

# PATENT SPECIFICATION

819,900

DRAWINGS ATTACHED.



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## COMPLETE SPECIFICATION.

### Improvements in or relating to Optical Microscopes.

We, C. BAKER OF HOLBORN LIMITED, a British Company, of 244 High Holborn, London, W.C.1, and MICHAEL GRANT LEES CURTIES, a British Subject, of the Company's address, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement :—

The invention relates to optical microscopes and it is an object of the invention to provide an improved microscope.

The invention provides an optical microscope in which the lens tube is carried by two rigid, spaced, upright pillars which extend upwardly from a base to support respectively the two opposed sides of a slide member on which the lens tube is mounted.

Preferably the pillars also support respectively two doors which are pivoted thereto for movement between a closed position in which they enclose the lens tube and an open position in which they extend outwardly and permit the instrument to be used.

The pillars are preferably connected by a web or wall, which may be formed integrally therewith.

One specific construction of a microscope embodying the above and other features of the invention will now be described by way of example, with reference to the drawings accompanying the Provisional Specification, which are somewhat diagrammatic and in which :—

Figure 1 is a vertical longitudinal sectional view through the microscope with certain parts of the microscope omitted for the sake of clarity ;

Figure 2 is a horizontal sectional view through the lens tubes mounting substantially on the line 2—2 of Figure 1 ;

Figure 3 is a plan view of the sub-stage condenser assembly ;

Figure 4 is a vertical longitudinal sectional view through the sub-stage condenser assembly substantially on the line 4—4 of Figure 3 ;

Figure 5 is a plan view of the stage-top and mounting therefor ;

Figure 6 is a vertical sectional view substantially on the line 6—6 of Figure 5 ; and

Figure 7 is a vertical sectional view on the line 7—7 of Figure 5 ;

and with reference to the accompanying drawings in which :—

Figure 8 is a perspective view of the microscope with the doors closed ; and

Figure 9 is a perspective view of the microscope with the doors open.

In this example the microscope is a research microscope and comprises an inverted box-like base member 12 carrying two rigid, upright substantially L-sectioned pillars 13, 14 the wider arms 15, 16 of the pillars 13, 14 projecting rearwardly and being arranged in spaced parallel relationship. The other arms 17, 18 of the pillars 13, 14 are directed towards each other and are inter-connected by a web 19 formed integrally therewith to enhance the rigidity of the pillars.

The lens tube 21 of the microscope, including the eye-pieces 21<sup>1</sup>, is carried by a slide member 22 which is provided with a female dovetail slot 23 on its rear surface which inter-fits with a male dovetail member 24 formed integrally with the web 25 of a U-sectioned slide member 26. The arms 27 of this member 26 project through an aperture in the web 19 inter-connecting the rigid pillars 13, 14 and it is supported therebetween by two ball-slide bearings 28.

Each bearing 28 comprises two linear

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aces 31, 32 one of which races 31 comprises a short V-section groove having closed ends and containing a plurality of ball-bearings 33 so that the balls project beyond the open side of the groove, and the other of which races 32 comprises a long V-sectioned groove which co-operates with the portions of the balls 33 which project from the open side of the short groove 31 and provide the track surface on which the slide member 26 is moved. The two races 31 housing the balls are secured respectively to the outwardly directed faces of the arms 27 of the slide member 26 and the other two races 32 which provide the track surfaces, are secured respectively to the pillars 13, 14 in vertical, spaced parallel relationship so that the slide member 26 is movable vertically in its bearing 28. Each of the pillars 13, 14 is provided with an elongated generally rectangular sectioned projection 34 and the track races 32 are located in position by these projections.

The movement of the lens tube 21 is controlled from two knobs 40, 41 located on a panel at the front of the base member as described in our co-pending Application No. 13190/56 (Serial No. 819,899) of even date.

A lamp 30 is mounted in the base member 11 and light from the lamp is transmitted to a specimen positioned on the stage by lens system 30<sup>1</sup> having an aperture control, reflector 30<sup>11</sup>, and the sub-stage condenser assembly 37. The intensity of the lamp is controlled by a knob 20 located on the panel at the front of the base member 11 as described in our said co-pending Application No. 13190/56 (Serial No. 819,899).

The sub-stage condenser assembly is generally indicated at 37 in Figures 1 and 9 and is illustrated in more detail in Figures 3 and 4. The condenser lens 42 is carried by a U-sectioned carrier 43 comprising two spaced walls 44 inter-connected by a web 45 which does not extend for the full heights of the walls 44. The carrier 43 is supported from the front wall 46 of a vertically arranged box-like member 47 by two ball-slide bearings 48. Each bearing comprises two linear races 51, 52 one of which races 51 is secured to carrier 43 and comprises a short V-sectioned groove 53 having closed ends and containing a plurality of ball-bearings 54, so that the balls project beyond the open side of the groove, and the other of which races 52 is secured to the front wall 46 and comprises a long V-sectioned groove 55 which co-operates with the portions of the balls 54 which project from the open side of the short groove 53 and provide the track surfaces on which the carrier 43 is moved. The races 52 are secured to the wall 46 by screws.

The box-like member 47 is cast and comprises two side walls 56 each having a rectangular cut-away portion at the top back

corner, the front wall 46, a back wall 57 and a base plate 58 having a cut-away portion 59. The shape of the front wall 46 is shown in Figure 3 and comprises two side portions 61 inter-connected by a lower central portion 62. The box-like member 47 is rigidly secured to the base assembly 12 and to the web 19 inter-connecting the two pillars, which is shaped to receive this member.

The movement of the carrier 43 is controlled by a knob 63 located on a panel at the front of the base member as described in our said co-pending Application No. 13190/56 (Serial No. 819,899).

In this example the stage-top 65 is supported for backward and forward movement from a horizontal stage plate 70 carried by the base member 12 by two ball-slide bearings 66 which are similar to those by which the slide member 22 and the carrier 43 are mounted. The two short races 67 which house the balls 68 are secured to the underside of the stage-top and the two races 69 which provide the track surface are secured to the upper surface of the stage plate 70. The races 69 are secured to the plate 70 by screws. The stage-top is provided with a dependent flange 71.

The backward and forward movement of the stage-top 65 is effected through the flange 71 and is controlled by a knob 73 located on the aforesaid panel at the front of the base member 12 as described in our said co-pending Application No. 13190/56 (Serial No. 819,899).

In this example, a specimen under examination, e.g. a slide, is held in position on the stage-top 65 by means of one or more clips which extend forwardly over the stage-top. One such clip 74 is diagrammatically illustrated in Figure 5. The or each clip 74 is carried by a plate 75 mounted on a laterally extending member 76. The member 76 is supported for lateral movement by two ball-slide bearings 77 having a common short linear race 78 which houses the balls 79 and which is secured to the member 76. The two races 80 which provide the track surfaces are secured to the stage plate 70.

The lateral movement of the member 76 is controlled by a knob 81 located on the aforesaid panel at the front of the base as described in our co-pending Application No. 13190/56 (Serial No. 819,899) and the arrangement is such that this movement of the member 76 and consequently of the clip 74 causes the specimen to be moved laterally across the stage-top.

In this example two hollow-shaped doors 83, 84 are hinged respectively to the pillars 13, 14 so that the doors 83, 84 are movable between a shut position in which the lens tube 21, the stage 65, 66 and the sub-stage condenser assembly 37 are substantially totally enclosed between the doors 83, 84 130

the two pillars 13, 14 and the web 19 there-  
between, and the base member 12, and an  
open position in which the doors extends out-  
wardly from the pillars 13, 14. A catch 85  
is provided to lock the doors 83, 84 in their  
shut position. Each door 83, 84 comprises a  
curved, vertical marginal portion 86 shaped  
to conform to the front configuration of the  
base member 12, and the upper marginal  
portion 87 of each of the doors is shaped so  
that those two portions 87 provide a lid for  
the microscope when the doors are shut. The  
inside surfaces of the doors 83, 84 are provided  
with racks and pockets 88 to house the various  
microscope accessories e.g. alternative object  
lenses and a camera.

#### WHAT WE CLAIM IS :—

1. An optical microscope in which the lens tube is carried by two rigid, spaced, upright pillars which extend upwardly from a base to support respectively the two opposed sides of a slide member on which the lens tube is mounted.
2. An optical microscope as claimed in Claim 1 in which the two pillars are rigidly interconnected.
3. An optical microscope as claimed in Claim 2 in which the two pillars are rigidly interconnected by a web or wall formed integrally therewith.
4. An optical microscope as claimed in any one of the preceding claims, in which the pillars also support respectively two doors which are pivoted thereto for movement between a closed position in which they enclose the lens tube and an open position in which they extend outwardly and permit the microscope to be used.
5. An optical microscope as claimed in Claim 4, in which the pillars extend upwardly from a horizontal base which projects forwardly from the pillars or the member or members.
6. An optical microscope as claimed in Claim 5, in which the doors are of hollow shape and in which the construction and arrangement of the doors and the base is such that when the doors are in their closed position the lower portions thereof engage against the base.
7. An optical microscope as claimed in Claim 6, in which the upper portions of the doors are constructed and arranged to provide a lid for the microscope when the doors are in their closed position.
8. An optical microscope as claimed in any one of Claims 4 to 7, in which the inner face of one or both of the doors is provided with shelves, racks or the like to house ancillary equipment for use with the microscope.
9. An optical microscope as claimed in any one of the preceding claims, in which the lens tube or the slide member carrying the lens tube is supported for vertical movement by linear ball or roller bearings.
10. An optical microscope as claimed in any one of the preceding claims, in which the condenser lens of the sub-stage assembly is carried by a member supported for vertical movement by linear or roller bearings.
11. An optical microscope as claimed in any one of the preceding claims, in which the stage-top is supported by linear ball or roller bearings for backward and forward movement relative to the microscope.
12. An optical microscope as claimed in Claim 11, in which clips are provided to secure a specimen to the stage-top which clips are carried by a member supported by linear ball or roller bearings for movement transversely across the microscope.
13. An optical microscope substantially as hereinbefore described with reference to and illustrated in the drawings accompanying the Provisional Specification and the accompanying drawings.

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Chartered Patent Agents.

#### PROVISIONAL SPECIFICATION.

#### Improvements in or relating to Optical Microscopes.

We, C. BAKER OF HOLBORN LIMITED, a British Company, of 244 High Holborn, London, W.C.1, and MICHAEL GRANT LEES CURTIES, a British Subject, of the Company's address, do hereby declare this invention to be described in the following statement :—

The invention relates to optical microscopes and it is an object of the invention to provide an improved microscope.

The invention provides, in one of its aspects, an optical microscope in which the lens tube is carried by two rigid, spaced,

upright pillars which extend upwardly from a base to support respectively the two opposed sides of a slide member on which the lens tube is mounted.

Preferably the pillars also support respectively two doors which are pivoted thereto for movement between a closed position in which they enclose the lens tube and an open position in which they extend outwardly and permit the instrument to be used.

The pillars are preferably connected by a

web or wall, which may be formed integrally therewith.

The invention also provides, in another of its aspects, an optical microscope in which the lens tube is carried by a rigid upright member or members constructed and arranged to support two doors which are pivoted thereto for movement between a closed position in which they enclose the lens tube and an open position in which they extend outwardly and permit the instrument to be used.

One specific construction of a microscope embodying the above and other features of the invention will now be described by way of example with reference to the accompanying drawings in which:—

Figure 1 is a vertical longitudinal sectional view through the microscope with certain parts of the microscope omitted for clarity;

Figure 2 is a horizontal sectional view through the lens tube mounting on the line 2—2 of Figure 1;

Figure 3 is a plan view of the sub-stage condenser assembly;

Figure 4 is a vertical longitudinal sectional view through the sub-stage condenser assembly substantially on the line 4—4 of Figure 3;

Figure 5 is a plan view of the stage-top and mounting therefor;

Figure 6 is a vertical sectional view substantially on the line 6—6 of Figure 5; and

Figure 7 is a vertical sectional view on the line 7—7 of Figure 5.

In this example the microscope is a research microscope and comprises an inverted box-like base member 12 carrying two rigid, upright substantially L-sectioned pillars 13, 14 the wider arms 15, 16 of the pillars 13, 14 projecting rearwardly and being arranged in spaced parallel relationship. The other arms 17, 18 of the pillars 13, 14 are directed towards each other and are inter-connected by a web 19 formed integrally therewith to enhance the rigidity of the pillars.

The lens tube 21 of the microscope is carried by a supporting block 22 which is provided with a female dovetail slot 23 on its rear surface which inter-fits with a male dovetail member 24 formed integrally with the web 25 of a U-sectioned slide member 26. The arms 27 of this member 26 project through an aperture in the web 19 inter-connecting the rigid pillars 13, 14 and is supported therebetween by two ball-slide bearings 28.

Each bearing 28 comprises two linear races 31, 32 one of which races 31 comprise a short V-section groove having closed ends and containing a plurality of ball-bearings 33 so that the balls project beyond the open side of the groove, and the other of which races 32 comprises a long V-sectioned groove which co-operates with the portions of the

balls 33 which project from the open side of the short groove 31 and provide the track surface on which the slide member 26 is moved. The two races 31 housing the balls are secured respectively to the outwardly directed faces of the arms 27 of the slide member 26 and the other two races 32 which provide the track surfaces, are secured respectively to the pillars 13, 14 in vertical, spaced parallel relationship so that the slide member 26 is movable vertically in its bearings 28. Each of the pillars 13, 14 is provided with an elongated generally rectangular sectioned projection 34 and the track races 32 are located in position by these projections.

The movement of the lens tube 21 is controlled from two knobs located on a panel at the front of the base member as described in our co-pending Application No. 13190/56 (Serial No. 819,899) of even date.

The sub-stage condenser assembly generally indicated at 37 is similarly carried by a U-sectioned slide member 43 which is supported between two arms extending outwardly from the front face of a vertically arranged hollow box-like member 47 by two linear ball-slide bearings 48. The two ball races 51 housing the balls 54 are secured respectively to the arms of the slide member 43 and the other two ball races 52 providing the track surfaces are secured to the opposed vertical faces of the arms of the box-like member 47 so that the slide member 43 is movable vertically in its bearings. The box-like member 47 is rigidly secured to the base assembly 12 and to the web 19 inter-connecting the two pillars which is shaped to receive this member.

The movement of the sub-stage condenser assembly is controlled by a knob located on a panel at the front of the base member as described in our said co-pending Application No. 13190/56 (Serial No. 819,899).

In this example the stage top 65 is supported for backward and forward movement from a horizontal plate-like support member 70 carried by the web connecting the two pillars by two ball-slide bearings 66. The two races 67 housing the balls are secured respectively to the undersurface of the stage top and the two races 69 providing the track surfaces are secured to the upper surface of the horizontal support member 70 and are located in position by two upstanding parallel flanges on the support member so that the stage top is guided for horizontal movement as aforesaid.

The movement of the stage top 65 is controlled by a knob 73 located on a panel at the front of the base member as described in our co-pending Application No. 13190/56 (Serial No. 819,899).

In this example two hollow-shaped doors 83, 84 are hinged respectively to the pillars 13, 14 so that the doors 83, 84 are movable

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between a shut position in which the lens tube 21, the stage 65, 66 and the sub-stage condenser assembly 37 are substantially totally enclosed between the doors 83, 84 the two pillars 13, 14 and the web 19 there-between, and the base member 12, and an open position in which the doors 83, 84 extend outwardly from the pillars 13, 14. Each door comprises a curved, vertical marginal portion shaped to conform to the front configuration of the base member, and the upper marginal portion of the doors is shaped so that those two portions provide the lid of the microscope when the doors are shut. The inside surface of the doors are provided with racks and pockets to house the various microscope accessories e.g. alternative object lenses and a camera. 15

The invention is not restricted to the constructional details of the foregoing example. 20

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Fig. 8.

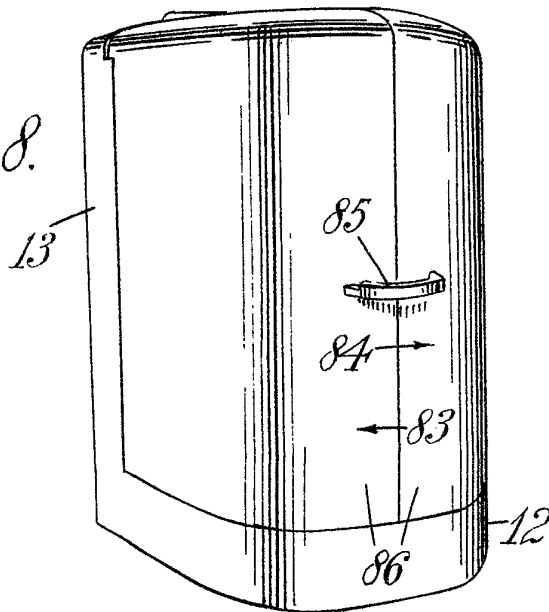


Fig. 9.

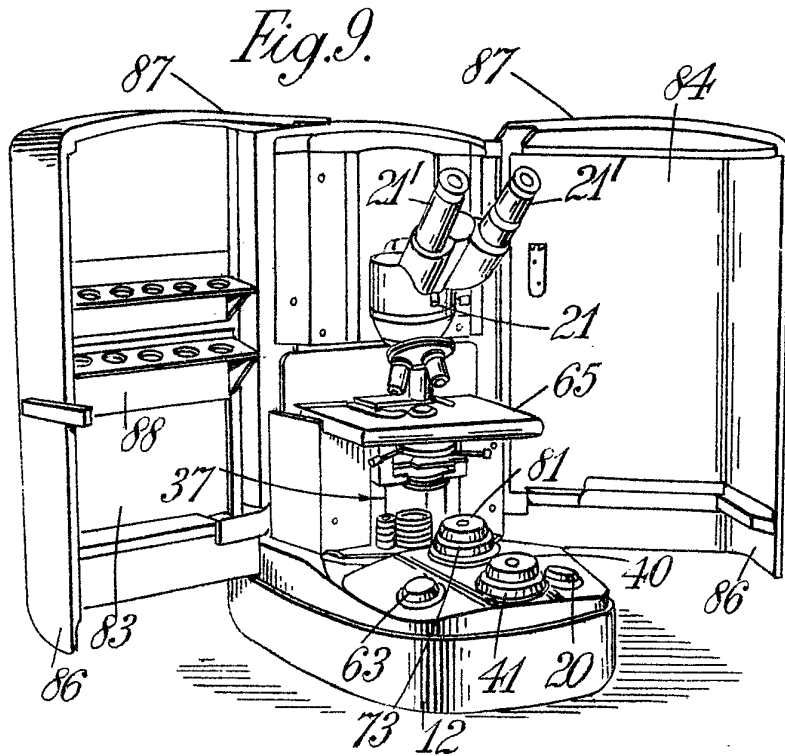


Fig. 1.

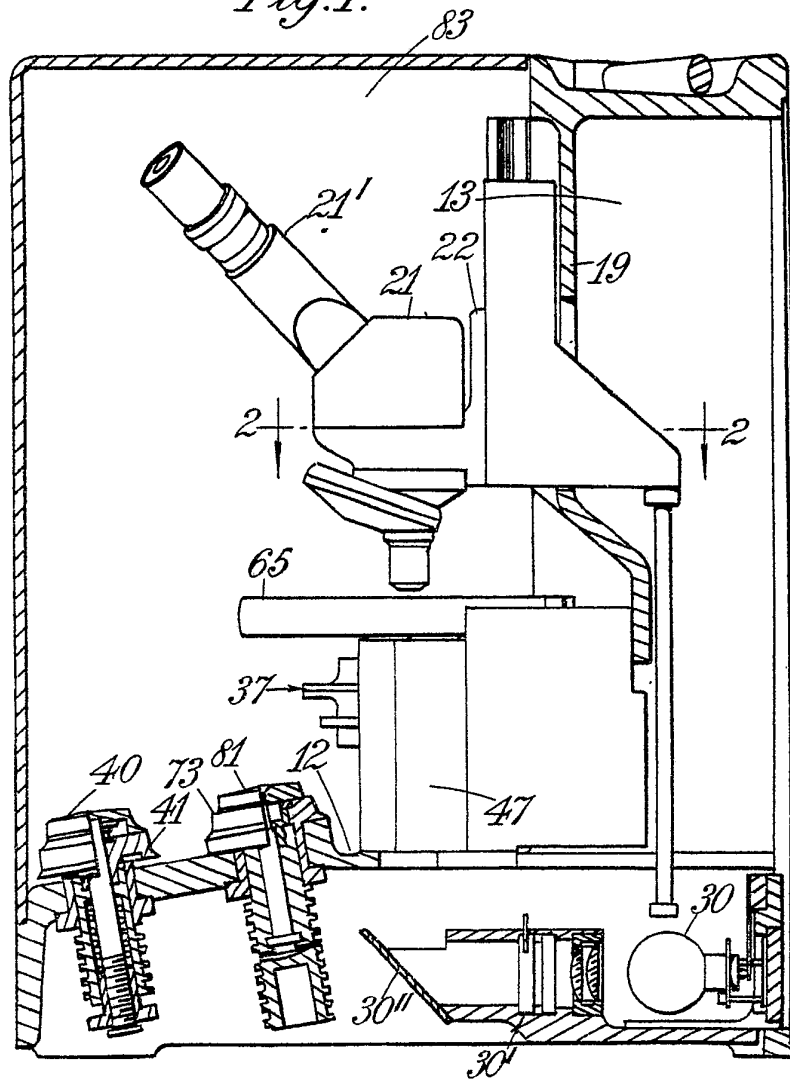




Fig. 2.

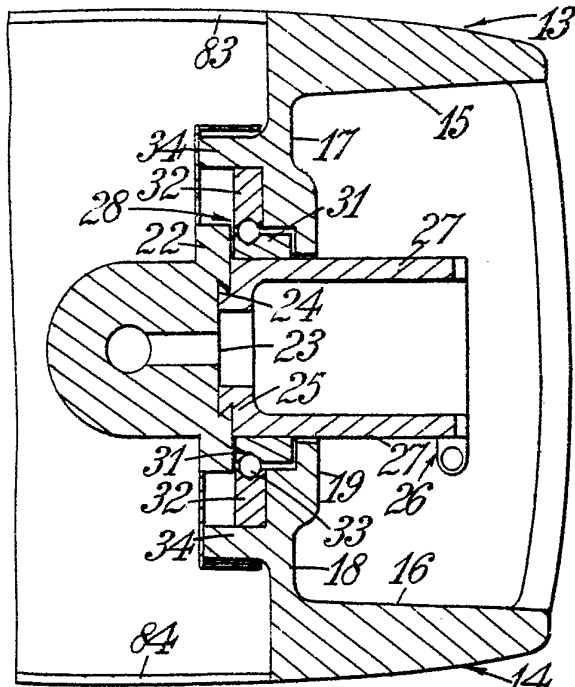
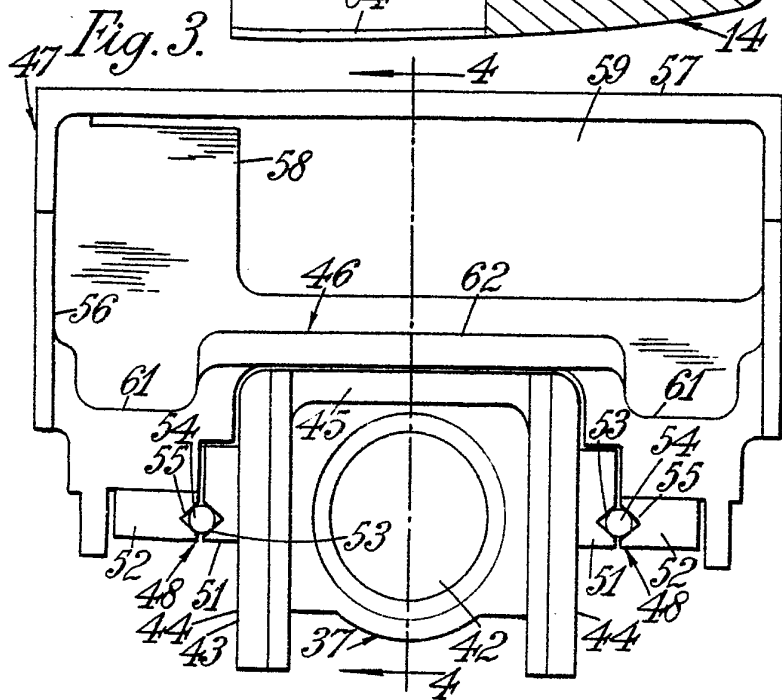


Fig. 3.





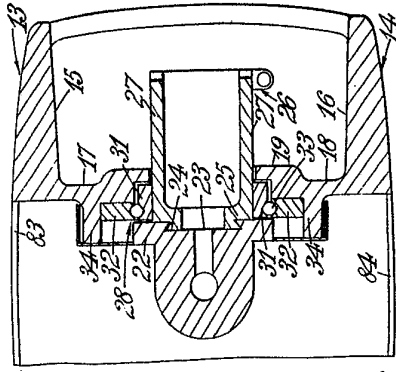
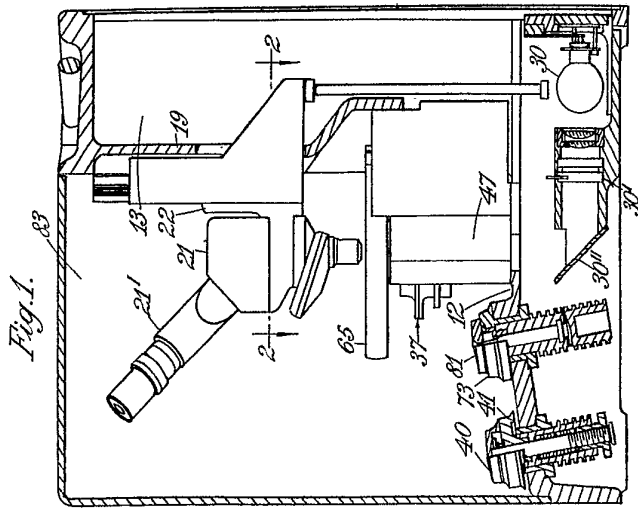


Fig. 2.

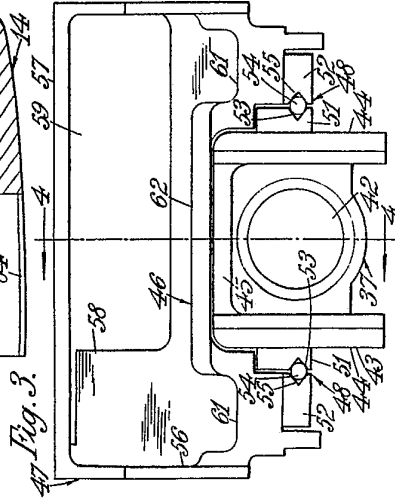


Fig. 3.

Fig. 4. 55

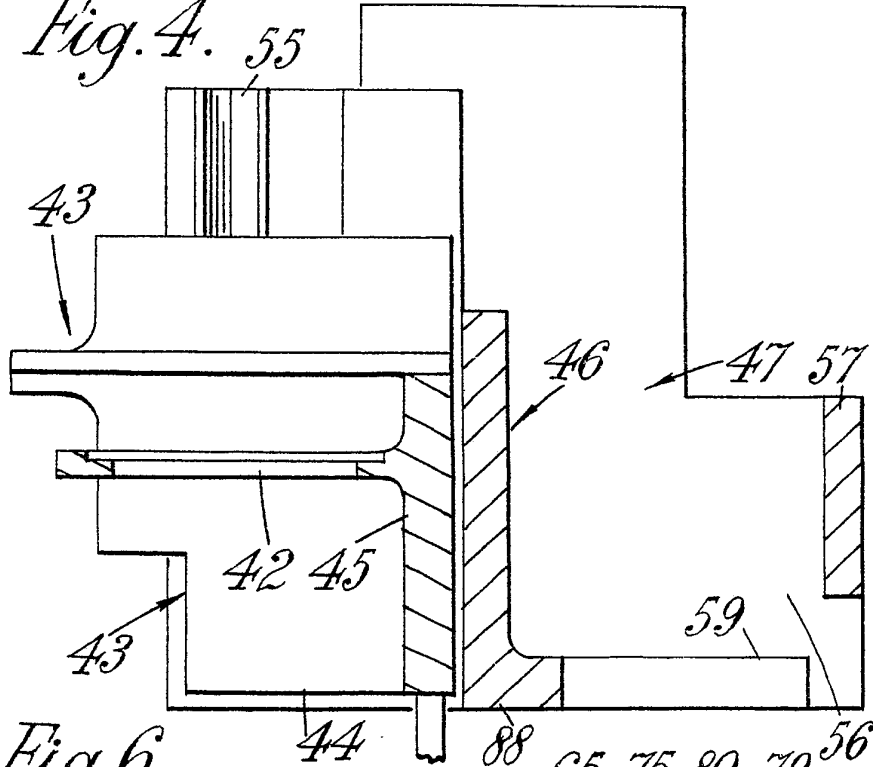


Fig. 6.

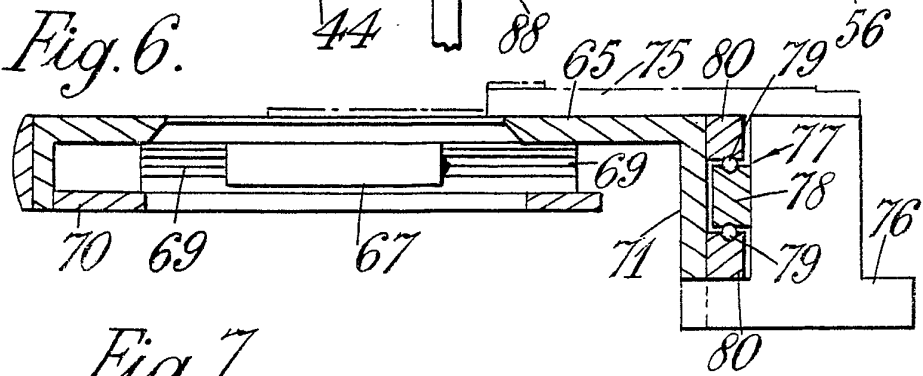


Fig. 7.

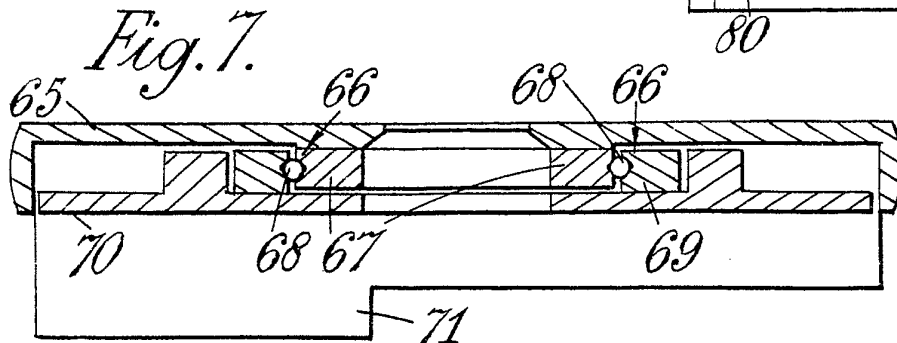


Fig. 5.

