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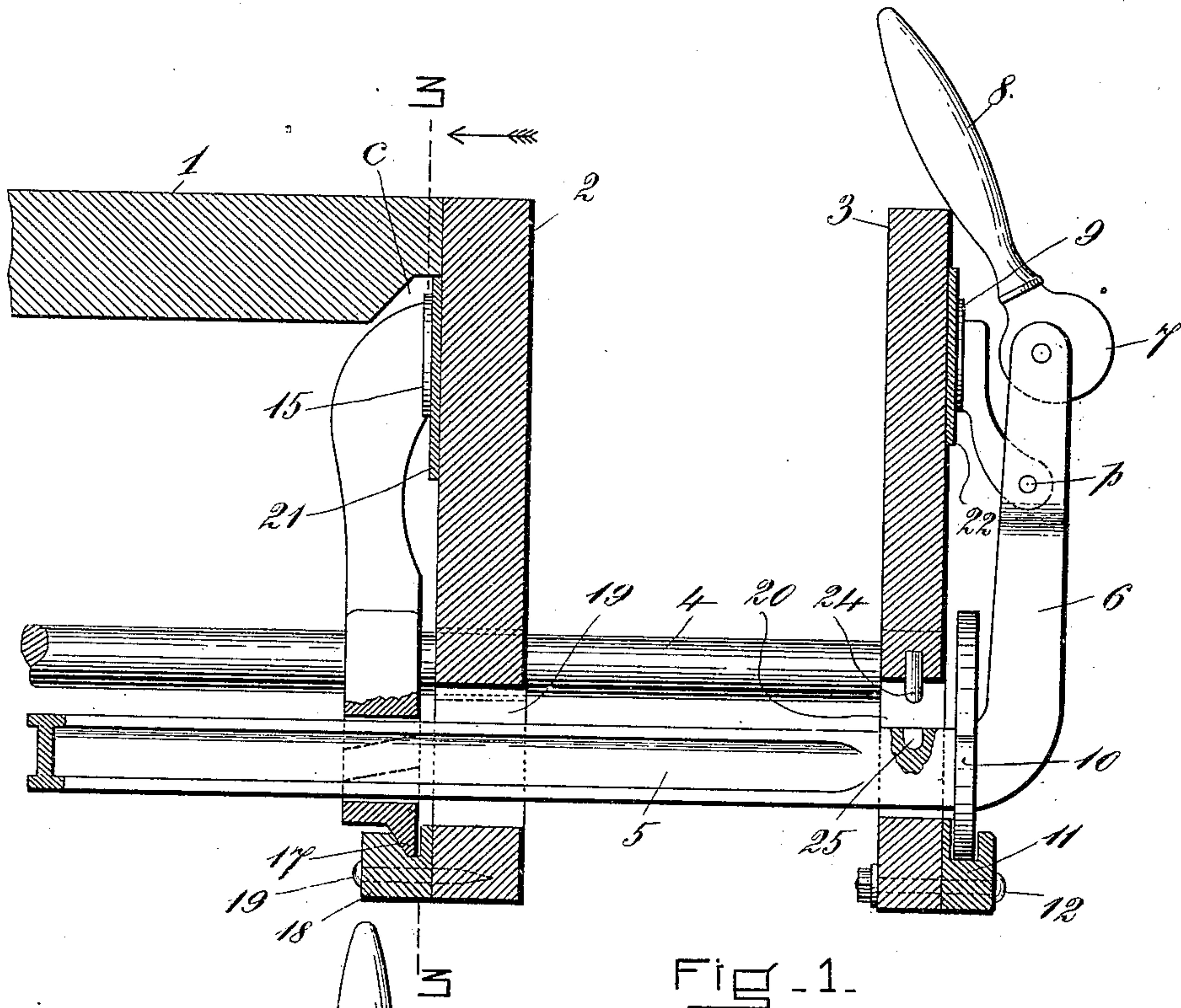
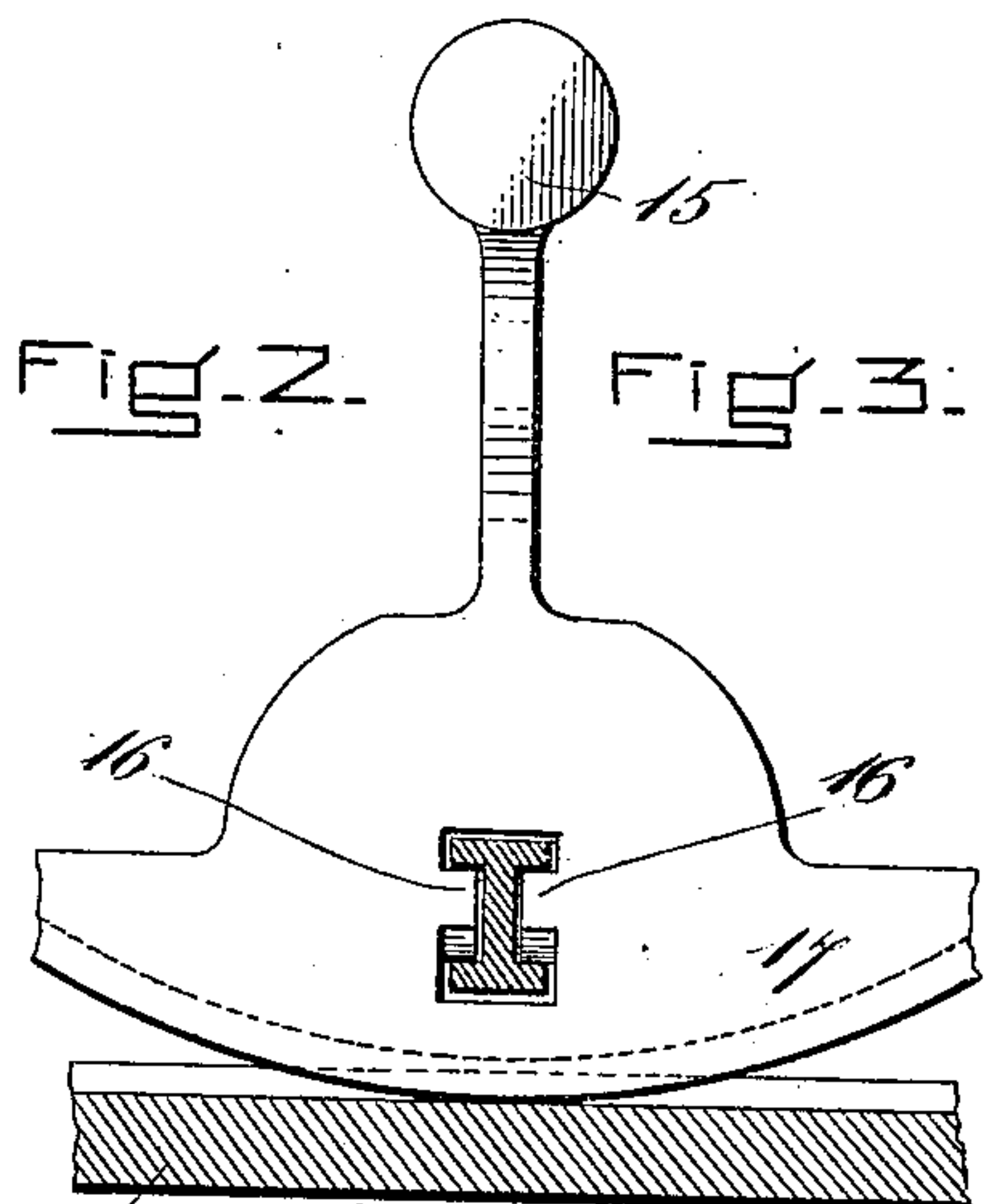
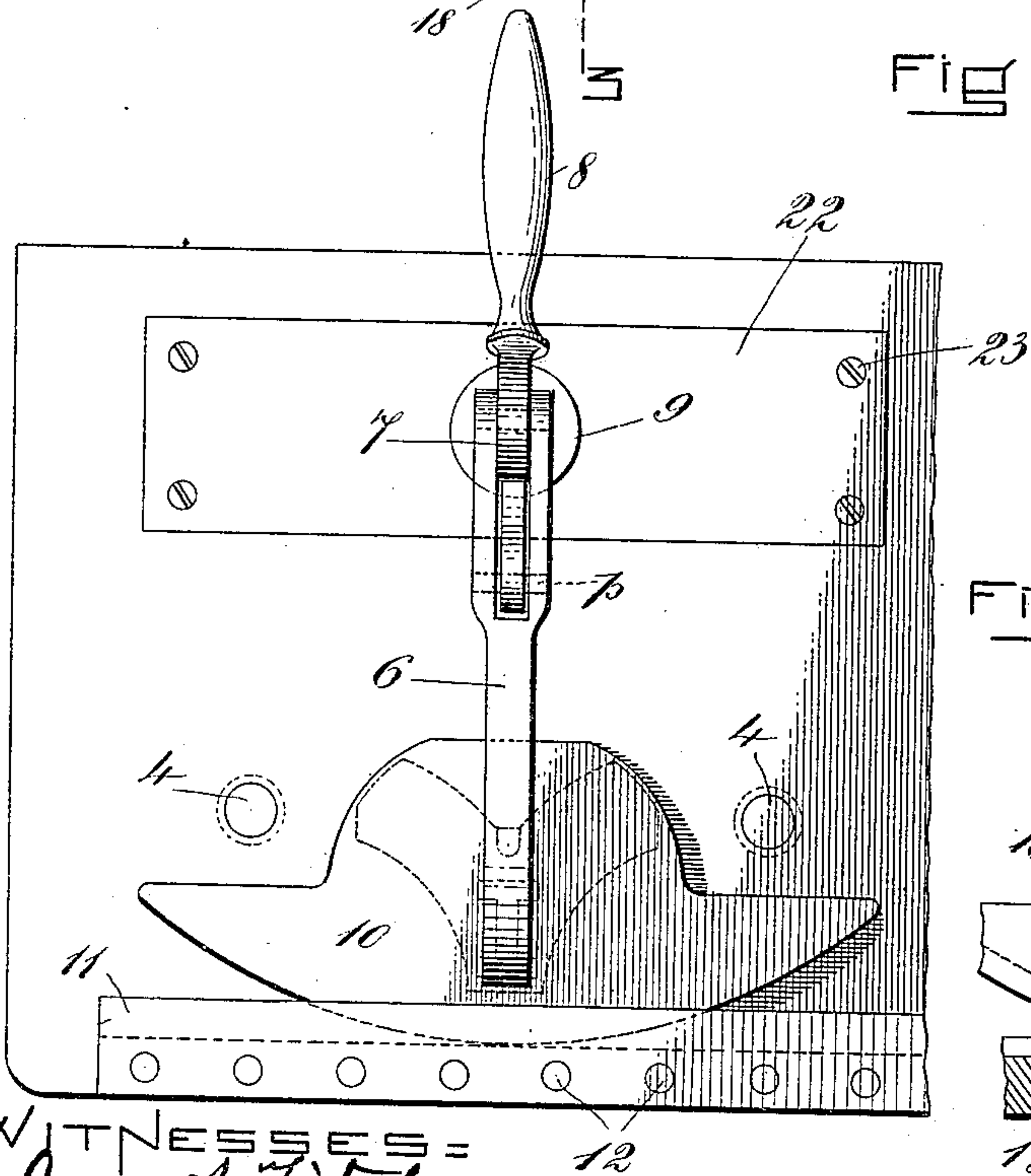


Fig. 1.



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# UNITED STATES PATENT OFFICE.

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*To all whom it may concern:*

Be it known that I, ARTHUR W. RICHARDS, a citizen of the United States, and a resident of Yonkers, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Vises, of which the following is a specification.

This invention relates to vises in general and it is particularly useful as applied to carpenters' bench vises, which have jaws of considerable extent.

The main object of my invention is to enable the clamping pressure to be applied to the work at the desired center of pressure, that is to say, at the point through which passes the resultant of all pressures which the operator wishes to exert upon the work, and to this end I provide, in connection with a jaw against which the work is held, a more or less independent clamping mechanism which may be adjusted transversely, or across the work-engaging face of said jaw, so that the clamping pressure may be exerted upon the work at any desirable point, within the limits of adjustability. As applied to a carpenter's bench vise of the usual type the fixed jaw of such vise serves as the jaw against which the work is clamped, and the clamping pressure is preferably applied by means of supplementary jaws which embrace the vise jaws and are transversely adjusted in unison.

I have found in practice that the position of the best point of application need only vary along a linear path, and my invention, therefore, further consists in supporting the clamping means in guided relation on the vise jaws so that the operator may easily and quickly shift the point of application along this proper linear path, the exact shape and extent of which will depend upon the intended use of the device. If the top, side and bottom edges of the vise jaw may severally be used as clamping edges, all desirable centers of pressure will be in a closed path following the outline of the vise jaw more or less closely all around. If the top edge alone be used the path need only be a line approximately parallel to the top edge of the vise jaw; and as this is the most common form it will be the form selected below for illustrating the invention.

My invention further consists in means that permit of quickly and simultaneously adjusting the separation of the vise jaws

and the corresponding separation of the clamp jaws, and it also comprises other features contributing to excellence of construction and efficiency.

In the accompanying drawings, Figure 1 is a side elevation partly in section of a vise embodying the various features of my invention in one preferred form; Fig. 2 is a face view of one of the jaws of the vise as seen from the right in Fig. 1; Fig. 3 is a cross section on the line 3—3 in Fig. 1.

The form of vise shown in the drawings is particularly adapted for use in connection with a carpenter's bench 1 or the like, in which case the parts are applied to the front or end of the bench indicated at 2 in the drawings, the part 2 providing one of the clamping jaws of the vise. The opposed clamping surface consists in a movable jaw 3 which is arranged to slide toward and from the fixed jaw 2 by being provided with the usual horizontal guide rods 4 passing through holes in the jaw 2, or in any other suitable manner. 5 represents a rod passing through the jaws 2 and 3 and provided on its outer end with an upwardly extending portion 6 which carries at or near its upper end the means by which the clamping pressure is applied to the movable jaw 3, in this form consisting of a cam 7 pivotally mounted in the bifurcated upper end of the part 6 and provided with an operating handle 8. The thrust of the cam 7 is preferably received on the rear surface of a plate 9 which is pivoted to the part 6 as at *p* and adapted to bear against the outer face of the jaw 3 as shown.

In order to enable the pressure exerted by the cam 7 to be applied at different points, the rod 5 is so mounted that said cam may be moved laterally to the desired point, this being accomplished in the construction illustrated by a rolling motion which is secured by providing the rod 5 with a specially formed fixed rocker 10 the lower edge of which is curved and runs in a track provided by a longitudinal groove cut in the bar 11 which is secured to the jaw 3 by bolts 12, causing the jaw 9 and rod 5 with the parts connected to the latter to move together during the quick adjustment of the vise. The lower edge of plate 10 is curved to secure any desirable linear path for the point of application of the pressure exerted by jaw 9. In the form here shown the de-



sired path is parallel to the top edge of the vise jaw and the cam curve is accordingly an arc of a circle with its center in or close by jaw 9. As the pressure may be applied at  
 5 any point in the path, the vise proper exerts the desired distributed pressure on the work and is relieved of twist and side strains, which are all confined to the clamping means.

10 The rod 5 is provided at some point behind the fixed jaw 2 with some means for resisting the outward pull on said rod when the clamping pressure is exerted by the cam 7 and for this purpose I prefer to employ a  
 15 rear clamp jaw 15 provided near its lower end with a perforation through which the rod 5 passes and with lugs 16 extending inwardly from the sides of said perforation and located in the rectangular grooves  
 20 formed in the sides of the rod 5, said lugs being inclined as shown in Fig. 1 and formed to provide diagonally opposite corners which upon slight downward movement of the outer end of the rod 5 will be caused to bear  
 25 against the upper and lower walls of the grooves with sufficient force to hold said rod against outward movement. If the front end of said rod be slightly raised, the rod will be free to slide along said lugs in either  
 30 direction. This arrangement causes the rear clamp jaw 15 to turn with the rod 5 and in order to maintain the upper end of said clamp jaw 15 directly opposite plate 9 in all positions of the vise, the lower end of  
 35 the clamp jaw 15 is provided with a laterally extending rocker 17 corresponding in all respects with rocker 10 of bar 5 and running in a groove in the bar 18 secured by fasteners 19 to the rear face of the jaw 2.  
 40 The result of this arrangement is that the clamp jaw 15 and the plate 10 roll simultaneously on their respective tracks as the rod 5 is turned, so that the two clamp jaws 9 and 15 are kept opposite each other in all  
 45 positions. The jaws 2 and 3 are cut away to provide spaces 19 and 20 suitable for permitting the movements of the rod 5, which are a necessary consequence of the rolling. The rocker 17 and its track 18 are preferably beveled as shown in Fig. 1 to keep the  
 50 clamp 15 normally pressed against the back of jaw 2 and thus avoid lost motion, and the top 1 of the bench is grooved at *c* to provide room for jaw 15 which must reach high  
 55 enough to act in direct opposition to clamp jaw 9. The vise jaws 2 and 3 in this special application of the invention being generally made of wood are provided with metallic guard plates 21, 22 fastened to the jaws by  
 60 screws 23 or in any other preferred manner.

As thus constructed the operation is as follows: Assuming that a piece of work has been placed between the jaws 2 and 3, the  
 65 movable jaw 3 may be pushed forward to confine the work between itself and the fixed

jaw 2 by lifting the portion 6 of the rod 5 and pushing the same forward whereupon when said portion 6 is dropped its plate 10 enters the groove of track 11 and causes the lugs 16 to bind in the grooves of rod 5, 70 clamp 15 being simultaneously forced against the rear face of the fixed jaw 2. In separating the jaws of the clamp and vise the bar 5 must, as explained above, be held in a raised position. This operation, however, 75 withdraws the rockers 10 from the groove in rail 11 and breaks the connection between the bar 5 and the vise jaw 3. To reestablish this connection automatically I provide jaw 3 with a pin 24 which is adapted to engage 80 itself in a recess 25 of bar 5 as the bar rises. The bar 5 is raised with its arm 6 approximately in a vertical position.

While the invention has been shown as applied to a bench vise, having one jaw ab- 85 solutely fixed, it will be understood that the vise may have either or both jaws movable and that it may even be used as a portable clamp.

I claim as my invention:

1. In a vise, the combination with a work- 90 holding jaw of means for clamping the work against the same, said means comprising a clamping member mounted to move toward said jaw to apply the clamping pressure and 95 also to move across the work-engaging face of said jaw to vary the point of application of the clamping pressure to the work.

2. In a vise, the combination with a fixed clamping member of a rod adjustable length- 100 wise beneath the work and provided at its outer end with a clamping jaw adapted to be adjusted laterally, in parallelism with the work-engaging face of the fixed clamping member, and means carried by said rod 105 for forcing the adjustable clamping jaw toward the work.

3. In a vise, the combination of a pair of work-holding jaws and a pair of clamping 110 jaws between which the work-holding jaws are located, said clamping jaws being provided with means for applying a clamping pressure to the work-holding jaws to force them together and being mounted to move 115 laterally in unison with respect to said work-holding jaws to vary the point of application of the clamping pressure thereon.

4. In a vise, the combination of a rod movable longitudinally toward and away 120 from the work and having a laterally movable outer end and clamping means carried thereby, a plate carried by said rod and provided with a curved lower edge and a track on which the lower edge of said plate is adapted to run. 125

5. In a vise, the combination of a pair of clamping members movable toward and from each other, and a rod adjustably connecting the same, plates movable with said members respectively and having similarly 130



curved lower edges, and tracks on which the lower edges of said plates are adapted to run.

6. In a vise, the combination with a fixed jaw and a movable jaw mounted to slide toward and from the same, of a rod passing through said jaws and provided on the opposite sides of the latter with laterally movable clamping members, and means for operating said members.

7. In a vise, the combination with a fixed jaw and a movable jaw mounted to slide toward and from the same, of a rod passing through said jaws and provided on the opposite sides of the latter with laterally movable clamping members, means for operating said members, said members being provided with laterally extending plates having curved lower edges, and tracks on which the lower edges of said plates are adapted to run respectively.

8. The combination with a vise comprising two jaws and means for guiding the motion of one of said jaws toward and from the other; of means for applying pressure against said jaws to force them together, and means for varying the position of the point of application of said pressure on said jaws.

9. The combination with a vise comprising a fixed jaw and a movable jaw and

means for guiding the motions of said movable jaw toward and from the fixed jaw; of a clamp for applying pressure on said vise jaws to force them together, said clamp being mounted and guided in transversely adjustable relation on the said vise jaws to vary the position of the line of the pressure exerted by the clamp upon the jaws.

10. A vise comprising a pair of relatively-movable work-holding jaws and a clamp embracing said jaws for applying pressure thereto to force them together, said clamp being laterally adjustable with respect to said jaws to vary the point of application of the clamping pressure thereon.

11. A vise comprising a pair of work-holding jaws and a pair of supplementary jaws located on the outer sides of the work-holding jaws and provided with means for forcing the same together, said supplementary jaws being mounted to move laterally in unison to vary the point of application of the clamping pressure on the work-holding jaws.

In testimony whereof, I have hereunto subscribed my name this ninth day of September, 1907.

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