



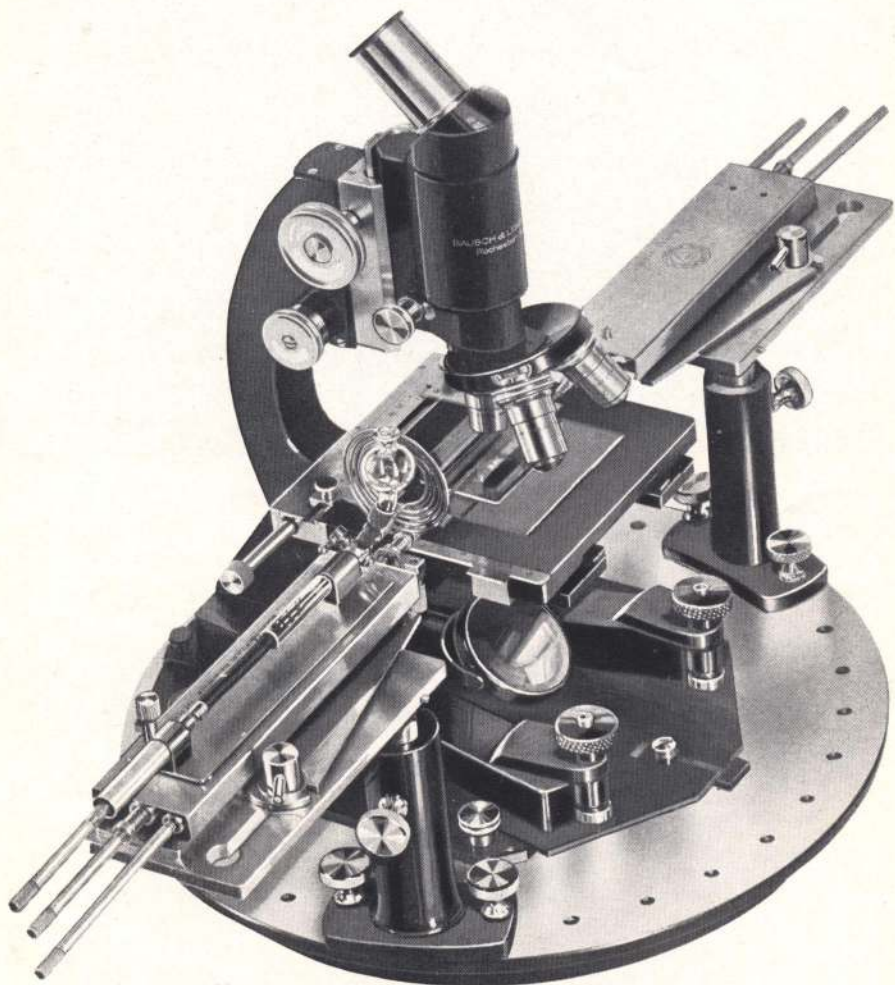
The New Fitz
MICRO-MANIPULATOR



BAUSCH & LOMB OPTICAL CO.

Designed by

Dr. G. W. Fitz



Manufactured by

Bausch & Lomb

Efficient Micro - Manipulation

THE sole purpose of any micro-manipulator is to manipulate small objects or cells in the field of the microscope during observation.

An original solution of the mechanical problems involved in micro-operations is offered in the design by Dr. G. W. Fitz.

The Fitz Micro-Manipulator, made only by Bausch and Lomb, accomplishes that object in the most certain and efficient manner. It is a universal instrument adapted to micro-operation in its widest range. It is equipped to carry all of the tools and accessories necessary to micro-manipulation and micro-injection. It will take *any standard microscope* upon its broad base.

It can be operated from over the cover glass in work of comparatively low power or from under the cover glass when used with high powers and oil immersion objectives. Its construction permits operating from either side, front or rear of the optical axis of the microscope, according to the needs of the operator.

The range of motion permits the point to be moved 6 mm in all three dimensions—3 mm each way from the midpoint. This range is ample

because the bracket and base can be easily and quickly adjusted to less than 1 mm.

The differential-screw and wedge construction method is extremely sensitive to motion and does away to a large extent with backlash or wear, (See diagrams opposite).

Flexible connections are used between the handles and the operating mechanism to avoid adventitious movement of the entire apparatus when the handles are actuated. Another advantage gained by this type of connection is that much weight is eliminated, making the instrument lighter and less cumbersome, yet retaining the essential rigidity.

The handle motions of the controls are so coordinated that the same direction of rotation of the handles produces the same direction of movement of the two operating points.

The handles of both right and left instruments are arranged in bilateral symmetry, thus avoiding confusion as to where the handles are and in which direction they should be turned to obtain motion in the desired direction.

By means of the position duplicator (which is supplied as standard equipment) the micro-manipulator may be

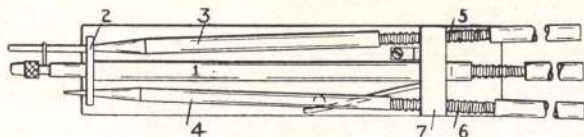
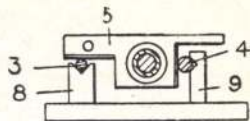


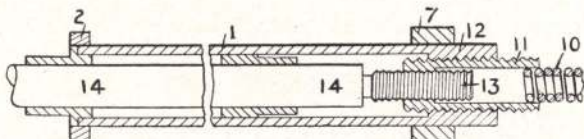
Diagram showing cone mechanism which actuates the micro-manipulator.

The tubular axis 1 carries the cross plate 2 which is firmly held, by a spring action, against the extensions of rods 3 and 4 which are flexibly attached to screws 5 and 6. The cone rods 3 and 4 lie respectively in notches



in pins 8 and 9 and are threaded through the cross bar 7.

By rotating the screw 5, rod 3 is advanced and its cone is pushed under the V edge of plate 2 to lift it and raise the operating point. Similar rotation of the screw 6 moves the operating point to right or left.



This diagram illustrates the differential screw system which is used to avoid the serious disadvantages of a fine screw system for controlling the thrust motion.

By rotating the control handle the system is actuated through the spring coil 10 upon

the hollow screw 11. One complete rotation advances the screw $1/30''$ into its nut 12. At the same time screw 13 is drawn back $1/36''$ into the inner end of the screw 11. The difference of these two motions ($0.0055''$ or 0.140 mm) is the amount of advance of the rod 14.

removed to reset the moist chamber or replace a broken point or clogged needle and the point easily returned to the operating position.

The following accessories are available:

Syringe Micro-Injector-Aspirator

This attachment is handy and can be quickly applied to either the right or left side. It can be adapted to all forms of micro operation. A single control gives either massive or micro-injection or aspiration. Injection bulk up to $1/2$ cc can be had rapidly by pushing the controlling handle in a pumping fashion. Rotating the controlling handle permits the injection to be made as slowly as desired.

The controlling handle is conveniently placed among the other controls for instant use.

The Pincette

A pincette is attachable to the Fitz Micro-Manipulator as an operating point. One of its jaws is fixed and the other is moved horizontally and vertically by rotating one of the controls. The pick-up control is, therefore, immediate and, being accomplished by feeling, does not take the operator's attention away from his observation.

Point Setting Gauge

This accessory acts as a guide with which the optical axis of the microscope and the height of the cover glass of the moist chamber can be located, and it makes the preliminary setting of the point very accurate and simple.

Point Renewal Gauge

This Gauge, used in combination with the position Duplicator, makes it possible to remove the point, renew it and relocate it with a minimum amount of time and effort expended.

• Novel Features •

- 1 Grouped controls which permit selection and actuation with one hand without distracting the attention.
- 2 Coordinated controls which produce natural movement under the microscope.
- 3 Complete bilateral symmetry by means of a right and left hand arrangement of controls.
- 4 Device for immediate return to operating position after withdrawing for setting or changing the moist chamber, tools, etc.
- 5 Sturdy, wearproof differential screw and wedge action.
- 6 May be operated from either side, front or rear of optical axis, or from intermediate positions.

• Advantages •

- 1 Simplicity of technique. Even a novice can learn to operate this instrument in a half-hour's time.
- 2 Full attention can be given to observation.
- 3 Ease of selection and rotation of controls.
- 4 Designed for rapid operation.
- 5 Sturdy construction means great durability.
- 6 The specimen may be attacked from any azimuth.

Specifications and Prices

Code Word	Catalog No.	Specifications	Price
<i>Agsak</i>	31-56-01-20	Micro-Manipulator, Double Instrument complete on metal base, in hardwood carrying case. Outfit includes: Two Fitz Manipulators, right and left; Two Position Duplicators; Four Operating Point Stubs with B. D. subcu sockets.....	\$250.00
<i>Agsil</i>	31-56-01-03	Micro-Manipulator, Single Instrument on metal base, in hardwood carrying case. Outfit includes: One Fitz Manipulator, right; One Position Duplicator; Two Operating Point Stubs with B. D. subcu sockets.....	160.00
<i>Agsom</i>	31-56-01-04	Same as above, but with left Fitz Manipulator.....	160.00
		NOTE: Companion instrument may be ordered in two weeks for..	90.00
		After two weeks it is subject to prior sale.	
<i>Agsun</i>	31-56-26	Syringe Micro-Injector-Aspirator.....	30.00
<i>Agtak</i>	31-56-27	Micro-Pincette, supplied with steel and platinum tips.....	75.00
<i>Agtel</i>	31-56-33	Point-Setting Gauge.....	10.00
<i>Agtim</i>	31-56-34	Point Renewal Gauge.....	22.50
<i>Agtion</i>	31-22-23-68	GBE-8 Research Microscope illustrated, with inclined erecting eyepiece holder. Comes equipped with Vertical Binocular Body (not shown), Monocular Body (as shown), paired 5× and 10× Huygenian Eyepieces, 10×, 43×, and 91× Oil Immersion Objective, 1.40 N. A. Abbe Condenser.....	356.50

Without further notice the prices herein are subject to increase for taxes and charges now or hereafter imposed by federal, state or other authorities applicable to the sale of articles covered by this price list.

Directions for use accompany each instrument.



BAUSCH & LOMB OPTICAL CO.

ROCHESTER, N. Y., U. S. A.

New York

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San Francisco

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Los Angeles

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