

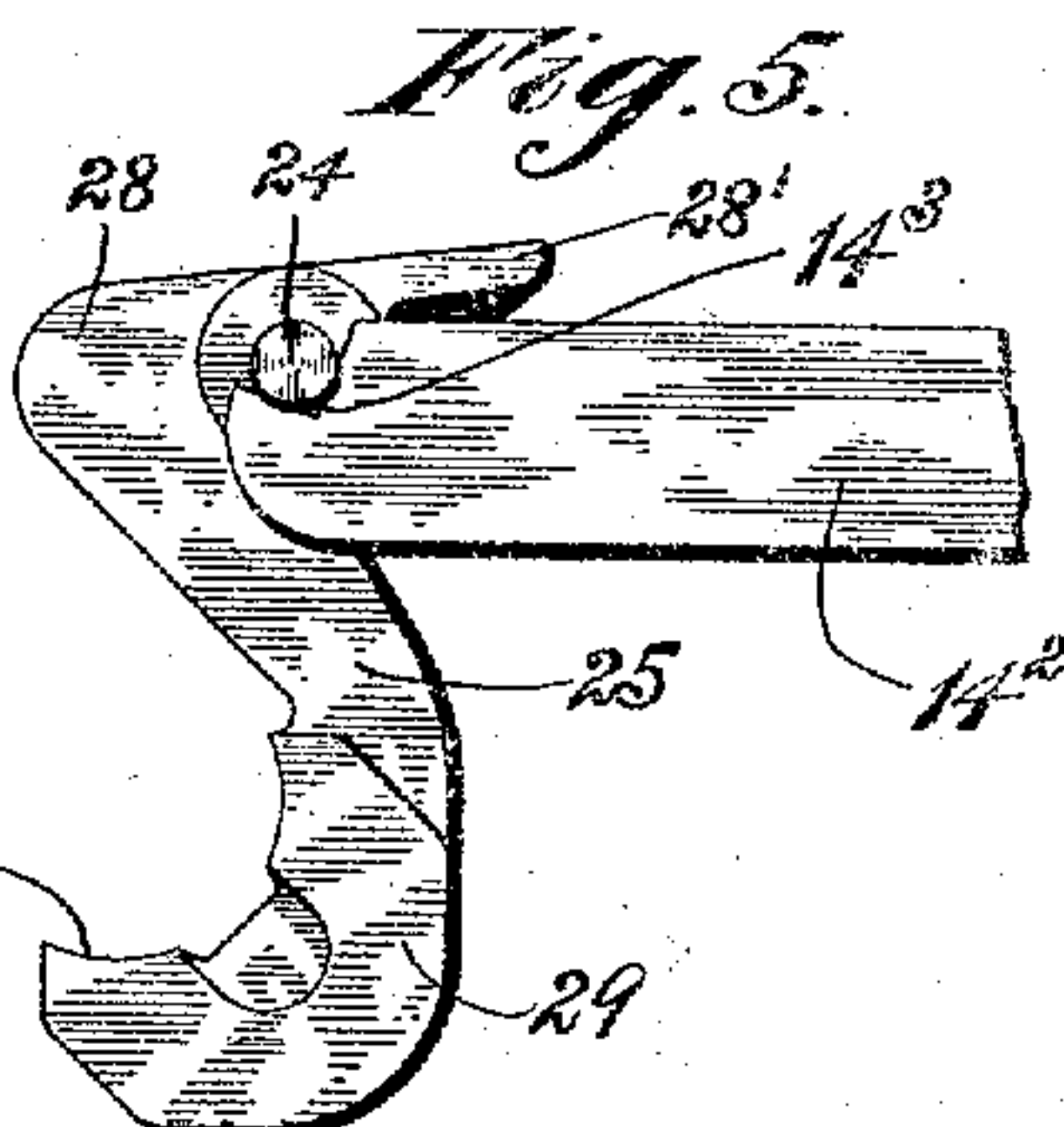
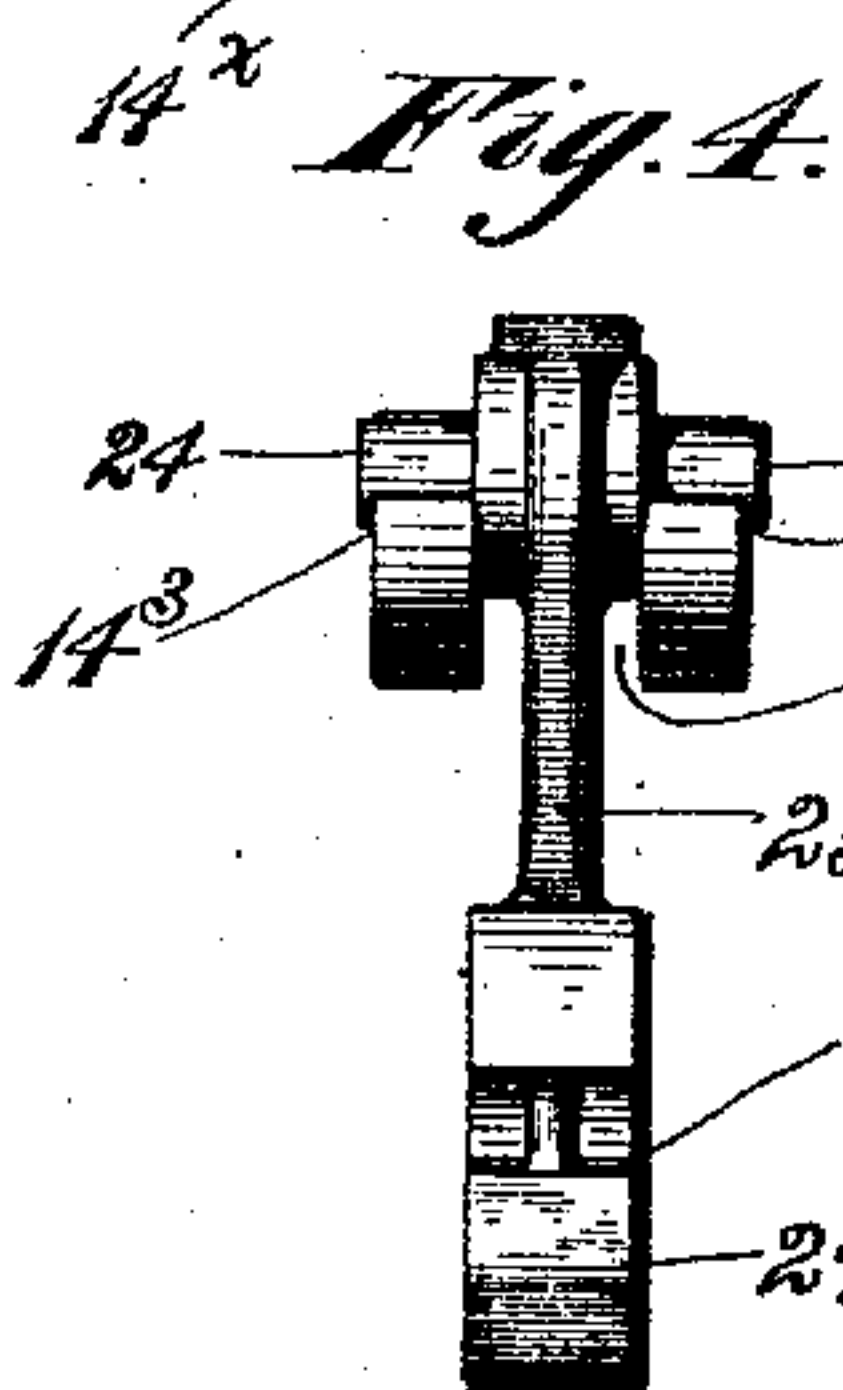
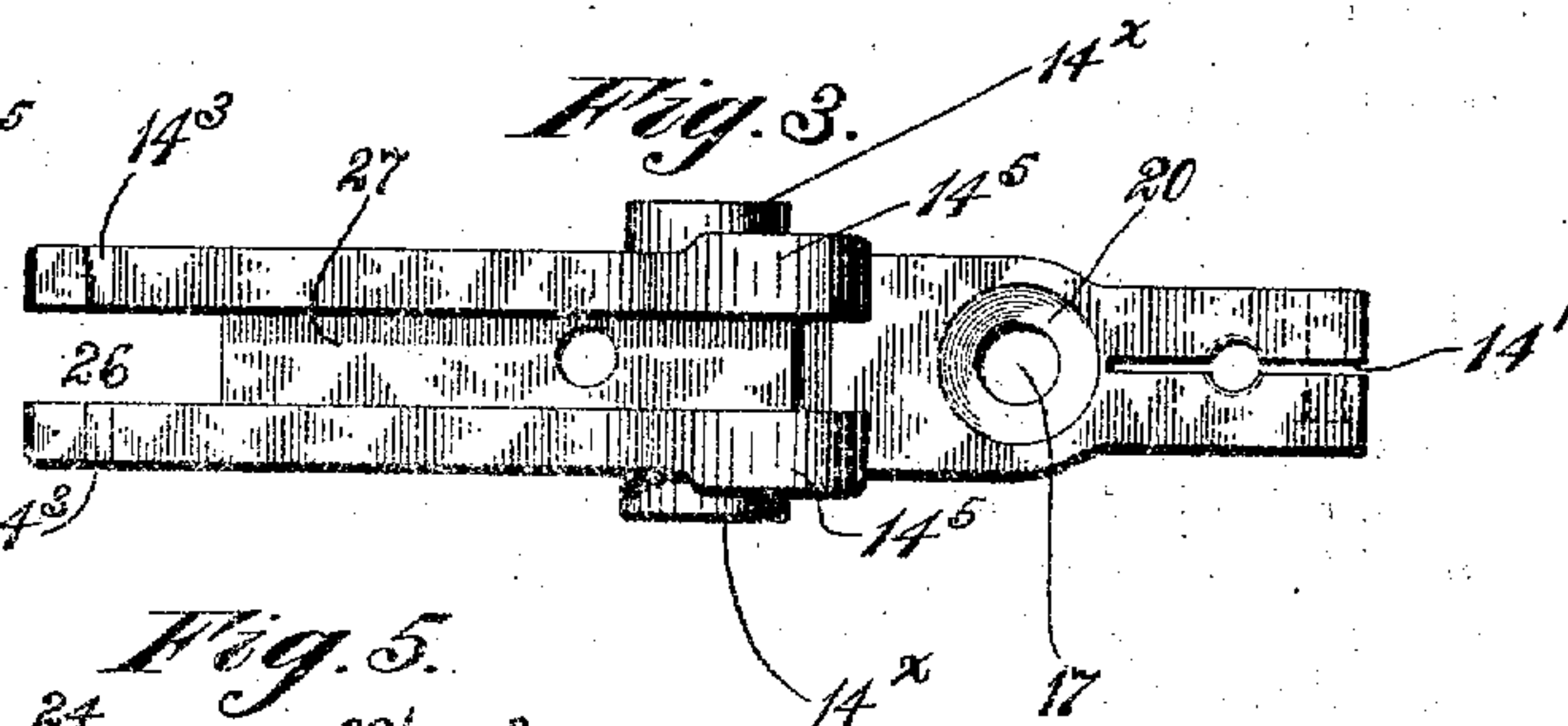
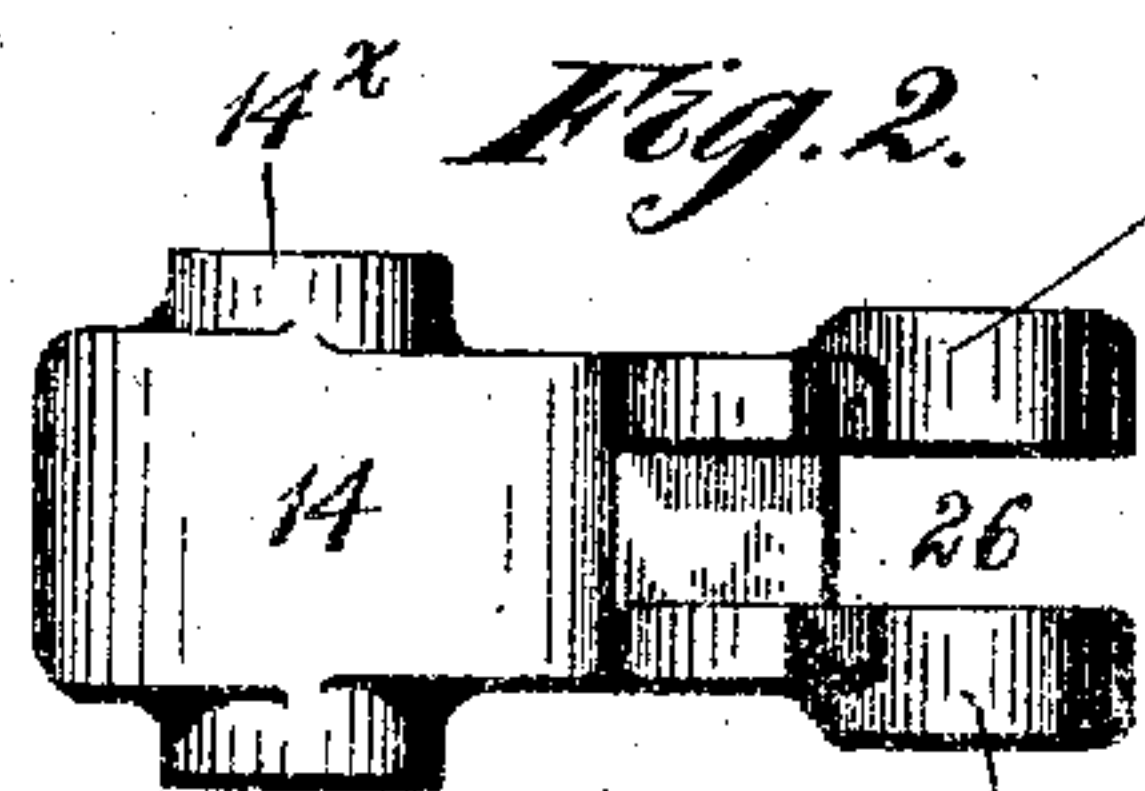
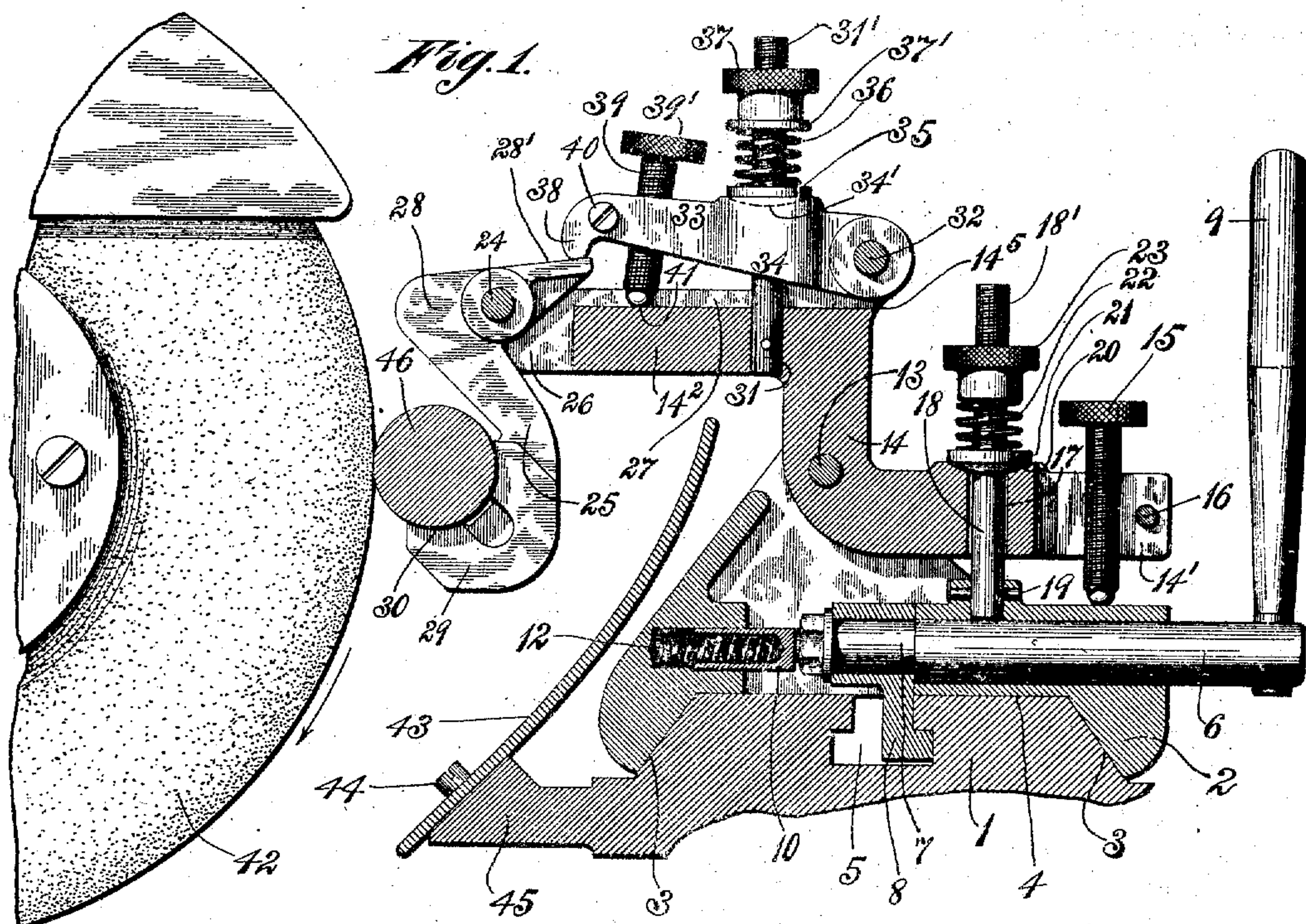
No. 886,293.

B. M. W. HANSON.

PATENTED APR. 28, 1908.

BACK REST FOR METAL REDUCING MACHINES.

APPLICATION FILED SEPT. 8, 1905.



Witnesses

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UNITED STATES PATENT OFFICE.

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BACK-REST FOR METAL-REDUCING MACHINES

No. 888,293.

Specification of Letters Patent.

Patented April 28, 1908.

Application filed September 3, 1905. Serial No. 277,549.

Of all whom it may concern:

Be it known that I, BENGT M. W. HANSON, a citizen of Sweden, who have declared my intention of becoming a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful improvements in Back-Rests for Metal-Reducing Machines, of which the following is a specification.

This invention relates to means for supporting work subject to vibration, such as in the turning, grinding or otherwise reducing of shafts and spindles, in which the ratio of length to diameter is sufficient to cause the work to vibrate, sag, or yield from the reducing tool, thus resulting in inaccuracies both as to cylindricity and equalization of diameter throughout its length.

Primarily the object of this invention is the provision of a readily adjustable and removable device mounted in any position between, and supported upon, the ways of the machine frame, said device carrying means for supporting contact-shoes bearing against the revolving work with sufficient pressure to prevent vibratory tendencies and sagging, and said device being capable of following up and keeping in contact with the work as it is reduced, without sufficient forward and upward tension to unduly crowd said work in the direction of the reducing-tool, or spring the work upward out of its straight axis of rotation through the centers of the grinding machine.

Another object of the invention is the provision of means, which while providing for the sources of inaccuracy just mentioned, will also make provision for errors as regards true cylindricity in pieces turned or ground from the rough.

It is well known that a reducing-tool acting upon a revolving, springy shaft does not produce true cylindrical work unless the piece is perfectly round to begin with, and as this is never the case in practice after each action along the shaft in reducing stock, said shaft will still be of the same general form as it was in the rough, although each reduction of diameter may and generally does produce a greater approximation to a perfect circle. A proper rest greatly facilitates this process, and brings the state of cylindrical perfection within reasonable prac-

tical limits with but few traverses of the reducing tool.

In the accompanying drawings, Figure 1 is a transverse section, showing certain parts in elevation, of a construction embodying the invention; and Fig. 2 is a detail view hereinafter mentioned. Figs. 3, 4 and 5 are detail views of an angle-lever and of the back-rest proper supported thereby.

Referring to the drawings, the numeral 1 indicates a section of the way which supports the head and tail-stocks of a grinding-machine of the class used for cylindrical grinding, and in which the work travels and the wheel-support is stationary, and 2 a back-rest stock which is shown in section and is fitted to the way and clamped thereto by means constituting part of the improvement. It will be observed that the way is not of the dovetailed shape usually employed, but is made in the truncated form shown with the guiding-edges 3 sloping towards a common point, with a flat top 4, and with a central T-slot 5 for the reception of devices for clamping the back-rest stock and the head and tail-stocks, as will be hereinafter described.

Designated by 6 is a shaft with an eccentric end 7, said shaft being fitted into the stock 2 at right-angles to the T-slot 5, and sleeved on the eccentric end 7 is a clamp 8 which instead of being of the form commonly employed with T-slots is of an L-shape form, as shown, the L-part of said clamp being made sufficiently narrow to enter the throat of the T-slot. A handle 9 is secured to the shaft 6, and serves to operate the same.

Designated by 10 is a plunger abutting at one end against the extremity of the eccentric shaft 6, and said plunger serves to locate the L-shaped clamp 8 in the T-slot 5 before the shaft is turned to operate said clamp. A helical spring 12 is inserted in a chamber of the plunger and in a similar chamber of the stock or base 2, and said spring serves normally to push the plunger and shaft 6 endwise, and thus to force the ledge or shoulder of the L-shaped clamp beneath the overhang of the T-slot. This disposition of parts constitutes a valuable feature of the invention, for by it the application and removal of the back-rest as a whole is greatly simplified. Here it may be stated that the features just described are not necessarily

limited in application to back-rests, for as will be obvious the same construction may be employed for clamping head and tail-stocks and other parts to the way or base, provided with a T-slot, upon which they are supported.

Pivoted at 13 in a recess 13' in the top of the base or stock 2 is an angle-lever 14, having tubular pivot-bosses 14^x, and one arm of which extends to the right, is split at its end at 14', and carries in the split-part a screw 15, said split part being clamped against the screw by a bolt 16. In this arm of said lever is formed a perforation 17 for the reception of a rod 18, which is secured to the top of the base 2 by a pin 19. At its top the perforation 17 opens in to a cup-shaped or part-spherical recess 20, and said perforation, is of slightly greater diameter than the diameter of the rod 18 for a purpose hereinafter described. Loose upon the rod 18 is a washer 21 having a convex surface which fits in the recess 20, and above said washer, and surrounding the rod, is a helical spring 22. For a portion of its length the rod 18 is threaded at 18', and in engagement with this threaded portion is a thumb-nut 23.

By the means just described a certain amount of angular motion of the lever 14 is permitted on the pivot 13, and as the spherical surface of the washer 21 rests in the corresponding socket in the lever-arm, distorted action of the spring is prevented. Pivoted by stub-shafts or trunnions 24 in inclined seats 14³ of the upper slotted arm 14² of the lever 14 is a work-supporting hanger or back-rest proper 25, and said lever-arm 14² is slotted at 26 to permit the movement of said hanger, and is longitudinally grooved at 27 for a purpose hereinafter described. This hanger 25 is of peculiar shape, it being provided with an angular portion 28, from an intermediate part of which the trunnions 24 project, and with a shoe 29, curved at 30 to fit the work, as illustrated in Figs. 1 and 5.

Designated by 31 is a rod which is pinned in an opening of the arm 14² of lever 14 adjacent to the vertical part of said lever, and pivoted at 32 in separated ears 14⁵ of said vertical part is a lever 33, the latter having a tubular boss 34 with a concave recess 34', and through which boss the rod 31 passes. Loose on the rod 31, and bearing against the boss 34 is a washer 35 convex on its under side to fit the recess 34', and surrounding a threaded part 31' of said rod is a helical spring 36, against which a nut 37 bears, through the intermediate washer 37', as shown in Fig. 1. At its free end the lever 33 is provided with a downwardly-projecting, curved nose 38, which bears against the portion 28' of the back-rest lever 28, as illustrated in said Fig. 1.

Adjacent to the nose 38 the lever 33 is split to receive a screw 39 having a knurled-head

39', and the split-parts of said lever are clamped upon said screw by a bolt 40. At its lower extremity the screw 39 is provided with a round tip 41, which fits in the groove 27 in the arm 14² of the lever 14; and when the work has been reduced the amount desired engages the bottom wall of the groove 27.

To prevent detritus from the grinding-wheel or other reducing-tool 42 from being thrown upon the base 2 and guideway 3, a curved plate or shield 43 is secured by a screw 44 to an extension 45 of said way.

In the operation of my invention work designated by 46 is centered between the traveling-head and tail-stocks (not shown), and the back-rest stock 2 is adjusted along the way 1 until the hanger 25 is brought to the desired location with relation to said work, and the lever 9 is then grasped and turned to cause the eccentric 7 to actuate the clamp 8 and bind the stock rigidly in place.

As the spring-actuated lever 33 bears against the arm 28' of the hanger 25, said hanger will be caused to rock on its trunnions 24, and the seat 30 will be forced against the stock under yielding pressure. By adjusting the screw 39 the limit of downward movement of the lever 33 is readily regulated, the rounded end 41 of said screw serving as a stop for this purpose. As the grinding-wheel or other reducing-tool traverses the work, more or less lateral pressure is imparted thereto, and as this occurs the hanger tends to rock on its trunnions, and its arm 28' by pressing against the nose 38 of lever 33 will tend to raise said lever on its pivot 32, against the tension of spring 36, and to throw down the rear arm of the lever 14, this action being, however, resisted by the screw 15, which is set normally to hold said lever 14 in the desired position. Consequently after the hanger has been placed in position with its shoe against the stock any yielding movement of the same due to the various causes above mentioned will be resisted by the lever 33 the bearing pressure of which against the arm 28' is controlled by adjusting the tension of the spring 36. As said lever 33 swings on its pivot the convex washer 35 rocks in the concave seat 34' and prevents the spring 36 from disalignment. As will be evident the spring 22 on rod 18 continually tends to force the rear arm of lever 14 downward and the forward arm upward thus causing an upward movement of the shoe 29 against the stock, whereas the spring-controlled lever 33 operating on the short arm 28' of the hanger will tend to force said shoe into substantial lateral engagement with the stock, the long arc of movement of the shoe struck from the pivotal point of the hanger approaching substantially a straight line. It will thus be seen that pressure is applied to the shoe of the hanger on substantially radial lines at right angles to each other, and that the shoe

is caused to follow up the stock as it is reduced in diameter and to keep in close engagement therewith at all times.

As shown in Fig. 1 the reducing operation is completed and the ends of the screws 15 and 39 are in contact with the stock 2 and lever 14, respectively, but it will be understood that at the beginning of said reducing operation these screws which act as stops, and will hereinafter be so referred to, are so adjusted that their points will be free from contact with said lever and stock. In other words the screws act as adjustable stops and here it may be stated that other forms of stops may be substituted for them without departure from the invention.

Interchangeable hangers may be provided having concave seats or shoes of different radius, so that stock of various diameters may be accommodated, and various means different from the devices shown may be employed for supporting the hangers, and for causing the shoes thereon to follow up the stock, without departure from the invention. So too, other means may be provided for permitting a yielding movement of the hanger under the conditions above mentioned, and still be within the purview of the invention.

While but one back-rest is shown it will be understood that as many as are necessary for stock-supporting purposes may be disposed along the machine-bed.

Changes may be made in the form and proportions of the various elements, and various devices may also be employed for securing the stock to the bed.

Having thus described my invention, what I claim is:

1. The combination, with a support having a slot, of a stock mounted on the support; a clamp inserted through the throat of the slot and laterally movable in said slot; and means for actuating said clamp to cause it to secure the stock to the support.

2. The combination, with a support having a T-slot; a stock mounted on the support; a clamp having a projection, and insertible through the throat of the T-slot; means whereby said clamp may be moved laterally to force its projection beneath the overhang of the slot; and means for actuating the clamp.

3. The combination, with a support having a T-slot, of a stock on the support; an L-shaped clamp insertible through the throat of the T-slot; means for moving said clamp laterally to cause its L part to pass beneath the overhang of the slot; and means carried by the stock for actuating the clamp.

4. The combination, with a support having a T-slot, of a stock mounted on said support; a shaft mounted in a bore of said stock, and carrying an eccentric; an L-shaped clamp sleeved upon the eccentric

part of the shaft; and means for forcing said shaft and clamp endwise to cause the clamp to pass beneath the overhang of the slot.

5. The combination, with a support having a T-slot, of a device mounted on said support; a clamp carried by said device, and having a lateral projection insertible through the throat of the T-slot; means for forcing said clamp endwise to carry its projection beneath the overhang of the slot; and means for actuating the clamp.

6. The combination, with a support having a T-slot, of a stock mounted for sliding adjustment upon said support, said stock having a bore; a shaft inserted in the bore of the stock, and carrying an eccentric; an L-shaped clamp sleeved upon the eccentric portion of the shaft; a handle carried by the shaft; and a spring-actuated plunger for forcing the shaft endwise to carry the clamp beneath the overhang of the slot.

7. The combination, with a support having a T-slot, of a stock mounted for adjustment on said support, said stock having a transverse bore, a shaft inserted in the bore of the stock, and having an eccentric; an L-shaped clamp sleeved upon the eccentric; a chambered plunger bearing against the end of said shaft; and a spring inserted in the chamber of the plunger, and bearing against the stock, said spring serving to force the shaft endwise to carry the L-part of the clamp beneath the overhang of the slot.

8. The combination, with a stock, of a two-armed lever pivoted thereto, and having seats at the end of its inner arm; an angular hanger provided with trunnions for entering said seats; a work-support carried by one arm of the hanger; a lever pivoted to an intermediate part of said two-armed lever; and means for forcing the end of said lever against an arm of said hanger.

9. The combination, with a stock, of a lever pivoted thereto, and having an arm projecting from each side of its pivot; a rod secured to the stock, and passing through a bore of the outer arm of said lever; a spring surrounding the rod; a washer intermediate the spring and said outer arm; a rod secured to the inner arm of the lever; a device pivoted to the lever, and through which said rod passes; a spring surrounding the rod; a washer intermediate said spring and said device; and a movably mounted hanger carrying a work-support, and with a part of which said device is in engagement.

10. The combination, with a stock, of a two-armed lever pivoted thereto; a stop on one arm of said lever; means for applying yielding pressure to said arm; a device pivoted to the lever intermediate the arms thereof; a stop carried by said device; means for imparting yielding pressure to said device; an angular hanger journaled on the inner arm of said lever, and against an arm of

which said device bears; and a work-support carried by the other arm of said hanger.

11. The combination, with a stock, of a two-armed lever pivoted thereto; a rod passing through an opening in one arm of said lever, and secured to the stock; a washer surrounding the rod, and having a convex bearing surface fitted in a seat of said arm; a spring on the rod above the washer; a nut in engagement with a threaded part of the rod, and serving to adjust the tension of the spring; a work-support movably mounted on the other arm of said lever; and a yielding device bearing against a part of said work-support.

12. The combination, with a support, of a lever pivoted thereto; a two-armed work-supporting hanger journaled on the lever; a device movably mounted on the lever, and bearing against an arm of said hanger; means for applying yielding pressure to said device; and means for also applying yielding pressure to said lever.

13. The combination, with a stock, of a two-armed lever pivoted thereto; a work-support carried by the inner arm of said lever; a yielding device carried by said inner arm, and bearing against a part of the work-support; and a yielding-device bearing against the outer arm of said lever.

14. The combination, with a stock, of a two-armed lever pivoted thereto; a yielding device bearing against the outer arm of said

lever; a stop carried by said outer arm; a work-supporting hanger carried by the inner arm of said lever; a lever pivoted to the two-armed lever and bearing against a part of said hanger; a stop carried by said lever; and means for applying yielding pressure to the pivoted lever.

15. The combination, with a stock, of a two-armed lever pivoted thereto; means for applying yielding-pressure to one arm of said lever; a work-support movably mounted on the other arm of said lever; and means carried by the two-armed lever for applying yielding pressure to said work-support.

16. The combination, with a machine-bed, of a stock adjustable thereon; a two-armed lever pivoted to the stock, and having an aperture in its rear arm, and a concave seat at the end of said aperture; a rod secured to the stock, and passing through the aperture, said rod having a threaded portion; a convex washer on the rod and fitting in said concave seat; a coiled spring on the rod above the washer; a nut for adjusting the tension of said spring; a work-support carried by the other arm of said lever; and means for applying yielding pressure to the work-support.

In testimony whereof I affix my signature in presence of two witnesses.

BENGT M. W. HANSON.

Witnesses:

FRANCES E. BLODGETT,
F. E. ANDERSON.