

Dec. 30, 1930.

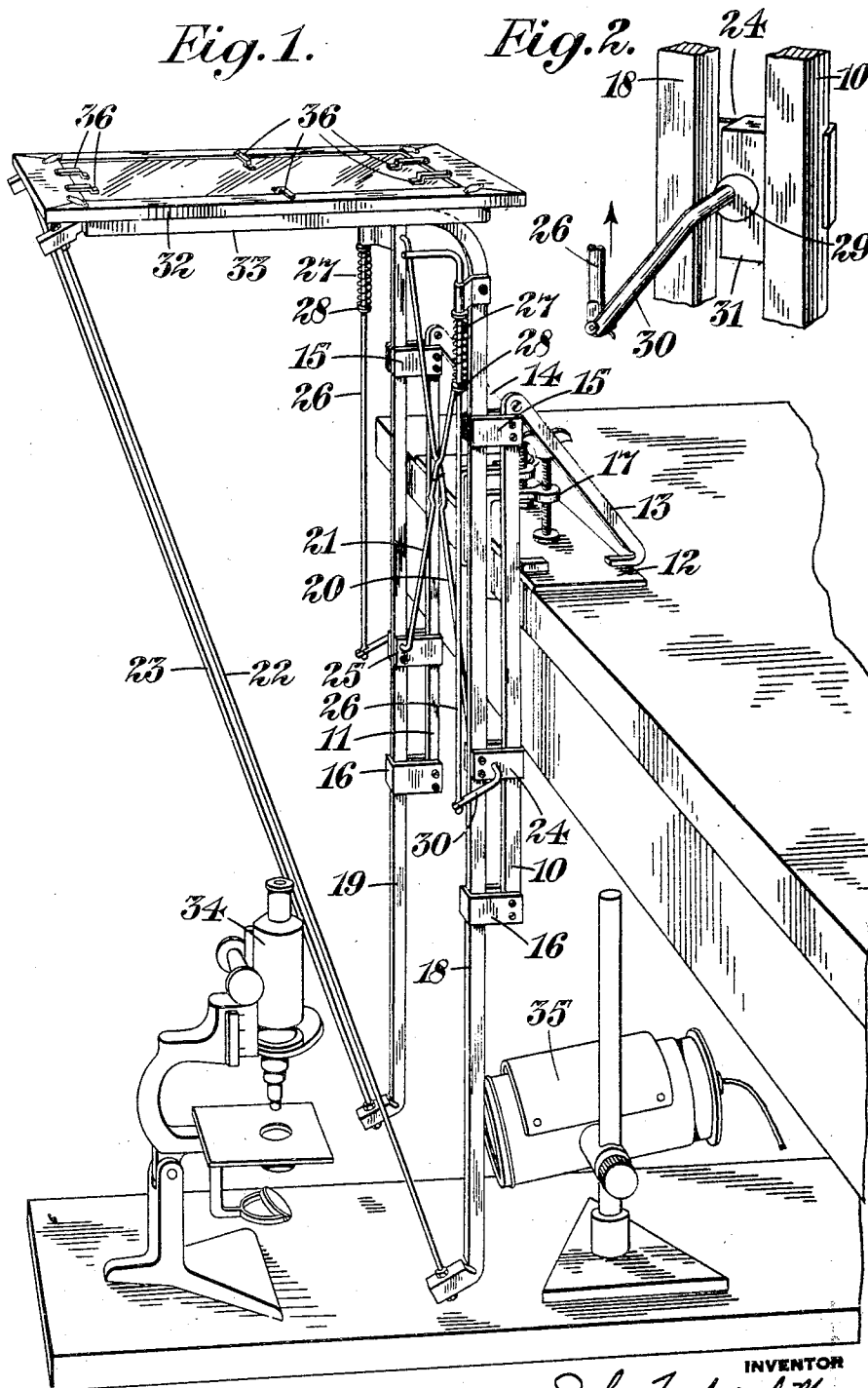
J. F. MARSHALL
 APPARATUS FOR USE IN MAKING GRAPHIC REPRODUCTIONS
 OF IMAGES PROJECTED FROM A MICROSCOPE
 Filed Oct. 5, 1927

1,786,543

2 Sheets-Sheet 1

Fig. 1.

Fig. 2.



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Fig. 3.

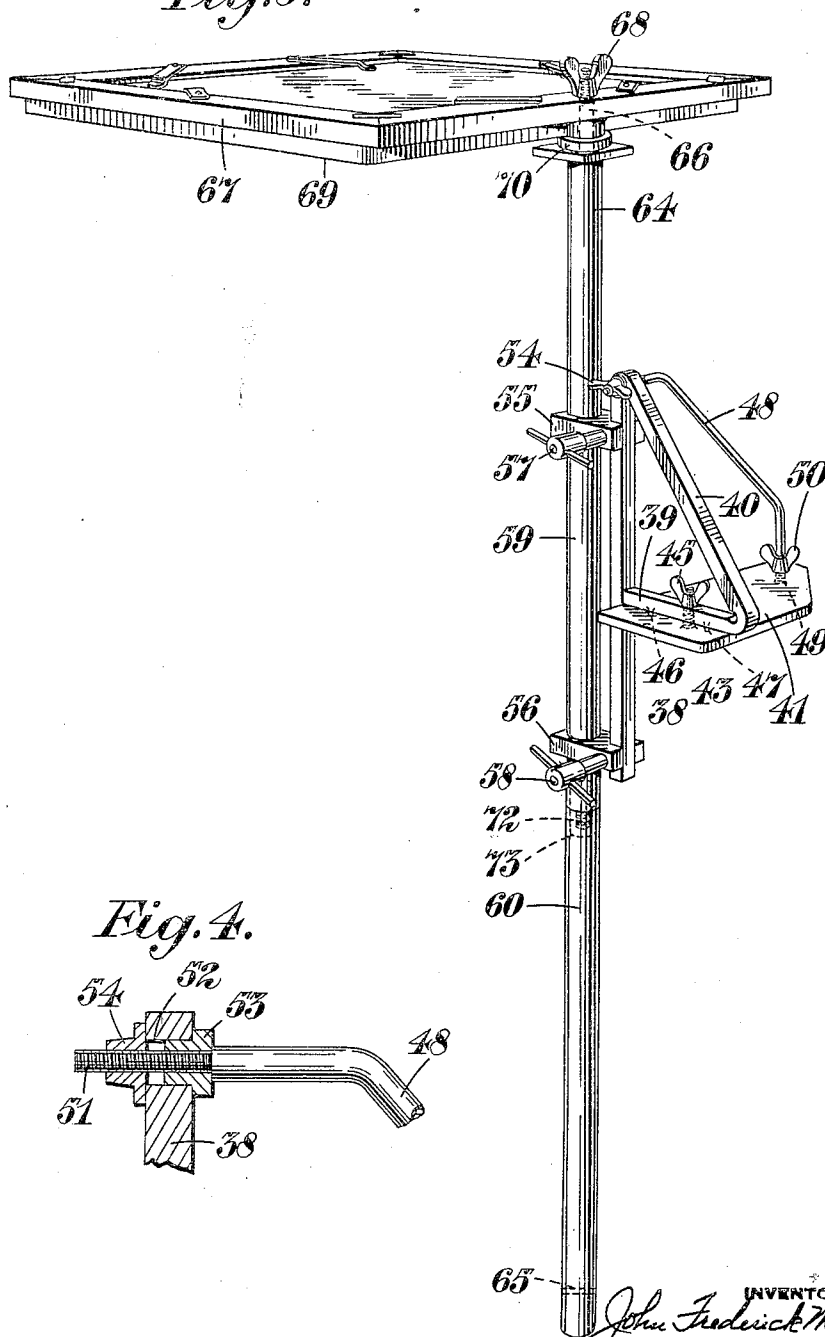
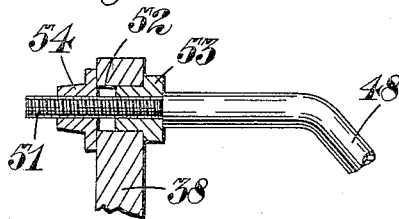


Fig. 4.



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APPARATUS FOR USE IN MAKING GRAPHIC REPRODUCTIONS OF IMAGES PROJECTED FROM A MICROSCOPE

Application filed October 5, 1927, Serial No. 224,128, and in Great Britain May 21, 1927.

This invention relates to apparatus for use in making graphic and other reproductions of images projected from a microscope.

5 An object of the present invention is to provide an adjustable apparatus which will permit the image to be readily focussed on a sheet on which the reproduction is to be made.

10 Another object of the invention is to provide a simple and robust apparatus for supporting a frame on which the said sheet is to be carried.

15 A further object of the invention is to provide an apparatus of the kind described which is readily transportable for use in different places.

20 A further object of the invention is to provide an apparatus of the kind referred to which can be quickly and easily dismantled to allow it to be packed in a small space.

Yet another object of the invention is to provide simplified means for holding the adjustable apparatus in any position of adjustment.

25 Still another object of the invention is to construct an apparatus which can be used by a draughtsman without causing eye-strain.

30 In order that the invention may be fully understood convenient constructions of apparatus according to the invention will now be described with reference to the accompanying drawings.

In the drawings:

35 Figure 1 is a view in perspective showing one construction according to the invention,

Figure 2 is an enlarged view showing certain details of this construction,

40 Figure 3 is a view in perspective showing a modified construction also according to the invention, and

Figure 4 is an enlarged view showing certain details of the modified construction in section.

45 Like references indicate like parts throughout the drawings.

Referring now to Figure 1, a body-portion of an adjustable bracket comprises two upright metal bars 10, and 11, of rectangular section, secured together in parallel relationship and arranged to be clamped to a

table or like support. For this purpose a horizontal metal plate 12 to be laid on the table has its front edge secured, as shown by welding or otherwise, to the uprights 10 and 11, at a short distance from their upper ends which are rigidly connected each by rigid ties 13 and 14 to the plate 12 at or near its rear edge. The uprights 10 and 11 are provided each with two tubular guides, one 15, near the upper end above the plate 12 and one, 16, near the lower end, in which guides the adjustable portion of the bracket (hereinbefore described) is movable up and down. Any convenient clamp 17 is used for clamping the plate 12 on the table, as shown in Figure 1. The clamp 17 is shown as being separate from the body-portion of the bracket, but alternatively it may be a screw-threaded spindle movable in a nut member secured to one or both of said uprights, for example carried by a bar connecting the latter.

The adjustable portion of the bracket comprises two members 18 and 19 of inverted L-shape secured together by cross-bars 20 and 21 in parallel relation and movable in a vertical direction in the guides 15, 16 on the uprights 10 and 11 aforesaid. The horizontal limbs of the L members extend away from the plate 12 and their free ends are tied by bracing members 22, 23 in the form of struts to the lower ends of the vertical limbs of the L members, so that the adjustable portion of the bracket is a triangular structure as viewed from one side.

55 In order to secure the adjustable portion of the bracket in any desired position of adjustment a convenient construction of clamp is used for clamping it to the body-portion. According to this construction, two cam-actuated clamps 24, 25 are provided one on each vertical limb of the L members 18, 19 aforesaid, the same being situated about the middle of the length of the latter. Each clamp is associated with a rod 26 that extends upwards to close below the horizontal limb of the associated L member, and a spring 27 bearing at one end against a fixed bracket below that limb and at its other end against a collar 28 on the rod 26 tends to press the latter downwards so as to hold the clamp 100

closed. As shown in Figure 2, each clamp comprises an eccentric element 29 which is carried on a crank-arm 30 connected to the rod 26 and is urged by the spring 27 into position to move a clamping block 31 against its respective upright 10 or 11. By lifting the rods 26 against their springs 27 the clamps can be released, by turning the eccentric elements 29 through the connection above described, in order to adjust the position of the support for focussing purposes.

In order to facilitate transport of the bracket so as to enable it to be used in various places the adjustable portion of the bracket may be arranged to be folded up, for example by providing detachable or hinged joints between its horizontal and vertical limbs of the L members 18, 19 and between the bracing members 22, 23 connecting the ends of the limbs. Also, in some cases, the bracing members themselves and the vertical limbs of the L members may be hinged or otherwise arranged to fold or telescope, for the same purpose.

The horizontal limbs of the adjustable support aforesaid may in some cases serve to receive directly a sheet of material on which the reproduction is to be made. In the construction illustrated in Figure 1, however, a holder in the form of a glazed frame 32 rests on the horizontal limbs of the members 18, 19 and may be secured thereto by any convenient means, such as bolts and nuts, there being also provided on the frame a metal frame 33 which slides on to the horizontal limbs as shown. The glass in the frame is preferably removable and forms a convenient bed for receiving a sheet of tracing paper or the like on to which the image to be reproduced can be readily projected from a microscope 34 and spot-light 35 placed vertically below it. Spring fingers 36 pivoted to the frame can be moved on to the paper to hold it securely against the glass.

Referring now to Figure 3, the modification herein illustrated comprises a body-portion having an upright bar 38 which is formed with a horizontal arm 39, the rear end of the arm being connected to the bar 38 by a second arm 40. A base-plate 41 is adapted to be clamped to a table or the like and the horizontal arm 39 is adapted to be detachably secured to the base-plate. For this purpose a threaded stud 43 is provided on the base-plate which is arranged to project through a hole in the arm 39, and a wing-nut 45 is provided to clamp the arm to the base plate. The arm also carries dowel pins 46 and 47 which engage in corresponding holes in the base-plate and retain the arm securely thereon. A strut 48 is provided to ensure rigidity of the bar 38 and this strut is threaded at its lower end, as shown at 49, to engage a threaded hole in the base-plate, a wing-nut 50 being also provided

to allow this threaded connection to be made secure. The upper end of the strut 48 is reduced and threaded as shown at 51 (see Figure 4) and is adapted to pass through a bore 52 formed between the junction of the arm 40 and the bar 38. A collar 53 is loosely mounted on the reduced end of the strut and fits within the bore 52, and a wing-nut 54 is provided on the end of the strut whereby the strut 48 and the bar 38 may be secured together.

Clamps 55 and 56 are carried by the bar 38 and are adjustable by wing-nuts 57 and 58 in the usual way.

In this modification the adjustable portion comprises a rod adapted to be adjustably held in the clamps 55 and 56 and is formed of two tubular members 59 and 60 of which the member 59 has a screwed end 72 fitting into a threaded hole in a plug 73 inserted in the member 60. Tommy-holes 64 and 65 are provided in the members 59 and 60 wherein tommy-bars can be inserted to separate the members. From this description it will be evident that the bar 38 and the strut 48 can be readily detached from the base-plate 41 and that the adjustable rod can be separated into two lengths. This arrangement has the advantage that the apparatus can be easily packed in a small space, for example in a fitted case, and is therefore easily transportable. At the upper end of the rod the latter is formed with a reduced threaded end 66, and a frame 67 similar to that previously described is arranged to fit upon the stud 66 and to be clamped in position by means of a wing-nut 68. A metal frame 69 supports the sheet-supporting frame and is clamped by the wing-nut 68 against a collar 70 on the end of the rod and holds the frame in position.

Instead of the screw-operated clamps 55 and 56 cam-actuated clamps similar to those previously described may be arranged on the bar 38.

It will be appreciated that the apparatus described in the form of an adjustable bracket is very convenient to use as the draughtsman can work on a horizontal surface, the image can be readily focussed on the sheet, and can be traced directly by the draughtsman, and no eye-strain is caused owing to viewing the image with one eye whilst using the other eye for drawing a copy of the same at a place remote from the image as heretofore.

Although the described apparatus is particularly adapted for making graphic reproductions it may also be used for making photographic reproductions in which case a sheet of light-sensitive material, e. g. photographic paper, may be placed face downwards on the glass sheet, this operation being conducted in a photographic dark room, and

the necessary exposure being made by lighting a lamp associated with a microscope. If desired, a light-tight, flexible enclosure in the form of a velvet "bag" may be interposed between the sheet and the eye-piece end of the microscope. Also it is not necessary that the apparatus should always be used with the glass sheet in a horizontal plane, although it will probably be so used in most cases. Sometimes, for example it may be desired to draw or photograph the side view of an object floating in water. In this case the object may be placed in a flat tank containing liquid, the microscope placed with its optical axis horizontal, and the drawing or photographic apparatus may be fixed to some support, for example by means of a clamp, which will locate the glass sheet in a plane normal to the optical axis of the microscope.

Various modifications may be made in the details of construction described above without departing from the invention.

I claim:

1. For use in making a graphic reproduction of an image projected from a microscope, apparatus comprising in combination a bracket, clamping means on said bracket arranged to enable the latter to be readily secured to an existing support, a movable carrier mounted upon the bracket, means for permitting rectilinear adjustment of the carrier in relation to the bracket, and an image-receiving sheet supported on the carrier with its plane perpendicular to the line of adjustment of said carrier on the bracket.

2. For use in making a graphic reproduction of an image projected from a microscope, apparatus comprising in combination an elongated bracket, means on said bracket for clamping it in a vertical position to a support, a carrier which is mounted on the bracket to extend outwardly therefrom at right angles thereto and which is adjustable along the length of the bracket, adjustable clamping means on the bracket operable to lock the carrier in any desired position of adjustment, and a translucent screen supported by the carrier aforesaid with its plane parallel to that of the carrier.

3. For use in conjunction with a microscope and a projection device, an apparatus comprising in combination a bracket, clamping means thereon for securing the bracket to an existing support, a slide mounted on the bracket and adjustable in a rectilinear path in relation to said bracket, clamping means on the bracket for locking the slide in any desired position of adjustment, a frame secured to the upper end of the slide and extending outwardly therefrom at right-angles thereto, and a translucent screen mounted in said frame.

4. For use in making a graphic reproduction of an image projected from a microscope,

apparatus comprising in combination a bracket, clamping means on said bracket arranged to enable the latter to be readily secured to an existing support, guides spaced apart along the length of the brackets and arranged to provide hollow cylindrical bearings, a rod slidable within the bearings aforesaid in a direction along the length of the bracket, clamping means on the bracket operable to lock the rod aforesaid in any desired position of adjustment in its guides, and an image-receiving sheet supported on the rod with its plane perpendicular to the axis of said rod.

5. An apparatus for use in making a graphic reproduction of an image projected from a microscope comprising in combination, a member arranged to be secured to a support therefor, an arm adapted to be secured to said member, readily detachable means for securing the arm to the member, a pair of clamps on said arm, a strut member secured both to the said member and to the said arm, readily detachable means for securing the strut, the arm and the member together, a rigid carrier arranged to be adjustably secured in position within said clamps and a translucent sheet-supporting frame carried by said carrier.

6. An apparatus for use in making a graphic reproduction of an image projected from a microscope comprising in combination, a member arranged to be secured to a support therefor, an arm adapted to be clamped to said member and having a dowel-pin connection with the latter to prevent rotation thereon, a sheet having one end threaded into said member and being clamped at its other end to said arm, a plurality of clamping elements carried by said arm, a rigid carrier adjustably mounted in said clamping elements and a translucent sheet-supporting frame detachably mounted on said carrier.

In testimony whereof I affix my signature.
JOHN FREDERICK MARSHALL.