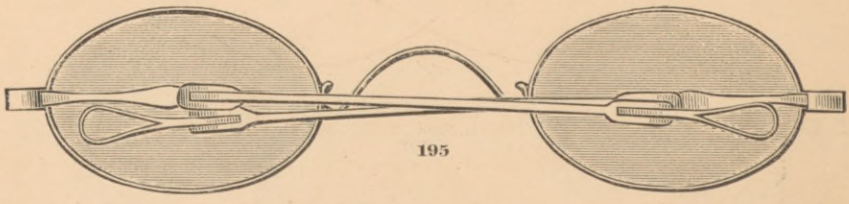
188 Coin Silver Spectacle, half-eyes, heavy frames, best glasses.... 3 50



190

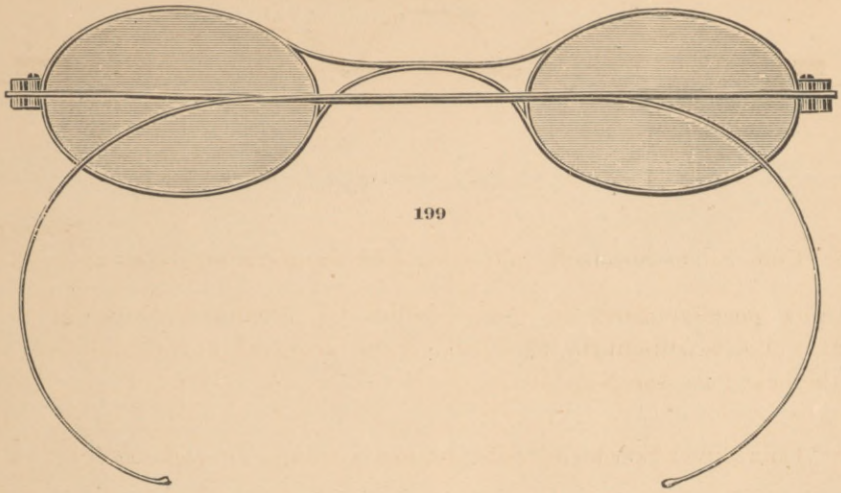
190 Coin Silver Spectacle, heavy frames, Single Temples, best double focus or Franklin Glasses (see No. 154)..... .... 3 50

193 Coin Silver Spectacle, heavy frames, Slide Temples, as per cut No. 195, best double focus or Franklin Glasses.. ..... 4 00



195

195 Coin Silver Spectacle, heavy frame, with Slide Temples, with best glasses..... 3 00

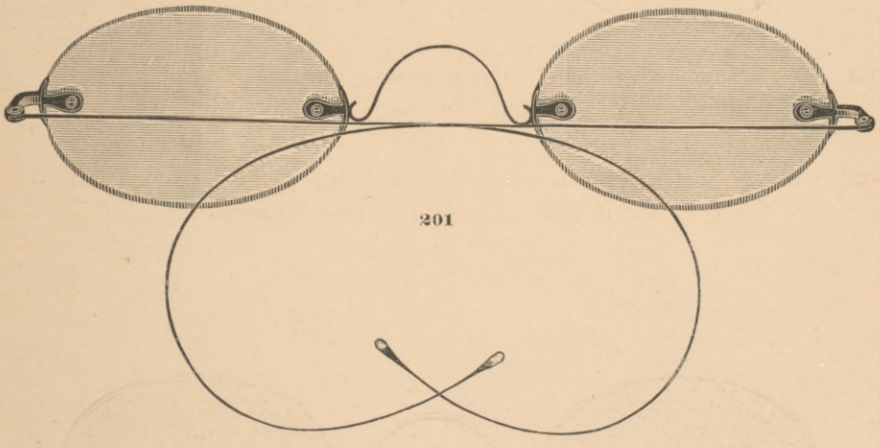


199

Price per pair.

197 Coin Silver Spectacle, light frame, with Riding or Hook Temples, with the best glasses..... $3 00

199 Coin Silver Spectacle, heavy frame, with Riding or Hook Temples, with the best glasses..... 3 50

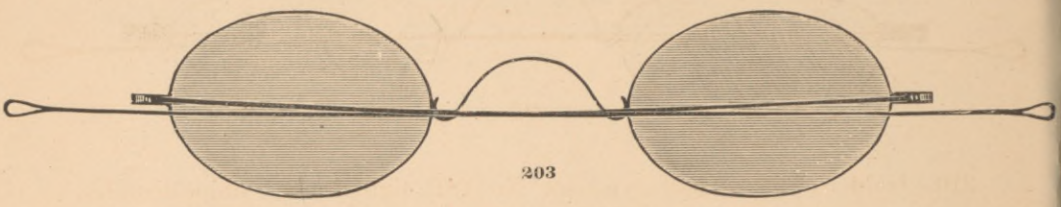


201

201 Coin Silver Spectacles, frameless eyes with Riding or Hook Temples, best glasses..... 3 50

The best Brazilian Pebbles will be furnished in Nos. 183, 185, 187, 188, 195, 197, 199, at an additional cost of $2; and in Nos. 190, 193, at an additional cost $6; and in No. 201, at an additional cost of $4.

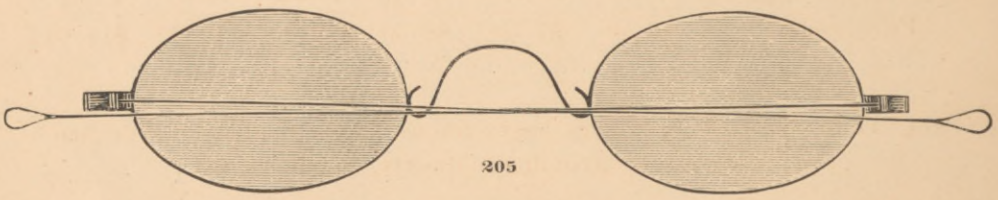
Gold Spectacles, Single and Double Temples.



203

203 Gold Spectacle, light frame, single temples, best glasses; according to quality, as follows, viz.:

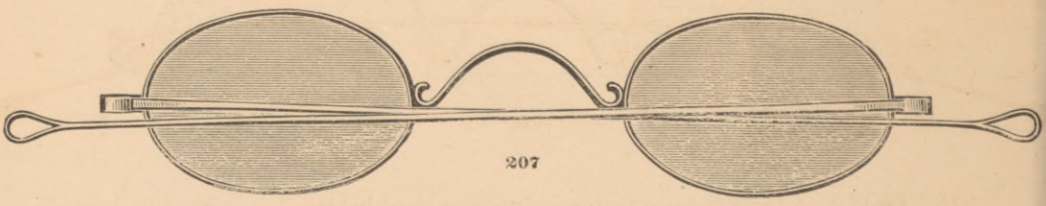
Fineness of gold..	8 kt.	10 kt.	12 kt.	14 kt.	16 kt.	18 kt.
Price each.....	$5 00	$6 00	$7 00	$8 00	$9 00	$10 00



205

205 Gold Spectacle, medium frame, single temples, best glasses; according to quality, as follows, viz.:

Fineness of gold..	8 kt.	10 kt.	12 kt.	14 kt.	16 kt.	18 kt.
Price each.....	$6 50	$7 50	$8 50	$10 00	$12 00	$14 00

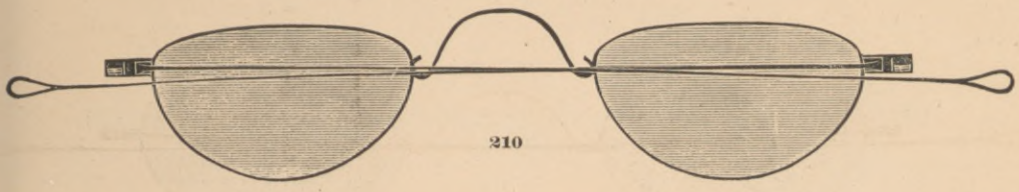


207

207 Gold Spectacle, heavy frame, single temples, best glasses; according to quality, as follows, viz.:

Fineness of gold..	8 kt.	10 kt.	12 kt.	14 kt.	16 kt.	18 kt.
Price each.....	$7 00	$8 50	$10 00	$11 50	$13 00	$15 00

Gold Spectacles, Single Temples.



210

210 Gold Spectacle, half eyes (see No. 187), light frames, single temples, best glasses; according to quality, as follows, viz.:

Fineness of gold..	8 kt.	10 kt.	12 kt.	14 kt.	16 kt.	18 kt.
Price each.....	$5 00	$6 00	$7 00	$8 00	$9 00	$10 00

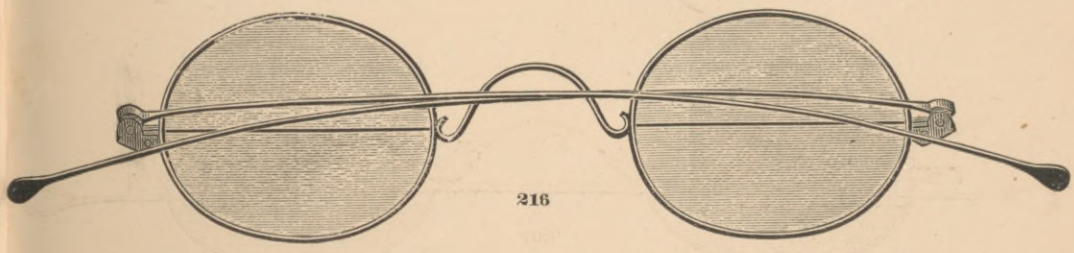
212 Gold Spectacle, half eyes, medium frames, single temples, best glasses; according to quality, as follows, viz.:

Fineness of gold..	8 kt.	10 kt.	12 kt.	14 kt.	16 kt.	18 kt.
Price each.....	$6 50	$7 50	$8 50	$10 00	$12 00	$14 00

214 Gold Spectacle, half eyes, heavy frames, single, double, or slide temples, best glasses; according to quality, as follows, viz.:

Fineness of gold..	8 kt.	10 kt.	12 kt.	14 kt.	16 kt.	18 kt.
Price each.....	$7 00	$8 50	$10 00	$11 50	$13 00	$15 00

Gold Spectacle, Single or Double Temples.

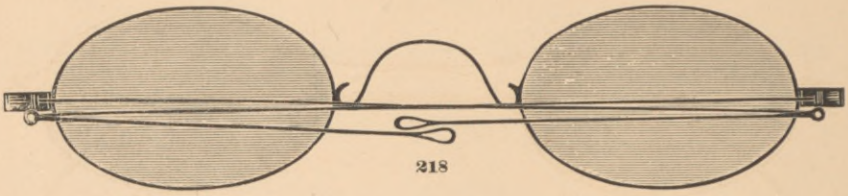


216

216 Gold Spectacle, heavy frames, single or double temples, with the best double focus or Franklin glasses (see No. 154); according to quality, as follows, viz.:

Fineness of gold..	8 kt.	10 kt.	12 kt.	14 kt.	16 kt.	18 kt.
Price each.....	$8 00	$9 50	$11 00	$13 00	$14 50	$16 50

Gold Spectacles, Double Temples.



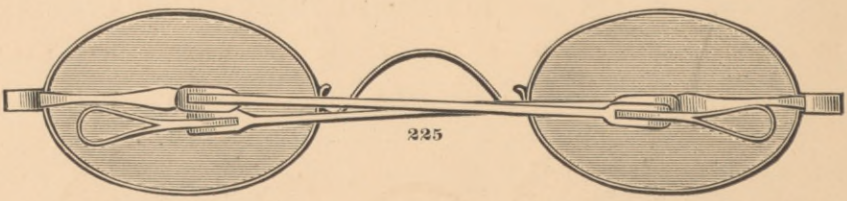
218 Gold Spectacle, medium frames, double or turnpin temples, best glasses; according to quality, as follows, viz.:

Fineness of gold..	8 kt.	10 kt.	12 kt.	14 kt.	16 kt.	18 kt.
Price each.....	$7 00	$8 00	$9 00	$10 50	$12 50	$14 50

220 Gold Spectacle, heavy frames, double or turn-pin temples, best glasses; according to quality, as follows, viz.:

Fineness of gold..	8 kt.	10 kt.	12 kt.	14 kt.	16 kt.	18 kt.
Price each.....	$8 00	$9 50	$11 00	$13 00	$15 50	$16 00

Gold Spectacles, Slide Temples.



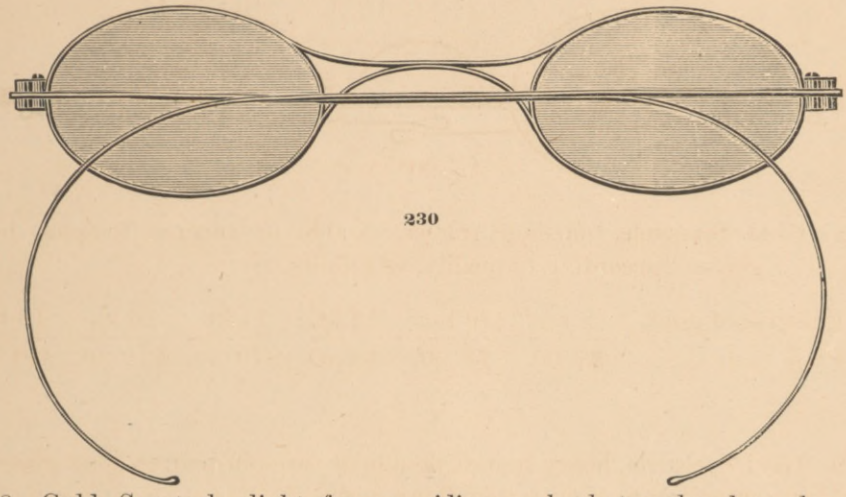
223 Gold Spectacle, medium frames, slide temples, best glasses; according to quality, as follows, viz.:

Fineness of gold..	8 kt.	10 kt.	12 kt.	14 kt.	16 kt.	18 kt.
Price each.....	$7 00	$8 00	$9 00	$10 50	$12 50	$14 50

225 Gold Spectacle, heavy frames, slide temples, best glasses; according to quality, as follows, viz.:

Fineness of gold..	8 kt.	10 kt.	12 kt.	14 kt.	16 kt.	18 kt.
Price each.....	$8 00	$9 50	$11 00	$13 00	$14 50	$16 00

Gold Spectacles, Riding or Hook Temples.



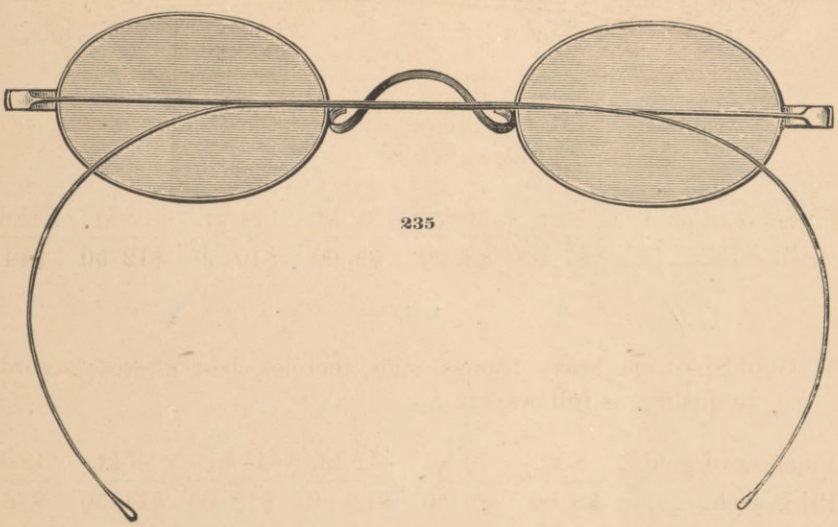
230

228 Gold Spectacle, light frames, riding or hook temples, best glasses; according to quality, as follows, viz.:

Fineness of gold..	8 kt.	10 kt.	12 kt.	14 kt.	16 kt.	18 kt.
Price each.....	$5 00	$6 00	$7 00	$8 00	$9 00	$10 00

230 Gold Spectacle, medium frames, riding or hook temples, best glasses; according to quality, as follows, viz.:

Fineness of gold..	8 kt.	10 kt.	12 kt.	14 kt.	16 kt.	18 kt.
Price each.....	$6 50	$7 50	$8 50	$10 00	$12 00	$14 00



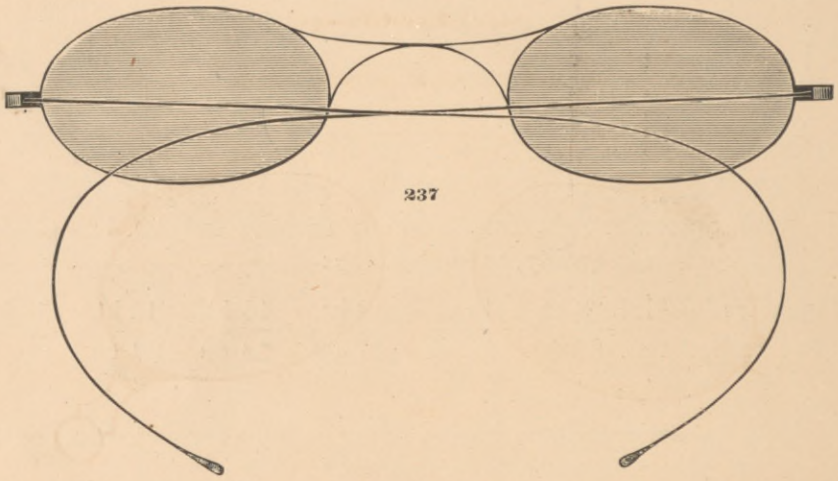
235

233 Gold Spectacle, light frame, riding or hook temples, best glasses; according to quality, as follows, viz.:

Fineness of gold..	8 kt.	10 kt.	12 kt.	14 kt.	16 kt.	18 kt.
Price each..	$5 00	$6 00	$7 00	$8 00	$9 00	$10 00

235 Gold Spectacle, medium frames, riding or hook temples, best glasses; according to quality, as follows, viz.:

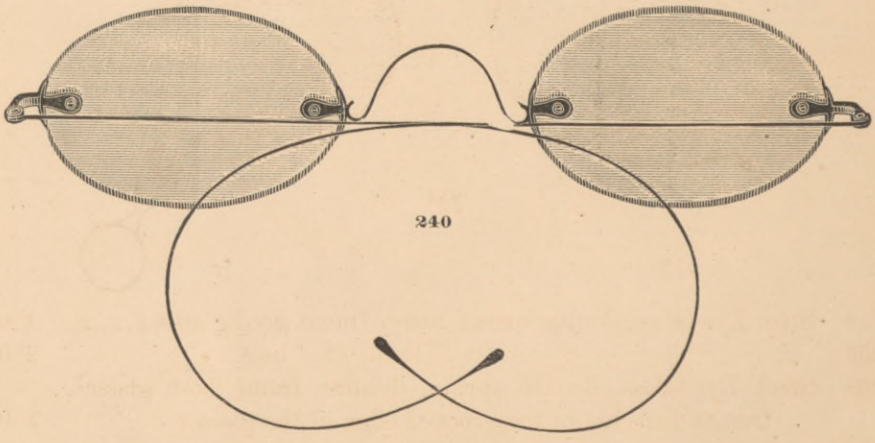
Fineness of gold..	8 kt.	10 kt.	12 kt.	14 kt.	16 kt.	18 kt.
Price each.....	$6 50	$7 50	$8 50	$10 00	$12 00	$14 00



237

237 Gold Spectacle, light frame, inserted in the grooved edge of the glasses, riding or hook temples, best glasses; according to quality, as follows, viz.:

Fineness of gold..	8 kt.	10 kt.	12 kt.	14 kt.	16 kt.	18 kt.
Price each.....	$6 00	$7 00	$8 00	$9 00	$10 00	$11 00



240

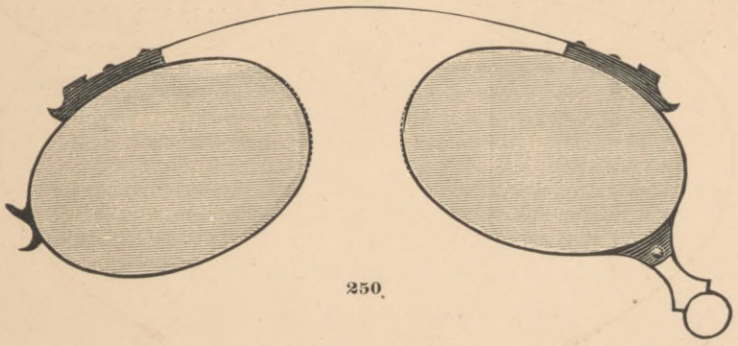
240 Gold Spectacle, frameless eyes, with riding or hook temples, best glasses; according to quality, as follows, viz.:

Fineness of gold..	8 kt.	10 kt.	12 kt.	14 kt.	16 kt.	18 kt.
Price each.....	$5 00	$6 00	$7 00	$8 00	$9 00	$10 00

The best Brazilian Pebbles will be furnished in Nos. 203, 205, 207, 210, 212, 214, 218, 220, 223, 225, 228, 230, 233, and 235, at an additional cost of $2.00; and in No. 216, $6.00; and in No. 237, $3.50; and in No. 240, $3.50.

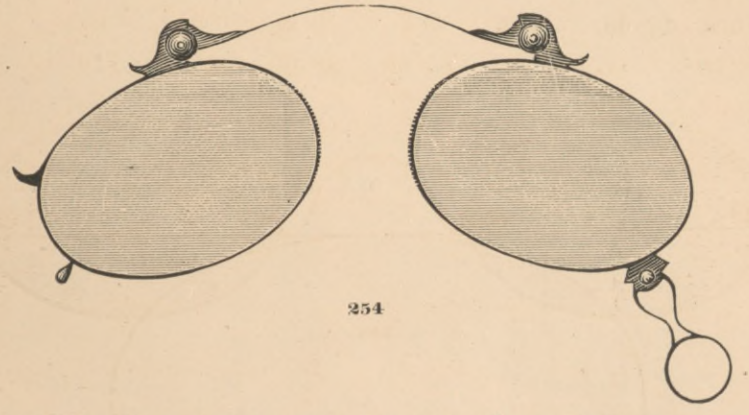
Steel Eye-Glasses.

FRAMES BLUE OR BRONZE COLOR.



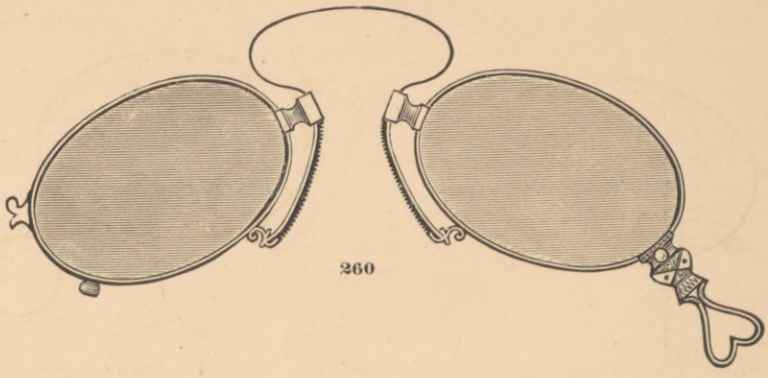
250

250 Steel Eye-Glass, single spring, heavy frame, good glasses..... $0 75
252 " " " " light " best " 1 50



254

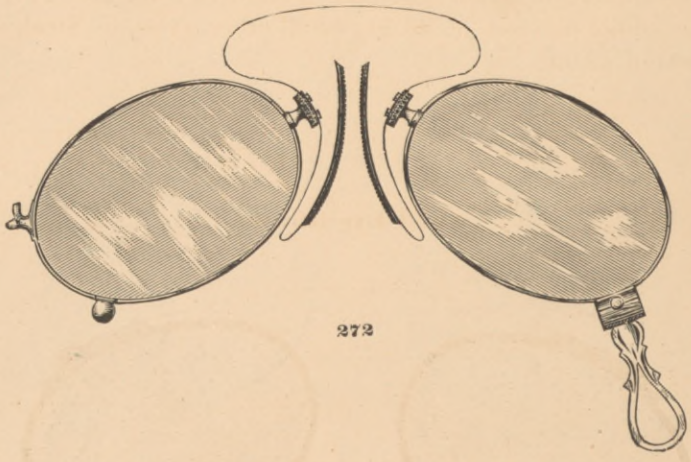
254 Steel Eye-Glass, double spring, heavy frame, good glasses..... 1 00
256 " " " " " light " best " 2 00
258 Steel Eye-Glass, double spring, lightest frame, best glasses, frames inserted in the grooved edge of the glasses..... 3 00



260

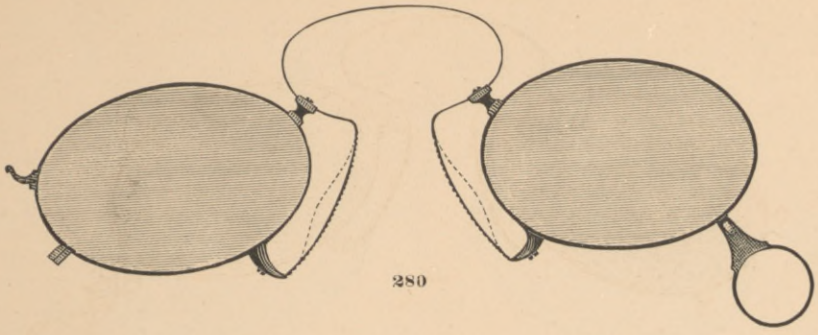
260 Steel Eye-Glass, heavy frame, good glasses..... $1 00
263 " " " light " " " 1 50
265 " " " " " best " 2 00
267 " " " lightest " " " 2 50
270 Steel Eye Glass, lightest frame, best glasses, with frames inserted in the grooved edge of the glasses..... 3 00

Steel Eye-Glasses, Patent Springs.



272

272 Steel Eye-Glass, Bertel. Pat. Spring, heavy frame, good glasses..... ..... 1 50
274 Steel Eye-Glass, B. Pat. Spring, light frame, best glasses..... 2 00
276 " " " " " " lightest " " " 2 50
278 Steel Eye-Glass, B. Pat. Spring, lightest frame, best glasses, with frames inserted in the grooved edge of the glasses..... 3 00



280

280 Steel Eye-Glass, Lomb's Pat. Spring, heavy frame, good glasses..... $1 50

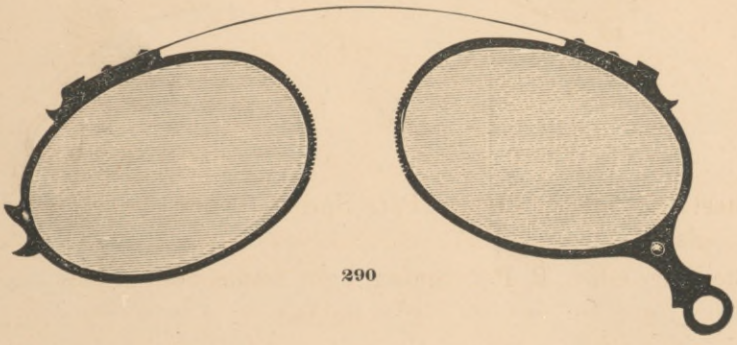
283 Steel Eye-Glass, Lomb's Pat. Spring, light frame, best glasses..... 2 00

285 Steel Eye-Glass, Lomb's Pat. Spring, lightest frame, best glasses..... 2 50

287 Steel Eye-Glass, Lomb's Pat. Spring, lightest frame, best glasses, with frames inserted in the grooved edge of the glasses..... 3 00

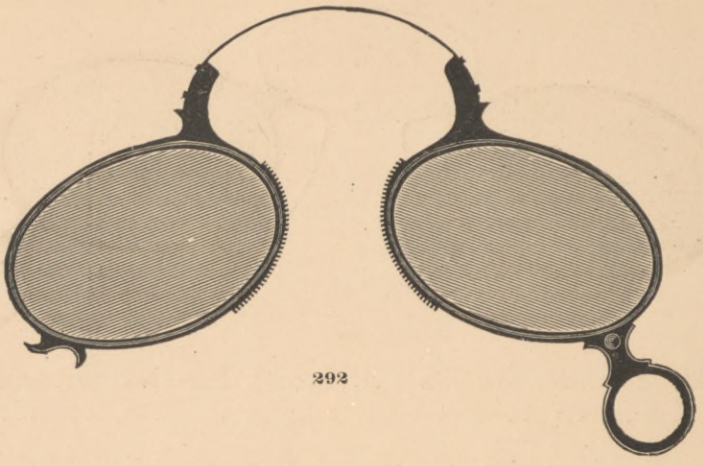
The best Brazilian Pebbles will be inserted in Nos. 258, 270, 278 and 287, at an additional cost of $3.50; in all other styles, in Steel, at an additional cost of $2.00.

Shell Eye-Glasses.



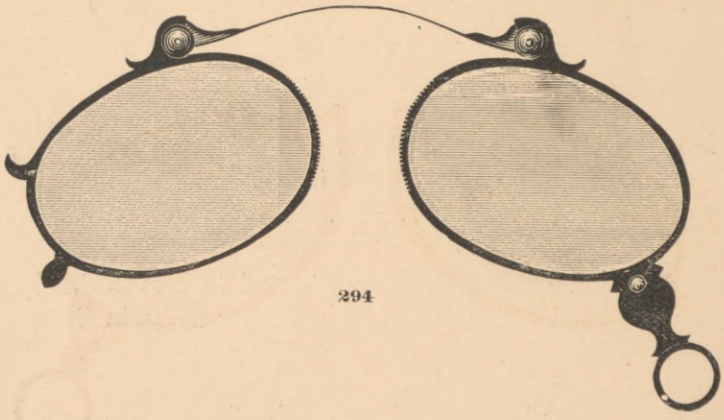
290

290 Tortoise Shell Eye-Glass, straight spring, best glasses..... $1 50



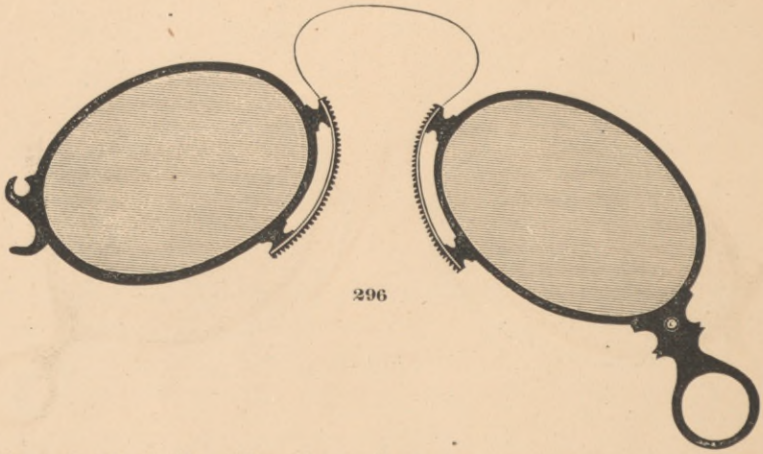
292

292 Tortoise Shell Eye-Glass, curved spring, best glasses..... $1 50



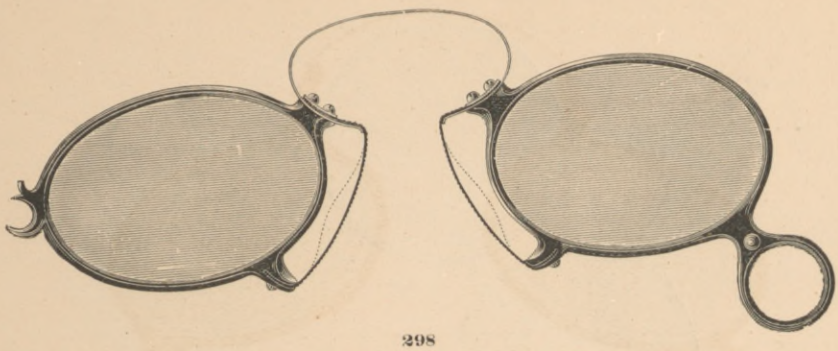
294

294 Tortoise Shell Eye-Glass, double spring, best glasses..... 2 00



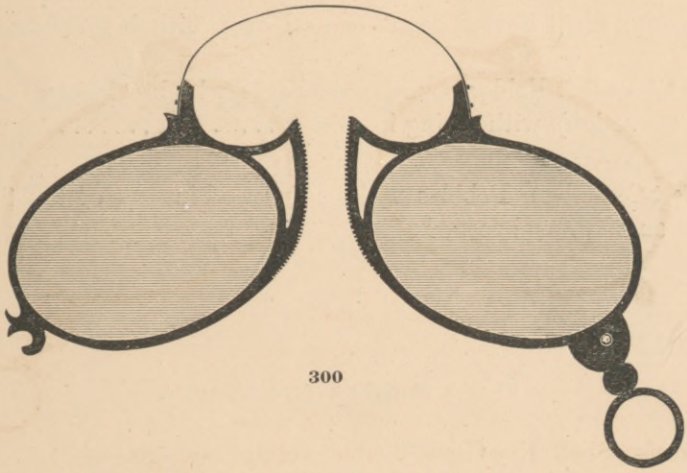
296

296 Tortoise Shell Eye-Glass, best glasses..... 2 00



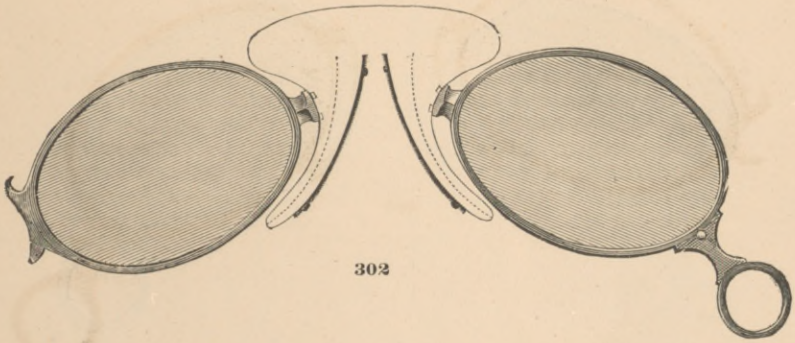
298

298 Tortoise Shell Eye-Glass, H. Lomb's Pat. self adjusting spring, best glasses (see No. 322)..... $2 50



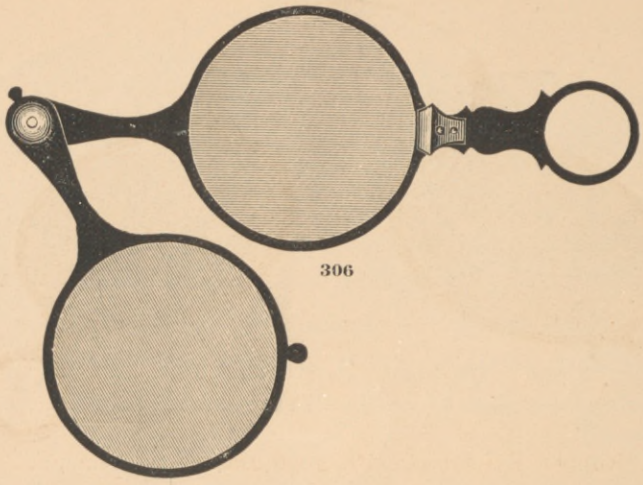
300

300 Tortoise Shell Eye-Glass, Anatomical spring, best glasses.... 2 00



302

302 Tortoise Shell Frames, Berteling's Pat. Spring, best glasses... 2 50



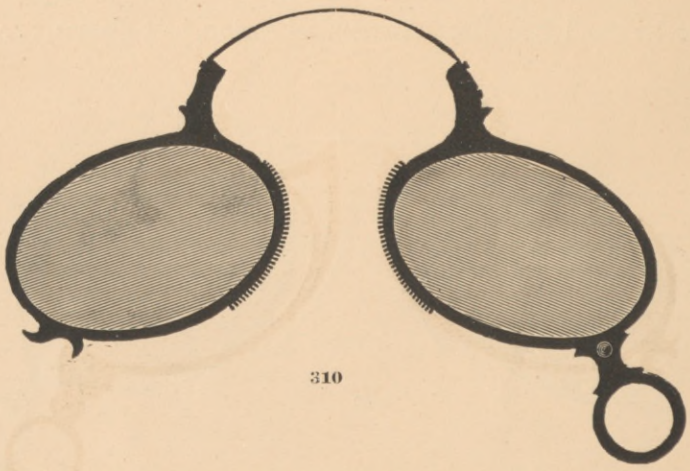
306

304 Tortoise Shell Folder, round or oval eyes, with best glasses.. $2 00

306 Tortoise Shell Folder, round or oval eyes, with best glasses (double action), with spring in joint..... 2 50

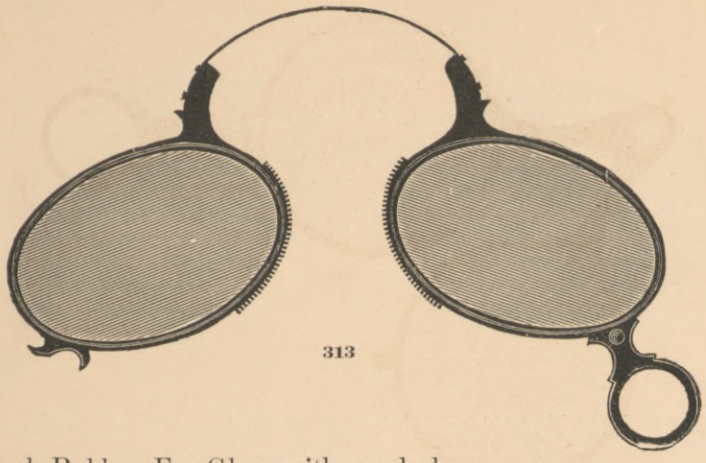
The best Brazilian Pebbles will be inserted in any of the Shell Eye-Glasses at an additional cost of $2.00.

Hard Rubber Eye-Glasses.



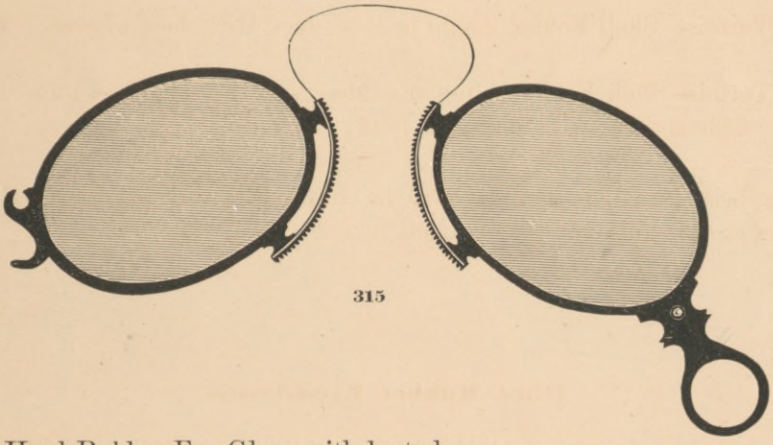
310

310 Hard Rubber Eye-Glass, with good glasses..... $0 75



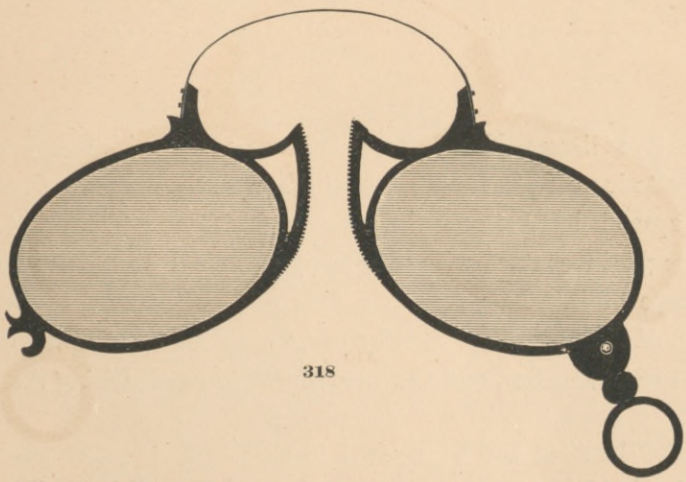
313

313 Hard Rubber Eye-Glass, with good glasses... .... $1 00



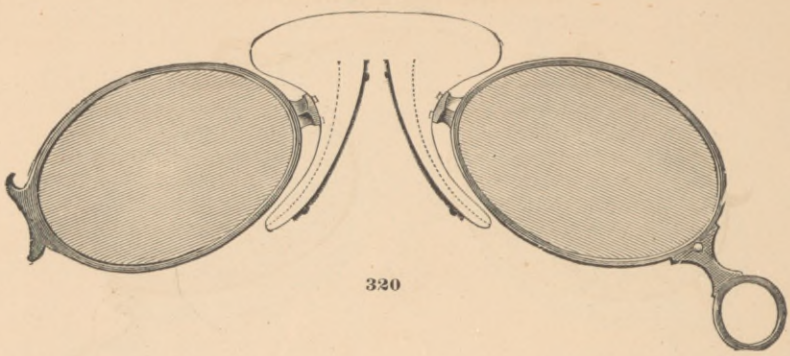
315

315 Hard Rubber Eye-Glass, with best glasses..... 1 50



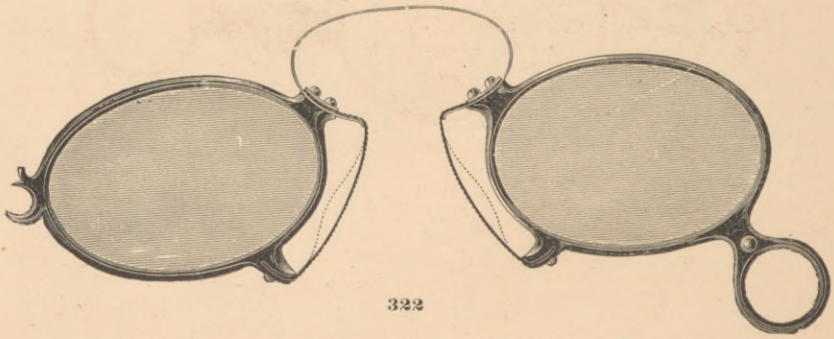
318

318 Hard Rubber Eye-Glass, with best glasses, Anatomical spring. 1 50



320

320 Hard Rubber Eye-Glass, Bert. Patent Spring, with best glasses $1 50



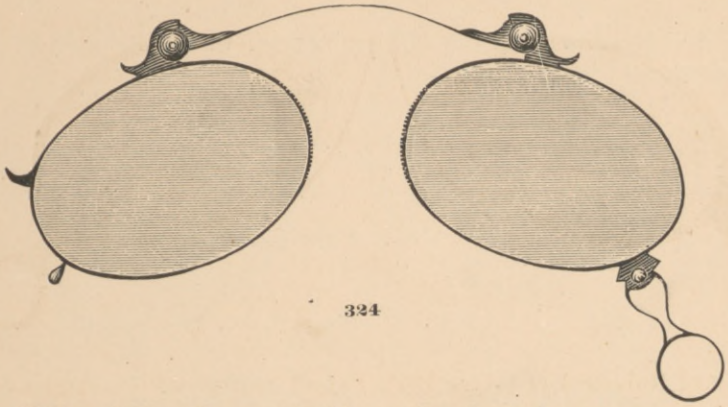
322

322 Hard Rubber Eye-Glass, Lomb's Patent Spring, with best glasses 1 50

These Eye-Glasses, Nos. 320 and 322, are made self-accommodating by means of elastic nose-pieces affixed to the lens frames in such a manner that sufficient space is left between the frame and each nose-piece, that the latter, when brought in contact with the nose, will yield enough to adapt itself to the shape of it. This secures a firm hold on the nose, to the extent of the length of the nose-piece, thereby preventing a concentration of pressure on a small isolated point, and the uncomfortable pinch arising therefrom.

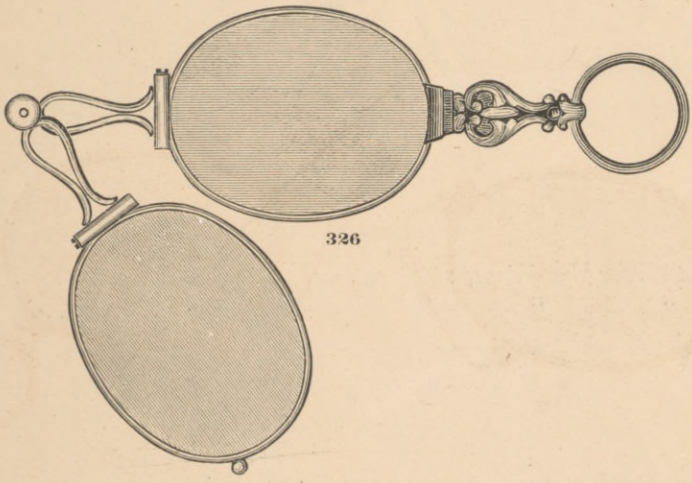
The best Brazilian will be inserted in Nos. 315, 318, 320, and 322 at an additional cost of $2.00.

Gold-Plated Eye-Glasses.



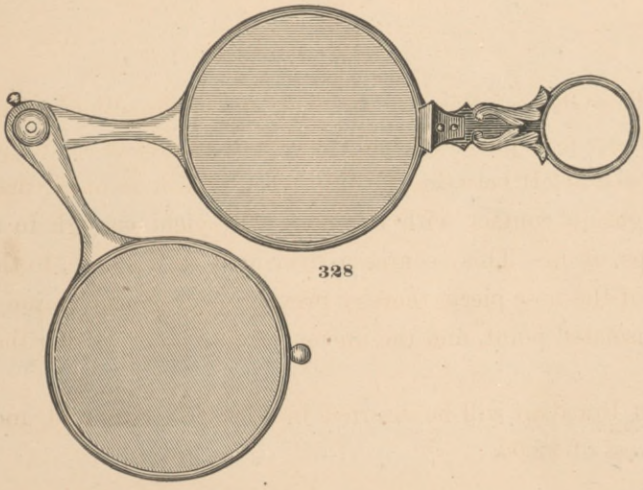
324

324 Gold-Plated Eye-Glasses, double spring, best glasses..... $2 50



326

326 Gold-Plated Folder, best glasses..... 3 50

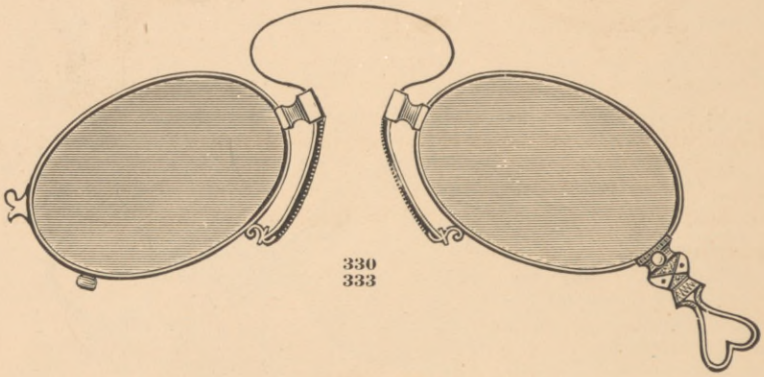


328

328 Gold-Plated Folder, double action spring, best glasses $5 00

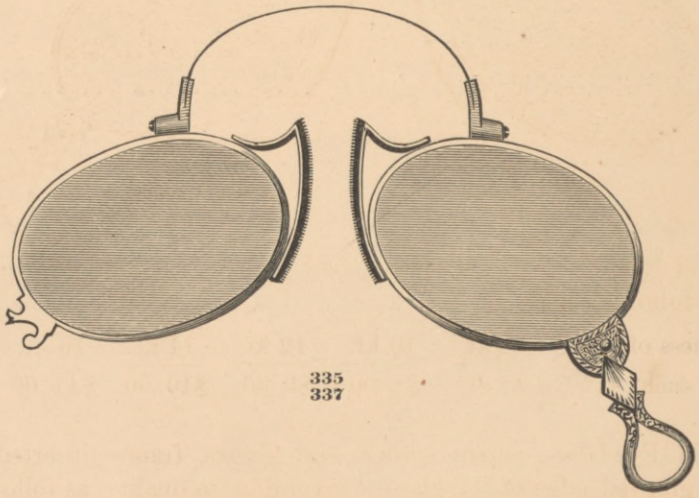
The best Brazilian Pebbles will be inserted in Gold-Plated Eye-Glasses at an additional cost of $2.00.

Coin-Silver Eye-Glasses.



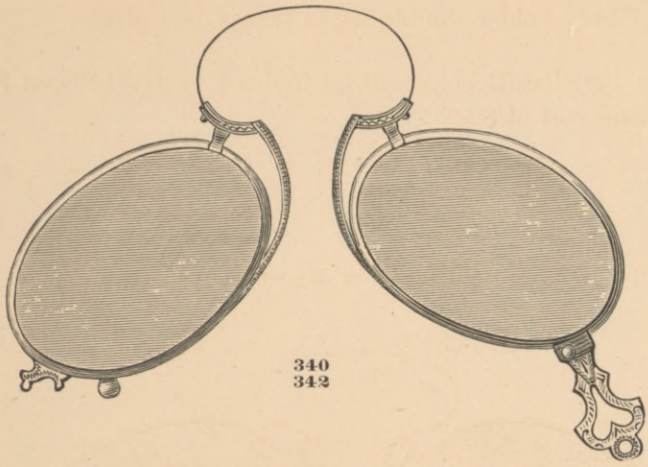
330
333

330 Coin-Silver Eye-Glass, steel spring, best glasses..... $4 00
333 " " gold " " " 5 00



335
337

335 Coin-Silver Eye-Glass, steel spring, best glasses..... 4 00
337 " " gold " " " 5 00

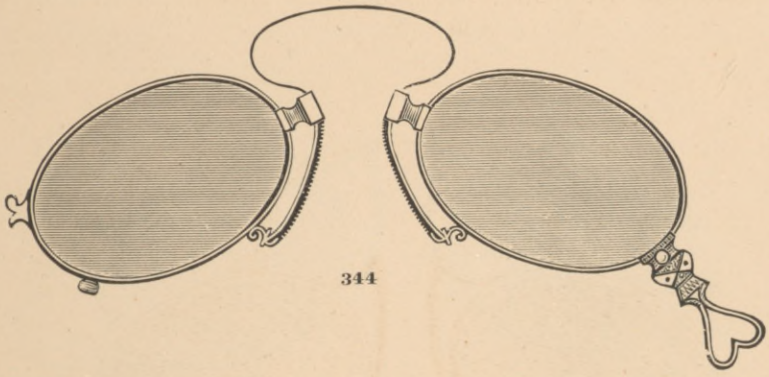


340
342

340 Coin-Silver Eye-Glass, steel spring, best glasses $4 00
342 " " gold " " " 5 00

The best Brazilian Pebbles will be inserted in Coin-Silver Eye-Glasses at an additional cost of $2.00.

Gold Eye-Glasses.



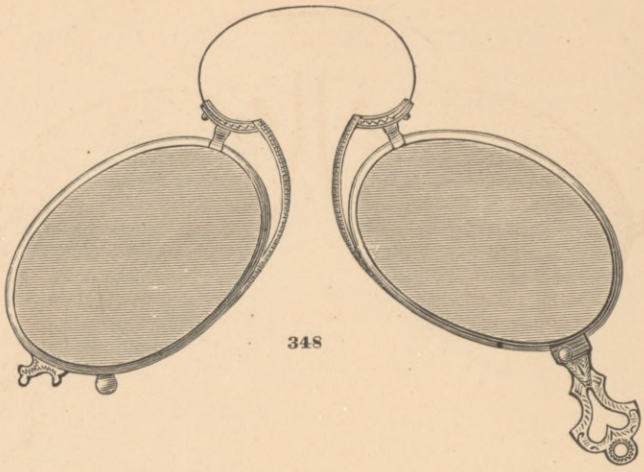
344

344 Gold Eye-Glass, patent spring, best glasses; according to quality, as follows, viz.:

Fineness of gold.	8 kt.	10 kt.	12 kt.	14 kt.	16 kt.	18 kt.
Price each.....	$7 00	$8 00	$9 00	$10 00	$11 00	$12 00

346 Gold Eye-Glass, patent spring, best glasses, frames inserted in the grooved edge of the glasses; according to quality, as follows, viz.:

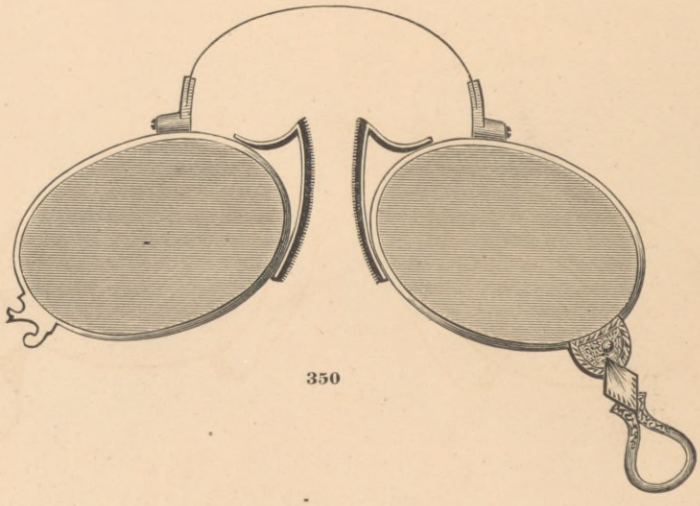
Fineness of gold.	8 kt.	10 kt.	12 kt.	14 kt.	16 kt.	18 kt.
Price each.....	$8 00	$9 00	$10 00	$11 00	$12 00	$13 00



348

348 Gold Eye Glass, curved spring, best glasses; according to quality, as follows, viz.:

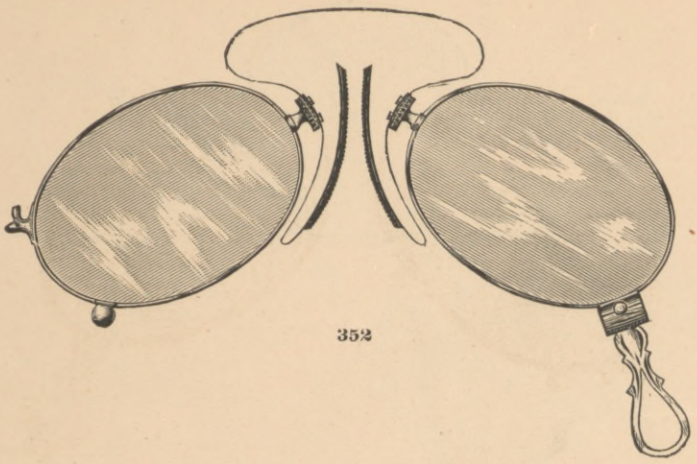
Fineness of gold.	8 kt.	10 kt.	12 kt.	14 kt.	16 kt.	18 kt.
Price each.....	$7 00	$8 00	$9 00	$10 00	$11 00	$12 00



350

350 Gold Eye-Glass, anatomical spring, best glasses; according to quality, as follows, viz.:

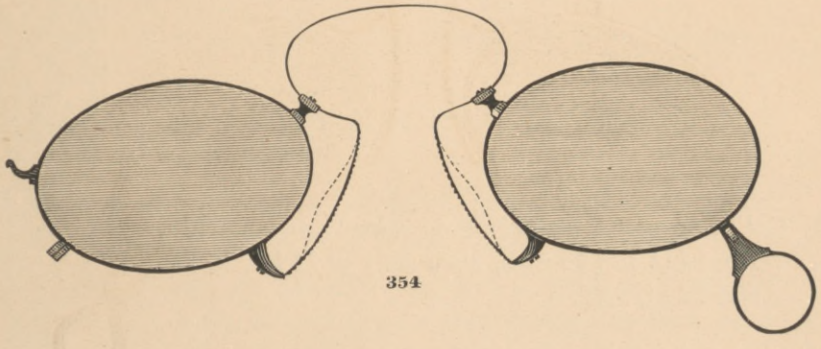
Fineness of gold.	8 kt.	10 kt.	12 kt.	14 kt.	16 kt.	18 kt.
Price each.....	$7 00	$8 00	$9 00	$10 00	$11 00	$12 00



352

352 Gold Eye-Glass, Bert. Patent spring, best glasses ; according to quality, as follows, viz. :

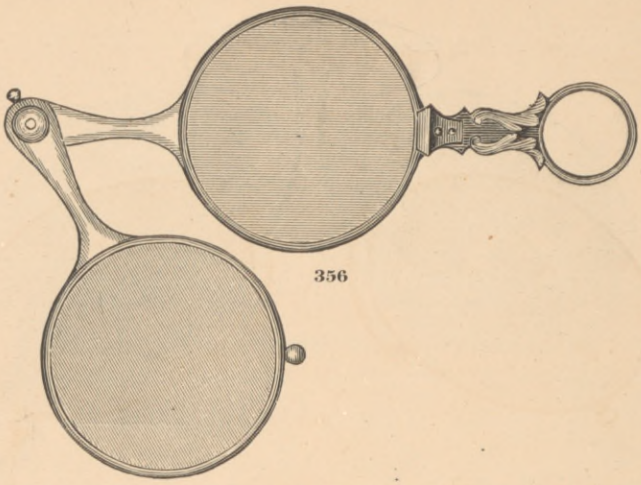
Fineness of gold.	8 kt.	10 kt.	12 kt.	14 kt.	16 kt.	18 kt.
Price each.....	$7 00	$8 00	$9 00	$10 00	$11 00	$12 00



354

354 Gold Eye-Glass, H. Lomb's Patent spring, best glasses ; according to quality, as follows, viz. :

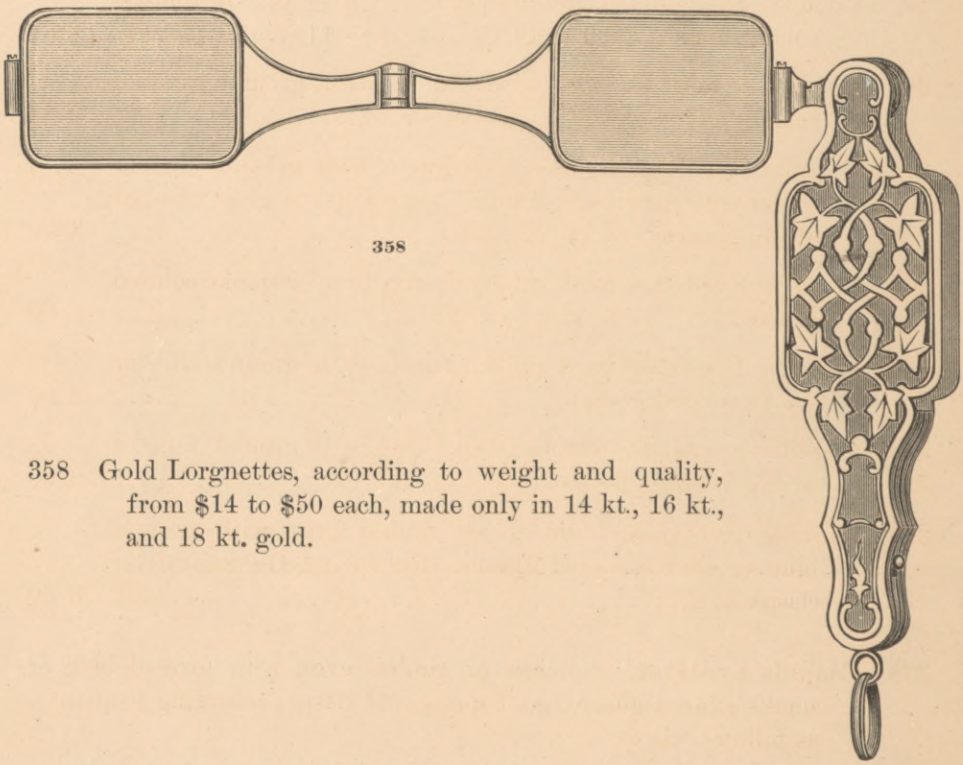
Fineness of gold.	8 kt.	10 kt.	12 kt.	14 kt.	16 kt.	18 kt.
Price each.....	$7 00	$8 00	$9 00	$10 00	$11 00	$12 00



356

356 Gold Folder, double action springs, best glasses; according to quality, as follows, viz.:

Fineness of gold	14 kt.	16 kt.	18 kt.
Price	$14 00	$16 00	$18 00

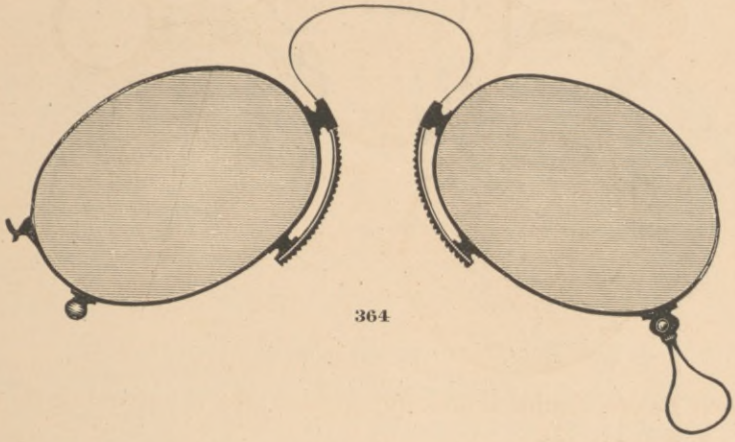


358

358 Gold Lorgnettes, according to weight and quality, from $14 to $50 each, made only in 14 kt., 16 kt., and 18 kt. gold.

The best Brazilian Pebbles will be inserted in Gold Eye-Glasses, at an additional cost of $2.

Coquille Eye-Glasses.



364

360 Coquille Eye-Glass, heavy steel frame, with blue or smoke-colored glasses..... $1 00

362 Coquille Eye-Glass, medium steel frame, with blue or smoke-colored glasses..... 1 50

364 Coquille Eye-Glass, light steel frame, with ground blue or smoke-colored glasses..... 2 50

366 Coquille Eye-Glass, lightest steel frame, with ground blue or smoke-colored glasses, frames inserted in the grooved edge of the glasses..... 3 50

368 Coquille Eye-Glass, hard rubber frame, blue or smoke-colored glasses..... 1 50

370 Coquille Eye-Glass, hard rubber frame, with ground blue or smoke-colored glasses..... 2 50

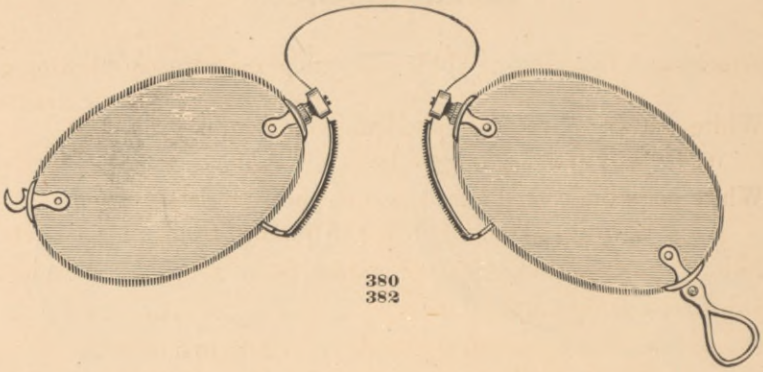
373 Coquille Eye-Glass, tortoise shell frame, with ground blue or smoke-colored glasses..... 2 50

375 Coquille Eye-Glass, frameless or rimless eyes, with ground blue or smoke-colored glasses, steel spring, German silver clasps..... 3 50

378 Coquille Eye-Glass, frameless or rimless eyes, with ground blue or smoke-colored glasses, gold spring and clasps; according to quality, as follows, viz.:

Fineness of gold.	8 kt.	10 kt.	12 kt.	14 kt.	16 kt.	18 kt.
Price each.....	$6 00	$7 00	$8 00	$9 00	$10 00	$11 00

Frameless Eye-Glasses.



380
382

380 Frameless Eye-Glass, German silver clasps, best glasses..... $2 50

382 Frameless Eye-Glass, gold spring and clasps, best glasses; according to quality, as follows, viz:

Fineness of gold...	8 kt.	10 kt.	12 kt.	14 kt.	16 kt.	18 kt.
Price each.....	$6 50	$7 00	$7 50	$8 00	$8 50	$9 00

Frameless Eye-Glasses will be furnished with the best Brazilian Pebbles, at an additional cost of $3.50.

Single Eye-Glasses.

384 Frameless or rimless single Eye-Glass, best glasses..... $1 00
386 " " " " " pebbles..... 3 00
388 Steel single Eye-Glass, best glasses..... 1 25
390 " " " " pebbles..... 3 00
392 Shell " " " glasses..... 1 25
394 " " " " pebbles..... 3 00
396 Hard rubber single Eye-Glass, best glasses..... 75
398 " " " " pebbles..... 2 50

Eye-Glass Holders.

400 Hard rubber Eye-Glass Holder..... 25
402 Metal japanned Eye-Glass Holder..... 25
404 " gilt Eye-Glass Holder..... 50
406 " gold plated Eye-Glass Holder..... 1 25
408 Gold (14 kt.) Eye-Glass Holder.....$3 00, $3 50, $5 00, $8 00
410 14-inch Gold Eye-Glass Chain; according to quality:

Fineness of gold....	8 kt.	10 kt.	12 kt.	14 kt.	16 kt.	18 kt.
Price.....	$2 50	$3 00	$3 50	$4 00	$4 50	$5 00

412 Silk Eye-Glass Cords, 10 cts., 15 cts., 20 cts., 25 cts., each.

Spectacle Glasses.

Spectacles and Eye-Glasses will be set with glasses at the following prices:

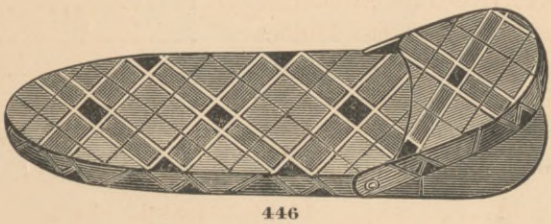
		PER PAIR.
415	White convex or concave spherical glasses from 5 in. to 72 in. focus, according to quality	60 cts. to $1
418	White periscopic convex or concave spherical glasses, from 5 in. to 72 in. focus, according to quality, from	75 cts. to $1
420	Colored glasses, blue, green, or smoke, from	75 cts. to $1 50
423	Double focus or Franklin glasses	1 50
425	Convex or concave spherical glasses, from 2 in. to 5 in. focus	1 00
428	" " " " " 1 in. to 2 in. "	1 50
430	Plano-convex or concave-cylindrical glasses, from 5 in. to 48 in. focus	1 50
432	Sphero-cylindrical glasses will be ground to order only.	
434	Prisms for use in spectacles, from 1 to 15 degrees, each	1 00
436	Coquille glasses, colored, blue, green, or smoke, from	75 cts. to $1 50

Pebbles.

438	Convex or concave Brazilian Pebbles, 5 in. to 60 in. focus	$2 50
440	" " " " 2 in. to 5 in. "	5 00
442	Periscopic convex or concave Brazilian Pebbles, 5 in. to 60 in. focus	3 00
444	Periscopic convex or concave Brazilian Pebbles, 2 in. to 5 in. focus	6 00

Cylindrical and prismatic Pebbles will be ground to order only.

Spectacle Cases.



446

446 Tartan Spectacle Case, in different plaids, to fit any size of Spectacle, each $1 00



448

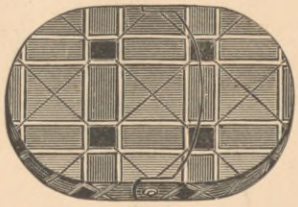
448 Nickel, Silver Plated Spectacle Case, to fit any size of Spectacle, each $1 25
450 Sole Leather Spectacle Case, with pull-off cover, to fit any size Spectacle, each 75
452 Morocco Leather Spectacle Case, with flap cover, to fit any size Spectacle, each ..... 25 to 50 cts.
454 Common Leather Spectacle Case, with flap, etc., each ..... 10 "



456-462

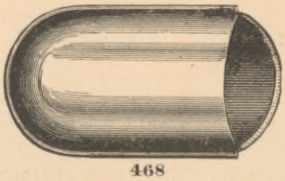
456 Morocco Leather Spectacle Case, with open end, to fit any size of Spectacle, each ..... 25 to 50 cts.
458 Common Leather Spectacle Case, with open end, to fit any size of Spectacle, each ..... 10 "
460 Tin Spectacle Case, with cover, to fit any size of Spectacle .... 25 "
462 Tin Spectacle Case, with open end, to fit any size of Spectacle.. 25 "

Eye-Glass Cases.



465

465 Tartan Eye-Glass Case, in different plaids, each $1 00



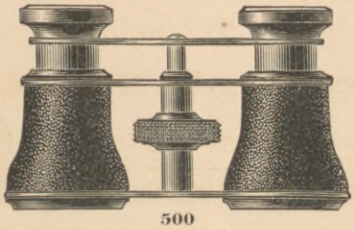
468

468 Nickel, Silver Plated Eye-Glass Case, with open end, each 1 25
470 Tin, Nickel Plated Eye-Glass Case, with open end, each 25
473 Tin Eye-Glass Case, with open end, each 15
475 Sole Leather Eye-Glass Case, with pull-off cover, each 50
478 Morocco Leather Eye-Glass Case, with open end, each ..... 25 to 50
480 Common " " " " " 10

Opera Glasses.

Opera Glasses are in such general use that an extended description is entirely unnecessary; the achromatism of the lenses, and extent and clearness of field combined with portability are the requirements of a good glass. The following list comprises the manufactures of the best European makers, and the prices will be found reasonable for the class of goods mentioned; these Opera Glasses are warranted to be perfectly achromatic.

The price includes a Morocco Leather Case, with handle.



500

500 Six Lens Opera Glasses, Black Morocco Leather covered body, metal cross-pieces and barrels, japanned black; price according to size of object glasses, as follows:

1 in.	$1\frac{3}{16}$ in.	$1\frac{5}{16}$ in.	$1\frac{1}{2}$ in.	$1\frac{11}{16}$ in.
$4 00	$4 50	$5 00	$5 50	$6 00

502 Six Lens Opera Glasses, Fancy Colored Morocco Leather covered body, metal cross-pieces and barrels, either gold or nickel plated; price according to size of object glasses:

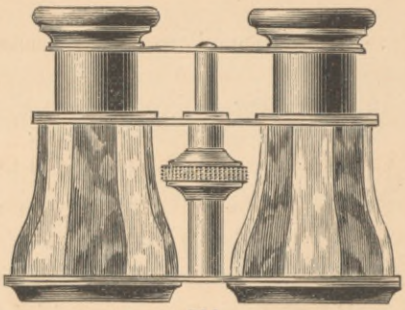
1 in.	$1\frac{3}{16}$ in.	$1\frac{5}{16}$ in.	$1\frac{1}{2}$ in.	$1\frac{11}{16}$ in.
$5 00	$6 00	$7 00	$8 00	$9 00

504 Lemaire & Fils celebrated Six Lens Opera Glasses, black Morocco leather covered body, metal cross-pieces and barrels, japanned black; price according to size of object glasses:

1 in.	$1\frac{3}{16}$ in.	$1\frac{5}{16}$ in.	$1\frac{1}{2}$ in.	$1\frac{11}{16}$ in.
$5 00	$5 50	$6 00	$6 50	$7 00

506 Lemaire & Fils celebrated Six Lens Opera Glasses, fancy colored Morocco leather covered body, metal cross-pieces and barrels, either gold or nickel plated; price according to size of object glasses:

1 in.	$1\frac{3}{16}$ in.	$1\frac{5}{16}$ in.	$1\frac{1}{2}$ in.	$1\frac{11}{16}$ in.
$6 00	$7 00	$8 00	$9 00	$10 00



514

508 Lemaire & Fils celebrated Six Lens Opera Glasses, White Pearl body, metal cross-pieces and barrels, either gold or nickel plated; price according to size of object glasses:

1 in.	$1\frac{3}{16}$ in.	$1\frac{5}{16}$ in.	$1\frac{1}{2}$ in.	$1\frac{11}{16}$ in.
$10 00	$11 00	$12 00	$13 00	$14 00

510 Lemaire & Fils celebrated Six Lens Opera Glasses, White Pearl body, cross-pieces and barrels; price according to size of object glasses:

1 in.	$1\frac{3}{16}$ in.	$1\frac{5}{16}$ in.	$1\frac{1}{2}$ in.	$1\frac{11}{16}$ in.
$21 00	$24 00	$28 00	$33 00	$39 00

512 Lemaire & Fils celebrated Six Lens Opera Glasses, Oriental Pearl body, metal cross-pieces and barrels, either gold or nickel plated; price according to size of object glasses:

1 in.	$1\frac{3}{16}$ in.	$1\frac{5}{16}$ in.	$1\frac{1}{2}$ in.	$1\frac{11}{16}$ in.
$12 00	$13 50	$15 00	$16 50	$18 00

514 Lemaire & Fils celebrated Six Lens Opera Glasses, body of alternate stripes of White and Smoke Pearl, metal cross-pieces and barrels, either gold or nickel plated; price according to size of object glasses:

1 in.	$1\frac{3}{16}$ in.	$1\frac{5}{16}$ in.	$1\frac{1}{2}$ in.	$1\frac{11}{16}$ in.
$12 00	$14 00	$16 00	$18 00	$20 00

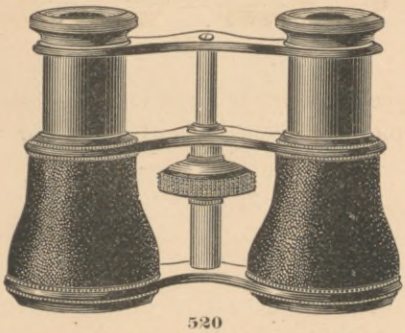
516 Lemaire & Fils celebrated Six Lens Opera Glasses, Smoke Pearl body, metal cross-pieces and barrels japanned black; price according to size of object glasses:

1 in.	$1\frac{3}{16}$ in.	$1\frac{5}{16}$ in.	$1\frac{1}{2}$ in.	$1\frac{11}{16}$ in.
$10 00	$11 00	$12 00	$13 00	$14 00

518 Lemaire & Fils celebrated Six Lens Opera Glasses, Smoke Pearl body, cross-pieces and barrels; price according to size of object glasses:

1 in.	$1\frac{3}{16}$ in.	$1\frac{5}{16}$ in.	$1\frac{1}{2}$ in.	$1\frac{11}{16}$ in.
$22 00	$25 00	$29 00	$34 00	$40 00

Any of Lemaire & Fils celebrated Opera Glasses will be furnished with twelve (12) glasses at an additional cost of $3.



520

520 Bardou & Fils celebrated Opera Glasses, Turkey Morocco leather covered bodies, metal cross-pieces and barrels japanned black; price according to size of object glasses:

1 in.	$1\frac{3}{16}$ in.	$1\frac{5}{16}$ in.	$1\frac{1}{2}$ in.	$1\frac{11}{16}$ in.
$8 00	$9 00	$10 00	$12 50	$15 00

522 Bardou & Fils celebrated Six Lens Opera Glasses, fancy colored Turkey Morocco leather covered body, metal cross-pieces, barrels and ornamental bead work on body heavily gold plated; price according to size of object glasses:

1 in.	$1\frac{3}{16}$ in.	$1\frac{5}{16}$ in.	$1\frac{1}{2}$ in.	$1\frac{11}{16}$ in.
$10 00	$11 00	$13 50	$15 00	$17 00

524 Bardou & Fils celebrated Six Lens Opera Glasses, White Pearl body, metal cross-pieces and barrels either gold or nickel plated; price according to size of object glasses:

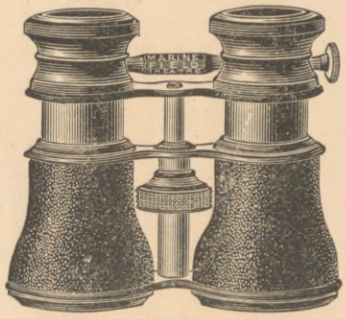
1 in.	$1\frac{3}{16}$ in.	$1\frac{5}{16}$ in.	$1\frac{1}{2}$ in.	$1\frac{11}{16}$ in.
$16 00	$18 50	$22 00	$26 00	$30 00

526 Bardou & Fils celebrated Six Lens Opera Glasses, White Pearl body, cross-pieces and barrels; price according to size of object glasses:

1 in.	$1\frac{3}{16}$ in.	$1\frac{5}{16}$ in.	$1\frac{1}{2}$ in.	$1\frac{11}{16}$ in.
$25 00	$29 00	$33 00	$38 00	$45 00

Any of Bardou & Fils celebrated Opera Glasses will be furnished with twelve lenses at an additional cost of $5.

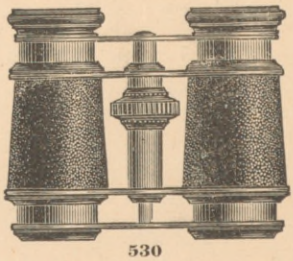
Opera, Field and Marine Glasses.



528

528 Ten Lens Opera, Field and Marine Glasses, Turkey Morocco leather covered bodies, metal cross-pieces and barrels japanned black, eye pieces capable of three different adjustments for Marine, Field and Theatre; price according to size of object glasses:

$1\frac{1}{2}$ in.	$1\frac{11}{16}$ in.	$1\frac{7}{8}$ in.	$2\frac{1}{8}$ in.
$16 00	$20 00	$24 00	$28 00

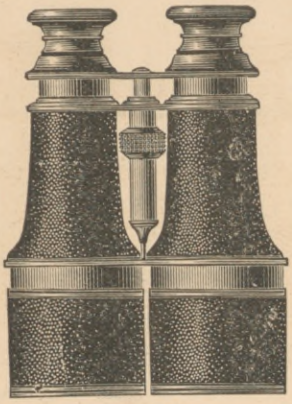


530

530 Six Lens Pocket, Field and Marine Glasses, Morocco leather covered body, metal cross-pieces and barrels japanned black, combining great power with portability; price according to size of object glasses:

1 in.	$1\frac{5}{16}$ in.
$15 00	$18 00

Field and Marine Glasses.



535

535 Six Lens Field and Marine Glasses, Morocco leather covered bodies and sun-shades, metal cross-pieces and barrels japanned black; in stiff sole-leather cases with sling strap; prices according to size of object glasses:

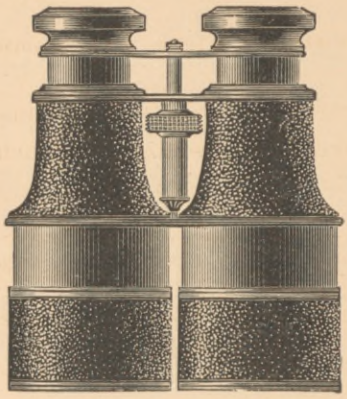
$1\frac{1}{2}$ in.	$1\frac{11}{16}$ in.	$1\frac{7}{8}$ in.	$2\frac{1}{8}$ in.	$2\frac{5}{16}$ in.
$7 00	$8 00	$9 00	$10 00	$11 00

538 Six Lens Field and Marine Glasses of Lemaire & Fils celebrated manufacture, same construction of frame as No. 535; in stiff sole-leather cases with sling strap; prices according to size of object glasses:

$1\frac{1}{2}$ in.	$1\frac{11}{16}$ in.	$1\frac{7}{8}$ in.	$2\frac{1}{8}$ in.	$2\frac{5}{16}$ in.
$10 00	$11 00	$12 00	$13 00	$14 00

540 Six Lens Field and Marine Glasses of Bardou & Fils celebrated manufacture, extra heavy metal body and shades, covered with Turkey Morocco, metal cross-pieces and barrels japanned black; in stiff sole-leather cases with sling strap; prices according to size of object glasses:

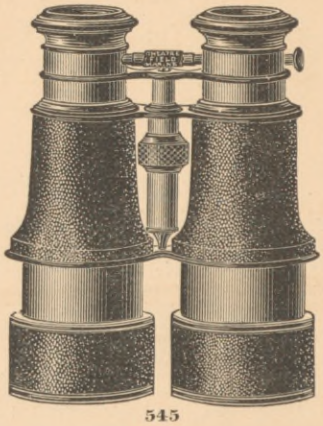
$1\frac{1}{2}$ in.	$1\frac{11}{16}$ in.	$1\frac{7}{8}$ in.	$2\frac{1}{8}$ in.	$2\frac{5}{16}$ in.
$20 00	$22 00	$24 00	$26 00	$28 00



543

543 Six Lens Field and Marine Glasses, extra heavy metal body and sun-shades, covered with Turkey Morocco, cross-pieces and barrels japanned black, extra large eye-pieces, short and compact form of frame, combined with great power; in flexible leather cases, with sling strap; prices according to size of object glasses:

$1\frac{7}{8}$ in.	$2\frac{1}{8}$ in.	$2\frac{5}{16}$ in.
$14 00	$16 00	$18 00



545

545 Ten Lens Opera, Field, and Marine Glasses, extra heavy metal body and sun-shades, covered with Turkey Morocco, cross-pieces and barrels japanned black, eye-pieces capable of three different adjustments, for Marine, Field, and Theatre; in stiff sole-leather cases, with sling strap; prices according to size of object glasses:

$1\frac{11}{16}$ in.	$1\frac{7}{8}$ in.	$2\frac{1}{8}$ in.	$2\frac{5}{8}$ in.
$18 00	$22 00	$26 00	$30 00

Any of the Six Lens Field and Marine Glasses will be furnished with twelve lenses at an additional cost of $5.

Lenses for Opera, Field, and Marine Glasses.

548 Simple concave eye-pieces, each, from 75 cents to $2.50.

550 Achromatic concave eye-pieces (2 glasses), each from $1.50 to $5.00.

552 " " " (3 glasses), " $2.00 to $7.50.

554 (2 Lens) Achromatic Plano-convex object glasses; according to size:

1 in.	$1\frac{3}{16}$ in.	$1\frac{5}{16}$ in.	$1\frac{1}{2}$ in.	$1\frac{11}{16}$ in.	$1\frac{7}{8}$ in.	$2\frac{1}{8}$ in.	$2\frac{5}{8}$ in.
$2 00	$2 50	$3 00	$3 50	$4 00	$4 50	$5 00	$5 50

556 Three Lens Achromatic convex object glasses; according to size:

1 in.	$1\frac{3}{16}$ in.	$1\frac{5}{16}$ in.	$1\frac{1}{2}$ in.	$1\frac{11}{16}$ in.	$1\frac{7}{8}$ in.	$2\frac{1}{8}$ in.	$2\frac{5}{8}$ in.
$3 00	$3 50	$4 00	$4 50	$5 00	$5 50	$6 00	$7 00

558 Morocco Opera Glass Cases, with handle:

Size of object glasses.	1 in.	$1\frac{3}{16}$ in.	$1\frac{5}{16}$ in.	$1\frac{1}{2}$ in.	$1\frac{11}{16}$ in.
Price each.....	$1 50	$1 60	$1 75	$1 85	$2 00

559 Sole Leather Field and Marine Glass Cases, with sling strap:

Size of object glasses.	$1\frac{1}{2}$ in.	$1\frac{11}{16}$ in.	$1\frac{7}{8}$ in.	$2\frac{1}{8}$ in.	$2\frac{5}{16}$ in.
Price each.....	$3 50	$3 75	$4 00	$4 25	$4 50

Achromatic Spy-Glasses.

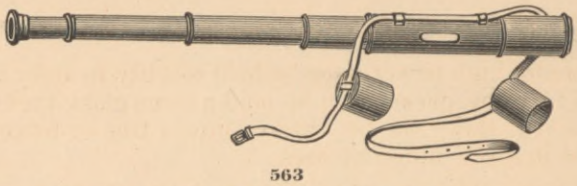


560

560 Achromatic Spy-Glass, 3 draws, wood, leather, or corded body, in case; price according to size, as follows:

Dimensions. *Open.*	*Closed.*	*Diameter of Object Glass.*	*Power.*	*Price.*
15 inches.	6 inches.	1 inch.	15 times.	$3 00
16 "	6 "	$1\frac{1}{8}$ "	20 "	4 00
18 "	$6\frac{3}{4}$ "	$1\frac{3}{8}$ "	25 "	5 00
23 "	8 "	$1\frac{5}{8}$ "	30 "	6 00
30 "	$9\frac{1}{2}$ "	$1\frac{7}{8}$ "	45 "	8 00

Any of the above will be furnished with a shade to keep off the sun or rain at an additional cost of 50 cents.



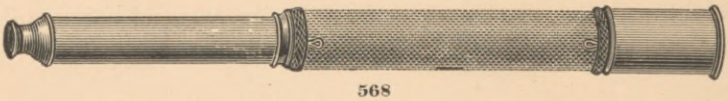
563

563 Achromatic Tourist's Spy-Glass, 3 oxidized draws, metal body covered with Morocco, leather caps and strap; price according to size, as follows:

Dimensions. Open.	Closed.	Diameter of Object Glass.	Power.	Price.
16 inches.	6 inches.	$1\frac{1}{8}$ inch.	20 times.	$5 00
17 "	7 "	$1\frac{3}{8}$ "	25 "	7 50
23 "	8 "	$1\frac{5}{8}$ "	30 "	10 00
30 "	10 "	$1\frac{7}{8}$ "	45 "	12 50

565 Same as 563, with 4 oxidized draws and sun-shade and the first quality of lenses; price according to size, as follows:

Dimensions. Open.	Closed.	Diameter of Object Glass.	Power.	Price.
16 inches.	6 inches.	$1\frac{1}{8}$ inch.	25 times.	$10 00
17 "	7 "	$1\frac{3}{8}$ "	30 "	15 00
23 "	8 "	$1\frac{5}{8}$ "	45 "	20 00
30 "	10 "	$1\frac{7}{8}$ "	60 "	25 00



568

568 Achromatic Ship's Spy-Glass, heavy metal body, either corded or covered with leather, spray or sun-shade, one brass draw; price according to size, as follows:

Diameter of Object Glass.	Power.	Price.
$1\frac{7}{16}$ inches.	30 times.	$8 00
$1\frac{3}{4}$ "	40 "	12 00
2 "	50 "	16 00
$2\frac{1}{8}$ "	60 "	20 00

570 Achromatic Naval Spy-Glass, heavy metal body, covered with leather, spray or sun shade, one oxidized draw, long, tapering body:

Dimensions. Open.	Closed.	Diameter of Object Glass.	Power.	Price.
23 inches.	18 inches.	$1\frac{5}{8}$ inch.	25 times.	$10 00
30 "	24 "	$1\frac{7}{8}$ "	35 "	15 00

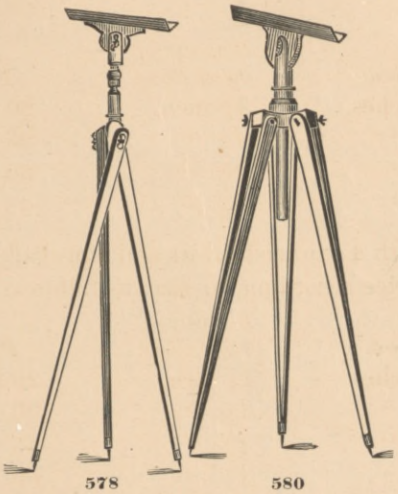
572 Achromatic Naval Spy-Glass, light, tapering, wood body, one brass draw:

Dimensions. Open.	Closed.	Diameter of Object Glass.	Power.	Price.
38 inches.	31 inches.	$2\frac{1}{8}$ inches.	40 times.	$20 00

Spy-Glass Clamps.

575 Spy-Glasses of high power must be held steadily in order to give a good effect; as few persons can so hold a large glass, these clamps are a necessity; they can be screwed into a tree or fence and are furnished in seven different sizes:

1 inch.	1⅛ inch.	1¼ inch.	1½ inch.	1⅝ inch.	1¾ inch.	2⅜ inches.
$1 75	$2 00	$2 75	$3 25	$3 75	$4 25	$5 00

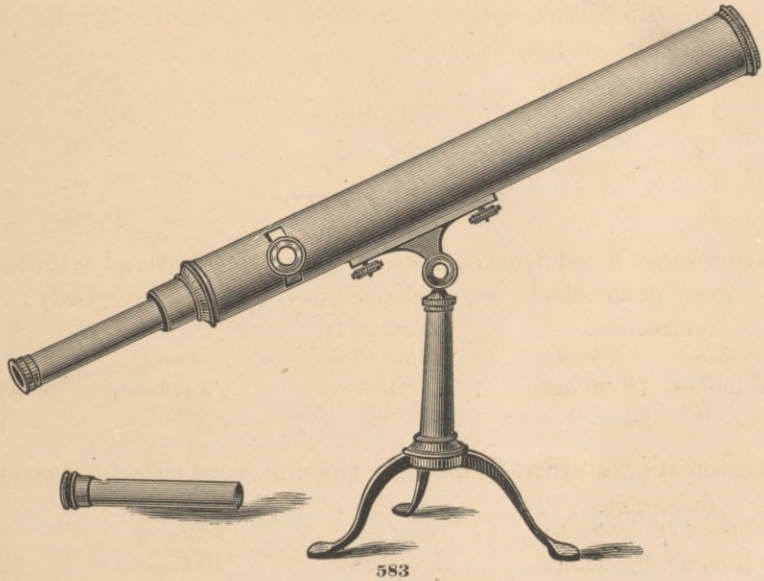


578 580

578 Spy-Glass Stand, having vertical and horizontal motion..... $5 00

580 Spy-Glass Stand, black walnut, having vertical and horizontal motion and adjustable for different heights..... 10 00

Astronomical Telescopes.



583

583 Astronomical Telescope, highly polished brass body and tripod stand, rack and pinion adjustment for focus, one terrestial eye-piece, one celestial eye-piece and sun-glass, object glass $1\frac{3}{8}$ inches in diameter; in walnut case with lock and key..... $25 00

585 Same as 583, object glass $1\frac{3}{4}$ inches in diameter..... 35 00

587 " " " 2 " " 50 00

590 " " " $2\frac{3}{8}$ " " 75 00

593 " " " $2\frac{3}{4}$ " " 100 00

595 " " " 3 " " 125 00

597 Astronomical Telescope, highly polished brass body, heavy mahogany stand, having vertical and horizontal motion and adjustable for different heights; rack and pinion adjustment for focus, one celestial and one terrestial eye-piece, sun-glass, object glass $2\frac{3}{4}$ inches in diameter, focus 42 inches; in neat walnut case with lock and key..... .....100 00

600 Same as 597, object glass 3 inches in diameter, focus 45 inches..125 00

603 " " " $3\frac{1}{4}$ " " " " 50 " ..150 00

605 " " " $3\frac{1}{2}$ " " " " 54 " ..175 00

Larger Instruments imported to order.

607 Terrestial Eye-pieces of any desired power, from...$10 00 to $15 00

609 Celestial " " " " " .... 7 50 to 10 00

Lenses for Spy-Glasses, Telescopes, and Microscopes.

612 Plano or Double Convex Lenses—

$\frac{1}{4}$ inch to 1 inch focus, diameter $\frac{1}{8}$ to $\frac{1}{2}$ inch, each..... $0 75

$\frac{1}{2}$ " " $1\frac{1}{2}$ " " " $\frac{1}{2}$ " $\frac{3}{4}$ " " 75

1 " " 2 " " " $\frac{3}{4}$ " 1 " " 75

$1\frac{1}{2}$ " " 3 " " " 1 " $1\frac{1}{4}$ " " 75

615 Achromatic Object Glasses of the first quality, for Spy-Glasses and Telescopes—

Diameter	1 in.	$1\frac{1}{8}$ in.	$1\frac{3}{8}$ in.	$1\frac{5}{8}$ in.	$1\frac{7}{8}$ in.	2 in.	$2\frac{1}{4}$ in.	$2\frac{1}{2}$ in.	$2\frac{3}{4}$ in.	3 in.
Price.....	$2 00	$2 25	$2 75	$3 50	$4 50	$6 00	$8 50	$12.	$20.	$28.

Larger glasses made to order at moderate prices.

Watchmakers' and Engravers' Glasses.

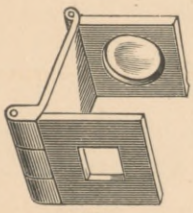


623



640

620	Watchmakers'	Glass,	1	lens,	$\frac{3}{4}$	inch	diameter	.....	$0 30
623	"	"	1	"	1	"	"	.....	40
625	"	"	1	"	$1\frac{1}{4}$	"	"	.....	75
628	"	"	2	"	$\frac{3}{4}$	"	"	.....	75
630	"	"	2	"	1	"	"	.....	1 00
632	Engravers'	"	1	"	$1\frac{1}{2}$	"	"	.....	1 00
634	"	"	1	"	$1\frac{3}{4}$	"	"	.....	1 25
636	"	"	1	"	2	"	"	.....	1 50
638	"	"	2	"	$1\frac{1}{2}$	"	"	.....	1 50
640	"	"	2	"	2	"	"	.....	2 00
642	"	"	2	"	$2\frac{1}{2}$	"	"	.....	2 50
644	"	"	2	"	3	"	"	.....	3 00
646	"	"	2	"	$3\frac{1}{2}$	"	"	.....	3 50
648	"	"	2	"	4	"	"	.....	4 00



650

650 Linen Prover or Weavers' Glass, for counting the meshes of Linen, Wire-cloth, etc., $\frac{1}{4}$ inch aperture, in brass or hard rubber frame, each..... 50

653 Linen Prover, brass frame, cross shaped orifice, giving $\frac{1}{4}$ inch and $\frac{1}{2}$ inch apertures, each..... 1 00

655 Linen Prover, same as 650, German silver frame..... 75

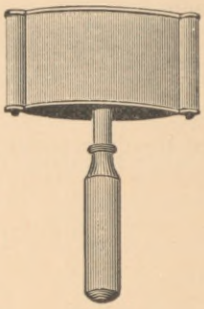
658 Same as 650, achromatic lens..... 1 25

660 Linen Prover, brass frame, rotating arm, over a circular disc, having $\frac{1}{4}$ inch, $\frac{1}{2}$ inch, .37 inch and 1 inch apertures..... 2 50

Reading and Picture Glasses.



668



674

These glasses are very useful in reading small print, examining maps, drawings, photographs or any minute work which would tire the unaided eyes; they are furnished in the following styles and sizes:

663 Reading Glass, oxidized brass frame, wood handle; price according to size:

Diameter of lens.	1 in.	1⅜ in.	1⅝ in.	1⅞ in.	2⅛ in.	2⅜ in.	2⅝ in.	2⅞ in.
Price each.....	$0 40	$0 50	$0 60	$0 75	$1 00	$1 25	$1 50	$1 75
Diameter of lens.	3⅛ in.	3½ in.	3¾ in.	4 in.	4¼ in.	4½ in.	4¾ in.	
Price each.....	$2 00	$2 25	$2 50	$2 75	$3 00	$3 25	$3 50	

665 Reading Glass, two plano-convex lenses, oxidized brass frame, wood handle; price according to size:

Diameter of lens.	1 in.	1⅜ in.	1⅝ in.	1⅞ in.	2⅛ in.	2⅜ in.	2⅝ in.	2⅞ in.
Price each.....	$1 00	$1 25	$1 50	$1 75	$2 00	$2 25	$2 50	$2 75
Diameter of lens.	3⅛ in.	3½ in.	3¾ in.	4 in.	4¼ in.	4½ in.	4¾ in.	
Price each.....	$3 00	$3 25	$3 50	$4 00	$4 50	$5 00	$6 00	

668 Reading Glass, German silver frame, ebony handle; price according to size:

Diameter of lens.	1 in.	1⅜ in.	1⅝ in.	1⅞ in.	2⅛ in.	2⅜ in.	2⅝ in.	2⅞ in.
Price each.....	$0 50	$0 60	$0 75	$1 00	$1 25	$1 50	$1 75	$2 00
Diameter of lens.	3⅛ in.	3½ in.	3¾ in.	4 in.	4¼ in.	4½ in.	4¾ in.	
Price each.....	$2 25	$2 50	$2 75	$3 00	$3 25	$3 50	$3 75	

670 Reading Glass, gold plated frame, ivory handle; price according to size:

Diameter of lens.....	1⅞ in.	2⅜ in.	3 in.	3½ in.	4 in.	4½ in.	5 in.
Price each.....	$2 00	$2 50	$3 25	$4 00	$5 00	$6 00	$7 00

672 Square Reading and Picture Glass, brass frame, wood handle; price according to size:

Size of lens	$2\frac{7}{8}$ in. x $1\frac{3}{8}$ in.	3 in. x $1\frac{1}{2}$ in.	$3\frac{1}{4}$ in. x $1\frac{5}{8}$ in.
Price each	$1 25	$1 50	$1 75

Size of lens	$3\frac{1}{2}$ in. x $1\frac{3}{4}$ in.	$3\frac{3}{4}$ in. x $1\frac{7}{8}$ in.
Price each	$2 00	$2 25

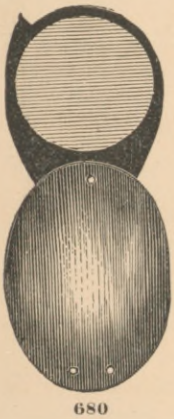
674 Square Reading and Picture Glass, two plano-convex lenses, oxidized brass frame, ebony handle; price according to size:

Size of lenses	$2\frac{3}{4}$ in. x $1\frac{3}{8}$ in.	$3\frac{1}{2}$ in. x $1\frac{3}{4}$ in.	$4\frac{3}{8}$ in. x $2\frac{1}{8}$ in.
Price each	$3 00	$4 00	$5 00

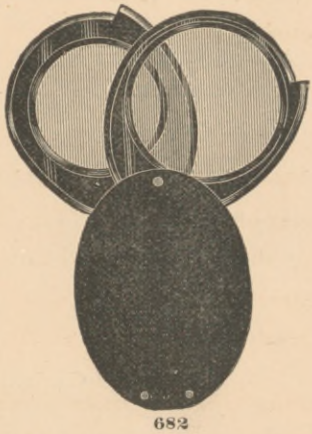
676 Round Picture Glass, German silver frame, ebony handle; price according to size:

Diameter of lens	$5\frac{1}{4}$ in.	6 in.	$6\frac{3}{8}$ in.	$6\frac{3}{4}$ in.	$7\frac{1}{2}$ in.	$8\frac{1}{4}$ in.
Price each	$5 00	$7 50	$10 00	$12 50	$15 00	$17 50

Folding Pocket Microscopes.



680



682

680 Pocket Microscope, hard rubber frame, one round glass, folding in oval case; price according to

Diameter of lens	$\frac{3}{4}$ in.	1 in.	$1\frac{1}{4}$ in.	$1\frac{1}{2}$ in.	$1\frac{3}{4}$ in.	2 in.
Each	$0 40	$0 50	$0 75	$1 00	$1 25	$1 50

682 Pocket Microscope, hard rubber frame, two round glasses, folding in oval case; price according to

Diameter of lens	$\frac{3}{4}$ in.	1 in.	$1\frac{1}{4}$ in.	$1\frac{1}{2}$ in.
Each	$0 75	$1 25	$1 75	$2 25

684 Pocket Microscope, hard rubber frame, three round glasses, folding in round case; price according to

Diameter of lens	$\frac{3}{4}$ inch.	1 inch.
Each	$1 25	$1 50

686 Pocket Microscope, same as No. 680, but with tortoise shell frame; price according to

Diameter of lens	$\frac{3}{4}$ in.	1 in.	$1\frac{1}{4}$ in.	$1\frac{1}{2}$ in.
Each	$0 75	$1 00	$1 25	$1 50

688 Pocket Microscope, same as No. 682, but with tortoise shell frame; price according to

Diameter of lens	$\frac{3}{4}$ in.	1 in.	$1\frac{1}{4}$ in.	$1\frac{1}{2}$ in.
Each	$1 25	$2 00	$3 00	$4 00

690 Pocket Microscope, same as No. 680, but with oxidized metal frame; price according to

Diameter of lens	1 in.	$1\frac{1}{4}$ in.
Each	$1 25	$1 50

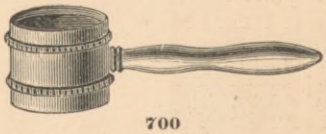
92 Pocket Microscope, same as No. 682, but with oxidized metal frame; two lenses $1\frac{1}{4}$ inches in diameter; price each..... $2 00

694 Pocket Microscope, same as No. 680, but with German silver frame; price according to

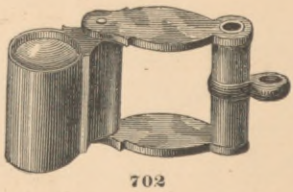
Diameter of lens	1 in.	$1\frac{1}{4}$ in.
Each	$1 50	$2 00

696 Pocket Microscope, same as No. 682, but with German silver frame; two lenses $1\frac{1}{4}$ inch in diameter; price each..... $3 00

Coddington Lenses.



700



702

700 Coddington Lens, brass frame; price according to the diameter of the lenses:

$\frac{1}{2}$ in.	$\frac{3}{4}$ in.	1 in.	$1\frac{1}{4}$ in.
$1 50	$2 00	$2 50	$3 00

702 Pocket Coddington Lens, hard rubber frame, folding in case; price according to diameter of the lenses:

½ in.	¾ in.	1 in.
$2 00	$2 50	$3 00

704 Pocket Coddington Lens, German silver frame, folding in case; diameter of lens ¾ in., price..... $3 50

Simple Microscopes.



706

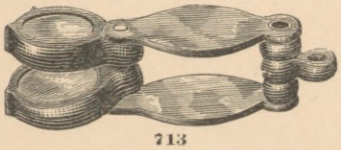


708

706 Microscope, brass body and feet, 2 double convex lenses, 1¼ inch in diameter..... $1 00

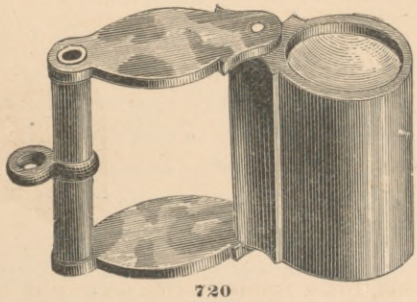
708 Microscope, hard rubber body and feet, 2 double convex lenses, 1¾ inch in diameter..... 1 25

710 Microscope, same as No. 708, oxidized metal body and feet.... 1 50



713

713 Achromatic Pocket Microscope, hard rubber frame, folding in case; formed of two achromatic double lenses, 14/32 in. diameter, giving magnifying powers 7, 10, and 18 times..... 8 50

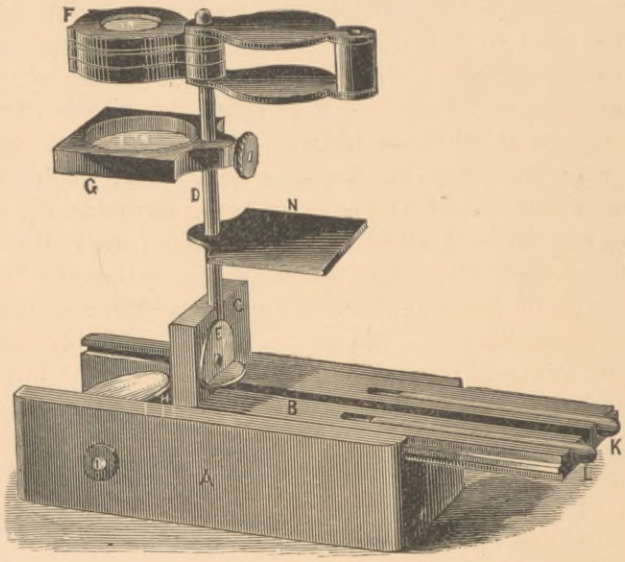


720

715 Aplanatic Triplet, 11/32 in. diameter, ½ in. focus..... 8 00

718 " " 14/32 " ¾ " 9 00

720 " " 17/32 " 1 " 10 00



723

EXCELSIOR POCKET AND DISSECTING MICROSCOPE.

(J. J. BAUSCH'S PATENT.)

The construction and method of using this Microscope is very simple, and will be readily understood from an inspection of the engraving. It consists primarily of a small wooden case, about one-third larger than shown in engraving. To one end of the lid of this case is attached one of the ends of the box; and when the lid is reversed and turned upside down it may be slid into the groove of the case, and then forms a stand for the lenses and glass stage, as is shown in the cut. The lenses and stage are supported by a steel rod, D, the lower end of which is hinged to the lid, so that it may be turned down and lie in a groove provided for it. When raised into the position shown in the figure, it is held very securely in place by means of the button, E; and this button also serves to retain it in the groove when it is turned down. The glass stage, G, which is fitted into a frame of hard rubber, slides easily on the stem, D, so as to be readily adjustable for focus, while at the same time it may be firmly fixed by means of a set-screw, at any desired height, and will then serve as a stage for dissecting purposes. The frame which holds the lenses fits on to the top of the stem. A mirror, H, is fitted into the case, and is readily adjustable by means of the button shown on the outside, so that light may be reflected up through the stage when the objects to be examined are transparent, and when they are to be viewed by reflected light there is a dark ground of hard rubber, N, which is also carried by the stem, D, and may be turned under the stage, so as to cut off all transmitted light. Dissecting needles (K and L), with neat handles, fit into appropriate grooves.

As a dissecting microscope for botanical, entomological, and physiological

work, this instrument is very efficient and convenient. The glass plate is fitted into the stage so as to form a cell capable of holding water, so that dissections may be carried on under that liquid, or aquatic animals may be kept alive and examined at leisure. The stage may also be turned so that the flat side will be up when so desired. When the lenses and stage are removed, they are readily packed in the case, and the whole thing packed into a compass which readily admits of its being carried in the vest pocket.

The lenses may be used either singly or together; are well made, and are provided with a proper diaphragm, which secures distinctness of definition. They give a range of power of from five to thirty diameters (twenty-five to nine hundred times the surface), the first being admirably adapted to the examination of minerals, textile fabrics, the larger parts of flowers, insects, etc., while the latter is sufficiently powerful to enable the student to dissect flowers and examine their more minute structure with great efficiency. Under good management this microscope shows the individual corpuscules in the blood of the frog, and will exhibit very clearly and beautifully the circulation in the foot of this animal.

723 With three lenses..... $2 75
725 With two lenses..... 2 50

Compound Microscopes.

The Microscope is one of the most useful optical instruments; it is almost indispensable to the scientific student, and its use in the arts is constantly increasing.

The great cost of really first-class instruments has heretofore limited their use.

Within the last three years, the Bausch & Lomb Optical Company have designed and perfected, under the direction of some of the ablest Microscopists in the United States, *first-class instruments*, which I can offer at the extremely moderate prices of the manufacturers, and highly recommend for their compactness, firmness, stability, and the general excellence and simplicity of their construction.

These Microscopes have certain important features which distinguish them from all others in the market, consisting of—

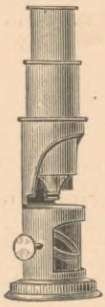
1. A new patented fine adjustment, see No. 755.
2. The German silver slide carrier, described in No. 768.
3. The periscopic eye-piece, described on page 76.
4. The hemispherical immersion condenser, and the new oblique light projector, described in No. 773.
5. The stages of these Microscopes are either of hard rubber, which cannot be injured by liquids in ordinary use, or of glass plates, highly polished, reducing the friction of the bearings of the slide carrier to a minimum.

6. The eye-pieces are mounted in hard rubber, and the prices are calculated accordingly. Eye-pieces mounted in brass will be furnished when desired at an additional cost of $1.50 each.

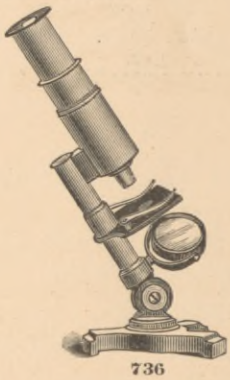
7. The sliding parts of the tubes in these instruments are all nickel plated. The present series of objectives, constructed after new formulas, are unsurpassed in all those qualities that constitute a first-class working objective. The lower powers have the advantages of depth of focus and freedom from color; the higher ones will be found to unite therewith great resolving power, and the greatest possible working distance, as far as these latter qualities can be obtained, without encroaching on the former.

The Non-Achromatic Microscopes, specified herein, are of the best French manufacturers of their class; the styles shown have been carefully selected as being capable of doing good work, considering the extremely low price at which they are offered.

NON-ACHROMATIC MICROSCOPES.



730



736

730 Microscope, brass body, 6 inches in height; one object-glass, having a power of 40 diameters, or 1,600 times the area; 2 plain glass slides, 1 test object slide, 1 brass forceps; in neat wood box..... $2 50

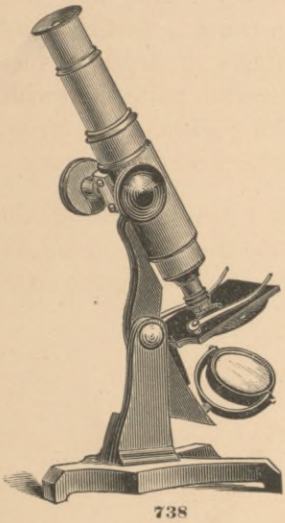
732 Microscope, same as No. 730, with 3 object-glasses, having a power of 40, 60, and 100 diameters..... 3 50

734 Microscope, same as 732, with bi-convex condenser, for use in examining opaque objects..... 5 00

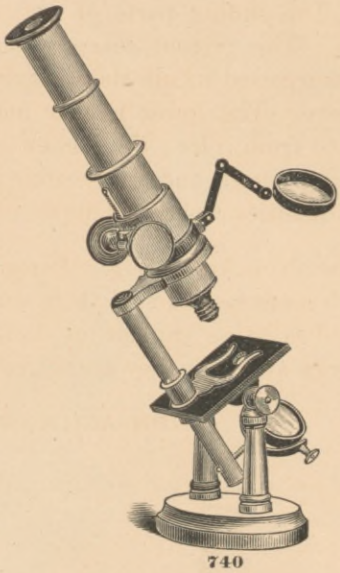
736 Microscope, brass body, 7 inches in height, triangular iron base, joint to incline the body at any angle, spring clips to hold the object slide, 2 object-glasses, having a power of 60 and 100 diameters; 2 plain glass slides, 1 glass slide with concave centre, 2 test objects, 1 brass forceps; in neat wood box..... 5 00

737 Microscope, same as No. 736, with rack and pinion adjustment for focus..... 9 00

ACHROMATIC MICROSCOPES.



738



740

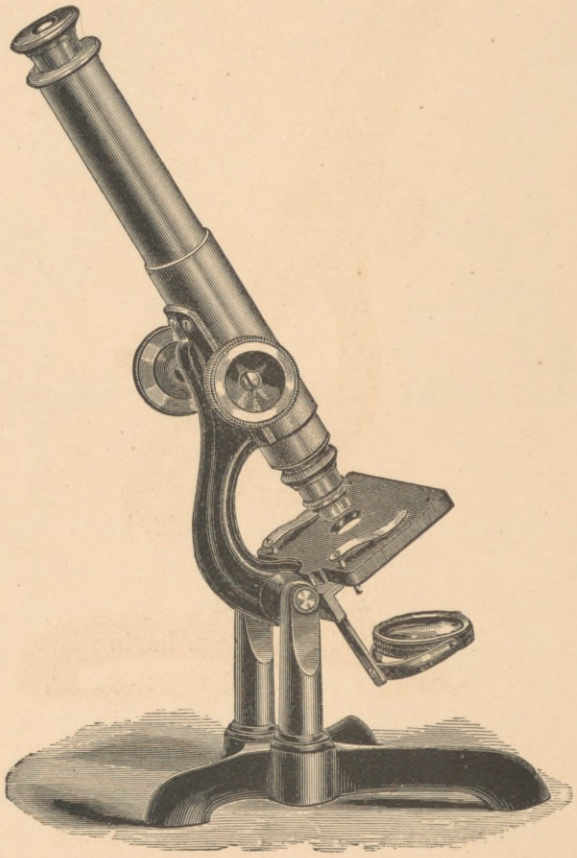
738 Microscope, brass body, 10 inches in height, heavy iron tripod stand, joint to incline the body at any angle, spring clips to hold the object slide, rack and pinion adjustment for focus, revolving diaphragm under the stage having four different sized openings, concave mirror, 3 object-glasses, having a power of 100, 125, 175 diameters; 6 plain glass slides, 1 glass circular disk with concave centre, 2 test objects, 1 brass forceps; in handsome, upright mahogany case, with handle, lock, and key..... $12 00

740 Microscope, brass body, 11½ inches in height, heavy oval iron base, can be inclined to any angle, spring clips to hold the object slide, rack and pinion adjustment for focus, condenser for concentrating light on opaque objects, plain and concave mirror, revolving diaphragm under the stage, having 4 different sized openings; 3 object-glasses, having a power of 75, 150, and 250 diameters; 6 plain glass slides, 1 glass slide with concave centre, 2 test objects, 1 brass forceps, 3 dissecting needles; in mahogany case, with lock and key..... 18 00

BAUSCH & LOMB OPTICAL COMPANY MICROSCOPES.

(See page 63.)

The engravings are one-third the size of the instruments.

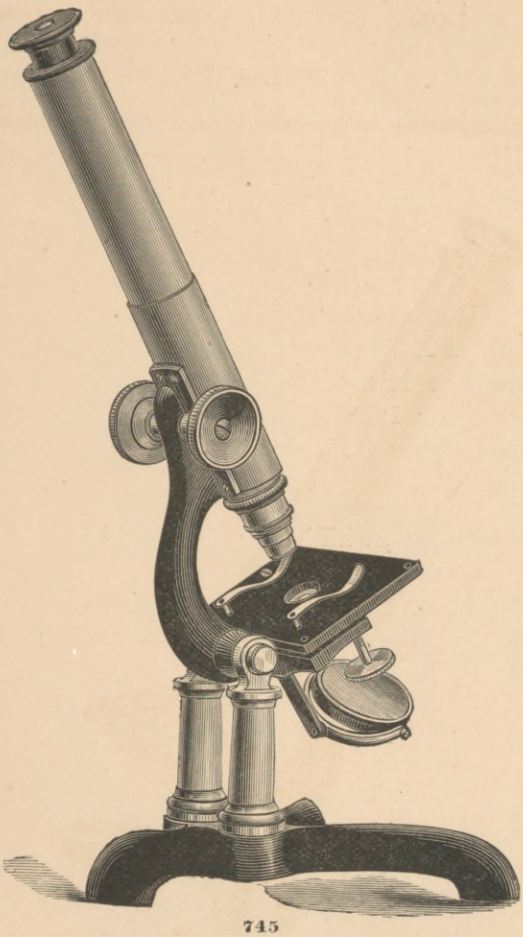


742

No. 742—Family Microscope.

Japanned cast-iron foot and pillars, supporting the axis which carries the body, so that it may be inclined to any angle; revolving diaphragm below the stage; rack and pinion for adjustment of focus; concave mirror, adjustable for oblique light; one (B) eye-piece, one first-class achromatic ½ inch objective, dividing so as to give two powers, 50 and 100 diameters.

In upright walnut case, with handle, lock and key..... $20 00



No. 745—Educational Microscope.

Japanned cast-iron foot, with brass pillars, which support the axis, thus allowing the body to be inclined to any angle; coarse adjustment by rack and pinion; fine adjustment by micrometer screw acting on secondary stage; revolving diaphragm below the stage; concave mirror which may be arranged either for central or for oblique light; one eye-piece (B); 2 inch and ½ inch objectives, magnifying 30 and 100 diameters.

In upright walnut case, with handle, lock and key..... $30 00

No. 748.

The same stand as No. 745, with a new dividing eye-piece, having extra eye-lens, giving powers of eye-pieces B and D, one inch and 3-10 inch objectives, the latter resolving *P. Angulatum*, magnifying 54, 92, 172 and 300 diameters.

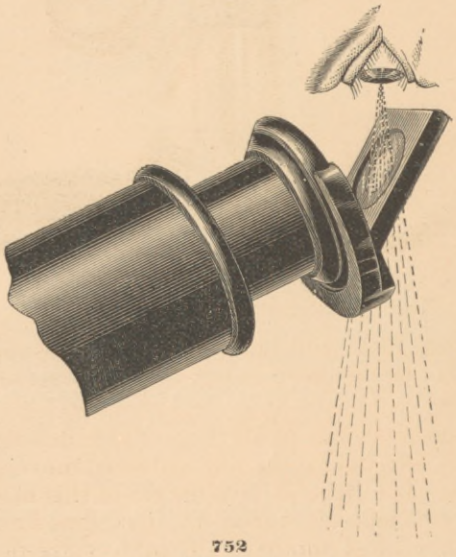
In upright walnut case, with handle, lock and key..... $35 00

No. 750.

The same stand as No. 745, with dividing eye-piece, having extra eye-lens (B and D); Eye-piece micrometer. Two objectives, viz.: one inch and $\frac{1}{4}$ inch, the latter having 100° aperture, and resolving *P. Angulatum* by central light, magnifying from 54 to 370 diameters; camera lucida for drawing, No. 752.

In upright walnut case, with handle, lock and key..... $40 00

Camera Lucida.

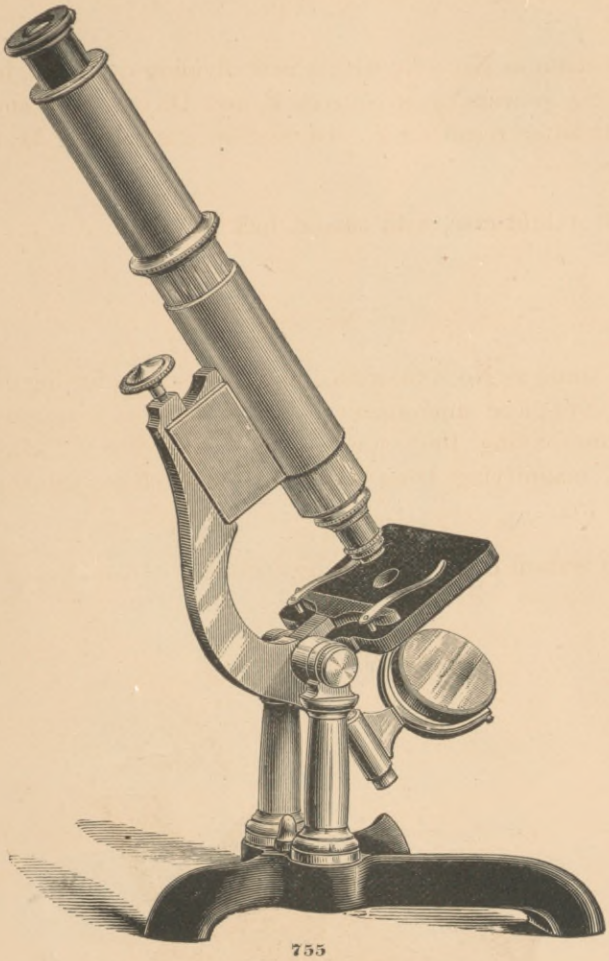


752
[*Full Size.*]

No. 752.

Camera Lucida for drawing, a greatly simplified form, having not only the advantages of other well-known constructions, but needing simple attachment to the eye-piece to be at once in proper position.

Made to fit any eye-piece..... $1 50



755

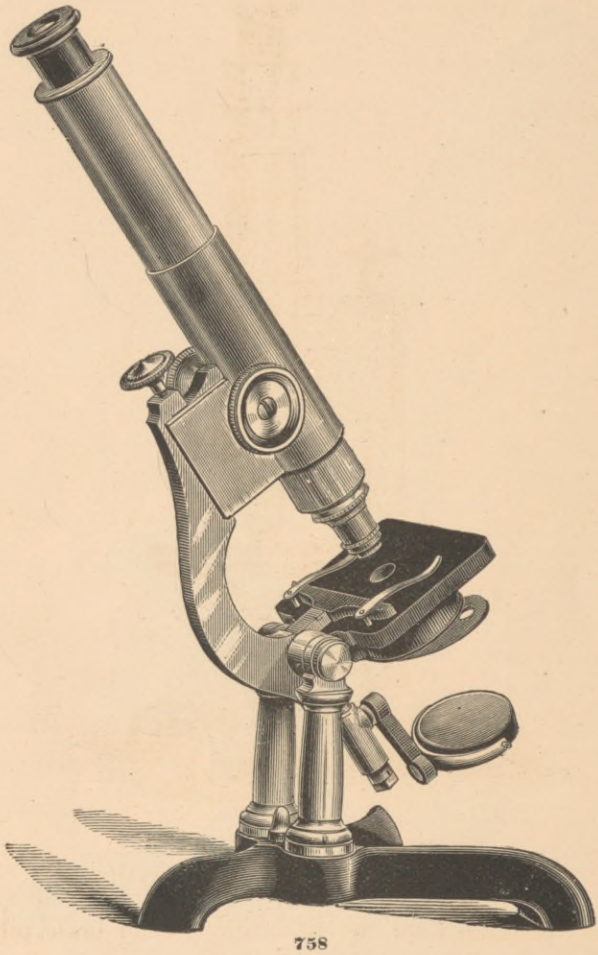
No. 755—Student's Microscope.

Japanned cast-iron foot, with brass pillars, which support the axis, thus allowing the body to be inclined to any angle; brass arm; coarse adjustment by sliding tube.

In this Microscope as well as in all those of which a description follows, the fine adjustment is effected by the new patented movement of the Bausch & Lomb Optical Co. The special advantages of this new adjustment are: (1) exceedingly easy and smooth movement of the fine screw, both ways; (2) perfect freedom from all lost motion; (3) perfect freedom from any side motion of the image; (4) extraordinary durability.

Plain and concave mirrors, arranged so that their distance from the object may be varied; also adjustable for oblique light; revolving diaphragm under the stage; two eye-pieces, viz.: A and C; two objectives, viz.: $\frac{3}{4}$ inch and 1-5 inch, the latter having 108° angular aperture and resolving easily *P. Angulatum* by central light; magnifying powers from 50 to 375 diameters; eye-piece micrometer and camera lucida.

In upright walnut case, with handle, lock and key, and drawer for accessories..... $50 00



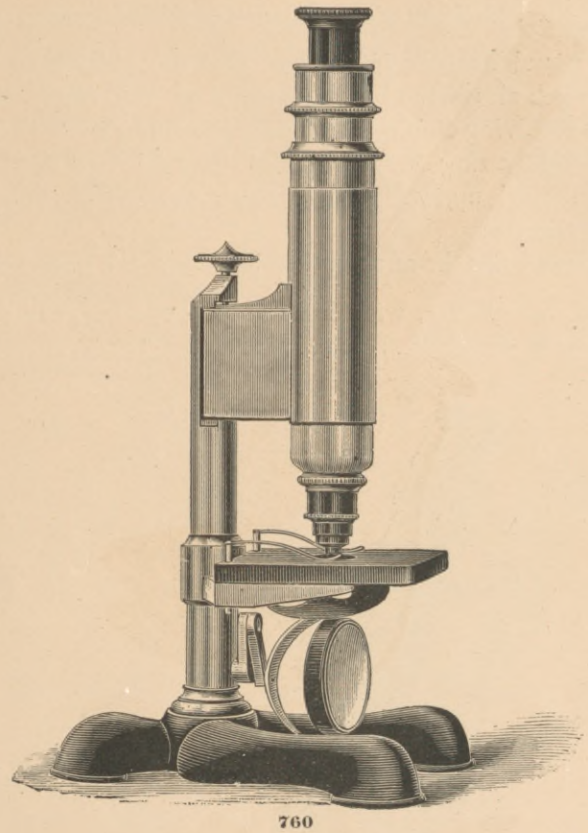
758

No. 758—Student's Microscope.

Japanned cast-iron foot, with brass pillars, which support the axis, thus allowing the body to be inclined to any angle; brass arm; coarse adjustment by rack and pinion; fine adjustment by the new patent frictionless motion (see No. 755).

Plain and concave mirrors hanging to a swinging bar so as to allow the most oblique light for high powers, and arranged so that their distance from the object may be varied; sub-stage, in which the revolving diaphragm or other accessories may be fitted; two eye-pieces, viz.: A and C; two objectives, viz.: 3-4 inch and 1-5 inch, the latter of 108° angular aperture, resolving easily *Pl. Angulatum* by central light; magnifying powers from 50 to 375 diameters. Eye-piece micrometer, camera lucida.

In upright walnut case, with handle, lock and key, and drawer for accessories.....$60 00



760

No. 760—Laboratory Microscope.

Large heavy cast-iron foot, carrying a strong solid brass pillar, to which the body, stage and mirror motion is attached; draw tube allowing 2½ inch shortening; coarse adjustment by sliding tube; fine adjustment by the new patent frictionless motion (see No. 755); large hard rubber stage, resting upon two strong brass arms; spherically formed revolving diaphragm under the stage, fixed in such a manner as to be very close to the object slide; plain and concave mirror, arranged so that their distance from the object may be varied. These mirrors may also be brought to any obliquity or *above* the stage for opaque objects; two eye-pieces, A and C; two objectives 3-4 inch and 1-5 inch; magnifying powers, when the tubes are completely drawn out, from 50 to 375 diameters; eye-piece micrometer.

This Microscope is intended specially for student's work in histological laboratories. In its general construction, therefore, it has been simplified to the last degree, so as to reduce the cost as much as possible, but the quality of the optical part has been fully maintained.

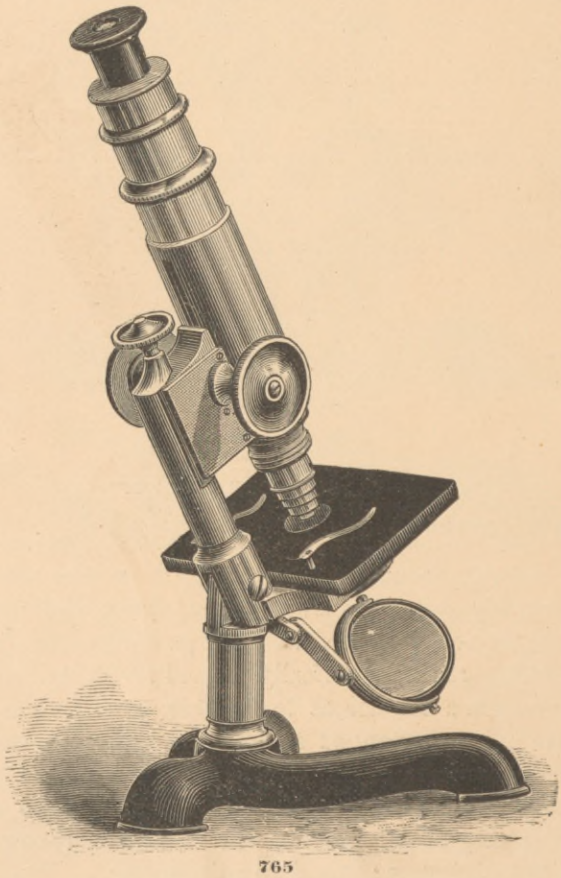
In upright walnut case, with handle, lock and key, and drawer for accessories..... .....$50 00

No. 763—Inclining Laboratory Microscope.

The same stand as No. 760, except that the pillar is provided with a strong joint, which allows the body to incline at any angle (shown by cut No. 765); the revolving diaphragm also is replaced by a sub-stage of standard size, in which slides a ring carrying one of three different sized diaphragms, which, when pushed up, will closely reach the object slide (Hartnack's cylinder diaphragm).

This Microscope has the same optical parts as No. 760, and camera lucida.

In upright walnut case, with handle, lock and key, and drawer for accessories..... .....$55 00



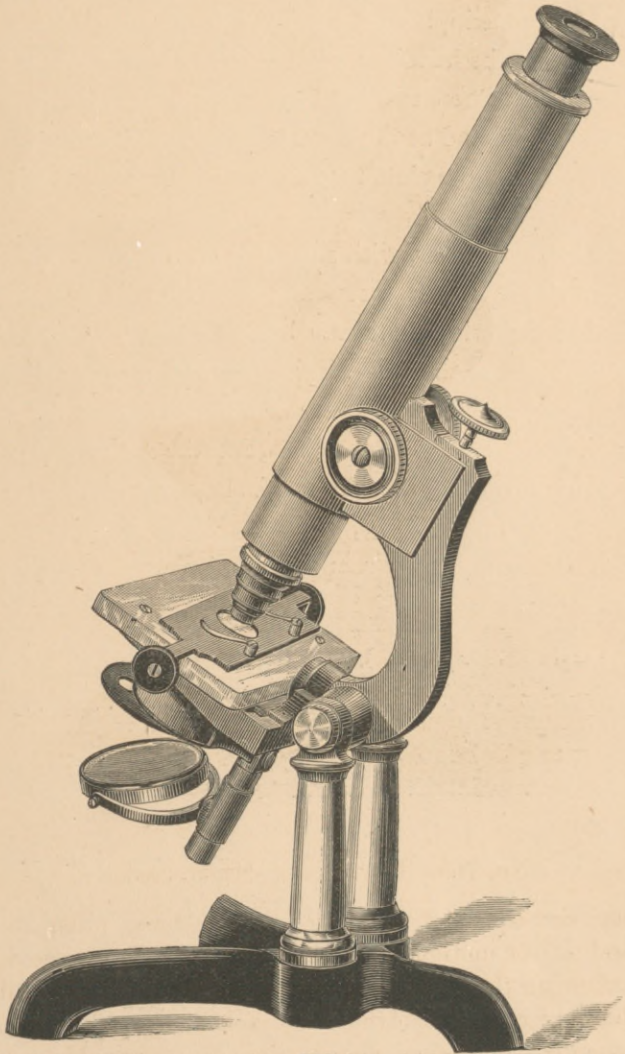
765

No. 765—Physicians' Microscope.

Large heavy cast-iron foot, carrying a strong brass pillar, to which the body, stage and mirror motion is attached, and which is provided with a strong joint, allowing the body to incline to any angle; draw tube allowing 2½ inch shortening; coarse adjustment by rack and pinion; fine adjustment by the new patented frictionless motion (see No. 755); large hard rubber

stage, resting upon two strong brass arms; sub-stage of standard size, in which slides a ring carrying one of three different sized diaphragms (Hartnack's cylinder diaphragm), which, when pushed up, will closely reach the object-slide; plain and concave mirror, arranged so that their distance from the object may be varied. These mirrors may also be brought to any obliquity or *above* the stage for illuminating opaque objects; two eye-pieces, A and C; two objectives, 3-4 inch and 1-5 inch; magnifying powers, when the tubes are completely drawn out, from 50 to 375 diameters; eye-piece micrometer and camera lucida.

In upright walnut case, with handle, lock and key, and drawer for accessories..... $60 00



768

No. 768—Large Student's Microscope.

Heavy Japanned cast-iron foot, with highly finished brass pillars, carrying the axis for inclination of the body; brass arm; coarse adjustment by rack and pinion; fine adjustment by the new patented motion (see No. 755).

This Microscope is provided with a movable slide holder, serving as a substitute for a mechanical stage. This slide holder consists of a German silver plate of very light weight, moving on a strong glass plate which forms the immovable stage. Only four small points of the German silver plate touch the top of this glass plate, while two prolongations of the former, bent downward and backward and acting as springs, press against the underside of the glass plate with just sufficient force to keep the slide holder in position, and to prevent it from slipping off when the instrument is inclined. Two small knobs facilitate the handling of this slide holder. This arrangement much exceeds in smoothness and evenness of motion the movable glass-stages now so commonly used and at the same time, while the movable part is of less weight, allows the glass plate to be of sufficient strength to guard against easy breaking.

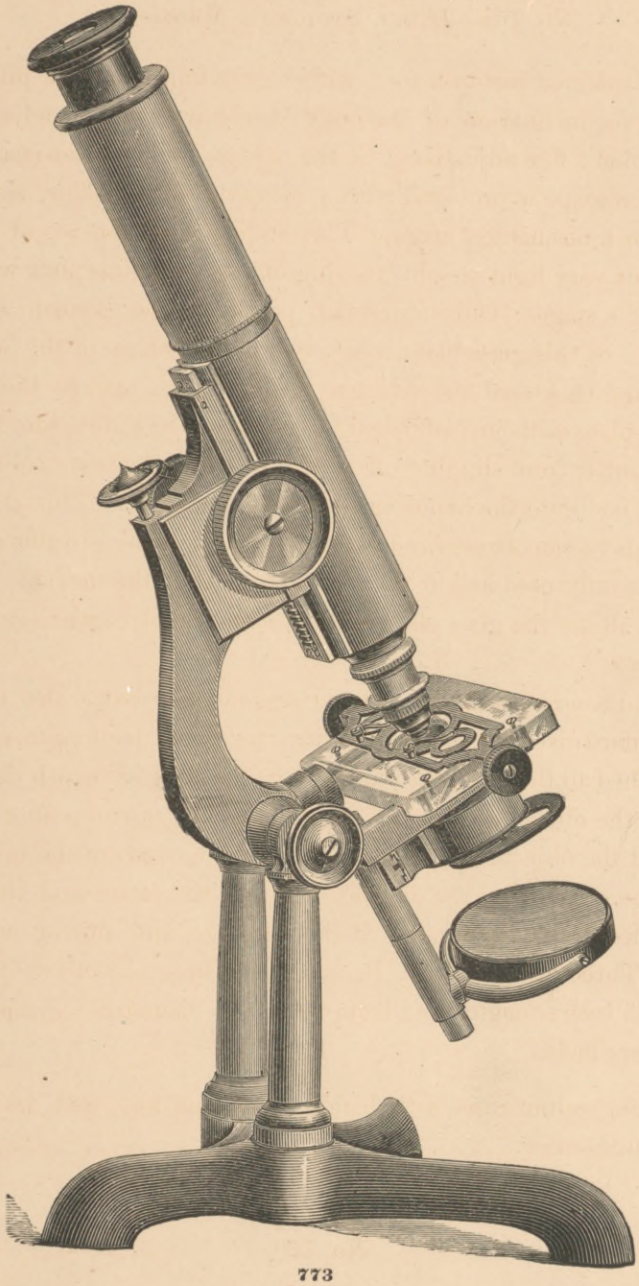
Plain and concave mirrors, with sub-stage of the extra size required to receive standard sized English accessories; revolving diaphragm, etc. These are all attached to the swinging mirror bar, the axis of which is placed at the level of the object, so that the diaphragm and mirror swing concentrically around the object; the mirror can also be moved on the mirror bar to and from the object, and the distance between the latter and the sub-stage can be varied by reversing it. Both sub-stage and mirror can also be removed. Three eye-pieces, A, B, and C. Three objectives, 2 inch, 3-4 inch, and 1-5 inch; magnifying from 22 to 375 diameters; eye-piece micrometer, camera lucida.

In upright walnut case, with handle, lock and key, and drawer for accessories.....$90 00

No. 770.

Same stand as No. 768. Three eye-pieces, A, B, and C; four objectives, 2 inch, 3 4 inch, 1-5 inch, and 1-8 inch immersion; eye-piece micrometer, camera lucida. Bull's-eye condenser No. 873 on separate stand.

In upright walnut case, with handle, lock and key, and drawer for accessories.....$115 00



773

No. 773—The Professional Microscope.

Heavy brass foot and brass pillars, both highly finished, carrying the axis for inclination of the body, which movement can easily be tightened or loosened by two strong mill-head screws; coarse adjustment by rack and pinion, moving a long prismatic slide of first-class workmanship, attached to

the body; fine adjustment by the new patented frictionless motion (see No. 755). The object-slide rests upon a newly devised slide carrier described in No. 768.

The body tube has an inner draw tube with society screw, to which objectives of very long focal distance can be attached; E. Gundlach's New Hemispherical Immersion Condenser and Oblique Light Projector.

"This condenser is a valuable addition to the resources of the microscopic observer. It has the form of a solid glass cone, truncated at the vertex, with a base of spherical curvature. A drop of water connects the truncated vertex with the slide, and the light from the illuminating source falls perpendicularly on the base, whether central or oblique to the axis" (Extract from Award, Cent. Exhib., 1876). The Oblique Light Projector is distinguished from the immersion condenser by the lower surface being plane instead of convex, and parallel with the upper surface. Large plain and concave mirrors, with sub-stage for receiving accessories of English standard size, and two revolving diaphragms, one of the latter belonging to the condenser, all attached to the swinging mirror bar, the axis of which is placed on the level of the object, so that the diaphragm and mirror swing concentrically around it. The mirror, as well as the sub-stage, can be moved on the mirror-bar, to and from the object, and both can be removed, the latter by a horizontal prismatic slide.

Sub-stage ring, with internal "society screw," for objectives, condenser, etc. Two slot diaphragms of different widths, covering the whole surface of the mirror, and only allowing light to pass through the slot in such a direction that very sharp shadows by oblique light will be produced. Three of E. Gundlach's new periscopic Eye-pieces B, C, and D.

"The periscopic Eye-piece consists of a triple Eye-lens, a double convex Field-lens, the latter being situated within the focal distance of the former, and a diaphragm located in the focus of the equivalent of both lenses.

The field of these Eye-pieces is considerably larger and flatter than that of Kellner's, and the image is sharply defined to the extreme edge.

As the focus of this Eye-piece lies behind the Field-lens (the same as in Ramsden's Eye-piece), it is particularly suitable for Micrometers, especially as the division is distinctly, and in correct proportion, visible to the extreme edge, which is notably not the case with Ramsden's Eye-piece.

A micrometer division placed in the focus of this Eye-piece shows, moreover, very perspicuously, the high degree of the correction of the aberrations, while the image transmitted by an objective can be no reliable test, as the aberrations of the objective, especially the distortion, are easily confounded with those of the Eye-piece."

Four objectives, 2 inch, $\frac{3}{4}$ inch, $\frac{1}{3}$ inch, and $\frac{1}{8}$ inch immersion, with adjustment for cover; magnifying powers from 30 to 800 diameters; Eye-piece micrometer, camera lucida. Bull's-eye condenser No. 875.

In upright walnut case, with handle, lock, and key, and drawer for accessories..... $200 00

Achromatic Objectives for Microscopes.

775	4 inch	10°	Ang. ap., non-Adjusting	$15 00
778	4 "	6°	" " "	6 00
780	2 "	18°	" " "	12 00
782	2 "	12°	" " "	6 00
784	1 "	36°	" " "	20 00
786	1 "	20°	" " "	6 00
788	3-4 "	27°	" " "	8 00
790	1-2 "	72°	" " "	22 00
793	1-2 "	40°	" " "	9 00
795	4-10 "	100°	" " "	20 00
797	3-10 "	75°	" " "	11 00
800	1-4 "	100°	" " "	14 00
802	1-5 "	108°	" " "	15 00
804	1-5 "	108°	Ang. ap., with adjustment, moving the front lens	18 00
806	1-6 "	130°	Ang. ap., with adjustment, moving the front lens	20 00
808	1-6* "	im. nearly 180°	Ang. ap., with adjustment, moving the back lens (inner motion)	30 00
810	1-8 "	immersion 170°	Ang. ap., non-adjusting	20 00
812	1-8 "	" 170°	Ang. ap., with adjustment, moving the front lens	24 00
814	1-8* "	im. nearly 180°	Ang. ap., with adjustment, moving the back lens (inner motion)	40 00
816	1-12 "	" " 180°	Ang. ap., with adjustment, moving the front lens	40 00
818	1-12* "	" " 180°	Ang. ap., with adjustment, moving the back lens (inner motion)	50 00
820	1-16* "	" " 180°	Ang. ap., with adjustment, moving the back lens (inner motion)	80 00

Higher powers made by special contract.

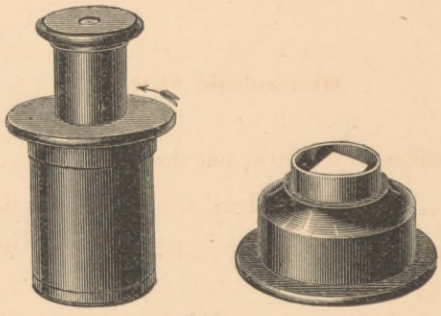
The objectives marked * have an angular aperture of very near 180° for dry mounted objects; for water the aperture is 110°.

EYE-PIECES.

823	Huyghenian Eye-piece A, mounted in hard rubber.....	$2 50
825	B, " "	2 50
827	C, " "	2 50
830	A, " brass	4 00
832	B, " "	4 00
835	C, " "	4 00
837	Dividing Eye-piece, with extra Eye-glass, giving the power of the ordinary B and D Eye-pieces; mounted in hard rubber.	3 75
840	Same Eye-piece as 837; mounted in brass.....	5 25
842	E. Gundlach's periscopic Eye-piece (see description, page 76). A, mounted in hard rubber.....	10 00
844	E. Gundlach's periscopic Eye-piece B, mounted in hard rubber.	10 00
846	" " " C, " "	8 00
848	" " " D, " "	8 00
850	" " " A, " brass.....	11 50
852	" " " B, " "	11 50
854	" " " C, " "	9 50
856	" " " D, " "	9 50

Condensers for Microscopes.

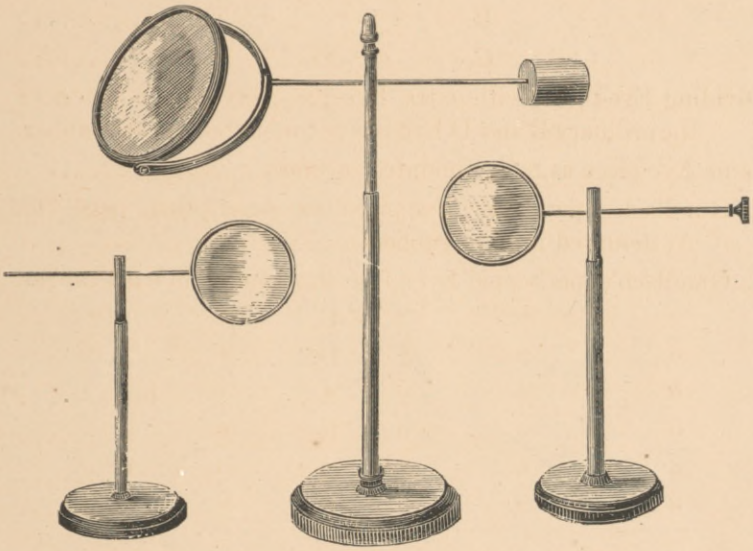
858	E. Gundlach's Hemispherical Achromatic Immersion Condenser (see No. 773; mounted for stand, No. 768).....	$9 00
860	E. Gundlach's Oblique Light Protector (see No. 773; mounted for stand, No. 768).....	8 00



862

862 Small Polariscope..... 15 00

865 Large Polariscope, with Professor Prasmowsky's new prisms of a very large field. The Polarizer, of largest diameter, is fitted in the sub-stage. The analyzer connected with goniometer, and separate eye-piece..... $35 00



867 875 869

867 Double Convex Condenser, 1½ inch diameter, with stand 1 25
869 Bull's Eye Condenser, 1½ inch diameter, on stand..... 2 50
871 " " 1⅞ " " 4 50
873 " " 2⅜ " " 7 50
875 " " 3 " " 10 00
878 " " 3 " " with joint.... 12 00

Microscope Slides.

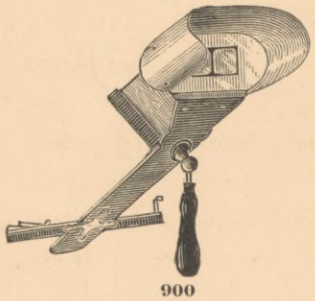
880 Crown glass slides, 3 x 1 inch, per dozen..... $0 20
881 " ground edges, 3 x 1 inch, per dozen..... 35
882 Thin glass covers, according to thickness, from 20 to 35 cents per dozen, per oz..... $2 to 5 00
883 Mounted objects, 2⅜ x ¾ inches, per dozen..... 1 00
884 " 3 x 1 " " ..... $1 50 to 12 00

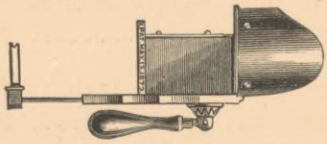
885	Turn Table, for use in mounting slides	$3 00
886	" with self-centering adjustment	6 00
887	Section Cutter	4 00
888	Live Box	2 00
889	Micro-Photographic Charms in great variety. "Lord's Prayer," "Creed," "Ten Commandments," "Views in Paris," "New York," etc., mounted in miniature Ivory Opera Glasses, each	20
890	Mounted as slides for the Microscope, each	50

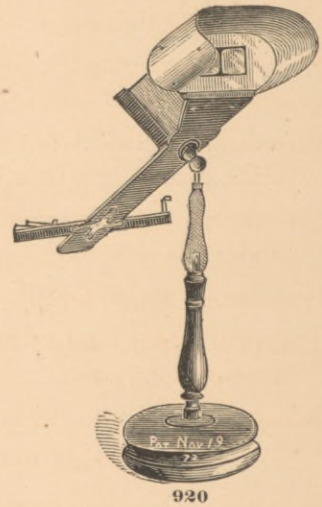

889

A large stock of Burgoyne's Preparations for the Microscope, constantly on hand.

Stereoscopes.


900


925



920

900	Stereoscope, walnut hood and shaft, glasses 1¼ inch square	$0 75
903	" " gilt patent slide, glasses 1¼ inch square	1 00
905	" " " " " " 1½ "	1 50
907	" " " " " " 1⅝ "	1 75
910	Any of the above on stand at an additional cost of	50
912	Stereoscope, polished walnut hood and shaft, glasses 1½ inch square	2 00
915	Stereoscope, polished walnut hood, nickel plated patent slide, glasses 1½ inch square	2 50
918	Stereoscope, polished mahogany hood and shaft, glasses 1⅝ inch square	2 00

920 Stereoscope, polished mahogany hood, nickel plated patent slide, glasses 1¾ inch square $3 00

923 Stereoscope, polished satin wood hood and shaft, glasses 1¾ inch square 3 00

925 Stereoscope, polished satin wood hood, gilt patent slide, glasses 1¾ inch square 3 50

927 Stereoscope, polished rosewood hood, walnut shaft, glasses 1¾ inch square 3 00

930 Stereoscope, polished rosewood hood and shaft, glasses 1¾ inch square 3 50

932 Stereoscope, polished rosewood hood, nickel plated patent slide, glasses 1¾ inch square 4 00

934 Stereoscope, polished maple hood and shaft, glasses 1¾ inch square 3 50

936 Stereoscope, polished maple hood, nickel plated patent slide, glasses 1¾ inch square 4 00

938 Stereoscope, polished inlaid walnut hood, nickel plated patent slide, glasses 1¾ inch square 3 50

940 Stereoscope, polished inlaid maple hood, nickel plated patent slide, glasses 1¾ inch square 4 00

942 Stereoscope, polished inlaid rosewood hood, nickel plated patent slide, glasses 1¾ inch square 4 00

944 Stereoscope Stand, for 912 to 942, each 1 50

946 Polished walnut Cabinet Stereoscope, to hold 50 opaque or 25 transparent views 12 00

948 Same as 946; polished rosewood 15 00

950 " " To hold 100 opaque views 24 00

Larger instruments will be furnished to order.

952 Stereoscope views in all the principal cities of Europe and the United States; of mountain and lake scenery; comic views, plain and colored; transparent views, etc., in great variety, from 50 cents per dozen to 4 00

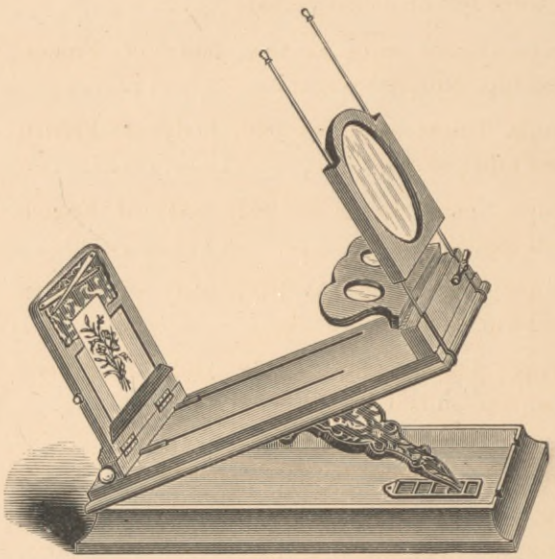
Stereoscope Glasses.

954 Stereoscope Glasses, 1¼ inch square, per pair 50

956 " " 1½ " " 75

958 " " 1¾ " 1 00

Graphoscopes.



968

The Graphoscope is the Stereoscope combined with a single lens of great power, intended for the examination of paintings, engravings, flowers, photographs, and other objects. The instruments herein mentioned are furnished with the first quality of lenses, and the woodwork is finished in the best manner, equal to the imported instruments, and is warranted to stand any climate.

960 Graphoscope, lens 3 inches in diameter, Stereoscope glasses $1\frac{1}{2}$ inch square, body of walnut, oil finished. $6 00

962 Graphoscope, lens 4 inches in diameter, Stereoscope glasses $1\frac{1}{2}$ inch square, body of walnut, oil finished..... 8 00

964 Graphoscope, lens 4 inches in diameter, Stereoscope glasses $1\frac{3}{4}$ inch square, body of polished walnut, rods and all metal work gilt or nickel plated 12 00

966 Graphoscope, lens 5 inches in diameter, Stereoscope glasses $1\frac{3}{4}$ inch square, body of polished walnut, rods and all metal work gilt or nickel plated 15 00

968 Graphoscope, lens 6 inches in diameter, Stereoscope glasses $1\frac{3}{4}$ inch square, body of polished walnut, rods and all metal work gilt or nickel plated..... 18 00

970 Graphoscope, lens 7 inches in diameter, Stereoscope glasses $1\frac{3}{4}$ inch square, body of polished walnut, rods and all metal work gilt or nickel plated 22 00

972 Graphoscope, lens 10 inches in diameter, Stereoscope glasses $1\frac{3}{4}$ inch in diameter, body of polished walnut, rods and all metal work gilt or nickel plated..... $28 00

974 Graphoscope, lenses same as 964, body of French walnut, paneled top, polished 20 00

976 Graphoscope, lenses same as 966, body of French walnut, paneled top, polished..... 25 00

978 Graphoscope, lenses same as 968, body of French walnut, paneled top, polished..... 30 00

980 Graphoscope, lenses same as 970, body of French walnut, paneled top, polished..... 36 00

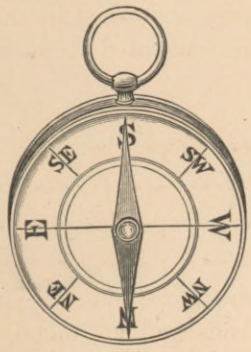
982 Graphoscope, lenses same as 972, body of French walnut, paneled top, polished..... 50 00

GRAPHOSCOPE LENSES.

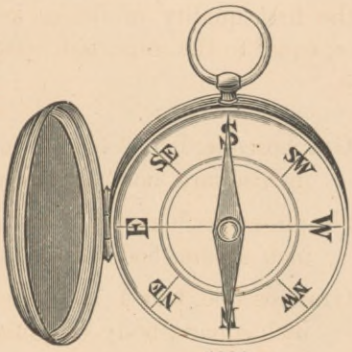
984

3 in.	4 in.	5 in.	6 in.	7 in.
$1 00	$1 50	$2 00	$2 50	$3 00

Compasses.



998



1000

990 Pocket Compass, round brass, open face, paper scale:

Diameter.....	$1\frac{1}{4}$ in.	$1\frac{1}{2}$ in.	2 in.
Price each.....	30c.	40c.	50c.

992 Pocket Compass, same as No. 990, with detachable cover and stop to needle:

Diameter.....	$1\frac{1}{4}$ in.	$1\frac{1}{2}$ in.	2 in.
Price each.....	40c.	50c.	60c.

994 Pocket Compass, same as No. 990, with detachable cover, agate centre and stop to needle:

Diameter	1¼ in.	1½ in.	2 in.
Price each	$1 50	$1 75	$2 25

996 Pocket Compass, same as No. 990, with detachable cover, agate centre and stop to needle; silvered bench divided in degrees:

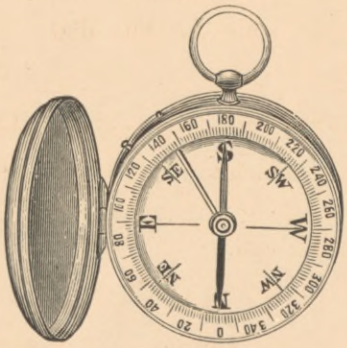
Diameter	1¼ in.	1½ in.	1¾ in.	2 in.	2¼ in.	2½ in.
Price each	$1 75	$2 00	$2 25	$2 50	$2 75	$3 00

998 Pocket Compass, brass, open face, watch shape, metal scale, with stop to needle:

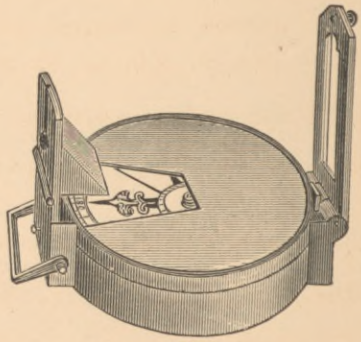
Diameter	1¼ in.	1½ in.	1¾ in.	2 in.	2¼ in.	2½ in.
Price each	$0 50	$0 75	$1 00	$1 25	$1 50	$1 75

1000 Pocket Compass, brass hunting case, watch shape, metal scale, with stop to needle:

Diameter	1¼ in.	1½ in.	1¾ in.	2 in.	2¼ in.	2½ in.
Price each	$0 75	$1 00	$1 25	$1 50	$1 75	$2 00



1002



1032

1002 Pocket Compass, brass hunting case, watch shape, agate centre and stop to needle, silvered bench divided in degrees:

Diameter	1¼ in.	1½ in.	1¾ in.	2 in.	2¼ in.	2½ in.
Price each	$2 00	$2 25	$2 50	$2 75	$3 00	$3 25

1004 Pocket Compass, same as No. 1002, with case heavily nickel plated:

Diameter	1¼ in.	1½ in.	1¾ in.	2 in.	2¼ in.	2½ in.
Price each	$2 25	$2 50	$2 75	$3 00	$3 25	$3 50

1006 Pocket Compass, bronzed brass case fitted in morocco case with cover, blued magnetic needle with gilt letters N. and S., and self-acting stop to needle, diameter 1¾ inch..... $2 00

1008 Pocket Compass, case same as No. 1006, with agate centre in needle 2 25

1010 Pocket Compass, case same as No. 1006, with floating card dial, agate centre in needle, and self-acting stop 2 50

1012 Pocket Compass, case same as No. 1006, with Singer's Patent card dial (see No. 1036), agate centre in needle, and self-acting stop..... 3 00

1014 Pocket Compass, case same as No. 1006, with Singer's Patent Pearl dial, agate centre in needle, and self-acting stop..... 4 00

1016 Pocket Compass, open face, watch shape, heavily gold plated case, with Singer's Patent Card dial, diameter 1½ inch..... 4 00

1018 Pocket Compass and Sun Dial combined, wood box, diameter 2 in.; height, 1 inch..... 50

1020 Pocket Compass and Sun Dial combined, brass case with detachable cover, agate centre and stop to needle; circle divided in degrees, and adjustable scale for Sun dial; diameter, 2 inches, $2 50; 3 inches..... 5 00

1022 Prismatic Compass, in morocco case, 2 inches..... 12 00

1024 " " with azimuth glass, 2 inches 15 00

1026 Prismatic Compass, in solid sling, leather case:

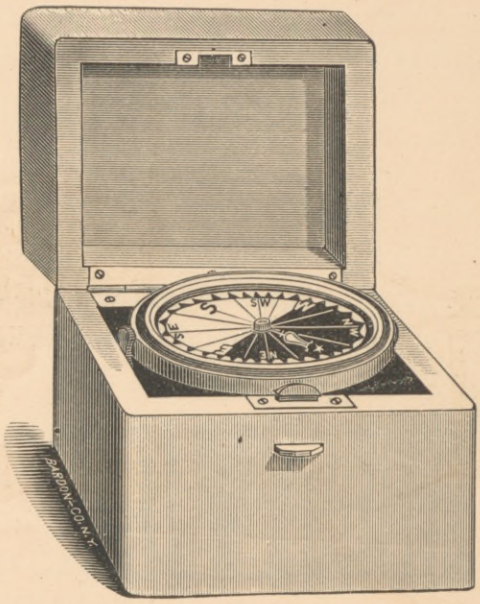
Diameter.....	3 in.	3½ in.	4 in.
Price each.....	$18 00	$22 00	$25 00

1028 Prismatic Compass, same as No. 1026, complete, with azimuth glass:

Diameter.....	3 in.	3½ in.	4 in.
Price each.....	$24 00	$27 00	$30 00

1030 Tripod Stand complete, for Prismatic Compass..... 12 00

1032 Hutchinson's Improved Prismatic Compass, in solid sling leather case..... 18 00



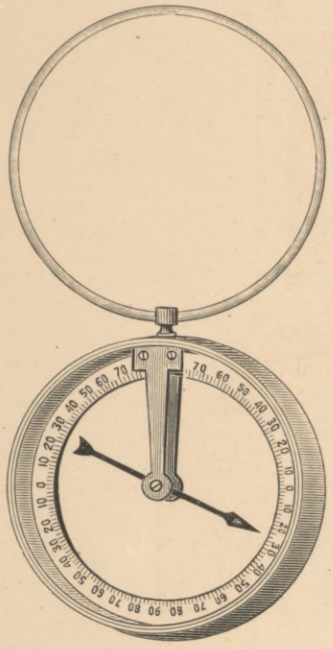
1036

1034 Boat Compass, deep wood bowl, floating card dial, agate centre; diameter, 3½ inches; height, 2 inches $2 50

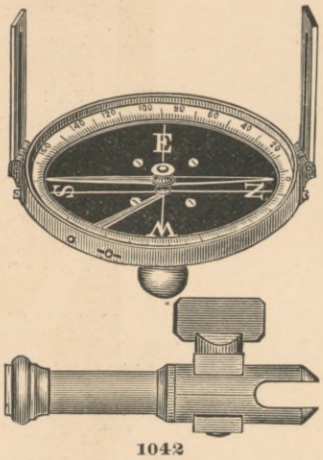
1036 Yachting or Boat Compass; these compasses are constructed expressly for yachts, boats, etc. They are of the best quality, mounted in mahogany cases, with brass gymbal rings and bowls. The Singer's Patent Card Dials are balanced on jeweled centres, reducing the friction to a minimum.

	3 in.	4 in.	5½ in.	6½ in.—square.
Price each.	$3 50	$4 50	$6 00	$7 50

1038 Yachting or Boat Compass, pocket size, polished boxwood case lined with velvet, gymbal rings and bowl either gold or nickel plated; Singer's Patent Card Dial, with jeweled centre $10 00



1039



1042

1039 Miners' Dipping Needle Compass, diameter 3 inches, in mahogany case $9 00

1040 Surveyors' Compass, with folding sights, in morocco case:

Diameter	2½ in.	3 in.	3½ in.
Price each	$6 00	$6 50	$7 00

1042 Surveyors' Compass, with folding sights, ball and socket joint, brass head for Jacob Staff, in mahogany case:

Diameter	3 in.	3½ in.	4 in.	4½ in.	5 in.
Price each	$9 00	$10 50	$12 00	$13 50	$15 00



1044

1044 Compass Charm, with ring, to attach to watch chain; gilt; diameter ½ inch $0 25

1046 Compass Charm, with ring to attach to watch chain; heavily gold plated.

Diameter	$\frac{3}{8}$ in.	$\frac{1}{2}$ in.	$\frac{5}{8}$ in.	$\frac{7}{8}$ in.
Price each	$0 50	$0 60	$0 75	$1 00

1048 Compass Charm, with ring to attach to watch chain, coin silver.

Diameter	$\frac{3}{8}$ in.	$\frac{1}{2}$ in.	$\frac{5}{8}$ in.	$\frac{7}{8}$ in.
Price each	$0 60	$0 75	$1 00	$1 25

1050 Compass Charm, with ring to attach to watch chain, 14 karat gold.

Diameter	$\frac{3}{8}$ in.	$\frac{1}{2}$ in.	$\frac{5}{8}$ in.	$\frac{7}{8}$ in.
Price each	$2 50	$3 75	$5 00	$6 25

1052 Compass Charm, with ring to attach to watch chain, needle suspended between two polished glass discs, rim heavily plated.

Diameter	$\frac{5}{8}$ in.	$\frac{7}{8}$ in.	1 in.
Price each	$1 25	$1 50	$2 00

1054 Compass Charm, with ring to attach to watch chain, needle suspended between two polished quartz or pebble discs, rim of 14 karat gold.

Diameter	$\frac{5}{8}$ in.	$\frac{7}{8}$ in.	1 in.
Price each	$7 50	$10 00	$12 00

Sand-Glasses.

1056 Half-minute and quarter-minute Sand-Glasses, without frames, each $0 25

1057 Sand-Glasses, white wood frames:

3 min., 4 min., and 5 min.	15 min.	30 min.	60 min.
$0 30	$1 00	$1 25	$1 50

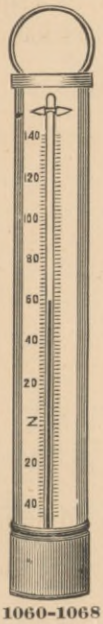
1058 Sand-Glasses, rosewood frames:

3 min., 4 min., and 5 min.	15 min.	30 min	60 min.
$0 50	$1 25	$1 50	$1 75

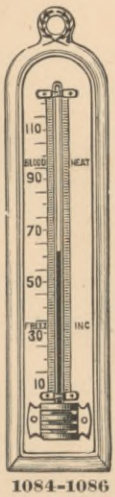
Thermometers.

The Thermometer, or measurer of heat, generally consists of a glass tube terminating in a bulb containing mercury or colored alcohol. Changes of temperature cause the liquid in the tube to expand and rise or to contract and fall; the indications thus given are read from a graduated scale attached to the tube. The graduated scale invented by Fahrenheit is the scale used in the United States and Great Britain and her Colonies; the Reaumur scale is used in the northern part of Germany and in Russia; the Centigrade scale is used throughout the rest of Europe and by scientific men generally. The thermometers herein catalogued are divided according to the Fahrenheit scale, from 30° to 40° below to 130° to 150° above zero, except where otherwise specified. The following rules are given to conveniently reduce the degrees of one scale to another, as may sometimes be necessary:

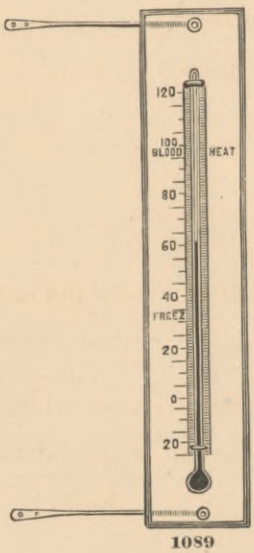
To reduce Fahrenheit to Centigrade degrees subtract 32, multiply by 5, divide by 9. Example: 212° Fahr. $- 32 = 180 \times 5 = 900 \div 9 =$ 100° Centigrade. To reduce Fahrenheit to Reaumur degrees subtract 32, multiply by 4, divide by 9. To reduce Centigrade to Fahrenheit degrees multiply by 9, divide by 5, and add 32. To reduce Reaumur to Fahrenheit degrees, multiply by 9, divide by 4, and add 32. To reduce Reaumur to Centigrade degrees multiply by 5 and divide by 4. To reduce Centigrade to Reaumur degrees multiply by 4 and divide by 5.



1060-1068



1084-1086



1089

1060 Thermometer, tin japanned case, mercury tube, silvered metal scale:

	7 in.	8 in.	10 in.	12 in.
Price each.....	$0 25	$0 35	$0 50	$0 75

1062 Thermometer, same as 1060, with double scales, Fahrenheit and Reaumur or Fahrenheit and Centigrade:

	7 in.	8 in.	10 in.	12 in.
Price each	$0 35	$0 50	$0 75	$1 00

1065 Thermometer, copper case, mercury tube, silvered metal scale, graduated from 40° below to 212° above 0:

	10 in.	12 in.	15 in.
Price each	$1 75	$2 00	$2 50

1068 Thermometer, same as 1065, graduated from 0 to 400°; length 12 inches $3 00

1070 Thermometer, on heavy brass plate, metal guard for bulb, silvered metal scale, graduated from 0 to 350°; length 12 inches 2 75

1072 Thermometer for confectioner's use, in black walnut case, tube completely protected by case, silvered metal scale, graduated from 150° to 400°; length 12 inches 2 00

1074 Thermometer, black walnut back, square or round corners, mercury tube, silvered metal scale:

	8 in.	10 in.	12 in.
Price each	$0 75	$1 00	$1 25

1076 Thermometer, black walnut back, square corners, spirit tube, with index to register the minimum point, silvered metal scale, graduated in single degrees:

	8 in.	10 in.	12 in.	15 in.
Price each	$1 50	$2 00	$2 50	$3 00

1078 Thermometer, black walnut back, highly sensitive spiral bulb, spirit tube, incorrodible porcelain scale; length 10 inches.. $2 50

1080 Thermometer, white wood back, mercury tube, guard for bulb, scale graduated on the wood:

	8 in.	12 in.
Price each	$0 50	$0 75

1082 Thermometer, same as 1080, with all three scales—Fahrenheit, Reaumur, and Centigrade; length 12 inches $2 00

1084 Thermometer, boxwood back, rounded top, beveled edge, mercury tube, guard for bulb, scale graduated on the wood in single degrees:

	8 in.	10 in.
Price each	$1 25	$1 50

1086 Thermometer, same as 1084, with double scales, Fahrenheit and Reaumur, or Fahrenheit and Centigrade:

	8 in.	10 in.
Price each	$1 50	$1 75

1088 Thermometer, cherry-wood frame, mercury tube, guard for bulb, scale graduated on opaque or ground glass, in Fahrenheit and Reaumur scales; length, 12 inches $2 00

1090 Show Thermometer, handsomely japanned wood frame, spirit tube, guard for bulb, scale graduated in single degrees:

	24 in.	30 in.	36 in.	42 in.	48 in.
Price each	$5 00	$5 50	$6 00	$7 00	$8 00

These Thermometers are intended for use in hotels, public halls, stores or as sign thermometers, and will be furnished with the name of purchaser thereon, if desired, without extra charge.

1092 Window Thermometer, triangular black walnut back, so constructed that when the thermometer is placed in the proper position on the sash of a window it faces inwardly, mercury tube, silvered metal scale; for right or left side of window as desired:

	8 in.	10 in.
Price each	$0 75	$1 00

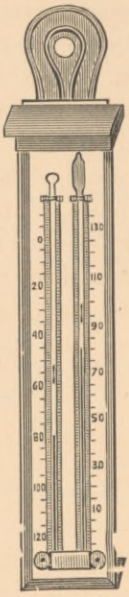
1094 Window Thermometer, in wood brackets, mercury tube, graduated paper scale, enclosed in cylindrical glass tube; length 12 inches 1 50

1096 Window Thermometer, in metal brackets, mercury tube, graduated opaque glass scale, enclosed in cylindrical glass tube; length 12 inches 2 00

1098 Window Thermometer, on heavy glass plate, with metal brackets, mercury tube, scale graduated on the glass plate; $1\frac{3}{4}$ inch wide by $9\frac{1}{2}$ inches long 2 50

1100 Window Thermometer, same as 1098, edge ornamented and polished; with double scales, Fahr. and Reau.:

$2\frac{1}{2}$ in. x 9 in.	$2\frac{1}{2}$ in. x 11 in.
$3 00	$3 50



1110-1112

1102 Minimum Thermometer, black walnut back, spirit tube, with index for registering the lowest point, silvered metal scale graduated in single degrees; length 10 inches..... $2 00

1104 Minimum Thermometer, same as 1102, on polished boxwood scale 3 00

1106 Minimum Thermometer, same as 1102, on solid porcelain scale..... 3 50

1108 Maximum and Minimum Thermometers, on boxwood back, spirit tube, with index for registering the minimum point, mercury tube with index for registering the maximum point; size 2¼ inches by 11 inches..... 6 00

Six's Self Registering Thermometer.

Six's Thermometer consists in a U shaped tube, having a spherical bulb at one end and a pear shaped bulb at the other; the spherical bulb is sometimes replaced by a long cylinder brought between the registering arms of the thermometer. The bulb end is completely filled with spirit, the pear-shaped end partially filled with spirit, while the lower end of the syphon is filled with mercury. A steel index, prevented from falling by a hair tied around it, acting as a spring, moves in the spirit in each of the side tubes.

The scale on the right hand for indicating the maximum temperature is as usual, having the zero at the bottom, while the scale on the left hand for indicating the minimum temperature is a descending one, the zero being at the top.

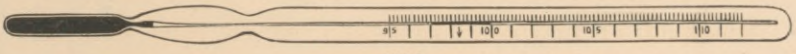
When setting the instrument to register extremes of heat and cold, the registers are brought into contact with the mercury by passing a small magnet down the outside of each tube. Then, should a rise of temperature take place, the spirit in the spherical bulb or cylinder expands, forcing the mercury down the left hand tube and causing it to rise in the right, which it does also partly by its own expansion. The reverse of this occurs when a diminution of temperature takes place, contraction in all the contained fluids result, and the registering mercury ascends in the left hand column pushing the index before it, where it remains until readjusted for the next observation. The end of the index nearest the mercury indicates the maximum and minimum temperatures which have been attained during the stated hours of observation.

1110 Six's Maximum and Minimum Thermometer, in black japanned case, graduated boxwood scale:

	8 in.	10 in.
Price each	$3 50	$4 00

1112 Six's Maximum and Minimum Thermometer, in white japanned case, graduated porcelain scale:

	8 in.	10 in.	12 in.	15 in.	20 in.
Price each	$6 00	$8 00	$10 00	$12 00	$15 00



1114

1114 Clinical Thermometer, with indestructible scale, self registering, graduations engraved on the glass tube, with constriction near the bulb to prevent the entrance of the registering index:

3½ in., 4 in., 5 in., or 6 in., in rubber case, each $2 50

1116 Cylindrical Glass Thermometer, insulated paper scale:

	7 in.	10 in.	12 in.
Price each	$0 50	$0 75	$1 00

1118 Cylindrical Glass Thermometer, same as 1116 with Fahr. and Reau. scales:

	7 in.	10 in.	12 in.
Price each	$0 75	$1 00	$1 25

1120 Cylindrical Glass Thermometer, same as No. 1116—

Graduated from 0 to 350°; length 12 inches. $1 25
" " 0 " 600° " " 1 50

1122 Cylindrical Glass Rod Thermometer, graduations engraved on the glass tube; length 12 inches:

	212°	400°	650°
Price each	$1 75	$2 00	$2 25

1125 Pocket Thermometer, insulated paper scale with brass screw cap and cylinder case, size 5 inches long by ½ inch diameter, 1 50

1126 Copper Rain Gauge with glass measuring jar graduated to 100ths of an inch 5 00

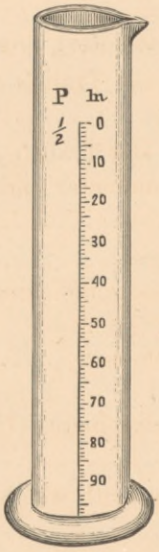
1127 Japanned Tin Rain Gauge, same as No. 1126 ..... 4 00

1128 Anemometer or Wind Gauge, portable size 25 00

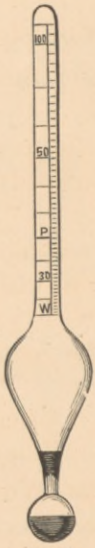
Hydrometers.



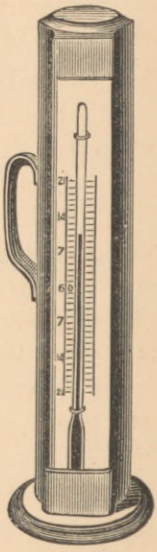
1160



1162



1180



1186-1188

1130 Glass Hydrometer for Acids (Acidimeter), each $0 75

1132 " " " Alkali 75

1134 " " " Ammonia 75

1136 " " " Bark (Barkometer) 75

1138 Copper " " " " " 7 00

1140 " " " Beer (Sacchrometer) 7 00

1142 Glass " " " " " 75

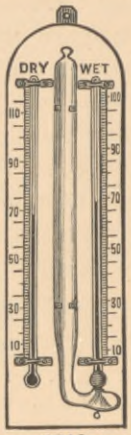
1144 Glass Hydrometer for Beer, with correction Thermometer attached 2 00

1146	Glass Hydrometer for Brine (Salometer)	$0 75
1148	" " " Cider	75
1150	" " " Dye Solutions	75
1152	" " " Ether	75
1154	" " " Glue	75
1156	" " " Lime-water	75
1158	" " " Lye	75
1160	" " " Milk (Lactometer)	75
1162	" Creamometer	1 00
1164	" Hydrometer for Oils (Animal)	75
1166	" " " " " (Petroleum)	1 00
1168	Glass Hydrometer for Oils (Petroleum), with Thermometer attached	2 00
1170	Glass Hydrometer for Sea Water (Salinometer)	1 00
1172	Copper " " " "	6 00
1174	Glass " " Shellac	75
1176	Glass Hydrometer for Silver Solution, with test glass in case (Actinometer)	75
1178	Glass Hydrometer for Spirits (Alcoholometer), proof scale	75
1180	Glass Hydrometer for Spirits, Proof and Tralle's or Custom House scales	1 00
1182	Glass Hydrometer for Spirits, Proof and Tralle's or Custom House scales, combined with Thermometer and correction scales	2 00
1184	Silver Hydrometer for Spirits, Proof scale	12 00
1186	Tin test can for Spirits, with Thermometer and correction scale	2 50
1188	Copper " " " " " " " "	4 00
1190	Glass Hydrometer for Syrup (Sacchrometer)	75
1192	Copper " " " "	6 00
1194	Glass " " Urine, with test glass in case (Urinometer)	75
1196	" " " Vinegar	75
1198	Glass Hydrometer for Wine and Must with weight, Oechle's scale	1 25
1200	Glass Hydrometer, Twaddle's scale No. 1	75
1202	" " " " Nos. 2, 3, 4, 5 or 6, each.	1 00
1204	Glass Hydrometer for Liquids lighter than water; Beaume's and the specific gravity scales combined	1 25
1206	Glass Hydrometer for Liquids heavier than water; Beaume's and the specific gravity scales combined	1 25

1208 Glass Hydrometer jars with lip, same as No. 1162, but without the graduated scale:

	6 in.	8 in.	10 in.	12 in.	16 in.	18 in.
Price each..	$0 25	$0 35	$0 50	$0 65	$0 75	$1 00

Mason's Hygrometers.



1212

1210 Mason's Hygrometer, black walnut back, wet and dry bulb Thermometers on silvered metal scales, glass siphon..... $3 50

1212 Mason's Hygrometer, boxwood back, scales for wet and dry bulb, graduated on the wood in single degrees, detachable glass siphon..... 5 00

USES TO WHICH MASON'S HYGROMETER IS APPLICABLE.

The use of this instrument in the sick chamber will be at once evident, as a fire kept up in a closed room naturally dries the air which the patient has to breathe, and it soon becomes either more *detrimental* or *beneficial* in many diseases of the *Lungs*, *Skin*, or *Intestinal Canal*. It is the duty of the medical attendant to point out those conditions of the body which will be benefited or injured by atmospheric influences, and suggest the means by which this can be obviated as far as art will allow; for in many cases life depends upon the temperature, state of dryness, or humidity of the climate or room in which an individual resides, which condition of the air it is the office of the Instrument to constantly register, and show, by mere inspection.

If the apartment is too *dry*, which is frequently the case in frosty weather, it will be necessary to maintain sufficient evaporation from a tea urn, or other convenient apparatus, while the Hygrometer points out when the proper degree of humidity has been attained; the urn is then removed, and may be brought into the room again when required. On the contrary, if the air be required remarkably dry, it may be rendered so, either by raising the temperature of the room, or resorting to those substances which absorb vapor most rapidly.

Thus with the aid of this Instrument (*as it indicates both the temperature, dryness, and humidity of the air*), an artificial LOCALITY may be produced by very simple and easy means; and those, whose circumstances, avocations, or family ties prevent them from seeking a *climate* suited to their peculiar constitution, can, to a very great extent, obviate the necessity by the assistance of the Instrument now submitted to the public, the deside-

ratum of which has been long felt and its *prospective uses* fully appreciated by the reflecting portion of the profession.

If the air be *very dry*, the difference between the two thermometers will be great; if moist, less in proportion; and when FULLY SATURATED *both will be alike.* For general purposes, it is only necessary to place the Instrument in a retired part of the room, away from the fire, and not exposed to the open doors or passages; but for nice experiments, the observation should be *always* made in the open air and in the *shade*, taking especial care that the Instrument be not influenced by the radiation of any heated bodies, nor any currents of air; the Dew-point is then found by the Rule given on page 98, and corresponds exactly with the *Dew-point Hygrometer*, an Instrument described in "Jameson's Journal," July, 1835, and modified by Dr. MASON.

Should the wind be strong upon the Instrument, the "Degrees of Dryness observed," multiplied by 2, gives the "Absolute Dryness" (the "Excess of Dryness" being omitted in the calculation), because a strong current of air makes the Instrument indicate the *Excess of Dryness*, which is necessary to be added, in a calm atmosphere.

If the absolute dryness of an apartment be required, the Instrument must be placed in the shade, and the Dew-point found, which subtracted from the temperature of the apartment, will give its Absolute Dryness. The reason is obvious, and arises from this law, namely, that air has its dryness doubled for every increase of temperature corresponding to 21° of Fahrenheit's thermometer, and in proportion for all intermediate temperatures.

It will detect the dampness of an apartment or bed.

The facility of registering Meteorological Observations by this Instrument, will probably induce many to avail themselves of its use, and tend to enlarge that branch of science.

In regulating the Hygrometical state of the air in hot-houses, green-houses, etc., as well as in manufactories, warehouses, malting-houses, and in the laboratory of the chemist, its use will be duly appreciated.

The advantages it offers at sea cannot be too forcibly pointed out. The objections made by naval men to the barometer, leaving them in doubt whether to expect wind or rain by the fall of the mercury, would in a great measure be obviated by the joint observation of the Hygrometer, because, if it indicate a relative degree of dryness, wind alone may be expected; if the contrary, then rain, or rain with wind, follows.

N. B.—The silk which covers the wet bulb, and thread which conveys the water to it, requires renewal about every month, and the fountain to be filled when requisite, with distilled water, or water that has been boiled and allowed to cool, by immersing it in a basin of the water till the apperture *only* is just upon the surface, and the water will flow in. If the Hygrometer is placed out of doors in frosty weather, the fountain had better be removed, or the freezing of water within it may break it; in this case a thin coating of ice may soon be formed on the wet bulb, which will last a considerable time, and may be renewed when requisite.

TABLES FOR THE USE OF DR. MASON'S HYGROMETER.

TABLE OF DEGREES.

By the TABLE OF DEGREES is shown, *without calculation*, the Absolute Dryness of the Atmosphere, in Degrees of Fahrenheit's Thermometer.

Observe the NUMBER OF DEGREES THE TWO THERMOMETERS DIFFER, which are here called "Degrees of Dryness observed," and found IN THE FIRST COLUMN of the table.

The *Second Column* merely contains the Figures which have been added to the Degrees of Dryness in the *First*, and multiplied by 2, to obtain THE ANSWER PUT DOWN IN THE THIRD COLUMN.

Mason's Hygrometer.	Degrees + excess × 2 = a' solute Dryness.		Leslie's Hygrometer compared with Mason's.
Degrees of Dryness Observed.	Excess of Dryness to be added.	Absolute Dryness existing.	
0	0.0	0.0	0
0.5	0.083	1.166	3
1	0.166	2.332	6
1.5	0.2495	3.499	9
2	0 333	4.666	12
2.5	0.4165	5.833	15
3	0.500	7.0	18
3.5	0.583	8.166	21
4	0.666	9.332	24
4.5	0.7495	10.499	27
5	0.833	11.666	30
5.5	0.9165	12.833	33
6	1.000	14.0	36
6.5	1.083	15.166	39
7	1.166	16.332	42
7.5	1.2495	17.499	45
8	1.333	18.666	48
8.5	1.4165	19 833	51
9	1.500	21.0	54
9.5	1.583	22.166	57
10	1.666	23.332	60
10.5	1.7495	24.499	63
11	1.833	25.666	66
11.5	1.9165	26.833	69
12	2.000	28.0	72
12.5	2.083	29.166	75
13	2.166	30.332	78
13.5	2.2495	31.499	81
14	2.333	32.666	84
14.5	2.4165	33.833	87
15	2.500	35.0	90
15.5	2.583	36.166	93
16	2.666	37.332	96
16.5	2.7495	38.499	99
17	2.833	39.666	102
17.5	2.9165	40.833	105
18	3.000	42.0	108
18.5	3.083	43.166	111
19	3.166	44.332	114
19.5	3.2495	45.499	117
20	3.333	46.666	120
20.5	3.4165	47.833	123
21	3.500	49.0	126
21.5	3.583	50.166	129
22	3.666	51.332	132
22.5	3.7495	52.499	135

EXAMPLE.—Temperature of the Air 57, wet bulb 54=3 degrees of dryness observed; then add 0.5 excess of dryness=3.5 and multiply by 2, which will give 7 degrees of absolute dryness existing.

To find the Dew-point.—Substract the Absolute Dryness from the Temperature of the Air. Example. 57—7=50 Dew-point.

To find the actual quantity of Vapor by weight in the Atmosphere.—Proceed as directed in the TABLE OF QUALITY.

The Comparison of Mr. Mason's with the *Dew-point Hygrometer, and of Sir John Leslie's, will be seen in the same line of the 1st, 3d, and 4th columns of the Table.

* Professor Daniel's Hygrometer is registered by the 3d column.

TABLE OF QUANTITY,

Showing the Weight, in Grains, of a Cubic Foot of Vapor, at different Temperatures, from 0 to 95 Fahrenheit.

Temp.	Weight in Grains.	Temp.	Weight in Grains.	Temp.	Weight in Grains.	Temp.	Weight in Grains.
0	0.856	24	1.961	48	4.279	72	8.924
1	0.892	25	2.028	49	4.407	73	9.199
2	0.928	26	2.096	50	4.535	74	9.484
3	0.963	27	2.163	51	4.684	75	9.780
4	0.999	28	2.229	52	4.832	76	10.107
5	1.034	29	2.295	53	5.003	77	10.387
6	1.069	30	2.361	54	5.173	78	10.699
7	1.104	31	2.451	55	5.342	79	11.016
8	1.139	32	2.539	56	5.511	80	11.333
9	1.173	33	2.630	57	5.679	81	11.665
10	1.208	34	2.717	58	5.868	82	12.005
11	1.254	35	2.805	59	6.046	83	12.354
12	1.308	36	2.892	60	6.222	84	12.713
13	1.359	37	2.979	61	6.399	85	13.081
14	1.405	38	3.066	62	6.575	86	13.458
15	1.451	39	3.153	63	6.794	87	13.877
16	1.497	40	3.239	64	7.013	88	14.230
17	1.541	41	3.371	65	7.230	89	14.613
18	1.586	42	3.502	66	7.447	90	15.005
19	1.631	43	3.633	67	7.662	91	15.432
20	1.688	44	3.763	68	7.899	92	15.786
21	1.757	45	3.893	69	8.135	93	16.186
22	1.825	46	4.022	70	8.392	94	16.593
23	1.893	47	4.151	71	8.658	95	17.009

TABLE OF CORRECTIONS,

To be used when the Term of Deposition, or DEW POINT, *differs from the Temperature of the Air in the Shade.*

Difference of Temp.	Correction.	Difference of Temp.	Correction.	Difference of Temp.	Correction.	Difference of Temp.	Correction.
0	0.0000	14	1.0291	27	1.0562	40	1.0834
1	1.0020	15	1.0312	28	1.0583	41	1.0854
2	1.0041	16	1.0333	29	1.0604	42	1.0875
3	1.0062	17	1.0354	30	1.0625	43	1.0896
4	1.0083	18	1.0375	31	1.0646	44	1.0917
5	1.0104	19	1.0396	32	1.0667	45	1.0937
6	1.0125	20	1.0417	33	1.0687	46	1.0958
7	1.0146	21	1.0437	34	1.0708	47	1.0979
8	1.0167	22	1.0458	35	1.0729	48	1.1000
9	1.0187	23	1.0479	36	1.0750	49	1.1021
10	1.0208	24	1.0500	37	1.0771	50	1.1042
11	1.0229	25	1.0521	38	1.0792	51	1.1062
12	1.0250	26	1.0542	39	1.0813	52	1.1083
13	1.0271						

RULE.—To find the weight of moisture in a cubic foot of air at any time, divide the *weight in Grains* found opposite the *Temperature*, corresponding to the Dew-point at the time, in the *Table of Quantity*, by the *Correction* found opposite to *Difference of Temperature* in Table of Corrections, corresponding to the absolute dryness existing at the time.

TO FIND THE QUANTITY OF VAPOR BY WEIGHT EXISTING IN THE ATMOSPHERE.

PROBLEM.—The Temperature of the Atmosphere in the shade, and of the *Dew-point* being given to find the quantity of vapor in a cubic foot of air.

If the temperature of the Air and the *Dew-point* correspond, which is the case when both thermometers are alike, and the air consequently saturated with moisture, then in the *table of quantity* opposite to the temperature will be found the corresponding weight of a cubic foot of vapor expressed in grains.

EXAMPLE.—Let the temperature of the air be 70° Fah., and the *Dew point* the same. Then opposite the temperature you have the weight of a cubic foot of vapor—8,392 grains.

But if the temperature of the air be different from the *Dew-point*, a correction is necessary to find the exact weight.

EXAMPLE.—Suppose the *Dew-point* be 70° Fah., as before, but the temperature of the air in the shade be 80°, then the vapor has suffered an expansion due to an excess of 10°, which requires a correction.

We find in the *table of corrections* for 10 degrees is 1.0208.

Then divide 8,392 grains at the *Dew-point*, viz., 70° by the correction corresponding to the degrees of absolute dryness, viz., 10°, and you have the actual weight of vapor existing.

EXAMPLE. $\frac{8.3920}{1.0208}$ —8.221 grains existing, which subtracted from the weight of vapor, corresponding to the temperature of 80° Fah., gives the number of grains required for saturation at that temperature.

EXAMPLE.—11.333 grains at the temperature of 80° Fah.
8.221 grains contained in the air.

3.112 grains required for saturation.

To find the relations of these conditions on the natural scale of humidity [complete saturation being 1,000], divide the weight of vapor at the *Dew-point* by the weight at the temperature of the air, the quotient gives the parts of 1.000 the degrees of saturation.

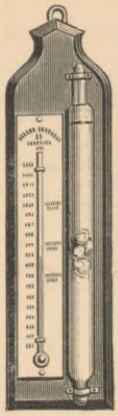
EXAMPLE. $\frac{\text{8.392 grains at the Dew-point—70}}{\text{11.333 grains at the temp. of the air 80}}$ =7.40 degrees of humidity. saturation being 1.000.

The principles of these calculations will be found in Professor Daniel's Meteorological Essays—in Mr. Anderson's Essay on Hygrometry, in the Edinburgh Encyclopedia, vol. XI., and in the Edinburgh Journal of Science, vol. VII., page 43, in an excellent article on the Dew-point Hygrometer, by Mr. Foggo, from which the table of corrections has been partly subtracted. The Table of Quantity by Weight has been taken from Professor Daniel's Work on Meteorology, to which the reader is referred for further particulars.

Barometers.



1214



1216

1214 Fitch's Cottage Barometer, with correct Thermometer attached. $1 00

This pleasing little instrument consists of a metallic house about 7 inches high, containing a male and female figure so arranged that in fine weather the female appears; while rains or stormy weather are announced by the appearance of the male.

1216 Storm-Glass, black walnut back, with 7 inch mercury Thermometer on silvered metal dial..... $1 00

1218 Storm-Glass, black walnut back, with 8 inch mercury Thermometer on silvered metal dial..... 1 25

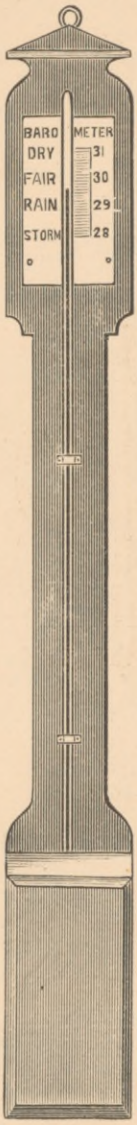
1220 Storm-Glass, boxwood back, mercury Thermometer, scale graduated on the wood in single degrees..... 3 50

1222 Mercurial Barometer, black walnut frame, 36 inches long..... 3 50

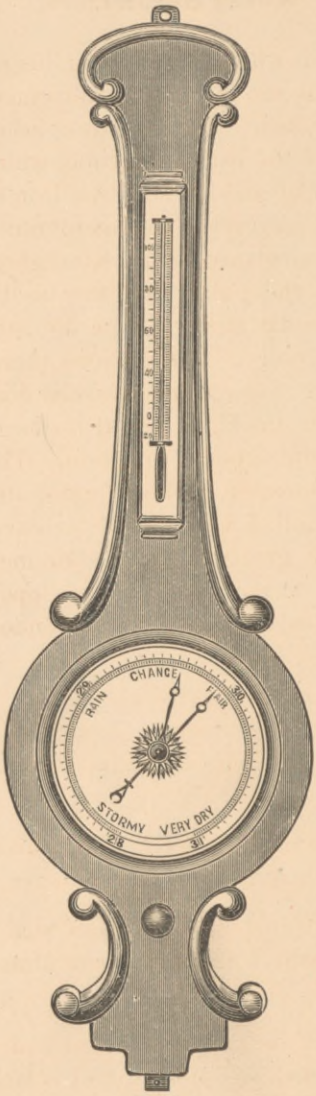
1224 Mercurial Barometer, black walnut frame, 36 inches long, with Thermometer attached..... 4 00

1226 Mercurial Barometer, cherry wood frame, 36 inches long, with Thermometer attached, barometer and thermometer scales graduated on opaque glass..... 5 00

1228 Mercurial Barometer, enclosed polished black walnut frame, 36 inches long, with Thermometer attached, barometer and thermometer scales graduated on opaque glass..... 10 00



1222



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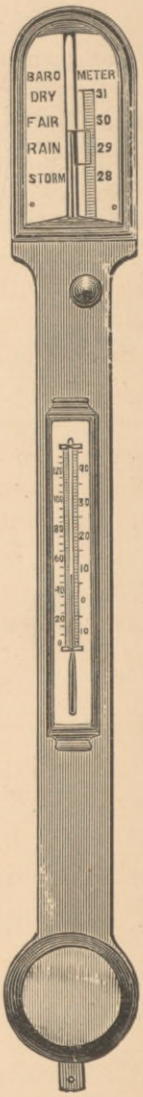
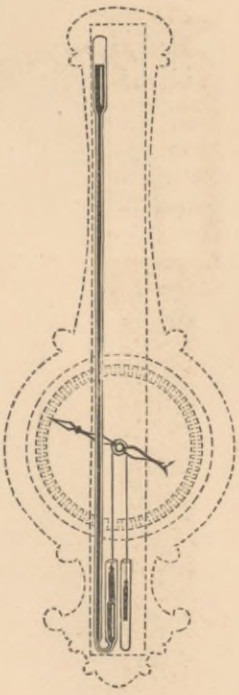


1232

1230 Mercurial Barometer, oak or rosewood frame, with Thermometer atttached ; barometer and thermometer scales graduated on ivory ; single vernier adjustable by rack and pinion.... 15 00

1232 Mercurial Barometer, walnut frame, with Thermometer attached ; barometer and thermometer scales graduated on enameled glass ; single vernier adjustable by rack and pinion. 20 00

Wheel Barometers.



This is an instrument in which the varying height of a column of mercury is shown by the movement of a needle on a circular dial. This is accomplished by adopting the siphon for the barometer tube, which is concealed behind the dial and frame. An iron or glass float sustained by the mercury in the open branch is suspended by a counter-balance somewhat lighter than itself. The axis of the pulley has the needle attached to it, and consequently moves the needle with the rise and fall of the mercury. It is obvious, therefore, that if the atmospheric pressure increases the float falls and the needle turns to the right, and if it diminishes the needle turns in the opposite direction. The divisions on the scale represent inches, tenths, and hundredths in the rise and fall of a column of mercury, and these can be read with great facility, as one inch occupies the space of six or more on this very open scale, acccording to size of dial; they are recommended where facility of reading is desired.

1234 Wheel Barometer, 8 inch silvered metal dial, convex mirror, spirit level, oat-beard hygrometer, and attached spirit thermometer $10 00

1236 Wheel Barometer, 8 inch silvered metal dial, beaded scroll pattern, and attached 10 inch thermometer 15 00

1238 Wheel Barometer, 10 inch silvered metal dial, convex mirror, spirit level, oat-beard hygrometer, and attached spirit thermometer 20 00

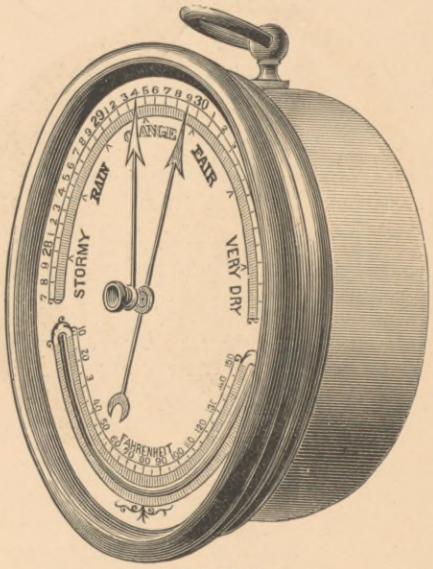
1240 Wheel Barometer, 12 inch silvered metal dial, convex mirror, spirit level, oat-beard hygrometer, and attached spirit thermometer 25 00

Aneroid Barometers.

The action of the Aneroid Barometer depends on the pressure of the atmosphere on a circular metallic box hermetically sealed and having a slightly elastic top; the vacuum serving the purpose of the column of mercury in the ordinary barometer. The actual movement of the vacuum box is very slight, but by the use of a series of levers, this is so multiplied,

that a movement of 1-220th of an inch carries the hand through three inches on the dial. This form of Barometer is highly recommended for its sensitiveness, accuracy, and portability; it works in any position in which it may be placed and is the least liable to injury or derangement of any instrument made for the same purposes.

To the tourist in estimating mountain heights and to the engineer in ascertaining the depth of mines, its aid is invaluable.



1246-1248

1242 Aneroid Barometer, heavy brass case, enameled card, closed dial—

	2½ in.	3½ in.	5 in.	6½ in.	8 in.
Price each.....	$3 50	$4 00	$5 00	$6 00	$7 00

1244 Aneroid Barometer, heavy brass case, enameled card, closed dial, with straight thermometer attached—

	5 in.	6½ in.	8 in.
Price each.....	$6 00	$7 00	$8 00

1246 Aneroid Barometer, heavy brass case, enameled card, closed dial, with curved thermometer attached—

	3½ in.	5 in.	6½ in.	8 in.
Price each.....	$7 50	$10 00	$12 50	$15 00

1248 Aneroid Barometer, heavy brass case, silvered metal, closed dial, with curved thermometer attached—

	3½ in.	5 in.	6½ in.	8 in.
Price each	$8 50	$11 00	$13 50	$16 00



1250-1252

1250 Aneroid Barometer, heavy brass case, enameled card, open face dial, with curved thermometer attached—

	5½ in.	6½ in.
Price each	$12 50	$15 00

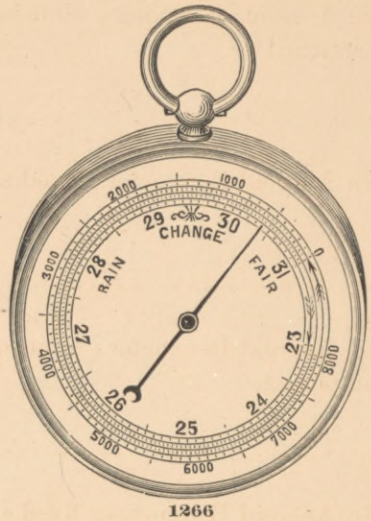
1252 Aneroid Barometer, heavy brass case, silvered metal, open face dial, with curved thermometer attached—

	5½ in.	6½ in.
Price each	$15 00	$18 00

1254 Stands in various designs for Aneroid Barometers from $5 to $25.

Pocket Aneroid Barometers.

These Barometers are all compensated for variations of temperature; the cases are either gilt or nickel plated as may be desired; the dials are of metal, handsomely silvered, and each barometer is furnished with a neat morocco case.



1266

1256 Pocket Aneroid Barometer, closed face, ordinary range barometer scale—

	1¾ in.	2½ in.
Price each	$14 00	$14 50

1258 Pocket Aneroid Barometer, closed face, ordinary range barometer scale, curved thermometer attached—

	1¾ in.	2½ in.
Price each	$15 00	$15 50

1260 Pocket Aneroid Barometer, open face, ordinary range barometer scale—

	1¾ in.	2½ in.
Price each	$14 50	$15 00

1262 Pocket Aneroid Barometer, open face, ordinary range barometer scale, curved thermometer attached—

	1¾ in.	2½ in.
Price each	$15 50	$16 00

1264 Pocket Mining Aneroid Barometer, raised dial, scale of feet from 2,000 below the sea level to 6,000 above, curved thermometer attached, 2½ inches.....$22 50

1266 Pocket Mountain Aneroid Barometer, fixed altitude scale to 6,000, 8,000, or 10,000 feet—

	1¾ in.	2½ in.
Price each	$15 00	$16 00

1268 Pocket Mountain Aneroid Barometer; same as No. 1266, with curved thermometer attached—

	1¾ in.	2½ in.
Price each	$16 00	$17 00

1270 Pocket Mountain Aneroid Barometer; fixed altitude scale to 15,000 feet—

	1¾ in.	2½ in.
Price each	$16 50	$17 50

1272 Pocket Mountain Aneroid Barometer; same as No. 1270, with curved thermometer attached—

	1¾ in.	2½ in.
Price each	$17 50	$18 50

1274 Pocket Mountain Aneroid Barometer; fixed altitude scale to 20,000 feet—

	1¾ in.	2½ in.
Price each	$17 00	$18 00

1276 Pocket Mountain Aneroid Barometer; same as No. 1274, with curved thermometer attached—

	1¾ in.	2½ in.
Price each	$18 00	$19 00

1278 Pocket Mountain Aneroid Barometer; raised dial, revolving altitude scale to 10,000 feet; curved thermometer attached—

	1¾ in.	2½ in.
Price each	$17 50	$18 00

1280 Pocket Mountain Aneroid Barometer; same as No. 1278; altitude scale to 15,000 feet—

	1¾ in.	2½ in.
Price each	$19 00	$20 00

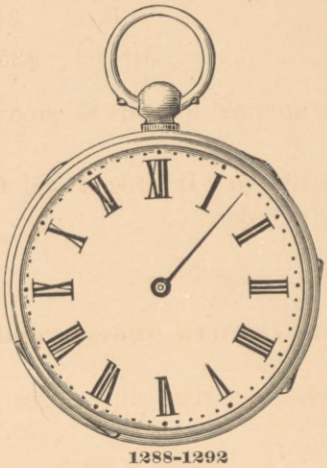
1282 Pocket Mountain Aneroid Barometer; same as No. 1278; altitude scale to 20,000 feet—

	1¾ in.	2½ in.
Price each	$22 50	$25 00

1284 Pocket Mountain Aneroid Barometer; raised dial, revolving altitude scale to 15,000 feet; curved thermometer and Singer's Patent Night Compass attached—

	1¾ in.	2½ in.
Price each	$26 00	$28 00

Pedometers.

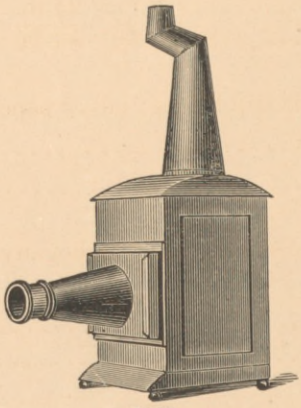


1288-1292

The Pedometer accurately measures the distance walked by the wearer. Full directions accompany each instrument.

1286	Pedometer, in German silver case	$15 00
1288	" " " " crystal glass	16 50
1290	" in silver case	25 00
1292	" " " crystal glass	26 50

Magic Lanterns.



1296

1294 Magic Lantern; heavy japanned tin case, single condenser and object-glass, with 1 dozen glass slides in box:

Size of condensers	1¾ in.	2 in.	2½ in.	3 in.	3½ in.
Price each	$3 50	$6 50	$9 00	$12 00	$16 50

1296 Magic Lantern; heavy japanned tin case, double condensers and object glasses; solar argand lamp, with 1 dozen glass slides in box:

Size of condensers	3 in.	3½ in.	4 in.	4½ in.
Price each	$18 00	$25 00	$38 00	$50 00

These Magic Lanterns are used in pairs to produce the dissolving view effect.

Magic Lanterns, with the Oxy-Hydrogen and Oxy-Calcium Light, for exhibition purposes, made to order.

Magic Lantern Slides (Comic).

1298 Magic Lantern slides, on glass slips, edges paper bound; 1 dozen slides in box:

Width of slide	1¾ in.	2 in.	2¼ in.	2¾ in.	3 in.	3¼ in.
Price per dozen	$1 00	$1 50	$1 75	$2 25	$2 50	$2 75

1300 Magic Lantern Slides, on glass slips; edges paper bound; subjects printed in outline and colored; 1 dozen slides in box:

Width of slides	1½ in.	1¾ in.
Price per dozen	$1 50	$2 00

1302 Magic Lantern Slides, in mahogany frames; subjects printed in outline and colored; 1 dozen slides in box:

Width of slides	2 in.	2½ in.	3 in.	3½ in.	4½ in.
Price per dozen	$4 00	$6 00	$8 00	$10 00	$15 00

1304 Magic Lantern comic slip Slides; edges paper bound:

Width of slides	2 in.	2½ in.
Each	$0 25	$0 40

1306 Magic Lantern comic slip Slides, in mahogany frames; 4 inches wide:

Each	$0 60
Per dozen	6 50

1308 Magic Lantern Slides, photographic Scriptural views, from the Old and New Testament; handsomely colored and mounted on glass-plates 3¼ inches square; picture 3 inches in diameter, to fit in carrier slide No. 1316, holding two pictures:

Each	$1 25
Per dozen	12 00

1310 Magic Lantern Slides; photographic scenery views; mounted on glass plates, as No. 1308:

Each	$1 00
Per dozen	9 00

1312 Magic Lantern Slides; photographic scenery views, handsomely colored; mounted on glass plates, as No. 1308:

Each	1 75
Per dozen	18 00

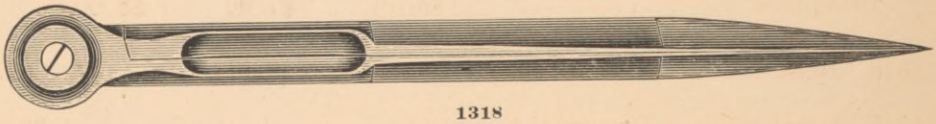
1314 Magic Lantern Slides; statuary finely photographed; mounted as No. 1308:

Each	1 50
Per dozen	15 00

1316 Carrier Slide to hold slides, from No. 1308 to No. 1314 50

A large assortment of views constantly on hand.

Mathematical Instruments.



1318

1318 Brass Dividers:

	4¼ in.	5½ in.	6¼ in.
Price, each	25c.	30c.	35c.

1320 Brass Dividers, steel points:

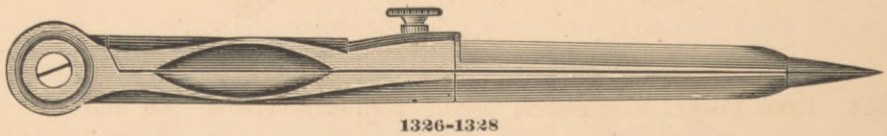
	4¼ in.	5½ in.	6¼ in.
Price, each	40c.	50c.	60c.

1322 German Silver Dividers, steel points:

	4¼ in.	5½ in.	6¼ in.
Price, each	50c.	60c.	75c.

1324 German Silver Dividers, steel joints and points:

	4¼ in.	5½ in.	6¼ in.
Price, each	75c.	85c.	$1 00

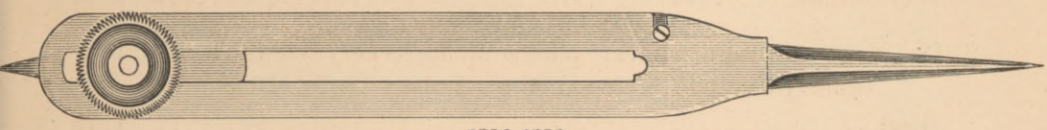


1326-1328

1326 Brass Hair Spring Dividers, 4½ in $2 00
1328 German Silver Hair Spring Dividers, 4½ in 2 25

1330 Brass Pocket Dividers, steel points screwing into sheath.... $1 50

1332 German Silver Pocket Divider, same as No. 1330..... 1 75



1334-1336

1334 Brass Proportional Dividers, in case:

	6½ in.	7 in.	8 in.
Price, each.....	$2 25	$2 50	$3 00

1336 German Silver Proportional Dividers, in case:

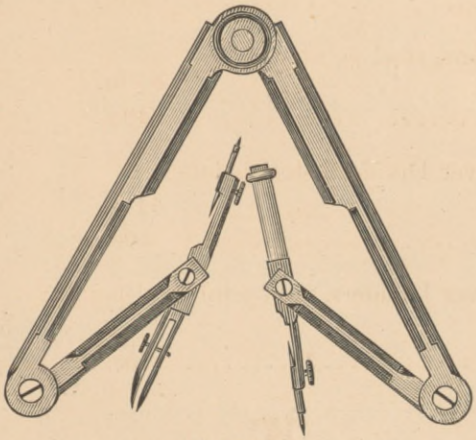
	6½ in.	7 in.	8 in.
Price, each	$2 75	$3 00	$3 75

1338 German Silver Proportional Dividers, with rack movement, in case:

	6½ in.	7 in.	8 in.
Price, each.....	$6 50	$7 00	$8 00

1340 Brass Triangular Compasses, to take off three points..... $3 50

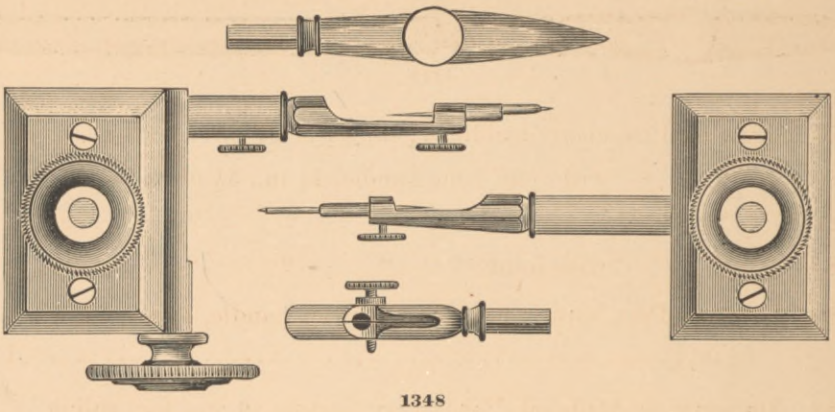
1342 German Silver Triangular Compasses..... ..... 4 00



1344-1346

1344 Brass Pocket Compasses, needle points, reversible pen and pencil points, in case..... 5 00

1346 German Silver Pocket Compasses, same as No. 1344, in case. 6 00



1348

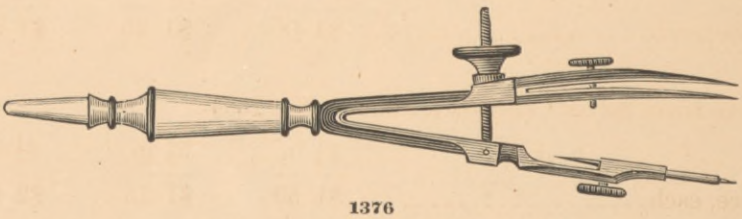
1348 German Silver Beam Compasses, needle points, pen and pencil points, in case $7 00



1352-1358

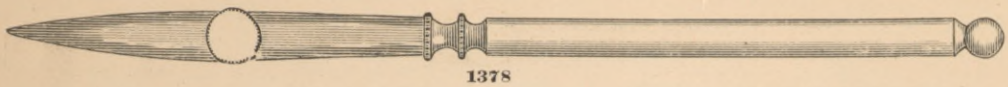
Price, each.

1350 Brass Dividers, with handle, needle point $0 50
1352 " Pencil, " " 50
1354 " Pen, " " 50
1356 German Silver Dividers, with handle, needle point 75
1358 " Pencil, " " 75
1360 " Pen, " " 75
1362 Brass Dividers, with handle, fixed needle point, removable leg, pen and pencil point 75
1364 German Silver Dividers, same as No. 1362 ..... 1 00



1376

1366 Steel Spring Dividers, with ivory handle 1 75
1368 " Bow Pencil, " 1 75
1370 " " Pen, " 1 75
1372 " Dividers, needle points, with ivory handle 2 50
1374 " Bow Pencil, " " 2 50
1376 " " Pen, " " 2 50



1378

1378 Drawing Pen, ebony handle, $4\frac{1}{4}$ in., $5\frac{1}{2}$ or $6\frac{1}{4}$ in..... $0 20

1380 " with pin, bone handle, $4\frac{1}{4}$ in., $5\frac{1}{2}$ or $6\frac{1}{4}$ in..... 25

1382 " " ivory " " " 50

1384 " with joint " " " " 75

1386 Drawing Pen, with joint and pin, ivory handle, $4\frac{1}{4}$ in., $5\frac{1}{2}$ or $6\frac{1}{4}$ in..... 1 00

1388 Drawing or Railroad Pen, ivory handle, 6 in., for ruling parallel lines..... 2 50

1390 Dotting Pen, with three (3) extra wheels..... 2 00

1392 Brass Compasses, with one jointed leg, the other leg removable; pen and pencil points, extension bar and key:

	$4\frac{1}{4}$ in.	$5\frac{1}{2}$ in.	$6\frac{1}{4}$ in.
Price, each.....	50c.	65c.	80c.

1394 Brass Compasses, with one jointed leg, needle pointed, the other leg removable; pen and pencil points, extension bar and key:

	$4\frac{1}{4}$ in.	$5\frac{1}{2}$ in.	$6\frac{1}{4}$ in.
Price, each.....	$0 80	$1 00	$1 25

1396 German Silver Compasses, same as No. 1392:

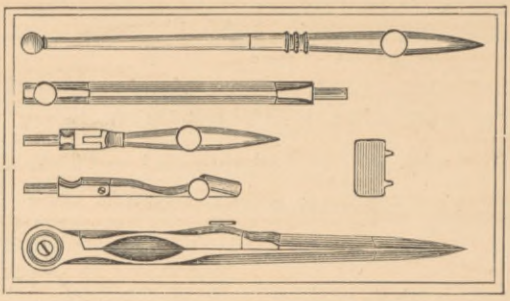
	$4\frac{1}{4}$ in.	$5\frac{1}{2}$ in.	$6\frac{1}{4}$ in.
Price, each.....	$1 00	$1 25	$1 50

1398 German Silver Compasses, same as No. 1394:

	$4\frac{1}{4}$ in.	$5\frac{1}{2}$ in.	$6\frac{1}{4}$ in.
Price, each.....	$1 50	$1 75	$2 00

1400 German Silver Compasses, steel joints, with one jointed leg, needle pointed; the other leg removable; pen and pencil points, extension bar and key:

	$4\frac{1}{4}$ in.	$5\frac{1}{2}$ in.	$6\frac{1}{4}$ in.
Price, each.....	$2 50	$3 00	$3 50



1406

Mathematical instruments in mahogany cases. These cases contain, besides the instruments enumerated, a Protractor, Rule and Crayon-holder.

1402 Brass Drawing Set, consisting of one pair 4½-inch Compasses, with removable leg, pen and pencil point and key..... $0 60

1404 Brass Drawing Set, same as No. 1402, with extension bar to Compasses, in addition..... 75

1406 Brass Drawing Set, consisting of one pair 4½-inch Compasses, with removable leg, extension bar, pen and pencil points; one Drawing Pen..... 1 00

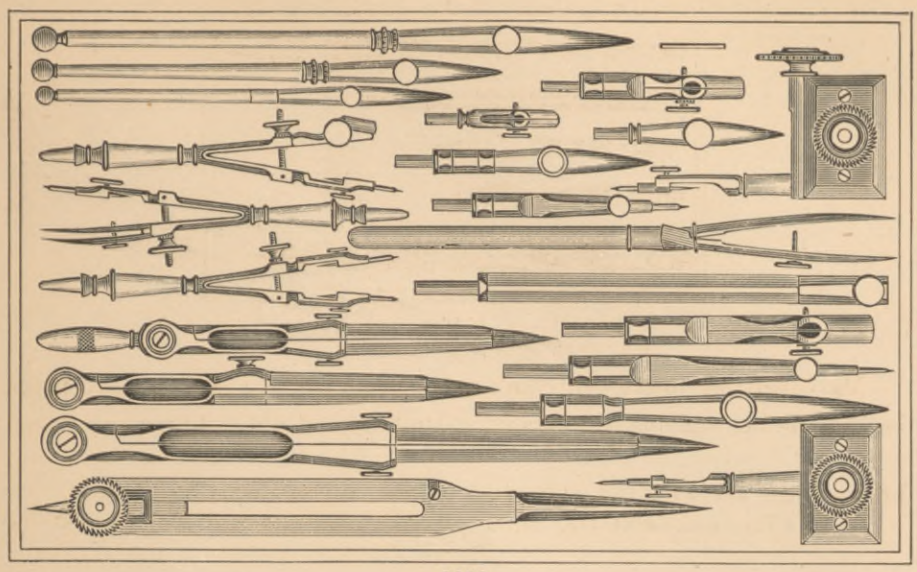
1408 Brass Drawing Set, consisting of one pair 4½-inch Compasses, with removable leg, extension bar, pen and pencil points; one pair 4-inch Dividers, one Drawing Pen..... 1 25

1410 Brass Drawing Set, consisting of one pair 5½-inch Compasses, with removable leg, extension bar, pen and pencil points; one pair 5-inch Dividers, one Drawing Pen..... 1 50

1412 Brass Drawing Set, consisting of one pair 6¼-inch Compasses, with removable leg, extension bar, pen and pencil points; one pair 5½-inch Dividers, one Drawing Pen..... 1 75

1414 Brass Drawing Set, consisting of one pair 5½-inch Compasses, with removable leg, extension bar, pen and pencil points; one pair of 4¼-inch Dividers; one pair 3½-inch Bow Compasses, with pen and pencil points, one Drawing Pen..... 2 00

1416 Brass Drawing Set, consisting of one pair 6¼-inch Compasses, with removable leg, extension bar, pen and pencil points; one pair of 5½-inch Dividers; one pair 4-inch Bow Compasses, with pen and pencil points, one Drawing Pen..... 2 25



1454

Mathematical Instruments in velvet lined trays, fitting in rosewood cases, with lock and key; each case contains, besides the instruments enumerated, a Protractor, Key and Rule.

1418 Brass Drawing Set, consisting of one pair 6¼-inch Compasses, with removable leg, extension bar, pen and pencil points; one pair 4½-inch Dividers; one pair 3½-inch Compasses, with removable leg, pen and pencil points; one pair 3-inch Bow Compasses, with removable leg, pen and pencil points; 1 Drawing Pen..... $2 50

1420 German Silver Drawing Set, same as No. 1418..... 5 00

1422 Brass Drawing Set, same as No. 1418, with the addition of one 7-inch Proportional Divider..... 5 00

1424 German Silver Drawing Set, same as No. 1418, with the addition of one 7 inch Proportional Divider..... 7 50

1426 Brass Drawing Set, consisting of one pair 5½-inch Compasses, having one leg jointed, and with fixed needle point, the other leg removable, extension bar, pen and pencil points; one pair 4½-inch Dividers; one Bow Pen and one Bow Pencil, with fixed needle points; one 4¼-inch Drawing Pen; one 6¼-inch Drawing Pen..... 6 00

1428 German Silver Drawing Set, same as No. 1426..... 7 50

1430 Brass Drawing Set, same as No. 1426, but with Compasses 6¼ inches and 5½ inches long..... 6 50

1432 German Silver Drawing Set, same as No. 1430 ..... $8 00

1434 Brass Drawing Set, consisting of one pair 5½-inch needle-point Compasses, with removable leg, extension bar, pen and pencil points; one pair 4-inch Dividers, one Spring Bow Pen, one Drawing Pen 4 00

1436 German Silver Drawing Set, same as No. 1434 ..... 5 50

1438 Brass Drawing Set, same as No. 1434, but with Compasses 6¼ inches and 4¼ inches long 4 50

1440 German Silver Drawing Set, same as No. 1438 ..... 6 00

1442 Brass Drawing Set, consisting of one pair 6¼-inch needle-point Compasses with removable leg, extension bar, pen and pencil points; one pair 4½-inch Dividers; one 6-inch Proportional Divider; one pair 3½-inch needle point Bow Compasses with removable leg, pen and pencil points; one Spring Bow Pen, one 5-inch Drawing Pen, one 6-inch Drawing Pen 8 00

1444 German Silver Drawing Set, same as No. 1442 ..... 10 00

1446 German Silver Drawing Set, consisting of one pair 6¼-inch needle-point Compasses, with removable leg, extension bar, pen and pencil points; one pair 4½-inch Dividers; one 7½ inch Proportional Divider; one pair 3½-inch needle point Bow Compasses, with removable leg, pen and pencil points; one Spring Bow Pen, one 4-inch, one 5-inch, and one 6-inch Drawing Pen 16 00

1448 German Silver Drawing Set, same as No. 1446, but with 6¼-inch and 3½-inch Compasses, having both legs removable, and with needle points; and one pair 4½-inch Dividers replaced by one 4½-inch Hair-line Dividers 20 00

1450 German Silver Drawing Set, consisting of 1 pair 6¼-inch needle-point Compasses, with removable leg, extension bar, pen and pencil points; 1 pair 4½-inch Hair-line Dividers; one 7-inch Proportional Divider; 1 pair 4½-inch needle-point Bow Compasses, with pen and pencil points; 1 Spring Bow Dividers; 1 Spring Bow Pen; 1 Spring Bow Pencil; one 4-inch, one 5-inch, and one 6-inch Drawing Pen 22 50

1452 German Silver Drawing Set, same as No. 1450, but with 6¼-inch and 4½-inch Compasses, having both legs removable, and with needle points 25 00

1454 German Silver Drawing Set, consisting of 1 pair 6¼-inch needle-point Compasses, with removable leg, extension bar, pen and pencil points; 1 pair 4½-inch Hair-line Dividers; one 7-inch Proportional Divider; 1 pair 4½-inch needle-point Bow Compasses, with pen and pencil points; 1 Spring Bow Dividers; 1 Spring Bow Pen; 1 Spring Bow Pencil; one 4-inch, one 5-inch, and one 6-inch Drawing Pen; one 6-inch jointed Drawing Pen; 1 pair needle-pointed Beam Compasses, with pen and pencil points..... $35 00

1456 Pocket Brass Drawing Set, in neat cloth-covered case, consisting of 1 pair 4¼-inch needle-point Compasses, with removable leg, extension bar, pen and pencil point; one pair 3½-inch Dividers; 1 Spring Bow Pen; 1 Drawing Pen 3 50

1458 Pocket German Silver Drawing Set, same as No. 1456..... 5 00

1460 Pocket Brass Drawing Set, same as No. 1456, but with Compasses 5½ inches long..... 4 00

1462 Pocket German Silver Drawing Set, same as No. 1460..... 5 50

1464 Pocket Brass Drawing Set, same as No. 1456, but with Compasses 6¼ inches long..... 4 50

1466 Pocket German Silver Drawing Set, same as No. 1464..... 6 00

Protractors.

1468 Horn Protractors, semi-circular, ½°:

	4¼ in.	5¼ in.	6¼ in.	7 in.	8 in.	8¾ in.
Price, each.....	$0 20	$0 30	$0 40	$0 50	$0 60	$0 70

1470 Horn Protractors, circular, ½₀:

	4 in.	5¼ in.	6¼ in.
Price, each.....	$1 50	$1 75	$2 00

1472 Brass Protractors, semi-circular, ½₀:

	4¼ in.	5¼ in.	6½ in.	7 in.	8 in.	8¾ in.
Price, each.....	$0 25	$0 50	$0 75	$1 00	$1 25	$1 50

1474 German Silver Protractors, semi-circular ½°:

	4¼ in.	5¼ in.	6¼ in.	7½ in.	8¾ in.
Price, each.....	$0 75	$1 00	$1 25	$1 50	$1 75

1476 Boxwood Protractor, Square, 1°; 8 scales, $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$, 1 in.; scale of chords, diagonal scales, and scales of 30, 35, 40, 50, and 60 parts of the inch; 6 inches long, $1\frac{3}{4}$ inch wide $1 25

1478 Ivory Protractor, Square 1°; same scales as No. 1476; 6 inches long, $1\frac{3}{4}$ inch wide 2 25

Drawing Tacks.

1480 Drawing Tacks; brass heads, steel points, screwed in and riveted:

Diameter of head	$\frac{3}{8}$ in.	$\frac{7}{16}$ in.	$\frac{1}{2}$ in.	$\frac{9}{16}$ in.	$\frac{5}{8}$ in.
Per doz.	25c.	30c.	35c.	40c.	45c.

1482 Drawing Tacks; German silver heads, steel points, screwed in and riveted:

Diameter of head	$\frac{3}{8}$ in.	$\frac{7}{16}$ in.	$\frac{1}{2}$ in.	$\frac{9}{16}$ in.	$\frac{5}{8}$ in.
Per doz.	40c.	45c.	50c.	60c.	75c.

Triangles and Curves.

1484 Pearwood Triangles, plain, each $0 25
1486 Inlaid Wood Triangles, each 40
1488 Hard Rubber Triangles, each, from 25
1490 Whitewood Curves, each, from 25
1492 Hard Rubber Curves, each, from 50

T Squares.

1494 Mahogany T Square, fixed head:

Blade	18 in.	24 in.	30 in.	36 in.	48 in.	54 in.	60 in.
Price, each	$0 50	$0 75	$1 00	$1 25	$1 50	$1 75	$2 00

1496 Mahogany T Square, swivel head:

Blade	18 in.	24 in.	30 in.	36 in.	48 in.	54 in.	60 in.
Price, each	$1 00	$1 25	$1 50	$1 75	$2 00	$2 25	$2 50

Parallel Rulers.

1498 Ebony Parallel Rulers, made of the best seasoned ebony; brass arms:

	6 in.	9 in.	12 in.	15 in.	18 in.	21 in.	24 in.
Price, each	$0 25	$0 50	$0 75	$1 00	$1 25	$1 50	$1 75

1502 Ivory Parallel Rulers, German silver arms:

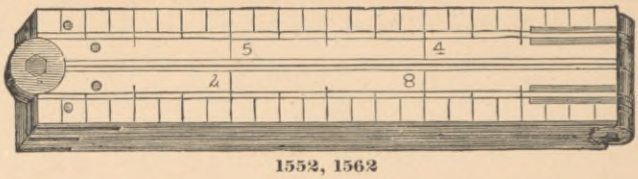
	6 in.	9 in.	12 in.
Price, each	$1 50	$2 50	$3 50

Drawing Scales.

1504	12-inch Boxwood School Rule, divided 8ths and 16ths of inches	$0 15
1506	6-inch Boxwood Drawing Scale, divided $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, 1 inch to the foot	50
1508	12-inch Boxwood Drawing Scale, divided $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, 1 inch to the foot	75
1510	24-inch Boxwood Drawing Scale, divided $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, 1 inch to the foot	2 00
1512	12-inch Boxwood Sector, folding to 6 inches	1 00
1514	12-inch Boxwood Chain Scale, divided 10 x 50, 20 x 40, or 30 x 60 parts to the inch	1 50
1516	2-inch Boxwood Offset Scale to match No. 1514	60
1518	12-inch Boxwood Gunter's Scale	75
1520	24-inch Boxwood Gunter's Scale	1 00
1522	6-inch Boxwood Triangular Scale, divided $\frac{3}{32}$, $\frac{3}{16}$, $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{2}$, 3 inch to the foot, and 16ths of inch, each	1 25
1524	12-inch Boxwood Triangular Scale, same division as No. 1522	1 75
1526	24-inch Boxwood Triangular Scale, same division as No. 1522	4 50
1528	6-inch Boxwood Triangular Scale, divided 10, 20, 30, 40, 50, 60, or 20, 30, 40, 50, 60, 80 parts to the inch, each	1 25
1530	12-inch Boxwood Triangular Scale, same division as No. 1528	1 75
1532	24 " " " "	4 50
1534	Folding Boxwood Metre Rule, 1 metre long, divided into Millimetres, Centimetres, and Decimetres on one side, inches on the other	50
1536	Folding Ivory Metre Rule, divided same as No. 1534	1 75
1538	6-inch Ivory Plotting Scale	75
1540	6 " Drawing " divided $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, 1 inch to the foot	2 00
1542	12 " " " " " "	3 50
1544	12 " Sector folding to 6 inches	2 50
1546	12 inch Ivory Chain Scale, divided 10 x 50, 20 x 40 or 30 x 60 parts to the foot	4 00
1548	2-inch Ivory Offset Scale to match No. 1546	1 00
1550	12 " Universal Scale, 12 Scales	4 00

Special Scales made to order.

Rules.

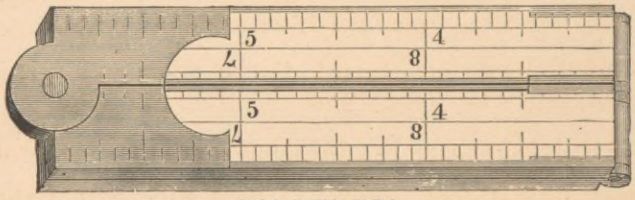


1552, 1562

1552 Boxwood Rule, 1 foot, 4 fold, $\frac{5}{8}$ inch wide, divided into 8ths and 16ths of inches..... $0 25

1554 Boxwood Rule, 1 foot, 4 fold, $\frac{5}{8}$ inch wide, divided into 16ths of inches on one side, Decimetres, Centimetres and Millimetres on the other..... 50

1556 Boxwood Rule, 1 foot, 4 fold, $\frac{5}{8}$ inch wide, divided same as No. 1552. Edge, brass bound..... 65



1560, 1572, 1574

1558 Boxwood Rule, 1 foot, 4 fold, $\frac{3}{4}$ inch wide, divided into 8ths, 10ths, 12ths and 16ths of inches. Edge brass bound..... 1 00

1560 Boxwood Rule, 1 foot, 4 fold, $\frac{13}{16}$ inch wide, divided into 8ths, 10ths, 12ths and 16ths of inches. Edge brass bound..... 1 25

1562 Ivory Rule, 1 foot, 4 fold, brass mounted, $\frac{5}{8}$ inch wide, divided into 8ths and 16ths of inches..... 75

1564 Ivory Rule, 1 foot, 4 fold, German Silver mounted, $\frac{5}{8}$ inch wide, divided into 8ths and 16ths of inches..... 1 00

1566 Ivory Rule, 1 foot, 4 fold, German Silver mounted, $\frac{5}{8}$ inch wide, divided into 8ths and 16ths of inches. Joints German Silver bound..... 1 25

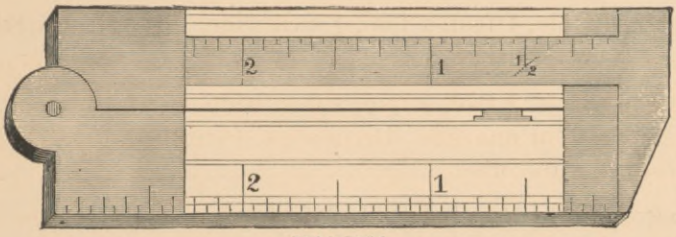
1568 Ivory Rule, 1 foot, 4 fold, German Silver mounted, $\frac{5}{8}$ inch wide, divided into 8ths and 16ths of inches. Edge German Silver bound..... 2 50

1570 Ivory Rule, 1 foot, 4 fold, German Silver mounted, $\frac{3}{4}$ inch wide, divided into 8ths, 10ths, 12ths and 16ths of inches.... 2 00

1572 Ivory Rule, 1 foot, 4 fold, German Silver mounted, $\frac{13}{16}$ inch wide, divided into 8ths, 10ths, 12ths and 16ths of inches and 100ths of a foot..... 3 00

1574 Ivory Rule, 1 foot, 4 fold, German Silver mounted, $\frac{13}{16}$ inch wide, divided into 8ths, 10ths, 12ths and 16ths of inches. Edge German Silver bound $4 00

Caliper Rules.



1576-1584

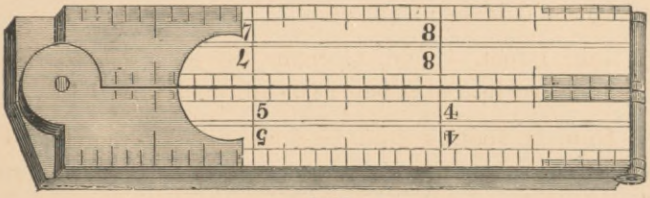
1576 Boxwood Rule, 6-inch, 2 fold, $\frac{7}{8}$ inch wide, with Caliper; divided into 8ths, 10ths, and 16ths of inches. 50

1578 Boxwood Rule, 1 foot, 4 fold, 1 inch wide, with Caliper; divided into 8ths, 10ths, 12ths, and 16ths of inches..... 1 00

1580 Boxwood Rule, same as No. 1578, but with edge brass bound. 1 25

1582 Boxwood Rule, 1 foot, 4 fold, $\frac{13}{16}$ inch wide, with Caliper; divided into 8ths, 10ths, 12ths, and 16ths of inches, and 100ths of a foot..... 1 50

1584 Ivory Rule, 6-inch, 2 fold, German Silver mounted, $\frac{7}{8}$ inch wide, with Caliper; divided into 8ths, 10ths, and 16ths of inches..... 1 25



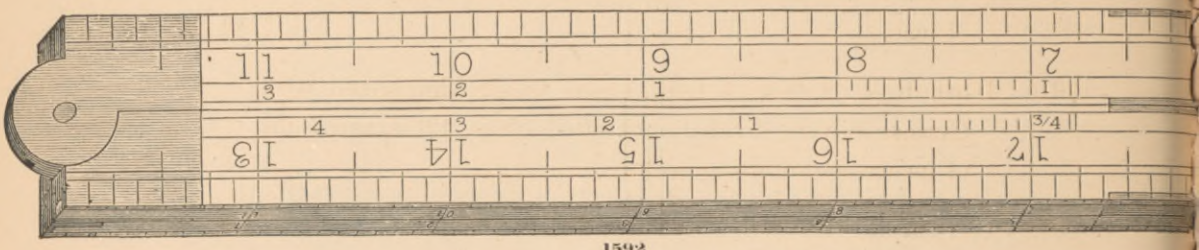
1588

1586 Ivory Rule, 1 foot, 4 fold, German Silver mounted, $\frac{7}{8}$ inch wide, with Caliper; divided into 8ths, 10ths, 12ths, and 16ths of inches 3 00

1588 Ivory Rule, 1 foot, 4 fold, German Silver mounted, $\frac{13}{16}$ inch wide, with Caliper; divided into 8ths, 10ths, 12ths, and 16ths of inches, and 100ths of a foot..... 3 50

1590 Ivory Rule, same as No. 1588, but with edge German Silver bound..... 5 00

Two Foot Rules.



1592

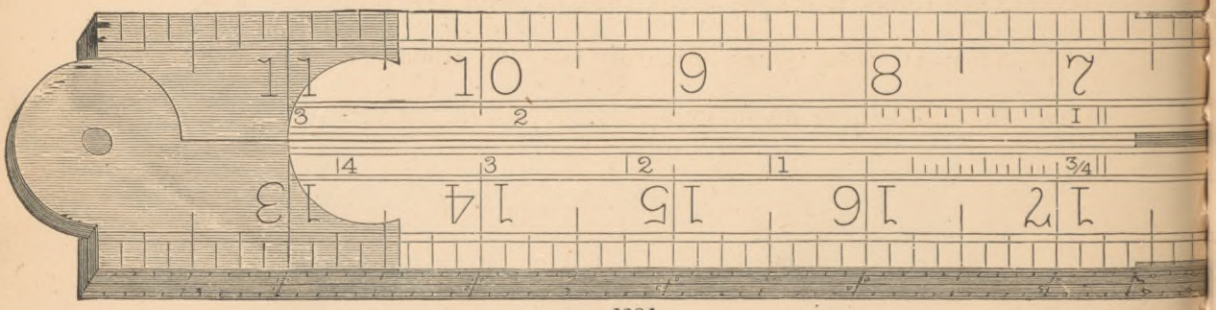
1592 Boxwood Rule, 2 foot, 4 fold, 1 inch wide; divided into 8ths and 16ths of inches $0 30

1594 Boxwood Rule, 2 foot, 4 fold, 1 inch wide; divided into 8ths and 16ths on one side; Decimetres, Centimetres, and Millimetres on the other..... 50

1596 Boxwood Rule, 2 foot, 4 fold, $\frac{3}{4}$ inch wide; divided into 8ths, 10ths, 12ths, and 16ths of inches; edge brass bound..... 75

1598 Boxwood Rule, 2 foot, 4 fold, 1 inch wide; divided into 8ths, 10ths, and 16ths of inches, and drafting scales..... 1 00

1600 Boxwood Rule, 2 foot, 6 fold, $\frac{3}{4}$ inch wide; divided into 8ths and 16ths of inches 75



1604

1602 Boxwood Rule, 2 foot, 4 fold, $1\frac{3}{8}$ inch wide; divided into 8ths and 16ths of inches 50

1604 Boxwood Rule, 2 foot, 4 fold, $1\frac{3}{8}$ inch wide; divided into 8ths, 10ths, and 16ths of inches, and drafting scales..... 75

1606 Boxwood Rule, 2 foot, 4 fold, $1\frac{3}{8}$ inch wide; divided into 8ths, 10ths, and 16ths of inches, and drafting scales; edge brass bound 1 25

1608 Ivory Rule, 2 foot, 4 fold, $\frac{7}{8}$ inch wide, joints bound with German Silver; divided into 8ths, 10ths, 12ths, and 16ths of inches $4 00

1610 Ivory Rule, 2 foot, 4 fold, 1 inch wide; edge bound with German Silver; divided into 8ths, 10ths, 12ths, and 16ths of inches, and drafting scales 5 00

1612 Ivory Rule, same as No. 1610, but $1\frac{3}{8}$ inch wide 7 00

Gauge Rods.

FOR MEASURING THE CONTENTS OF BARRELS, ETC.

1614 3-foot Satinwood Gauge Rod, 120 gallons $0 75

1616 4 " " " 300 " 1 00

1618 3-foot Lancewood Gauge Rod, 120 gallons, ivory face, heavy brass point 1 75

1620 3-foot Lancewood Gauge Rod, 120 gallons, ivory face, brass back, heavy brass point 2 50

1622 3-foot Gauge Rod same as No. 1620, but with steel point .. . 3 50

1624 3-foot All Steel Gauge Rod, ivory face, 120 gallons 7 00

1626 Brass Slide to fit any of above 1 00

Wantage Rods.

1628 8-line Satinwood Wantage Rod $0 75

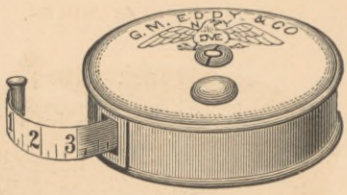
1630 8 " Boxwood, " 1 00

1632 12 " Satinwood, " 1 00

1634 12 " Boxwood, " 1 25

1636 1 Complete Set of C. H. Gauger's tools, comprising six pieces 25 00

Tapes.



1638

1638 Pocket Measuring Tapes in Nickel Plated Cases, with Spring and Stop; the Tapes are made of the best linen, $\frac{3}{8}$ inch wide:

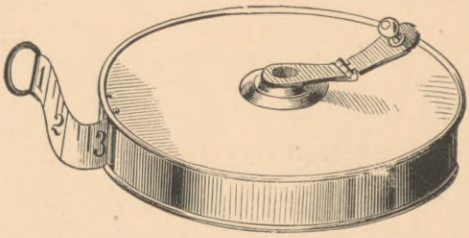
	3 ft.	5 ft.	6 ft.	8 ft.	12 ft.
Price, each	$0 75	$0 85	$1 00	$1 25	$1 50

1640 Pocket Measuring Tapes, in Nickel Plated Cases, with Spring and Stop; the Tapes are made of the finest Tempered Spring Steel, $\frac{1}{4}$ inch wide:

	3 ft.	4 ft.	5 ft.	6 ft.	8 ft.	12 ft.	15 ft.
Price, each	$1 50	$1 75	$2 00	$2 25	$2 50	$3 75	$4 00

ASSES' SKIN, BRASS BOUND CASE.

WITH FOLDING HANDLES.



1642, 1644, 1646

1642 Cotton Tapes, $\frac{1}{2}$ inch wide:

	25 ft.	30 ft.	40 ft.	50 ft.	66 ft.	75 ft.	80 ft.	100 ft.
Price, each	$0 40	$0 45	$0 50	$0 60	$0 70	$0 80	$0 90	$1 00

1644 Best Corded Linen Tapes, $\frac{1}{2}$ inch wide:

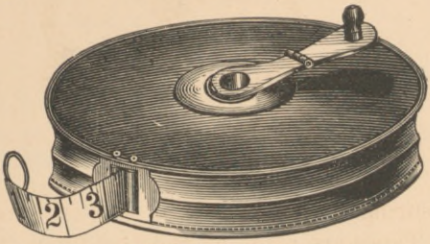
	33 ft.	40 ft.	50 ft.	66 ft.	75 ft.	100 ft.
Price, each	$0 75	$0 85	$1 00	$1 25	$1 35	$1 50

1646 Surveyor's Extra Heavy Holland Tapes, $\frac{5}{8}$ inch wide:

	50 ft.	66 ft.	75 ft.	100 ft.
Price, each	$1 50	$2 00	$2 25	$2 50

PATENT LEATHER CASE.

WITH FOLDING HANDLES.



1648, 1650, 1652

1648 Best Cotton Tapes, ½ inch wide:

	25 ft.	30 ft.	40 ft.	50 ft.	66 ft.	75 ft.	80 ft.	100 ft.
Price, each....	$0 50	$0 55	$0 60	$0 70	$0 80	$0 90	$1 00	$1 25

1650 Best Corded, All Linen Tapes, ½ inch wide:

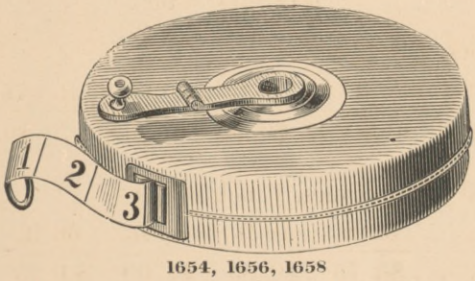
	33 ft.	40 ft.	50 ft.	66 ft.	75 ft.	100 ft.
Price, each.... ...	$0 75	$0 85	$1 00	$1 25	$1 35	$1 50

1652 Surveyors' Extra Heavy Holland Tapes, ⅝ inch wide:

	50 ft.	66 ft.	75 ft.	100 ft.
Price, each.....	$1 50	$2 00	$2 25	$2 50

BEND LEATHER CASE.

WITH FOLDING HANDLE.



1654, 1656, 1658

1654 Extra Heavy Corded Tapes, ⅝ inch wide:

50 ft.	66 ft.	75 ft.	100 ft.	
$1 75	$2 00	$2 25	$2 50	each.

1656 Enameled Linen Tapes, $\frac{5}{8}$ inch wide:

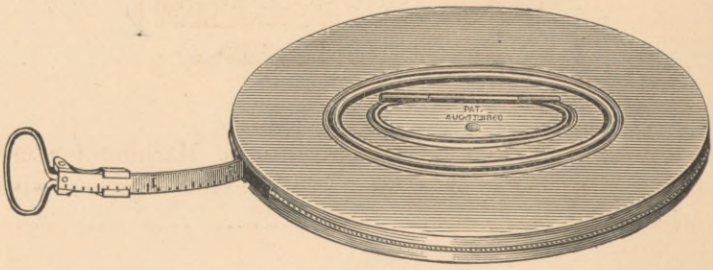
50 ft.	66 ft.	75 ft.	100 ft.	
$2 50	$2 75	$3 00	$3 50	each.

1658 Patent Metallic Tapes, $\frac{5}{8}$ inch wide:

25 ft.	33 ft.	40 ft.	50 ft.	66 ft.	75 ft.	100 ft.	
$2 00	$2 25	$2 60	$3 00	$3 75	$4 25	$5 00	each.

PAINE'S PATENT STANDARD STEEL TAPES.

IN LEATHER COVERED CASES, FLUSH HANDLE.



1660

1660 Finest Tempered Spring Steel Tapes:

	33 ft.	50 ft.	66 ft.	75 ft.	100 ft.
Price, each.....	$5 50	$8 00	$10 00	$12 00	$15 00

1662 Graduated Compensating Handles for various temperatures for Tapes, No. 1660.. .....per pair $3 00

Tapes of any special or foreign measure made to order.

Magnets.

1664 Horseshoe Magnets, best quality:

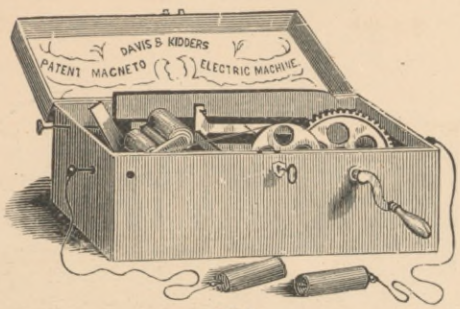
	2½ in.	3 in.	4 in.	5 in.	6 in.	7 in.
Price, each.....	$0 25	$0 35	$0 50	$0 75	$1 00	$1 25

	8 in.	9 in.	10 in.	11 in.	12 in.
Price, each.....	$1 50	$2 00	$2 50	$3 00	$3 50

1666 Bar Magnets:

2½ in.	3 in.	4 in.	5 in.	6 in.	7 in.	8 in.
$0 75	$1 00	$1 25	$1 50	$2 00	$2 50	$3 00

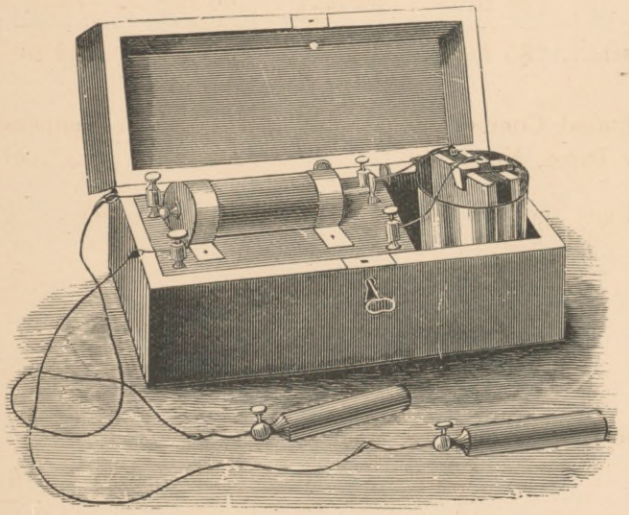
Magneto-Electric Machine.



1670

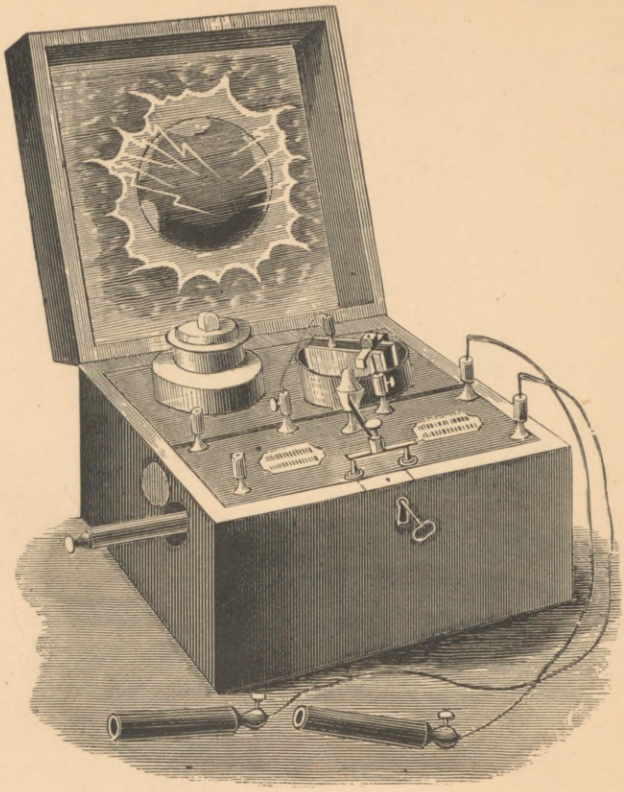
1670 Davis & Kidders' Patent Magneto-Electric Machine for use in the treatment of diseases of the Nervous System, with book explaining its use..... .....$10 00

Galvano-Electric Machines.



1672

1672 Galvano-Electric Machine, for use in the treatment of diseases of the Nervous System.....$12 00



1675

1675 Galvano-Electric Machine, for use in the treatment of diseases of the Nervous System.....$15 00

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