The Spencer

BRIGHT-LINE HAEMACYTOMETER

Doctors and laboratory technicians throughout America acclaim this new "Bright-Line" Haemacytometer. The lines are more visible, blood corpuscles are distributed more evenly, and eyestrain is virtually eliminated. Instead of grey lines on a glaring light background, the Spencer Haemacytometer provides a soft grey background with bright lines. This is due to the lines being ruled in a metal surface which is fused into the usual glass surface.

Due to the difference in surface tension characteristics of the metal surface and a glass surface, the corpuscles are distributed approximately 16% more evenly on the metal surface—a factor of great importance in making blood counts.

Another important feature is the slight concavity on the lower side of the chamber, directly under the rulings. This eliminates the possibility of scratches appearing on the under surface of the chamber, directly under the rulings and impairing the efficiency of operation.

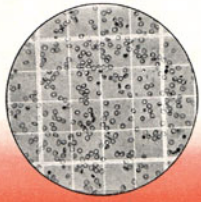
The advantages of the "Bright-Line" Haemacytometer in use, are:

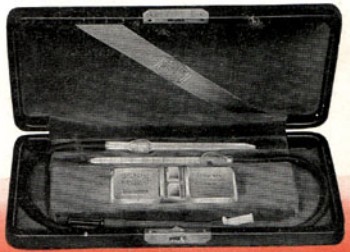
1. Lines readily visible—no effort required to find them.
2. More even distribution of corpuscles.
3. No need to stop down condenser—lines visible at any diaphragm opening.
4. A *definite* improvement in visibility of particles in solution.
5. Eyestrain eliminated—a *real* contribution to the comfort of the person making the blood count.

The United States Bureau of Standards' requirements are adhered to rigidly.

No. 1482-B Spencer "Bright-Line" Haemacytometer, complete with double improved Neubauer counting chamber, two cover glasses, Thoma Diluting Pipettes for both red and white corpuscles, in leatherette case ..... $ 12.00
No. 1482-C—Same with aluminum case 12.00
No. 1482-A—Same with cardboard case 10.50
No. 1482-D—Same with leather case 13.50
No. 1492—Double Improved Neubauer Counting Chamber only, with two cover glasses ..... $ 8.00
No. 1456—Thoma Pipette, 1-100 for red corpuscles. 1.00
No. 1458—Thoma Pipette, 1-10 for white corpuscles. 1.00
No. 1457—Trenner Pipette for red corpuscles 2.00
No. 1459—Trenner Pipette for white corpuscles 2.00
No. 1461—Cover Glass for double ruling ..... .50
Bureau of Standards' Certification or double counting chamber and cover glasses, extra 3.00
Bureau of Standards' Certification of Thoma Pipette, each extra 1.50
Bureau of Standards' Certification of Trenner Pipette, each extra 1.40

New construction makes lines appear white against a dark background.





A. S. ALOE COMPANY

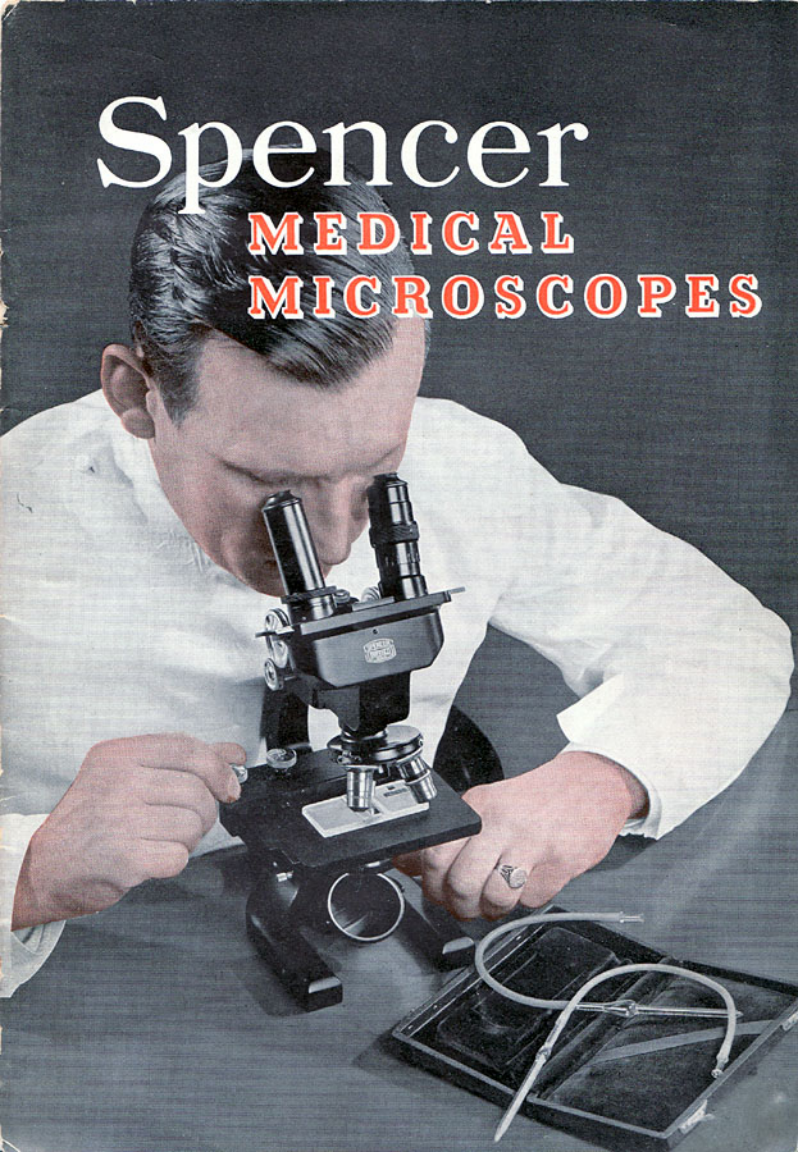
Los Angeles, Calif. ST. LOUIS, MO. Kansas City, Mo.

M-79-37

PRINTED IN U.S.A.

Spencer

MEDICAL MICROSCOPES



ERRATA SHEET
for
Spencer Lens Company
M-70 Catalog

Effective February 1, 1937

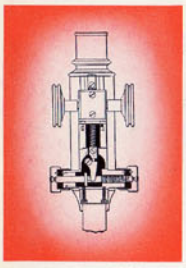
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Page Eight—Price revisions

Cat. No.	Price
Paired objectives	
285-J—per pair	$19.00
286-J—per pair	19.00
288-J—per pair	19.00
289-J—per pair	19.00
290-J—per pair	20.00
Unit A	46.00
Unit C	46.00
Paired Eyepieces	
134P—per pair	6.00
138P—per pair	6.00
142P—per pair	6.00
144P—per pair	6.00
135P—per pair	12.50
137P—per pair	12.50
139P—per pair	12.50
57-R	107.00
57-V	132.00
57-W	132.00
57-X	138.50
57-Z	138.50
57-AR	93.00
57-AV	118.00
57-AW	118.00
57AX	124.50
57-AZ	124.50
57-BR	88.00
57-BV	113.00
57-BW	113.00
57-BX	119.50
57-BZ	119.50

Spencer Optical Quality

Made available through mechanical perfection



Micrometer Type Fine Adjustment

The micrometer screw and nut, recognized as the best means for obtaining fine measurements or delicate movements, was adapted over twenty years ago for making fine focusing adjustments on Spencer microscopes. Twenty-seven threads engaged at all times insure enduring accuracy. Slide bearing metals of different grain structures, with grooves to retain the lubricant, aid the firm smoothness of operation. Since the action of the screw is applied only in moving the body tube upward, the possibility of breaking the cover glass is greatly reduced.

Dual-Cone Nosepiece

The nosepiece has a bearing made of two widely separated opposed cones instead of the ordinary single cone construction. It affords twice the usual bearing surface, lengthening its life and assuring at all times correct alignment of the microscope objectives.

Mechanical Stage

Smooth action of the mechanical stage is necessary for the examination of objects at high magnifications. One bearing for stage movement is chromium plated, the other brass, giving a bearing action of chromium on brass, instead of brass on brass. This eliminates any possibility of "binding" and produces a smooth sliding action in the Spencer mechanical stage.

The slide clips grip the microscope slide securely. The movable clip on the left is controlled by the tension of a concealed spring. The entire mechanical stage is finished in black enamel to prevent glare.

The range of movement provides for the complete examination of a large 3″ x 2″ slide. The mechanical stage can easily be racked off when a plain stage is desired.

Fork-Type Substage

The Spencer substage is unique. The arm supporting the substage optics is in the shape of a fork for facilitating the entrance and exit of the substage parts. This makes the interchange of the condenser and dark field illuminator extremely easy and assures permanent and proper alignment in relation to the optical system. These substage condensers are held firmly in place with no possibility of their being tilted out of alignment as may be the case where the condenser is held in a ring by friction.

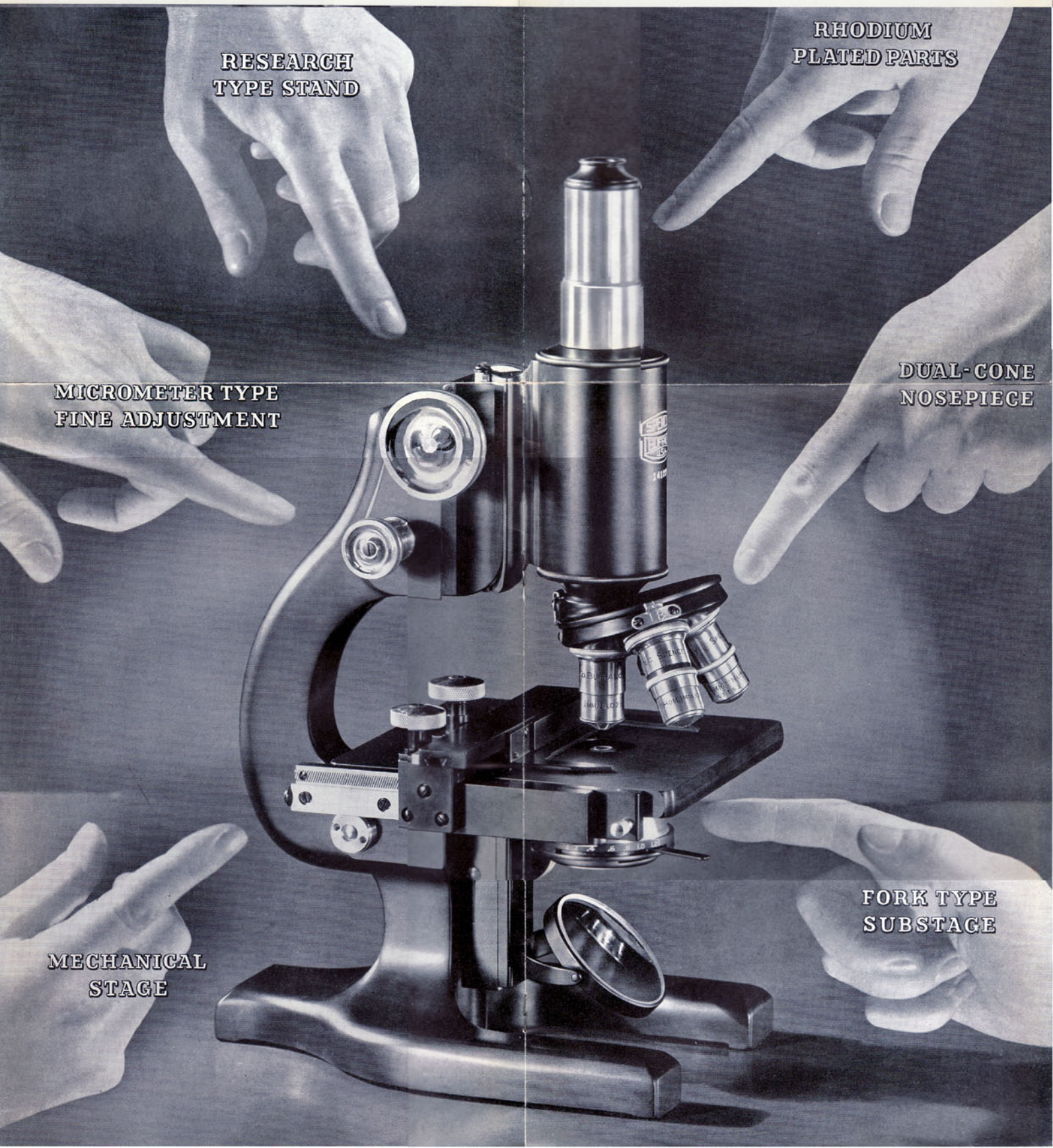


Research-Type Stand

The arm, base and pillar are constructed as in a research microscope, perfectly proportioned and balanced. The arm is of forged brass that will never change in form. The stand is rigid and stable—a beautiful instrument, built to serve you faithfully.

Rhodium Plated Parts

The adjustment buttons and other plated parts are now rhodium plated. Rhodium is a precious metal quite similar to platinum and is widely used in jewelry. It resembles, and has the warmth of silver—but its great value to you is that it has the indestructibility and resistance to chemical reagents characteristic of metals of the platinum group. For example: chromium is attacked readily by hydrochloric acid while rhodium is not affected.



Spencer Quality

C. A. Spencer
the first American microscope maker



The Spencer Trunnion Microscope such as made in 1847

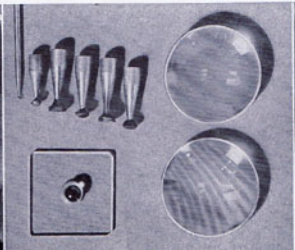
Charles A. Spencer (1813-1881) was the first American microscope maker. While still a boy, he ground lenses on a home-made lathe. In 1847 he started the commercial production of microscopes. His primary interest was in the construction of microscope optics, but he was forced to make microscope stands so that physicians and other scientists, for whom he made optics, would obtain the rigidity, smoothness of adjustment, and convenience needed for best optical results. This perfection of optical quality in an instrument of utmost convenience — an ideal with C. A. Spencer — became a policy of the Spencer organization. Today this policy is fostered by the Research and Development Department of the Spencer Lens Company where new ideas originate and suggestions from far and wide have the consideration of experts. Here, the new is fused with the good of past practice in perfecting instruments.

Full usefulness of a scientific organization requires the application of the most modern manufacturing methods such as are found in the Spencer organization; for, after an optical product has been designed, the optical system

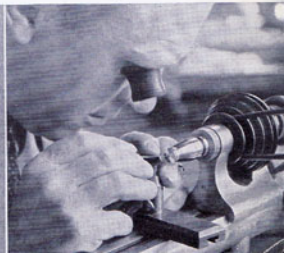
A—*Computing the Lens System*



B—*The Test for Surface Accuracy*



C—*Mounting the Lens in its Cell*



. . . *arising from Ideals, Science and Facilities*

computed and the model approved, it must be manufactured in quantities large enough to be economical. It must pass the critical tests that assure complete and lasting satisfaction.

In addition to mechanical and optical equipment, complete manufacturing facilities must include experts in all phases of optical work, and experienced craftsmen who are capable of carrying out the most advanced and ideal plans.

Special skill is required to grind and polish lenses accurate to a millionth of an inch. The illustration B shows lenses that make up a 1.8mm. oil immersion microscope objective. They are mounted ready for polishing on the ends of spindles. For each lens surface there is a master test glass such as the one shown below the lenses. The workman grinds and polishes each lens surface until the bands of color (Newton's rings) spread out, forming an even straw color as observed through its particular test glass. The large lenses at the right side of B illustrate the appearance of a satisfactory lens (upper) and an unsatisfactory lens (lower). Newton's ring test (interference of light waves) is the most critical measure of accuracy known to science.

Lenses must be accurately centered and mounted permanently into their cells as shown in illustration C—a mechanical operation consummated while watching a reflected point of light in the swiftly turning lens.

The assembly of an objective, illustration D, demands a practical knowledge of the various phenomena of light; for here, correction in the spacing of lenses is accomplished. A laboratory method of checking optical quality of microscope objectives is shown at E —sometimes called the "star test". By means of such a test, faults in design or workmanship may be detected.

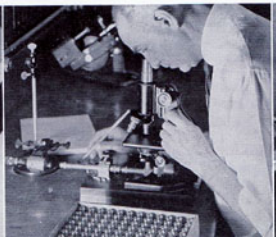
The illustration F shows part of the Inspection Department where the microscope is used exactly as you will use it. The quality of the optical system is verified by inspectors who are skilled microscopists. The mechanical perfection is confirmed by the smooth, positive operation of all adjustments.

The Spencer idealism, scientific knowledge and manufacturing facilities — revealed in enduring instruments—form the basis for the confidence men of science have placed in the Spencer organization since 1847.

D—*Assembly of the Lens Elements*



E—*The "Star Test" for Optical Quality*



F—*Final Inspection*



THE REQUIREMENTS FOR MEDICAL WORK

Examination of Tissue for Diagnosis

The many different magnifications obtainable with a medical microscope aid the doctor in the study of tissue and cell structure. The parfocal mounting of the objectives facilitates quick change of magnifications without the need for refocusing.

Direct and Differential Blood Count and Examination

For making white blood cell percentage counts and the regular examination and count of red cells, the 4mm. objective is ideal. It provides the doctor with the correct magnification for precision and convenience in this type of observation. The "Bright-Line" Haemacytometer reduces eyestrain, improves the distribution of blood cells in the counting chamber and makes fast work practical.

Diagnosis of Bacterial Diseases

The study of bacteria is facilitated by modern medical microscopes. The problems in this field have called forth the best efforts of the microscope manufacturers as well as the best technique on the part of the doctors. High magnification, correct illumination and excellent resolution of fine detail are now obtained with ease.

One of the medical developments that has received much public commendation is the recent effort toward early diagnosis of syphilis. The medical microscope with a dark field condenser is considered the best means of identifying the living Treponema pallidum—difficult to identify except with the best optical equipment.

Identification of Diseases of Parasitic Origin

The astute diagnostician requires the finest of optical quality. In the identification of fungi, protozoa and other parasites, he is assisted by the critical definition resulting from the correction of microscope optics for the various aberrations.

OPTICAL FEATURES OFFERED BY SPENCER

Many Useful Magnifications

The Spencer medical microscopes provide a full range of magnifications. The 16mm. objective is divisible. The front lens element may be removed, leaving an efficient low power 32mm. objective which, with the two eyepieces, gives four relatively low powers useful in the study of large sections in histology, embryology and neurology. Four higher powers are obtained with the other two objectives.

Objective	*Magnification of Objective*	*Eyepiece Magnification*	*Total Magnification*
Divisible 16mm. 32mm.	4X	6X	24X
Divisible 16mm. 32mm.	4X	10X	40X
Divisible 16mm. 16mm.	10X	6X	60X
Divisible 16mm. 16mm.	10X	10X	100X
4mm.	44X	6X	264X
4mm.	44X	10X	440X
1.8mm.	95X	6X	570X
1.8mm.	95X	10X	950X



4mm. Objective for Blood Work

The Spencer 4mm. objective was designed especially for blood examination and counts. Sufficient magnification is obtained without the need for the oil immersion objective. It has a long working distance, more than is necessary to focus through the relatively thick cover glasses used on haemacytometers. Hence there is little danger of breaking the cover glass.



Resolution and High Numerical Aperture

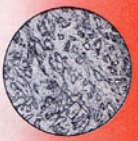
Resolving power in a microscope is its ability to separate fine detail in a specimen. Resolving power is a function of the numerical aperture (N.A.) and the highest practical N.A. gives the best detail if all other factors are equal. The lowest numerical aperture in the system limits the resolving power of the microscope.

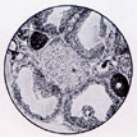
The Spencer 1.8mm. oil immersion objective has an N.A. of 1.25; and in order that it may receive sufficient light at full aperture, the Spencer condenser is designed to work with it at N.A. 1.25 when in oil immersion contact with the slide. This BALANCED OPTICAL SYSTEM gives the excellent resolution of detail needed for diagnosis



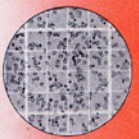
Dark Field

Dark field illumination, important in the examination of living bacteria, blood serum, spinal fluid, emulsion and colloids, is obtained with a special Spencer dark field condenser and a strong source of microscope illumination. This condenser, while necessary in some types of work, is not required on a medical microscope and therefore is listed as an accessory.

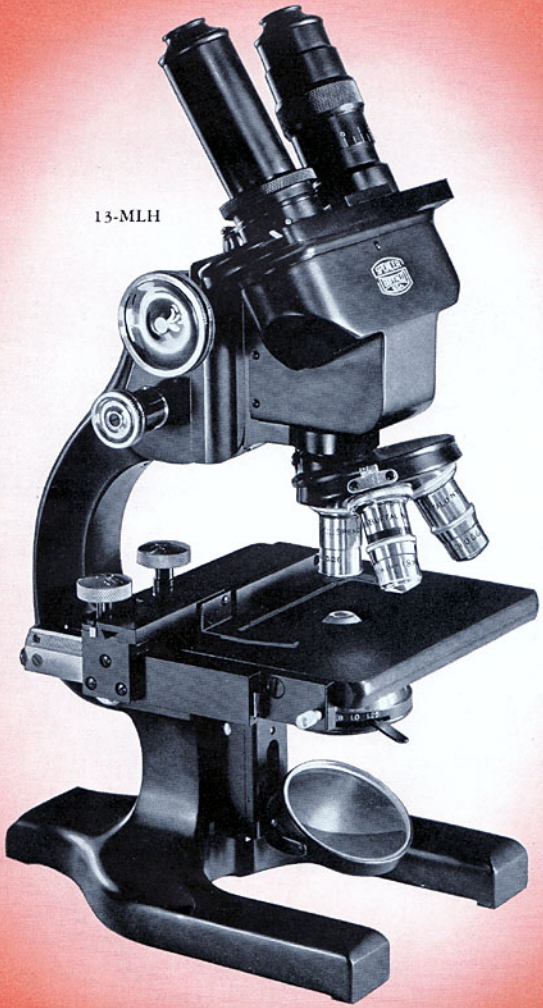








13-MLH



For Research

BINOCULAR microscopes have been selected almost universally for use in research. They relieve eye strain during long observations and provide the comfort conducive to better concentration and greater achievement.

The Spencer binocular body is especially designed for comfortable vision. The eyepiece tubes are adjusted quickly to your exact interpupillary distance by turning a knurled ring on the right eyepiece. An adjustable collar on the left eyepiece provides a focusing adjustment to compensate for any differences of vision between your eyes. An exclusive feature of Spencer binocular microscopes is the comfortable eight degree convergence of the eyepiece tubes, this is desirable since normal eye work is customarily done at ten to twenty inches. You will find it easy to look into the converging eyepieces and blend the two images.

The inclined binocular body enables you to make observations through the microscope and at the same time maintain a comfortable posture. Eyes, neck and shoulders are in a normal restful position, muscles do not become tired and you will work more efficiently.

All Spencer Medical Microscopes shown in this folder are the same in optical construction and mechanical precision. The differences are in the bodies and the method of mounting the bodies. If your work is likely to include research and your present available funds are restricting you in the choice of a microscope, we suggest the purchase of Spencer Medical Microscope 13MAH. It has the single vertical body tube which is interchanged readily with either the vertical or inclined binocular body when you are ready to purchase one of these. The single tube is large in diameter, especially well suited for later use in photomicrography.

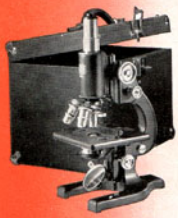
Fluorite Objectives

The Spencer achromatic objectives are the best that can be produced using glass alone in the lenses. For more perfect chromatic correction, lenses made of fluorite crystals are introduced. The prices are necessarily slightly higher. The results, however, are well worth the additional cost.



A Choice of

Number 33-MH Spencer Medical Microscope is the instrument selected by thousands of medical students during the last few years. The demand for all Spencer Medical Microscopes has been increasing rapidly but 33-MH is most popular. It meets all requirements for medical work.



33-MH
with Leatherette Case

Number 33-MH Spencer Medical Microscope—Complete as described with 6X and 10X Huyghenian eyepieces, dual-cone triple nosepiece, 16mm., 4mm., dry, and 1.8mm., N.A. 1.25 oil immersion achromatic objectives, mechanical stage, fork-type substage with condenser N.A. 1.25 and iris diaphragm. In carrying case equipped with slide box and fittings for additional objectives, haemacytometer and accessories; covered with rich black leatherette with chromium plated fittings, lock and key.....$ 157.00

The same as above but in hardwood cabinet with lock and key.. 155.00

Number 33-H the same as 33-MH but with the mechanical stage omitted, in hardwood case..... 135.00



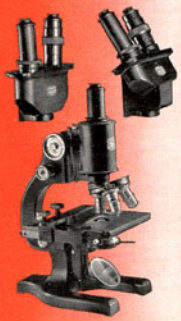
33-MH
with Hardwood Case

Number 13-MAH is a monocular microscope that later may be converted into a binocular microscope by the addition of either the vertical or inclined binocular bodies. These bodies may readily be interchanged. Buy this instrument now and plan to buy a binocular body at a later date.

Number 13-MAH the same as 33-MH but with large removable body tube in hardwood case.....$ 169.00

Vertical binocular body for number 13-MAH with extra 6X and 10X Huyghenian eyepieces..... 76.00

Inclined binocular body for number 13-MAH with extra 6X and 10X Huyghenian eyepieces..... 96.00



13-MAH
with optional bodies

The Research Binocular Microscope has become increasingly popular with those who have planned to do advanced work. It reduces eyestrain and offers comfort not attainable in a monocular microscope.

Number 13-MH the same as 13-MAH but with vertical binocular body, in place of monocular body, in hardwood case.....$ 235.00

Number 13-MLH the same as 13-MH but with inclined binocular body for greater comfort in continuous work, in hardwood case.... 255.00

Number 13-MJ the same as 13-MH but with fluorite oil immersion objective instead of the achromatic, in hardwood case..... 258.00

Number 315 achromatic condenser N.A. 1.30 in place of condenser N.A. 1.25 on above microscopes, extra..... 22.50

Additional single body tube, large diameter, to fit binocular microscopes 10.00

Without Mechanical Stage—if the mechanical stage is not desired on the microscope, deduct.....20.00

Leatherette Carrying Case, in place of wood case, extra..... 2.00

Instruments

Accessories

that add to the usefulness and convenience of your microscope

Bakelite Substage Lamp

The Spencer Substage Lamp embodies features in construction that make it a better lamp . . . and at the same time less costly than usual substage lamps.

Made of Bakelite, it is practically indestructible and is capable of withstanding the continuous hard usage and minor accidents which occur in a laboratory. Ventilation is better—specially placed vents allow the air to circulate around the bulb more readily. The bulb is replaced easily. It may be used in an upright position directly in front of the microscope mirror or under the stage with the mirror removed, as desired.

Number 385-A Lamp with blue ground glass, 10 watt bulb..$ 2.50
Number 385-B Lamp with daylight glass, 10 watt bulb..... 3.25

For use with binocular microscopes the additional illumination of the 15 watt bulb is desirable. Specify when ordering above lamps and add ..... .10
Number 386-Bulb, 110 watt, 110 volt..... .25
Number 388-Bulb, 15 watt, 110 volt..... .35

Dark Field Condenser

Dark field illumination is so important in the search for Treponema pallidum that it is almost a necessity in medical microscopy. The best type of equipment is needed for this work. Therefore, the Spencer Lens Company recommends the number 344 Dark Field Condenser, a separate unit, to fit in the fork type substage in place of the regular condenser. It is this type of equipment that is giving such excellent results in the hospital laboratories. A brilliant source of illumination such as the 369 Lamp is necessary for dark field.

Number 344 Dark Field Condenser with objective stop.....$ 26.00
Number 369-A Adjustable Laboratory Lamp, with 100 watt, 120 volt medium screw base bulb, with one blue and one ground glass... 18.00

Graduated Mechanical Stage

Number 485 Graduated Mechanical Stage makes possible the systematic examination of the entire area of a slide. Verniers read to tenth millimeters in both directions. Graduations are in white lines on a black background, complete in case.....$ 33.00
Without case..... 31.50

Inclined Eyepiece

To assume a comfortable sitting posture when working at a microscope is to increase your efficiency in observing. The Inclined Eyepiece is easily and quickly attached in place of the eyepiece tube.
Number N—Spencer Single Inclined Eyepiece.....$ 20.00



13-MH



13-MLH



Bakelite Substage Lamp



Dark Field Condenser



Inclined Eyepiece