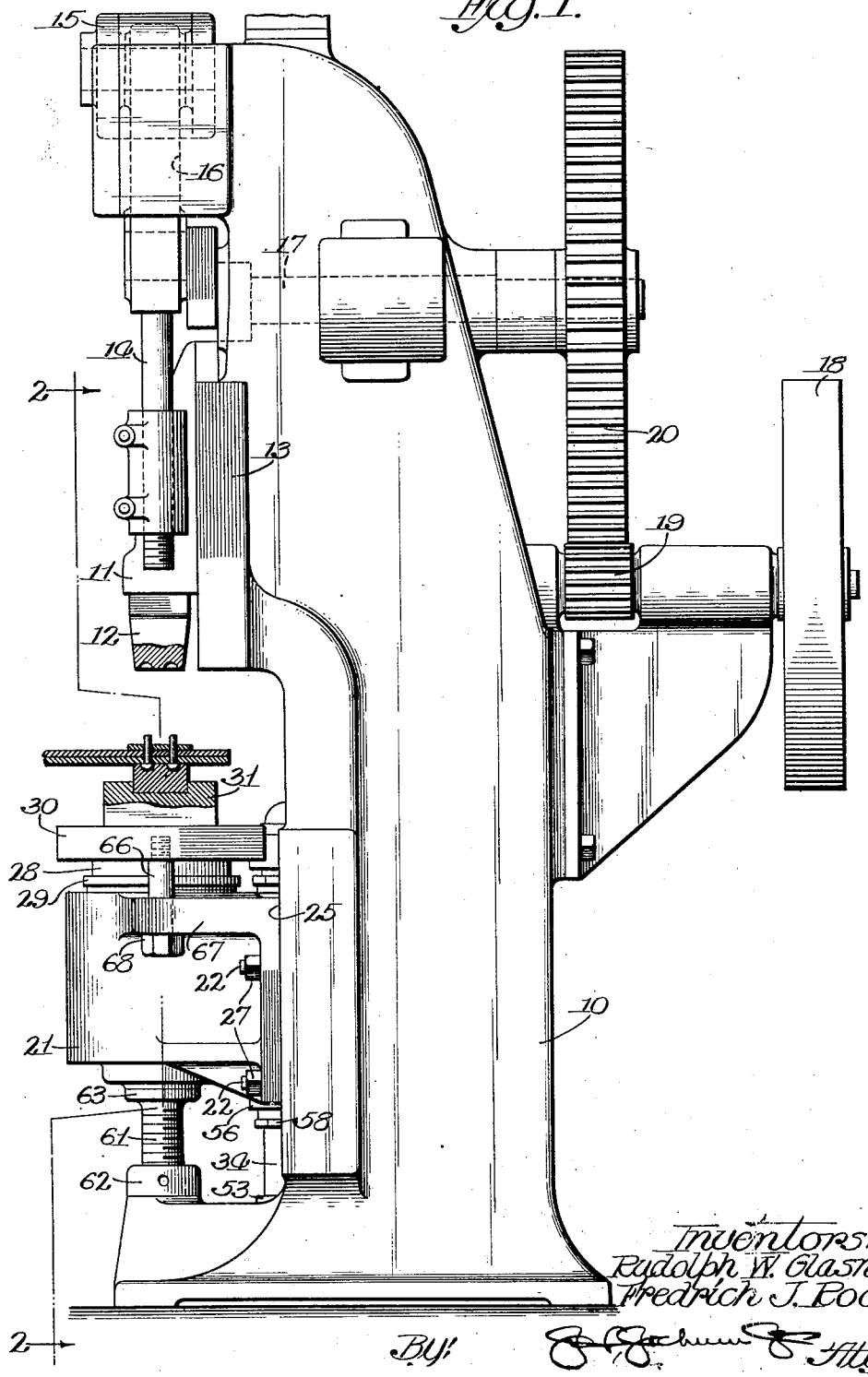
March 15, 1932. R. W. GLASNER ET AL 1,849,619

RIVETING MACHINE

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Fig. 1.



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RIVETING MACHINE

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Fig. 2.

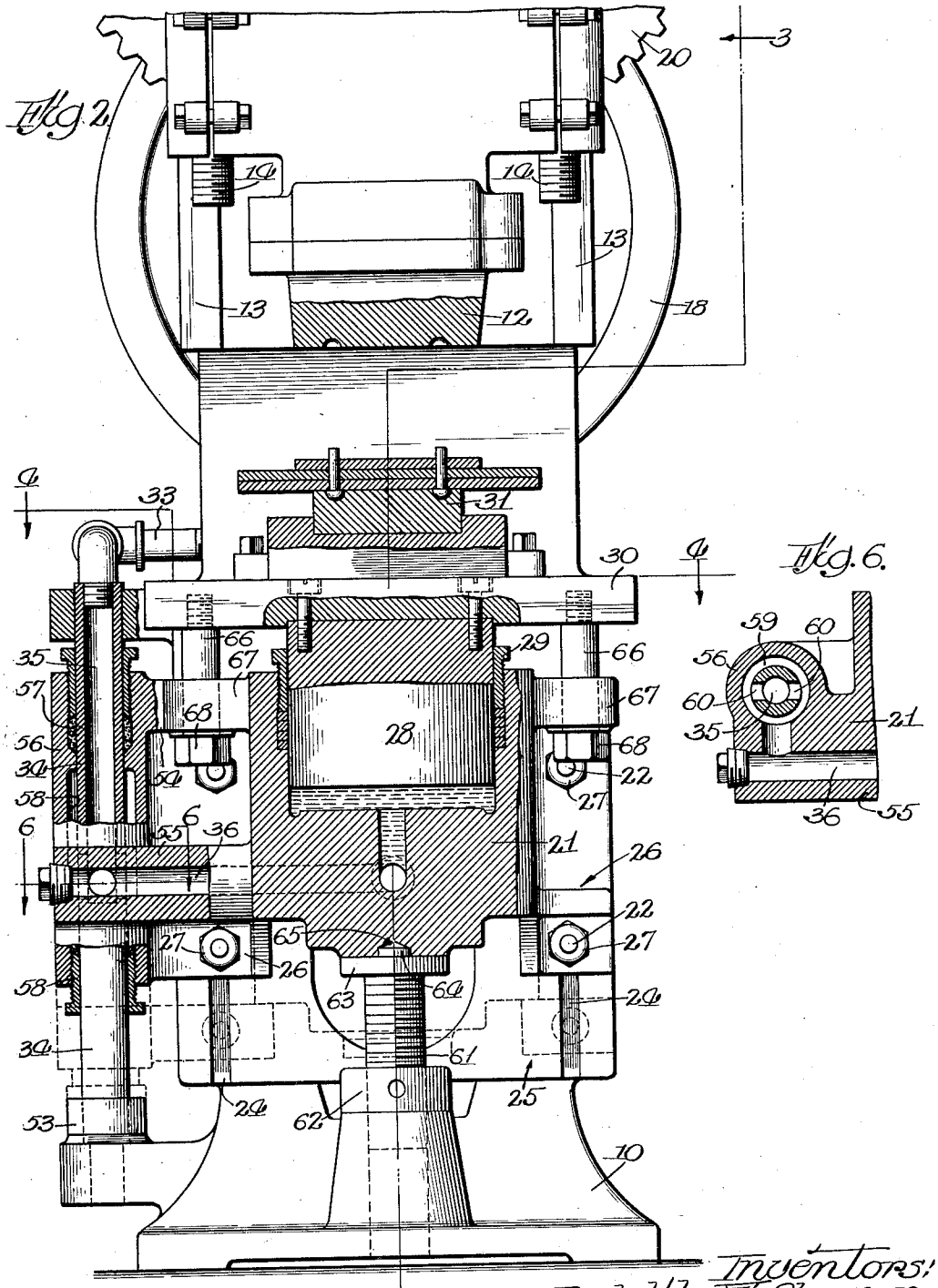


Fig. 6.

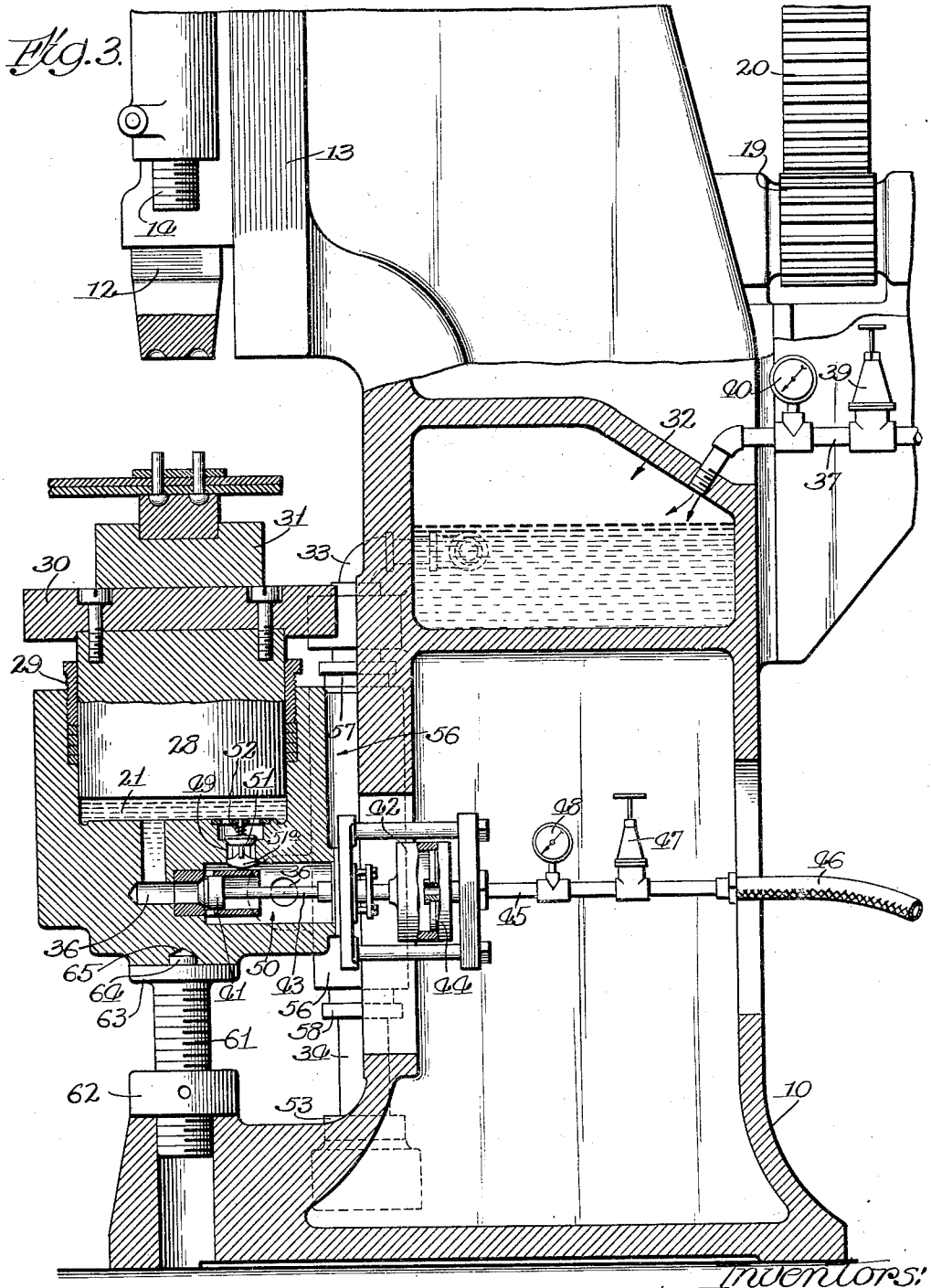
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RIVETING MACHINE

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Fig. 3.



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RIVETING MACHINE

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Fig. 4.

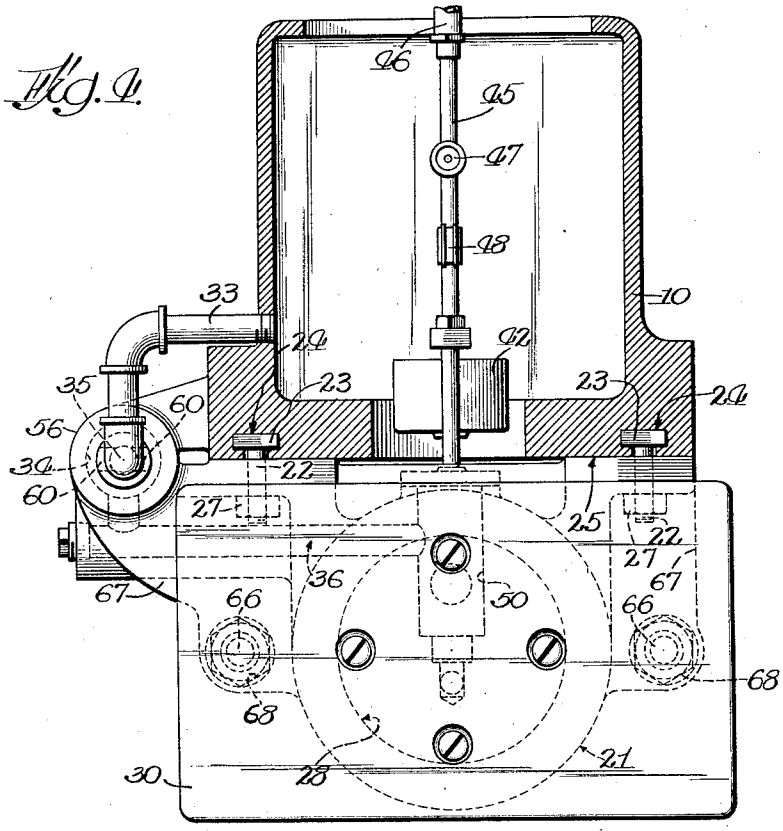
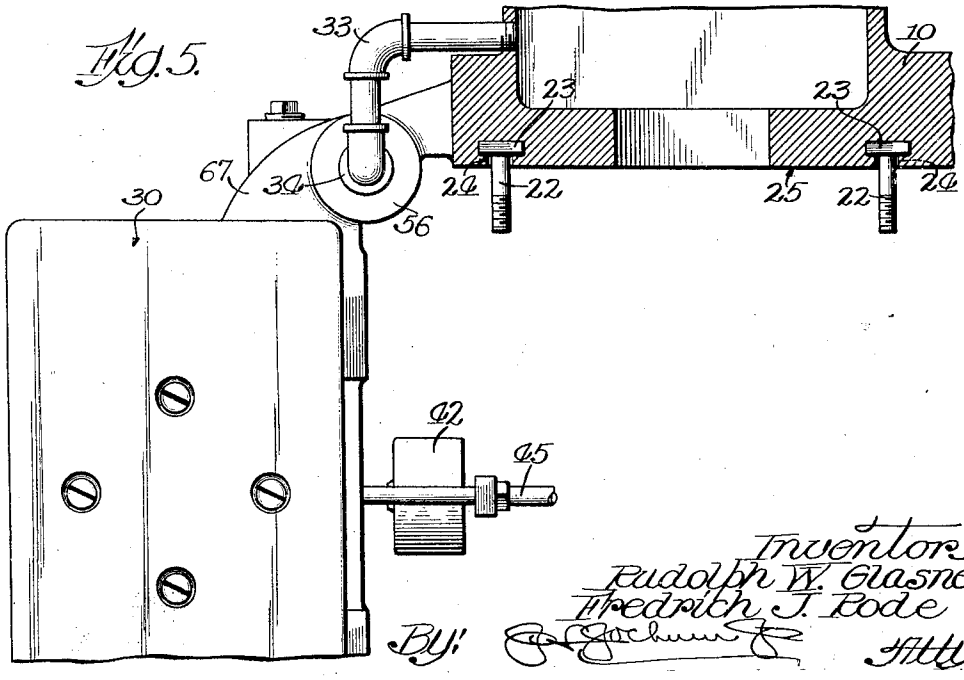


Fig. 5.



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Patented Mar. 15, 1932 1,849,619

UNITED STATES PATENT OFFICE

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RIVETING MACHINE

Application filed May 1, 1930. Serial No. 443,874.

In our application Serial No. 401,286, filed October 21, 1929, there is shown and described a riveting machine having a yielding bed controlled by fluid pressure means and so constructed as to provide an auxiliary reservoir, which latter is embedded in and constitutes an integral part of the press, thereby eliminating the installment of accessories, such as separate tanks, piping, couplings and the like, the cushioning means being arranged directly opposite the lower riveting die, thereby eliminating the use of leverages for exerting a yielding pressure on the dies and also eliminating binding strains and stresses on such levers.

The said application also discloses means for automatically compensating different or varying thicknesses of the material being operated upon, yielding means being provided to exert the proper blow necessary for the setting of rivets in a machine having a fixed throw.

It is one of the objects of the present invention to embody in a machine of this character means whereby the bed of the press and the cushioning means may be swung out of the way when desired.

A further object is to provide improved means whereby the bed of the press may be adjusted vertically to vary the size of the working space between the co-operating dies.

To the attainment of these ends and the accomplishment of other new and useful objects as will appear, the invention consists in the features of novelty in substantially the construction, combination and arrangement of the several parts, hereinafter more fully described and claimed and shown in the accompanying drawings illustrating this invention, and in which

Figure 1 is a view partly in elevation, partly in vertical section and partly broken away, of a riveting machine of this character constructed in accordance with the principles of this invention and showing the parts in one position.

Figure 2 is a detail sectional view taken on line 2—2, Figure 1, on an enlarged scale.

Figure 3 is an irregular sectional view taken on line 3—3, Figure 2.

Figure 4 is a sectional view taken on line 4—4, Figure 2.

Figure 5 is a top plan view of Figure 4, with parts omitted and showing the cushion and bed of the press swung out of position.

Figure 6 is a detail sectional view taken on line 6—6, Figure 2.

Referring more particularly to the drawings the numeral 10 designates generally the supporting structure of the machine, provided with a reciprocable ram 11 to which is connected a die 12. The ram slides upon suitable guides 13 and is connected by means of connecting members 14 with a slide 15 which in turn is connected by means of a crank arm 16 with a shaft 17, the latter receiving motion preferably from a pulley 18 driven from any suitable source, which in turn operates a gear 19 that meshes with a gear 20 connected with the shaft 17.

Supported by the frame of the machine is a cushioning device preferably comprising a cylinder 21 that is secured in position in the press by means of fastening bolts 22 having heads 23 which are adjustable in slots 24 in a surface 25 constituting a part of the framework of the machine.

These bolts pass through suitable apertures in flanges 26 and nuts 27 are provided on the bolts.

Operable within the cylinder 21 is a piston 28 which extends beyond the top of the cylinder and a packing gland or stuffing box 29 is provided to form a fluid tight joint.

The bed 30 of the machine is supported by the piston 28 and mounted upon the bed 30 is a die 31 which co-operates with the die 12.

Formed within the body of the machine is a tank or reservoir 32 for supplying fluid to the cylinder 21 through the medium of a pipe 33 leading from the reservoir 32 to an upright member 34 having a tubular portion 35 and discharging into the cylinder through a passage 36 leading into the bottom of the cylinder.

The fluid is supplied to the reservoir in any suitable manner and connected with the reservoir above the fluid line is a pipe 37 by means of which fluid pressure may be admitted to the reservoir above the liquid to force the

latter therefrom and into the cylinder 21, thereby serving as a means for raising the piston 28 and returning the bed 30 to normal position. Likewise when the bed plate 30 which acts as a pressure pad, is forced downwardly to force the piston downwardly in the cylinder 21, the fluid in the cylinder will be forced back into the reservoir 32 through the same connecting passage.

A pressure regulating valve 39 and a pressure gauge 40 may be provided in the pipe line 37.

Arranged in the passage 36 is a valve 41 for controlling the delivery of the fluid from the cylinder 21 back to the reservoir 32 and this valve acts as a variable resistance pressure creating means in the cylinder 21.

To that end the valve 41 is adapted to be seated and held seated by a predetermined pressure, such for instance as fluid pressure controlled means embodying a cylinder 42 which is connected with the valve 41 by means of a rod 43. Within the cylinder is a piston 44 which is held stationary. Connected with the piston 44 is a supply pipe 45 which opens through the piston and into the cylinder 42. Fluid pressure from any suitable source is supplied to the pipe 45 through a pipe 46, and a fluid pressure regulating valve 47 and pressure gauge 48 may be arranged in the pipe 45. By adjusting or varying the pressure of the fluid in the cylinder 42 the degree of pressure upon the liquid in the cylinder 21 necessary to unseat the valve 41 to permit the escape of liquid from the cylinder, may be varied.

When the valve 41 is unseated against the pressure in the cylinder 42 the liquid will be delivered back to the reservoir 32 through the pipe connection.

A passage 49 also leads from the bottom of the cylinder 21 and has communication with the passage 36 preferably with an enlarged portion 50 of the latter passage in which the valve 41 is located. A valve 51 is provided for controlling the passage 49 and this valve is normally seated by means of a spring 52, and the valve 51 operates in a direction to prevent escape of the liquid from the cylinder 21, but will open under the pressure of the fluid in the reservoir 32 to permit the liquid to be delivered into the cylinder 21 beneath the piston 28 when the valve 41 is seated, and thereby raise or return the piston 28 to its normal position.

All of the above referred to parts are substantially the same as described in the above referred to application, with the exception of the adjustable bed plate 30 and the manner of adjustably supporting the cylinder 21.

It has been found, in machines of this character that it is sometimes desirable to swing the cushion and the bed plate out of operative position with respect to the reciprocating die 12.

To that end the cushion and the bed plate are mounted for pivotal movement about an upright axis.

The upright member 34 is secured in position in any suitable manner and is provided with a shoulder 53 formed by a collar or in any other suitable manner and located at a position in proximity to the lower end of the member 34.

Connected with the cylinder 21 are arms 54—55 and connected with or formed as a part of the arms is a tubular connecting member 56 which telescopes with the upright member 34, stuffing boxes or packing glands 57—58 being provided for form fluid tight joints between the members 34 and 56.

A portion of the interior of the member 56 which constitutes a sleeve is of an internal diameter somewhat greater than the external diameter of the adjacent portion of the member 34 to form an annular space 59 (see particularly Figure 6 about the member 34. The member 34 is provided with passages 60 which form communications between the passage 35 in the member 34 and the annular space 59 in the sleeve or portion 56 and the passages 60 are arranged transversely with respect to the passage 35. The annular space 59 is of a length considerably greater than the diameter of the passages 60 so that the sleeve or portion 56 which telescopes with the member 34 may be moved longitudinally with respect to the latter and at the same time maintain a constant communication between the interior of the reservoir 32 and the passage 36, so that the cylinder 21 may be adjusted vertically and at the same time maintain the passage 36 in constant communication with the reservoir 32.

Any suitable means may be provided for vertically adjusting the bed plate 30 and the cylinder 21.

A simple and efficient means for that purpose embodies an upright screw 61 which is threaded into a suitable bearing 62. The screw is provided with a head or collar 63 adjacent the upper end thereof, and if desired a projection 64 may extend above the head or collar. The screw 61 is adjusted so that the cylinder 21 will rest upon the head 63 and the projection 64 will enter a groove or slot 65 in the bottom of the cylinder and which groove or slot is open at the ends and is constructed upon an arc described from the center of the pivot formed by the co-operating members 34—56.

When it is desired to vertically adjust the cylinder and the bed plate 30, the nuts 27 are first loosened so as to permit of such vertical adjustment, after which the screw 61 may be adjusted in either direction to respectively raise or lower the cushioning device and bed plate. After the proper adjustment has been obtained the nuts 27 are again tightened. During this adjusting movement the heads

23 of the bolts 22 will slide in the grooves or slots 24.

In order to swing the bed plate 30 and cushioning device out of operative position or from the position shown in Figure 4 to the position shown in Figure 5, the nuts 27 are loosened and the screw 61 adjusted in its bearing 62 to lower the cylinder 21 and the bed plate 30 until the end of the packing gland 58 or the member 56 engages and rests upon the shoulder or collar 53 at the lower end of the upright member 34, as indicated in dotted lines in Figure 2 and, after the nuts 27 have been removed from the bolts 22, the entire cushioning mechanism and the bed plate 30 may then be swung about an upright axis formed by the telescoping members 56 and 34, to the position desired, previous to which, however, the pipe 46 may be disconnected from the pipe 45.

During the swinging movement of the cushioning device and bed plate about the upright axis the bottom of the cylinder 21 will move out of engagement with the head or shoulder 63 of the screw 61 and the projection 64 will pass out of the slot 65.

The cushion and bed plate may be repositioned by moving them in the opposite direction about the pivot until the lower face of the cylinder 21 is in position to be engaged by the head or collar 63 on the bolt 61. During this repositioning movement the bolts 22 will enter openings in the flanges 26 and when the cylinder 21 and bed plate 30 have been properly positioned by the adjustment of the screw 61 the nuts 27 are tightened.

Thus it will be seen that with this improved construction the bed plate 30 and cushioning device are not only adapted for vertical adjustment in the machine but they may be readily swung out of position when desired and as readily swung back into position.

Any suitable means may be provided for limiting the movement of the bed plate 30 in one direction with respect to the cylinder 20 or under the influence of the fluid pressure in the cylinder 21.

To that end rods or pins 66 are provided which are secured to and depend from the bed plate 30 and pass loosely through ears or projections 67 connected to the cylinder 21.

On the free ends of the rods or pins are arranged nuts or heads 68 which serve as abutments to engage the lower faces of the ears or projections 67 and thereby arrest or limit the movement of the bed plate 30 under the influence of the pressure in the cylinder 21.

While the preferred form of the invention has been herein shown and described, it is to be understood that various changes may be made in the details of construction and in the combination and arrangement of the several parts, within the scope of the claims, without departing from the spirit of this invention.

What is claimed as new is:—

1. In a metal working press, a fluid pressure cushion which resists the working stroke of the press, in one direction, a reservoir within the machine separate from the cushion and containing fluid for said cushion, said reservoir being out of communication with said cushion during the normal operative stroke of the machine, and means adapting the bed of the machine and said cushion to be swung out of position with respect to the reciprocating die.

2. In a metal working press, a fluid pressure cushion which resists the working stroke of the press, in one direction, a reservoir within the machine separate from the cushion and containing fluid for said cushion, said reservoir being out of communication with said cushion during the normal operative stroke of the machine, and means for bodily and vertically adjusting the bed of the press and the said cushion.

3. In a metal working press, a fluid pressure cushion which resists the working stroke of the press, means mounting the press bed plate and cushion for pivotal movement whereby they may be swung out of operation when desired, and means whereby fluid may be supplied to the cushion through the said pivot.

4. In a working press, a fluid pressure cushion which resists the working stroke of the press, means mounting the press bed plate and cushion for pivotal movement whereby they may be swung out of operation when desired, variable resistance pressure creating means for controlling the fluid pressure in said cushion, and means whereby fluid may be supplied to the cushion through the said pivot.

5. In a metal working press, a bed plate, a fluid cushion for yieldingly resisting the movement of said bed plate in one direction, means mounting said plate and cushion for pivotal movement whereby they may be swung out of operation when desired, means whereby fluid may be supplied to the cushion through the said pivot, and means for vertically adjusting said bed plate and cushion when in operative position.

6. In a metal working press, a bed plate, fluid pressure cushioning means for yieldingly resisting the movement of said plate in one direction, means mounting said plate and cushion for bodily vertical adjustment, said plate being also adapted for bodily vertical movement with respect to said cushioning means, and means for limiting the relative movement of said bed plate with respect to said cushioning means under the influence of the pressure in said cushion.

7. In a metal working press, a bed plate, fluid pressure cushioning means for yield-

ingly resisting the movement of said plate in one direction, means mounting said plate and cushion for bodily vertical adjustment, said plate being also adapted for bodily vertical movement with respect to said cushioning means, means for limiting the relative movement of said bed plate with respect to said cushioning means under the influence of the pressure in said cushion, and means adapting said bed plate and said cushioning means to be swung out of their operative positions in the machine.

8. In a metal working press, a bed plate, fluid pressure cushioning means for yieldingly resisting the movement of said plate in one direction, means mounting said plate and cushion for bodily vertical adjustment, said plate being also adapted for bodily vertical movement with respect to said cushioning means, means for limiting the relative movement of said bed plate with respect to said cushioning means under the influence of the pressure in said cushion, and means adapting said bed plate and said cushioning means to be swung about a vertical pivot out of their operative positions in the machine.

9. In a metal working press, a bed plate, fluid pressure cushioning means for yieldingly resisting the movement of said plate in one direction, means mounting said plate and cushion for bodily vertical adjustment, said plate being also adapted for bodily vertical movement with respect to said cushioning means, means for limiting the relative movement of said bed plate with respect to said cushioning means under the influence of the pressure in said cushion, means adapting said bed plate and said cushioning means to be swung about a vertical pivot out of their operative positions in the machine, and means for supplying fluid to the cushion through the said pivot.

10. In a metal working press, a pressure pad, a fluid cushion for yieldingly resisting the movement of the pad in one direction, a reservoir in the press separate from said cushion for supplying fluid to the cushion, a connection between the reservoir and cushion, and means mounting said cushion and said pressure pad for swinging movement out of operative position with respect to the machine while the connection between said reservoir and the said cushion remain constant.

11. In a metal working press, a pressure pad, a fluid cushion for yieldingly resisting the movement of the pad in one direction, a reservoir in the press separate from said cushion for supplying fluid to the cushion, a connection between the reservoir and cushion, means mounting said cushion and said pressure pad for swinging movement out of operative position with respect to the machine while the connection between said reservoir and the said cushion remain constant, and means also mounting said bed plate and said cushion for bodily vertical adjustment while in operative position in the machine.

12. In a metal working press, a pressure pad, a fluid cushion for yieldingly resisting the movement of the pad in one direction, a reservoir in the press separate from said cushion for supplying fluid to the cushion, a connection between the reservoir and cushion, means mounting said cushion and said pressure pad for swinging movement out of operative position with respect to the machine while the connection between said reservoir and the said cushion remain constant, and means for limiting the movement of said pad in the opposite direction with respect to the cushion.

13. In a metal working press, a pressure pad, a fluid pressure cushion embodying a cylinder and piston for yieldingly resisting the movement of the pad in one direction, means pivotally supporting said cushion and said pad for swinging movements into and out of operative positions, a reservoir for containing fluid for the cushion, means whereby the fluid from the reservoir may be supplied to the cushion through the said pivot and returned to said reservoir, and variable resistance pressure creating means for controlling one direction of flow of the fluid between the cushion and said reservoir.

14. In a metal working press, a pressure pad, a fluid pressure cushion embodying a cylinder and piston for yieldingly resisting the movement of the pad in one direction, means pivotally supporting said cushion and said pad for swinging movements into and out of operative positions, a reservoir for containing fluid for the cushion, means whereby the fluid from the reservoir may be supplied to the cushion through the said pivot and returned to said reservoir, and means for vertically adjusting the said plate and said cushion when in operative positions in the press, the last said means assisting in supporting the said cushion.

In testimony whereof we have signed our names to this specification, on this 18th day of April, A. D. 1930.

RUDOLPH W. GLASNER.
FREDRICH J. RODE.