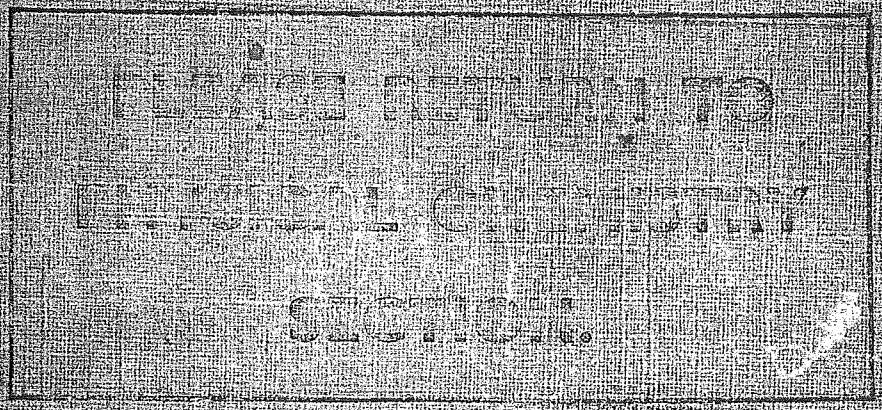
INSTRUCTION BOOK

PATHOLUX MICROSCOPE



VICKERS INSTRUMENTS LTD.

Successors to

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C. Baker Instruments Ltd. — CROYDON.

JCH

PATHOLUX MICROSCOPE

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PATHOLUX MICROSCOPE

UNPACKING

Open the cardboard carton.

Remove the top half of the moulded woodwool pack and lift out the microscope.

Within the pack will be found the microscope frame, the lamphouse and the soft plastic cover, M. 320490. Accessories will be packed separately in the accessory box.

The microscope is in a polythene bag. Remove the polythene bag.

The moving parts of the microscope are secured by wooden packing blocks. Remove the string securing these.

Remove the larger packing block which secures the microscope body platform by pulling it forward.

To remove the smaller packing block move the stage (5) to its most forward position by the upper stage control knob (6). Pull the wooden packing block which is under the stage forward and then remove it to the right, twisting it slightly as it is removed.

The fitting of these packing blocks and the securing of the stage (5) should be carefully noted, because if it is ever necessary to send the microscope by rail or sea these packing blocks will have to be replaced.

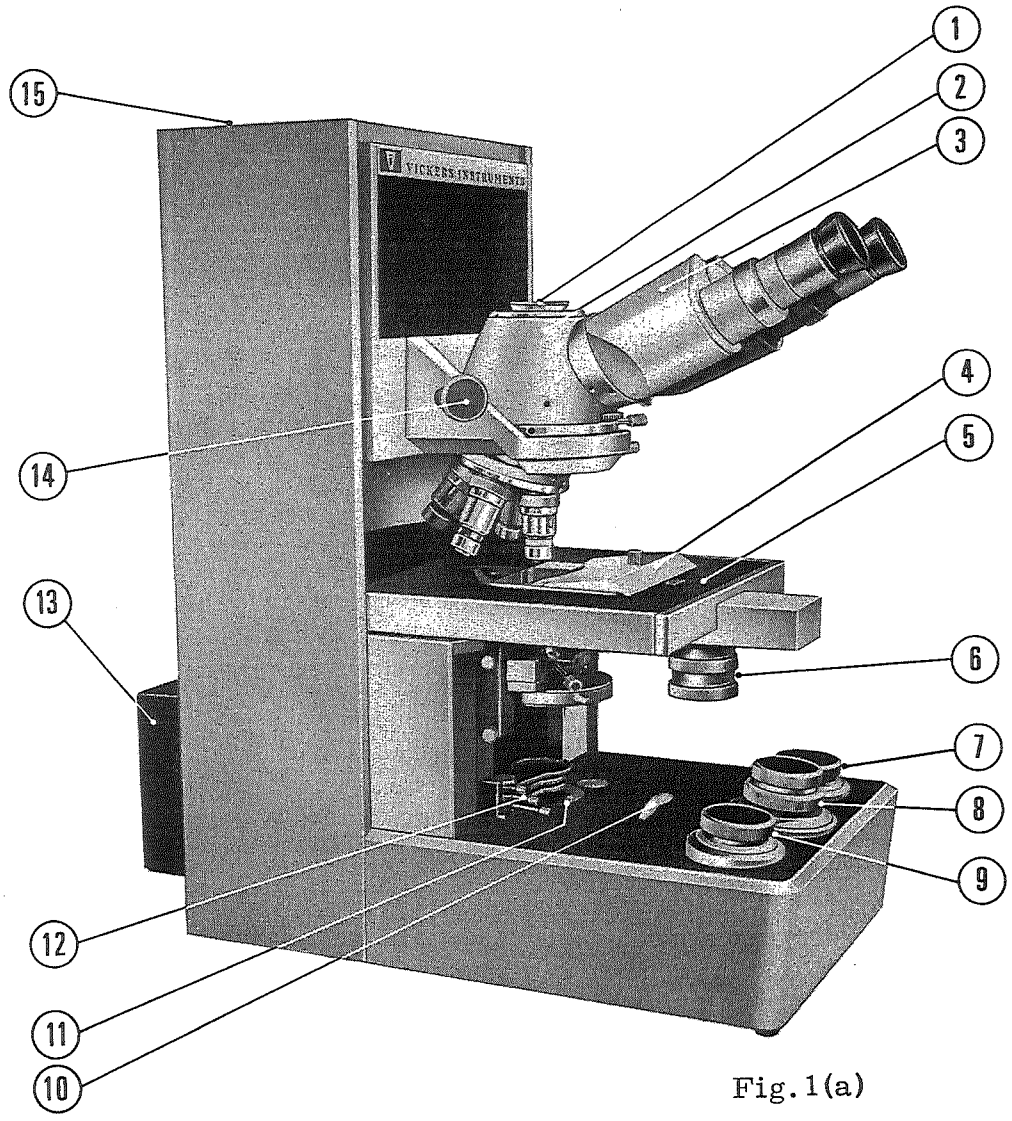


Fig. 1(a)

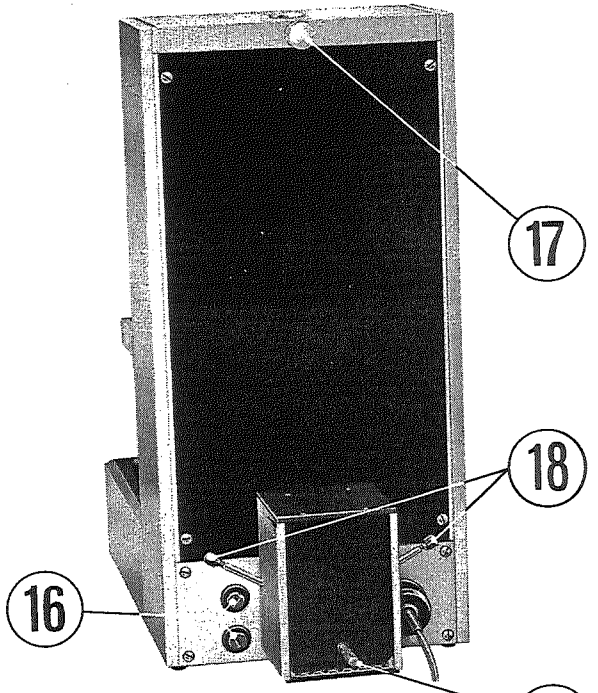


Fig. 1(b)

PARTS OF THE PATHOLUX

Reference to the illustrations, will show all the parts of the Patholux microscope and the function of the various controls.

1. Attachment for cameras, monocular projection tube, etc.
2. Beam splitting Prism box (interchangeable).
3. Binocular Head (interchangeable).
4. Specimen Holder (interchangeable).
5. Mechanical Stage.
6. Stage controls.
7. Light dimming control.
8. Coarse and fine focus control.
9. Substage focus control.
10. Field Iris Diaphragm Control.
11. Light exit window.
12. Filter holders (3).
13. Lamp house.
14. Clamp for high lift body slide.
15. Attachment for pillar for bellows camera or special experimental equipment.
16. Fuses.
17. Clamp for pillar.
18. Lamp Centring Screws.
19. Lamp Condenser focusing knob.

SETTING UP THE PATHOLUX

Plug the lamphouse (13) into the aperture at the back of the instrument, making sure the contacts enter the contact sockets and that the lamphouse (13) is pressed right home.

Plug the flexible lead into the socket on the lefthand side of the instrument at the back. (Apart from instruments sent to the North American markets, the lead will be supplied without a plug, owing to the great range of plugs used in Great Britain and elsewhere.)

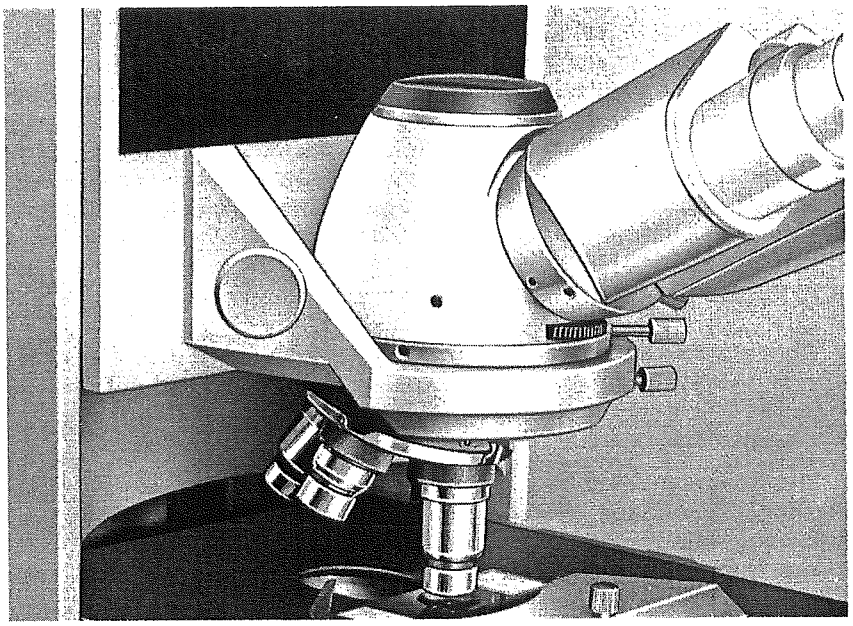


Fig. 2 The body platform showing the revolving objective changer and beam splitting prism box in position.

TO ATTACH THE REVOLVING OBJECTIVE CHANGER M.320480

Unscrew the clamp screw two turns.

Raise the body platform to its fullest extent by turning the focus control (8).

Apply the changer to the conical fitting beneath the platform, supporting it directly with the fingers, i.e. not by holding the objectives.

When it is securely located tighten up the clamp screw. There is a location to allow the holder to clamp in only one rotational position.

TO ATTACH THE BEAM SPLITTING PRISM BOX (2) M.320550.

Unscrew the clamp screw two turns.

Place the beam splitting prism box (2) on the conical fitting (1) on top of the platform. Tighten up the clamp screw.

TO ATTACH THE BINOCULAR HEAD (3) M. 320600

Unscrew the clamp screw two turns.

Apply the binocular head (3) to the cone fitting so that the two red dots are in line, i.e. so that the binocular head is at about 45° to the normal viewing position. Twist the binocular head (3) into the normal viewing position and tighten up the clamp screw.

TO FIT THE CONDENSER

Adjust the substage by turning the substage focus control (9) to its lowest position and the stage (5) to its most forward position. The condenser locates in the higher of the two dovetail slots in the substage. Introduce the condenser from the left hand side and engage the right hand side of the dovetail plate into the right hand side of the dovetail slide in the substage. Press the condenser gently forward and engage the left hand side of the slide in the left hand slot in the substage. Press the condenser right home and clamp with the clamp screw. The microscope in its simple form is now ready for operation.

MAGNIFICATION CHANGER M. 320670

Where a magnification changer has been supplied it fits on to the platform below the beam splitting prism box (2), attaching in the same manner as the beam splitting prism box (2) which then, attaches on top of the magnification changer.

The upper knurled ring on the magnification changer rotates to bring successive lens systems into the axis, giving the magnification factors engraved on it. The position 'B' introduces a Bertrand Lens for examining the back focal plane of the objectives. This can be focused by turning the lower knurled ring.

BEAM SPLITTING PRISM BOX (2) M. 320550

The standard beam splitting prism box is supplied with a prism which divides the light into two halves. By turning the knurled knob at the bottom of the beam splitting prism box to the right the prism can be swung to one side, letting all the light go straight through to the camera. The alternative beam splitting prism box, M. 320580, has a fully reflecting prism so that when the prism is in the optical path all the light is reflected to the eyepieces, and when it is swung to one side all the light is transmitted to the camera.

For all photographic work the monocular projection tube, M. 320700, must be fitted to the top of the beam splitting prism box, M. 320550. and before doing this the black Dust Cover must be removed from the top of the beam splitting prism box. The dust cover is attached to this by a spring fitting and can be removed by putting the thumb-nail under it and lifting it off.

SPECIMEN HOLDERS

The specimen holder (4) can be removed to give a plain stage by undoing the knurled screw on top of the holder and then removing the specimen holder. Alternatively, the glass plate holder, M. 320400, can be put in position in its place by locating it on the two dowel pins and tightening up the clamp screw.

MONOCULAR DRAW TUBE M. 320650

The monocular draw tube attaches to the beam splitting prism box in the same manner as the binocular head.

MICROPROJECTION MIRROR M. 321000

The microprojection mirror can either fit on top of the beam splitting prism box M. 320550 or M. 320580 in the same manner as other attachments, or it can be placed over the eyepiece on the straight drawtube M. 320650 or projection tube M. 320700 when this is placed on top of the beam splitting prism box.

ADJUSTMENT OF THE PATHOLUX

It is not the purpose of these instructions to give a full treatise on the use of the microscope; textbooks on the subject should be consulted for this.

The following is a very brief instruction for the setting up of the microscope.

After inserting objectives, condenser and eyepieces the specimen is focused with a low power objective.

The condenser is then focused to bring the field of view iris diaphragm into focus on the specimen.

It may be necessary to close the field of view iris (10) to accomplish this.

The field of view iris is then centred in the field of view by means of the condenser centring screws and the iris is then opened to just fill the field of view.

Inspection of the back focal plane of the objective will show an image of the lamp filament in this position and this should be central. If it is not central it may be adjusted by the centring screws on the lamphouse (18). If the field of view is not evenly illuminated this can be adjusted by the screw at the back of the lamphouse (19) which focuses the lamp condenser.

In the case of very low powers a diffuser may be necessary in one of the filter holders, (12).

As each successive higher power objective is brought into use the field of view diaphragm (10) will require re-adjusting to just fill the field of view with the new objective and in some cases the focus of the condenser will need adjusting (9) to bring the iris diaphragm as sharp as possible.

The condenser iris diaphragm should be adjusted to give the best compromise between resolution and contrast that can be obtained with the particular specimen being studied. The smaller the diaphragm is adjusted the higher the contrast will be, but the lower the resolution.

No fixed rule can be given for all specimens for the adjustment of this diaphragm.

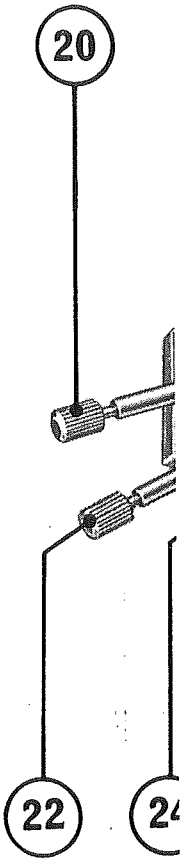
The diaphragm can easily be located on the condensers provided with the Patholux microscope by placing one's finger on the top of the plate by which the condenser attaches to the substage. The iris diaphragm lever is close to this plate in all the condensers except the Trilux condenser. In the case of the Trilux condenser the iris diaphragm lever is immediately above the lower plate which houses the supplementary lens.

THE CONDENSER IRIS DIAPHRAGM SHOULD NOT BE USED TO REGULATE THE LIGHT

This should be regulated by the dimming control (7) on the right of the control panel, or by filters inserted into the filter holders (12) or by a combination of the two. If the diaphragm is used to control the light it will not be giving the best compromise between resolution and contrast which is what it is intended for.

HIGH LIFT BODY SLIDE

Where large specimens are being examined the distance between the objectives and the stage can be increased by unclamping the body slide (14) and lifting it up on a subsidiary slide and reclamping it. When the slide is lowered again it must be carefully supported so that it does not drop under its own weight.



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TRILUX CONDENSER M. 320720

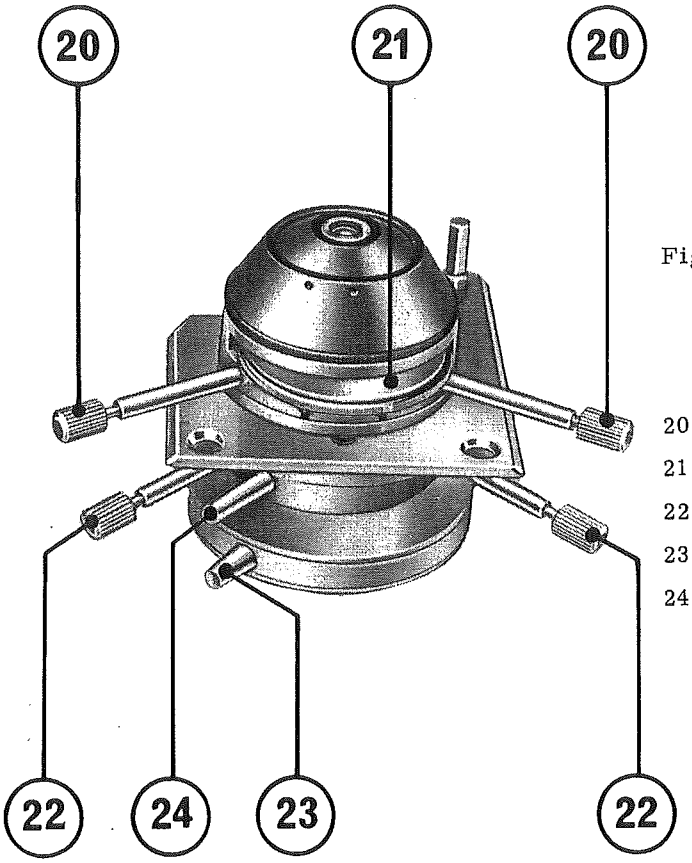

Fig. 3 PARTS OF THE TRILUX CONDENSER

20. Annuli centring screws.
21. Rotating disc with annuli.
22. Condenser centring screws.
23. Auxiliary lens control.
24. Iris diaphragm control.

The Trilux condenser provides light field, dark field or phase contrast microscopy with the same condenser.

Phase contrast microscopy can only be obtained when phase contrast objectives are used.

The condenser is inserted into the substage and focused and centred as already described, the condenser being centred by the lower pair of centring screws (22). The different forms of microscopy are controlled by the rotating disc (21) with red spots on it on the front of the condenser. When the disc (21) is in the position where four red spots are shown the condenser is ready for all ordinary light field microscopy, and the substage condenser iris diaphragm (24) is used in the manner described above.

When phase contrast microscopy is desired the disc (21) is rotated to one of the positions marked with one, two or three red dots. One red dot is the position for X10 phase contrast objectives, two red dots the position for X40 phase contrast objectives, three red dots the position for X50 and X100 phase contrast objectives. In these positions the condenser iris diaphragm (24) should always be opened to its fullest extent. When the condenser is being used for phase contrast, inspection of the back focal plane of the objective, either by the Bertrand Lens, in the magnification changer, or by an auxiliary microscope inserted in place of an eyepiece and focused, will show a grey ring, which is the phase plate in the objective, and a bright ring, which is the image of the annulus in the condenser. Adjustment of the upper pair of centring screws (20) on the Trilux condenser will superimpose these two rings. When the magnfication changer is then changed to one of the viewing positions, or when the auxiliary microscope is removed and replaced by an eyepiece, the specimen will be seen in phase contrast.

When the disc (21) on the Trilux condenser is in the position where there are no red dots it is set for dark field. The condenser iris diaphragm (24) should be opened to the fullest extent. With objectives of N.A. of 0.7 or less, dark field will be obtained without connecting the condenser to the underside of the slide with immersion oil. Where higher Numerical Aperture objectives are being used the condenser must be oil immersed to the underside of the slide. Objectives with an N.A. of more than 1.00 cannot be used for dark field at full aperture and a funnel stop (which is provided) must be inserted into the back of such objectives when they are used for dark field work. Even with lower powers slightly better contrast is obtained when the condenser is oil immersed. The focusing of the condenser in dark field is the same as in light field, i.e., an image of the field of view iris diaphragm (10) should be obtained as sharply as possible on the specimen and the iris (10) then opened up to fill the field of view.

The Trilux condenser is a short focus condenser and consequently the field of view is not filled with low power objectives. A supplementary lens (23) can be swung into the axis to fill the field of view with low power objectives. When this lens (23) is in the 'IN' position the field of view iris diaphragm (10) ceases to become a field of view iris and becomes an aperture iris and should be used in this way. This lens should only be used for low power objectives.

CHANGING THE 100w. QUARTZ IODINE LAMP M.320545

Remove the whole lamphouse (13) from the back of the instrument and slide the top and back cover of the lamphouse out vertically.

WARNING: Under no circumstances should the Quartz envelope of the Quartz Iodine Lamp be touched with the fingers, as deposit left on the quartz will damage the lamp. The lamp must always be handled with a piece of paper or such between the quartz envelope and the fingers.

With a screwdriver slack off the two screws which clamp the contacts of the lamp. Remove the old lamp.

Place the new lamp in the holder so that the contact pins engage in the two contacts. One of these contacts is floating to accommodate differences in the pitch of the pins of the different lamps.

Now screw up the screws to clamp the contacts.

It will be noted that the lamp is set at an angle to the optical axis. This is intentional, to reduce the bar effect of the filament in the aperture of the microscope objective.

Slide the top and back component back on to the lamphouse (13) and re-insert the lamphouse (13) into the back of the microscope.

The life of the lamp will be much improved if it is used as much as possible at reduced voltage, as controlled by the dimming control (7) on the microscope, and especially if it is not switched on and off at full voltage, but is switched on at a lower voltage and then the light increased by the dimming control (7)

In some circumstances the contacts of the lamp may become corroded with a deposit, increasing the contact resistance and reducing the light. If this happens the lamp can be removed and the contact pins scraped clean and the lamp replaced again.

CAMERAS

Full instructions for the Vickers Instruments Photographic Equipment will be found in the separate instruction booklet for the cameras. The following instructions refer to the fitting of the cameras to the Patholux microscope.

The cameras supplied for the Patholux all attach to a pillar which mounts on the microscope frame. These pillars can also be used for the attachment of specialised experimental apparatus.

Undo the pillar clamp screw (17) at the back of the instrument and remove the plug covering the hole on top of the microscope.

Gently insert the pillar in this hole, pressing it down as far as it will go.

Clamp it with the pillar cap screw. (17).

When cameras are being used the monocular projection tube M. 320700 and eyepiece must always be mounted on top of the beam splitting prism box.

BELLOWS EXTENSION CAMERA M. 030065

When the Bellows Extension camera is used the inner part of the light adapter is fitted to the monocular projection tube. The lower part of the Bellows Extension camera is then lowered down the pillar until the outer part of the light adapter fits over the inner part of the light adaptor, but without making contact. The magnification can be controlled by raising or lowering the upper part of the Bellows Extension camera on the pillar.

35 mm. AND POLAROID CAMERAS

These are fitted on the shorter pillar. The inner part of the light adapter is fitted over the monocular projection tube and the camera lowered on its pillar until the outer part of the light adapter fits over the inner part. They should not be allowed to make contact.

FUSES (16)

The Patholux microscope is protected by two tubular fuses (16) at the back of the instrument. These can easily be replaced by unscrewing the plug, pulling out the fuse, pressing a new one into position and replacing the plug in the back of the instrument.

'REGAVOLT' ROTARY TRANSFORMER

About every twelve months the rotary transformer may need cleaning. To do this remove the bottom plate of the instrument and inspect the rotary transformer. The winding track should be kept clean, with an occasional dusting with a soft brush or wiping over with a trichlorethylene cloth. If the track becomes pitted due to overload or corrosion, careful cleaning with a fine glass paper to restore the bright surface of the copper winding may be carried out. This should be done preferably by a service engineer.

CLEANING INSTRUCTIONS

Paint surfaces are best cleaned with the aid of a cloth slightly dampened with water or a weak detergent solution and are liable to be damaged by many of the organic solvents in common laboratory use.

The removal of grease may be effected safely by wiping gently with a cloth just moistened with a clear undoped commercial grade of petrol.

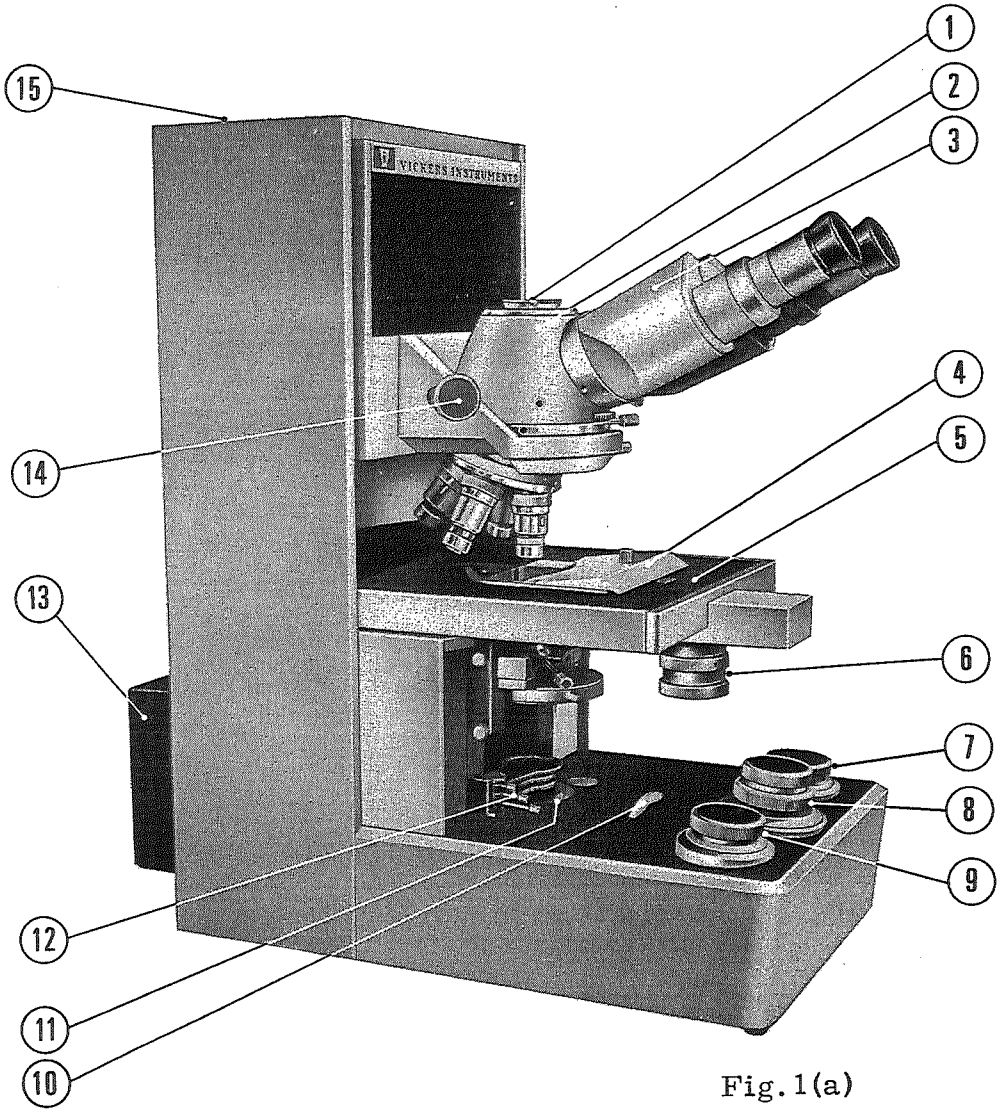

Fig. 1(a)

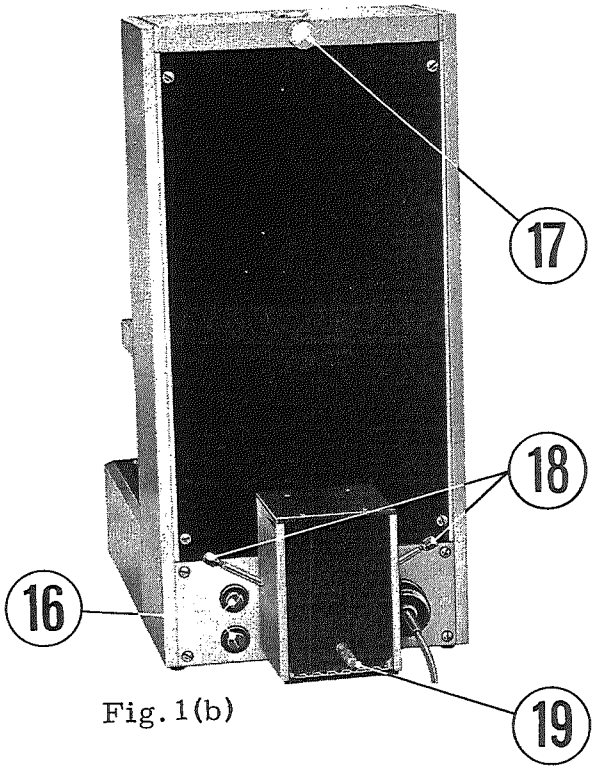

Fig. 1(b)

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