Aug. 19, 1930. F. J. RODE 1,773,438

PRESS FOR DRAWING SHEET METAL AND THE LIKE

Filed April 8, 1929 9 Sheets-Sheet 1

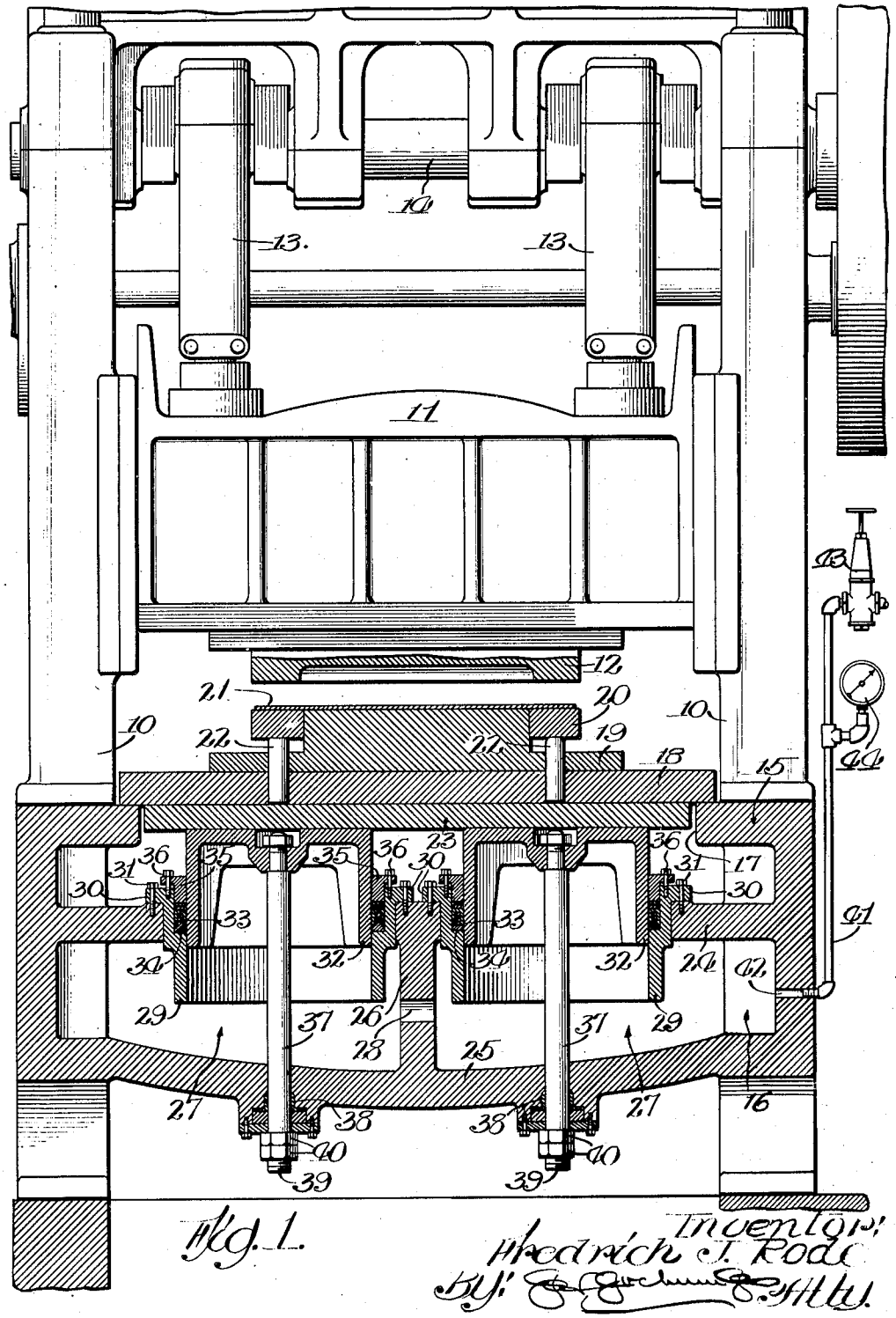


Fig. 1.

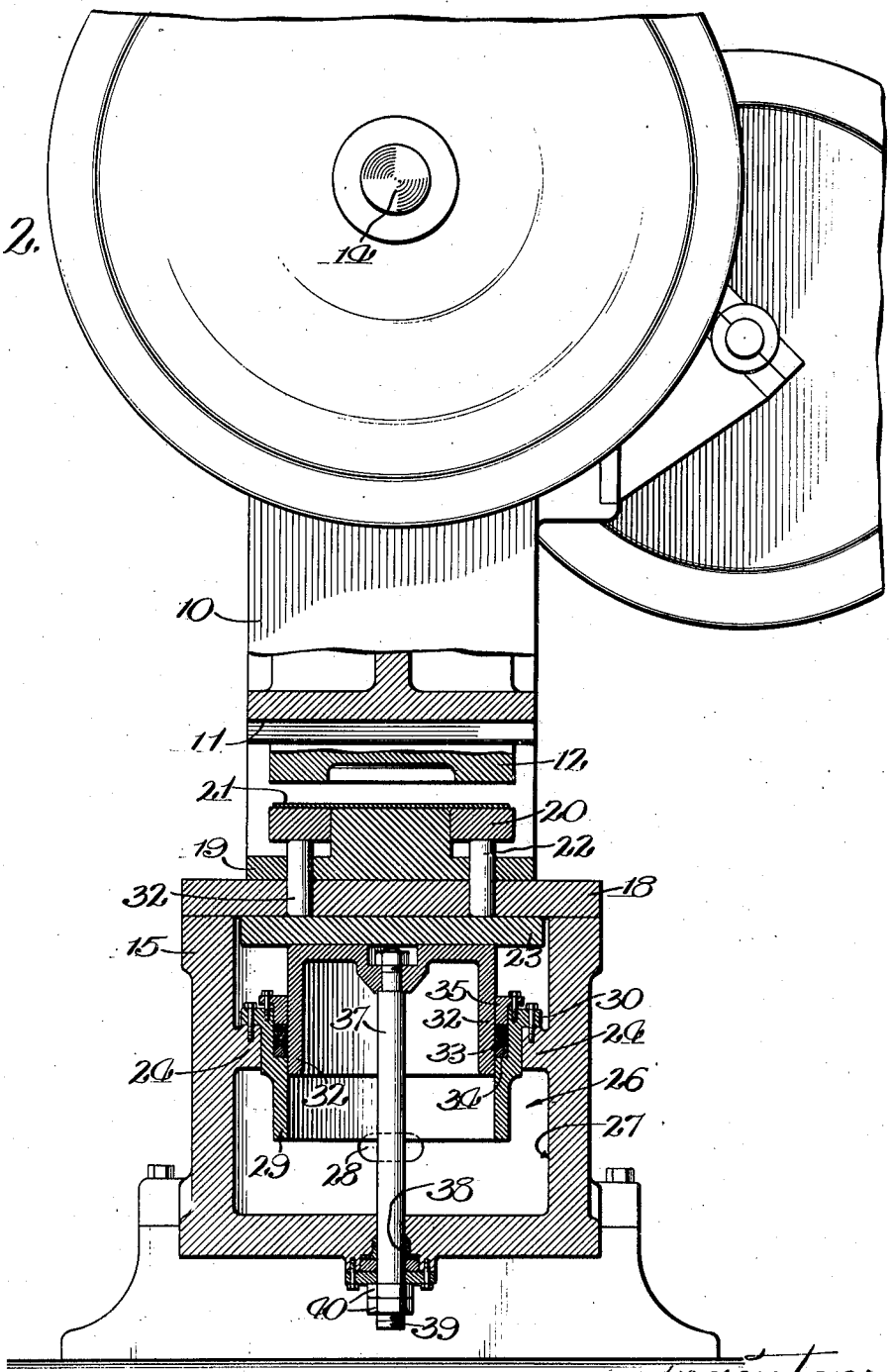
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Aug. 19, 1930. F. J. RODE 1,773,438

PRESS FOR DRAWING SHEET METAL AND THE LIKE

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Fig. 2.



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PRESS FOR DRAWING SHEET METAL AND THE LIKE

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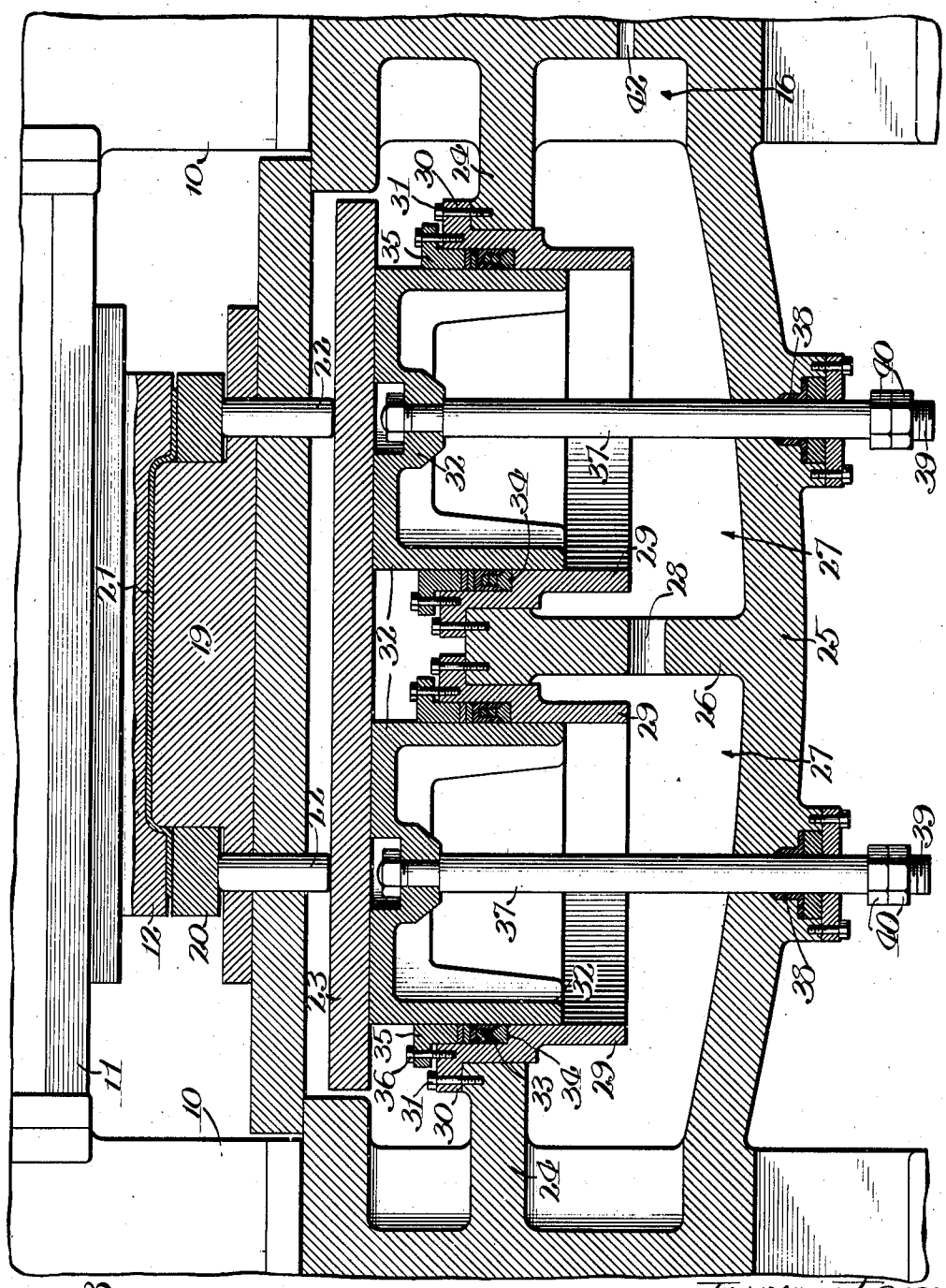


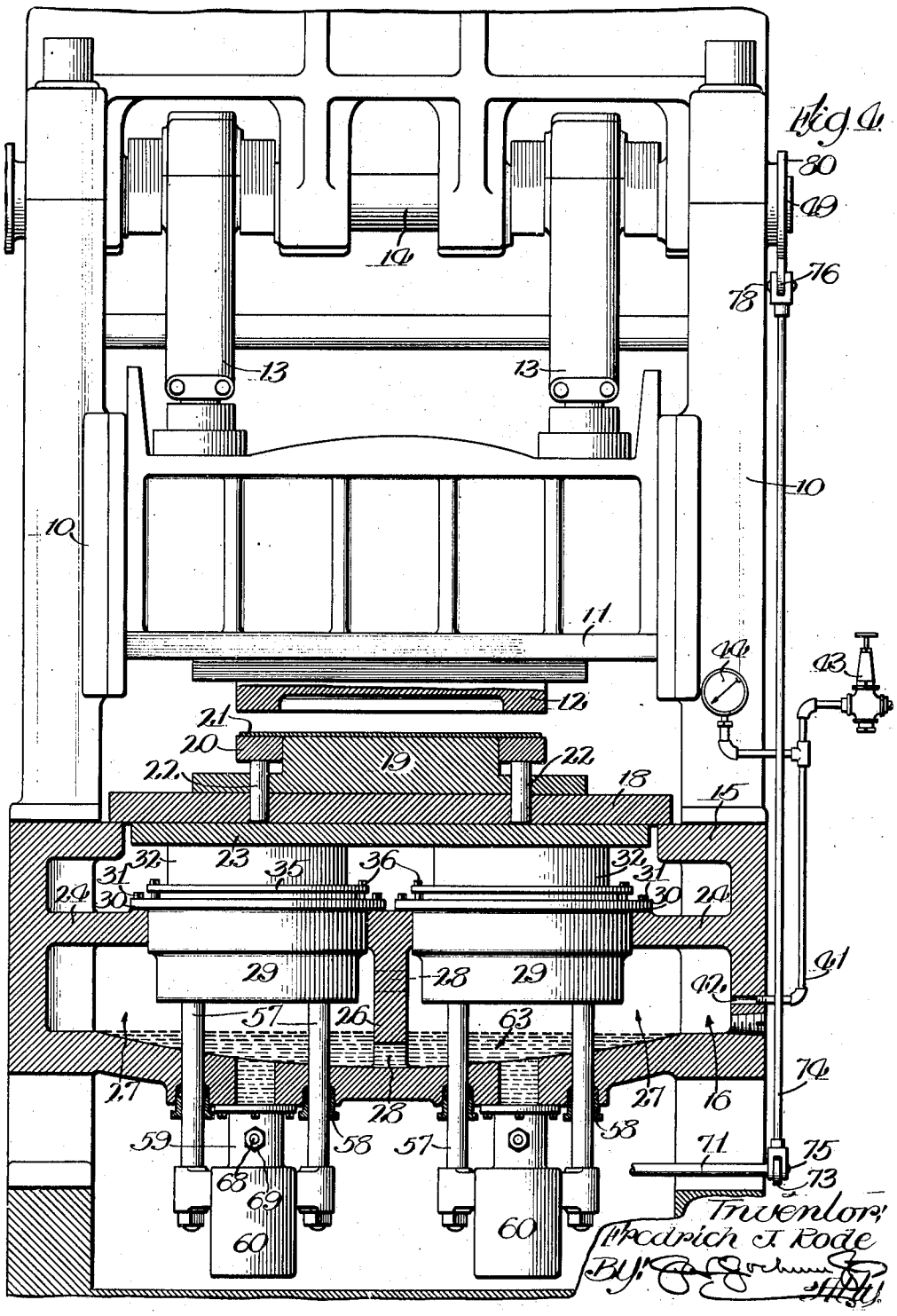
Fig. 3

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Aug. 19, 1930. F. J. RODE 1,773,438

PRESS FOR DRAWING SHEET METAL AND THE LIKE

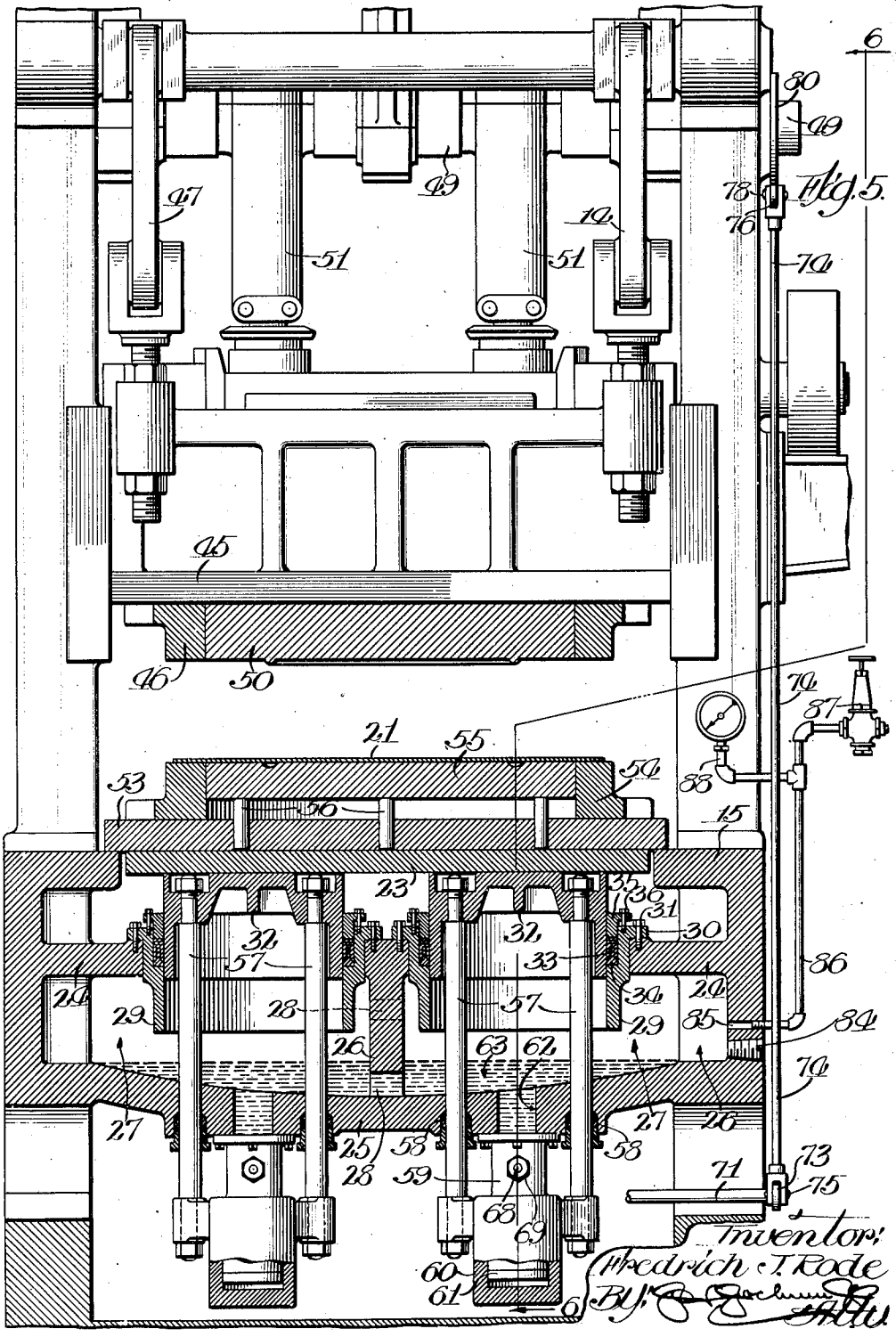
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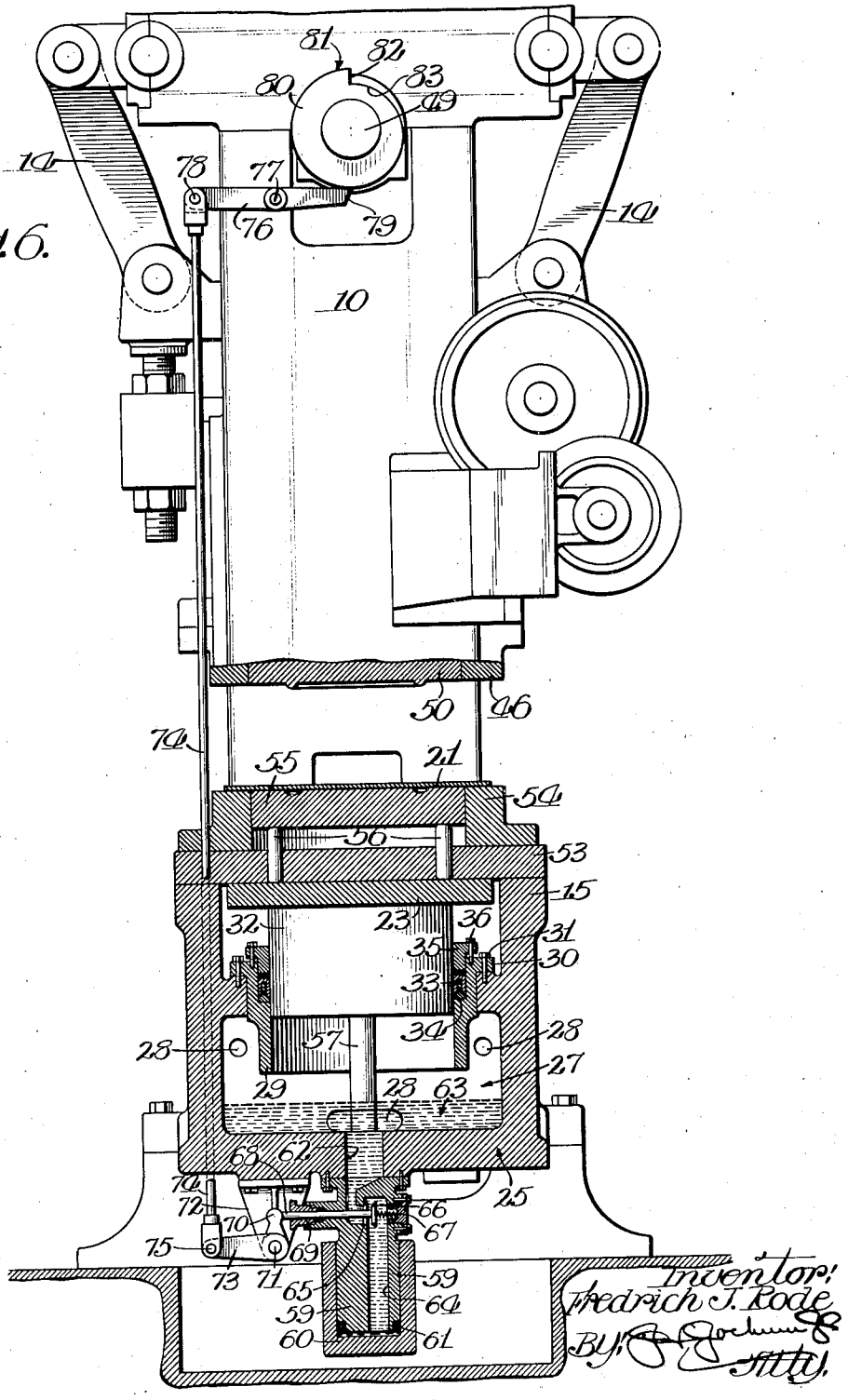


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PRESS FOR DRAWING SHEET METAL AND THE LIKE

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Fig. 6.

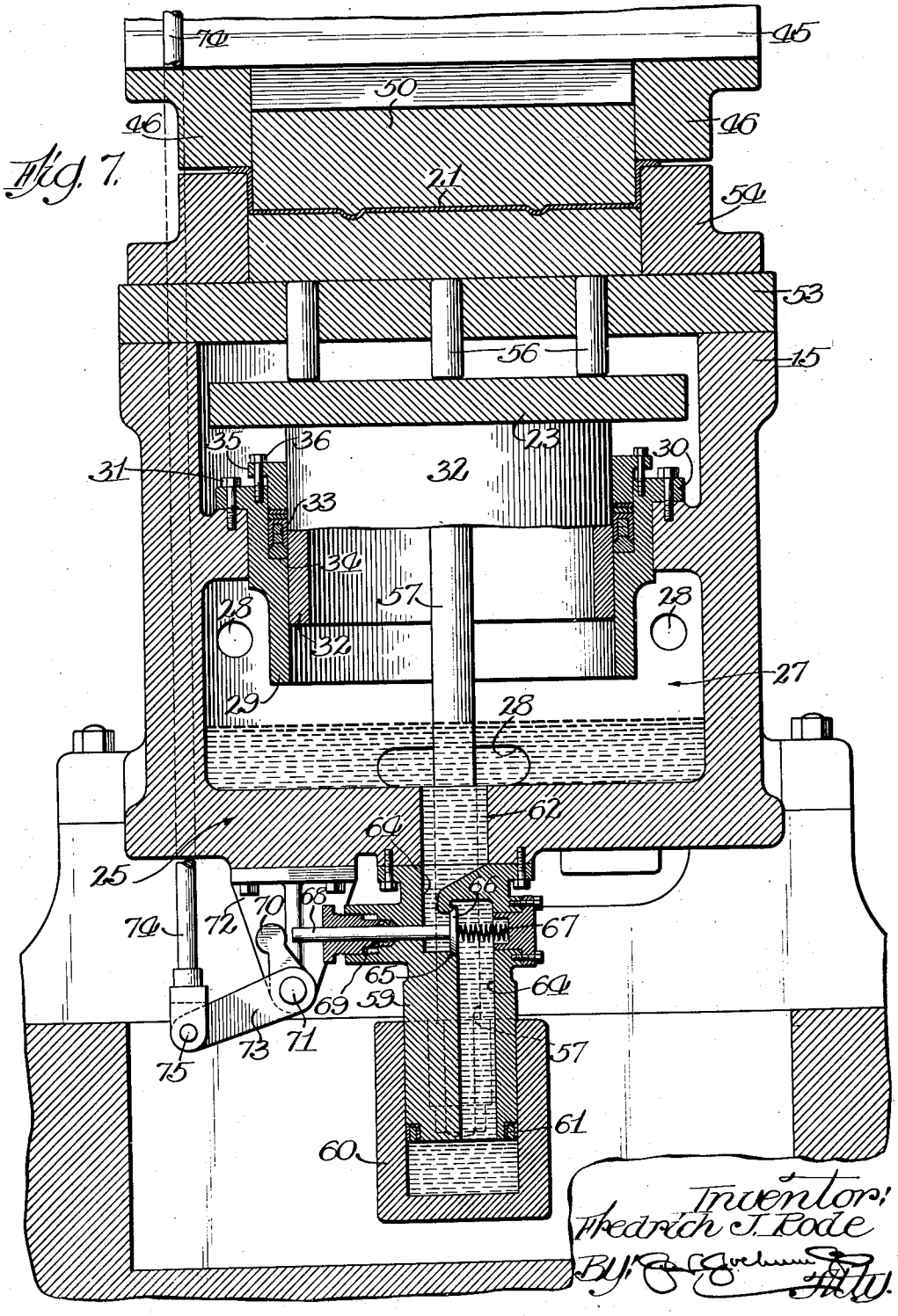


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PRESS FOR DRAWING SHEET METAL AND THE LIKE

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Fig. 7.

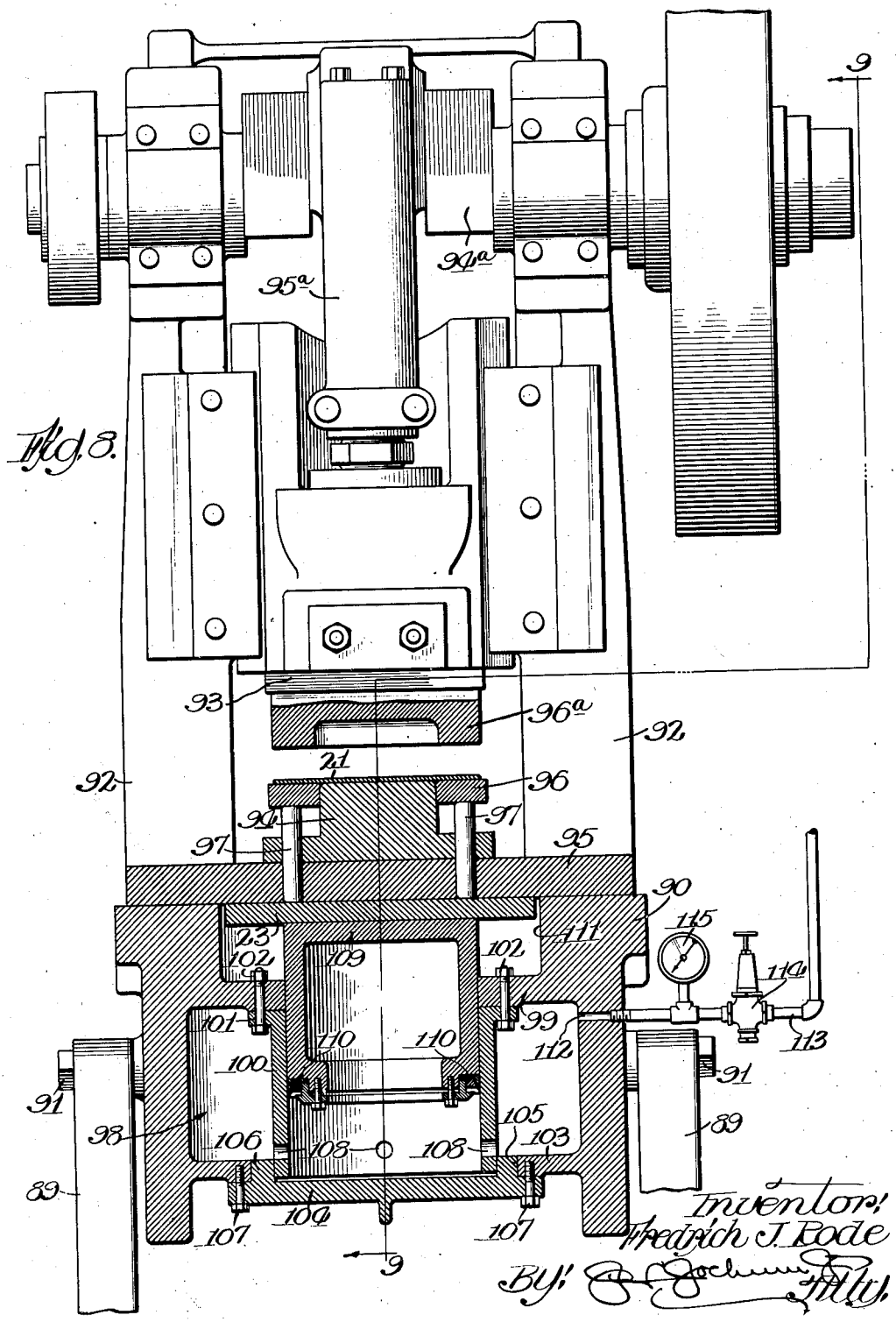


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PRESS FOR DRAWING SHEET METAL AND THE LIKE

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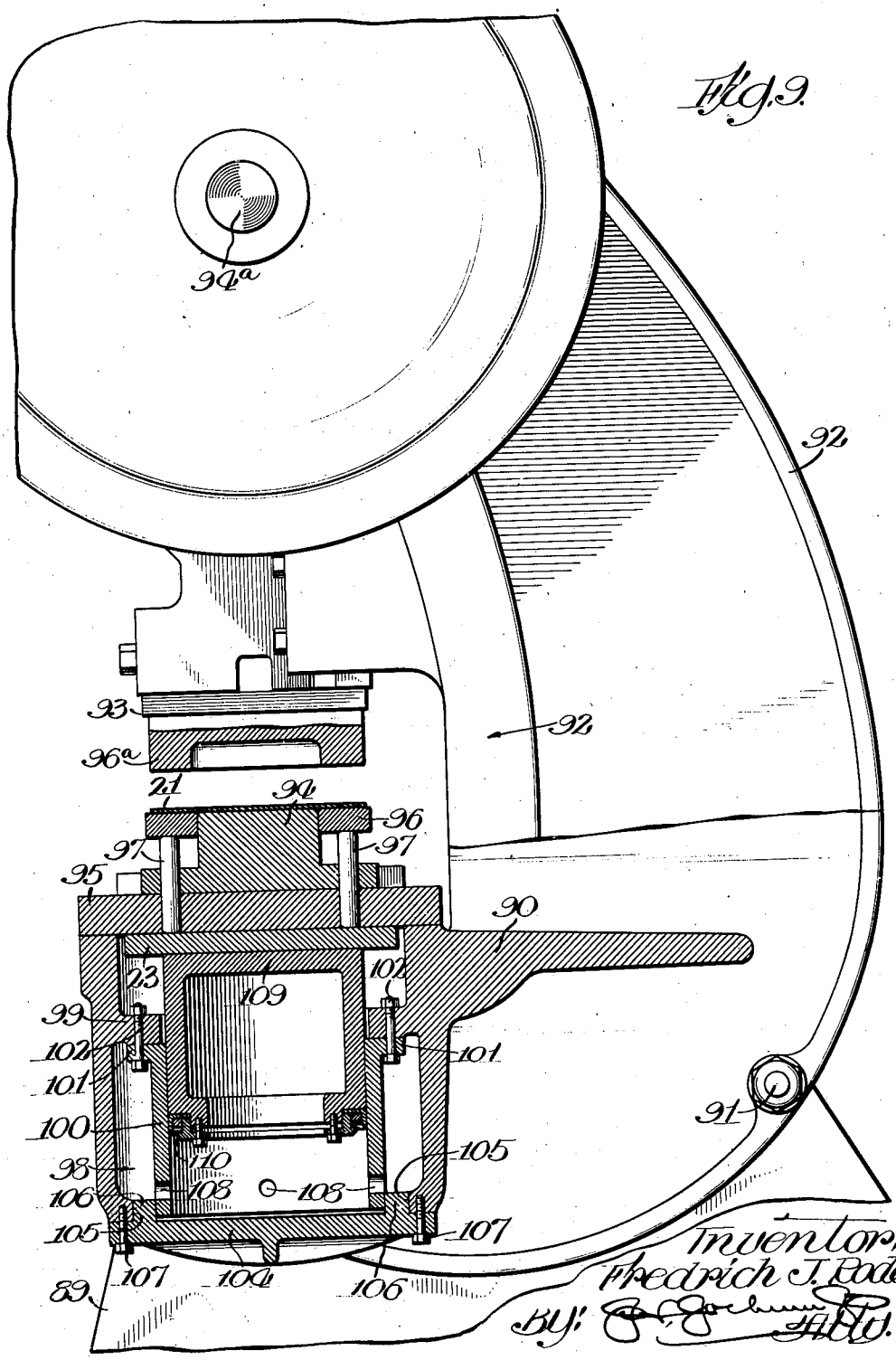


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PRESS FOR DRAWING SHEET METAL AND THE LIKE

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Fig. 9.



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UNITED STATES PATENT OFFICE

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PRESS FOR DRAWING SHEET METAL AND THE LIKE

Application filed April 8, 1929. Serial No. 353,421.

In presses for drawing sheet metal and the like in which the material is shaped by means of co-operating dies, one of which is reciprocable toward and away from the other, the work is usually held by means of a work holder or draw ring which co-operates with one of the dies, the work holder or draw ring being resisted in its movement in one direction by means of a fluid cushioning device, through the medium of a pressure pad.

Heretofore the cushion generally comprises co-operating cylinder and piston elements, one of which is attached to a stationary part of the press and the other to the presure pad, fluid being supplied to the cushion from a separate tank.

To install such a cushioning device and system necessitates considerable space and is quite expensive.

It is one of the objects of the present invention to improve and simplify the cushioning means and to reduce to a minimum the number of parts and attachments necessary, including the separate supply tank.

To that end the cushioning means is incorporated in and constitutes a part and parcel of the press, the cylinder being formed in the bed of the press, whereby a compact arrangement will be produced and the cost of installation will be materially reduced.

A further object is to provide improved means for locking the pressure pad at the limits of its movement in one direction, thereby preventing the pressure pad from immediately following the ram or movable die as they start to ascend, and improved means for automatically controlling the locking and unlocking of the pressure pad.

A further object is to provide improved means whereby the pressure of the fluid in the cushion will return the pressure pad to its normal position when the latter is unlocked.

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 section and partly broken away of a single acting press of this character constructed in accordance with the principles of this invention.

Figure 2 is a side elevation of Figure 1 with parts broken away and parts in section.

Figure 3 is an enlarged detail sectional view of the cushioning mechanism showing the parts in another position.

Figure 4 is a view similar to Figure 1 of a double acting press, partly in elevation, partly in section and partly broken away and having a locking mechanism for restraining the return movement of the pressure pad.

Figure 5 is a view similar to Figure 4, with parts in section and parts broken away.

Figure 6 is a view taken on line 6—6, Figure 5.

Figure 7 is an enlarged detail sectional view of the form of the invention shown in Figures 5 and 6, and with the parts in another position.

Figure 8 is a view in front elevation, partly in section and partly broken away of another form of press to which this invention is applied and with the locking mechanism for the pressure pad omitted.

Figure 9 is a view taken on line 9—9, Figure 8.

Referring more particularly to the drawings the numeral 10 designates generally the uprights of a press, 11 a reciprocable ram to which a die 12 is connected, the ram being reciprocable in any suitable manner preferably by means of links 13 connected with the ram and also with the crank shaft 14, motion being imparted to the shaft in any suitable manner so as to cause the ram to reciprocate upon the uprights 10.

The numeral 15 designates generally the bed of the press which is hollow to form a chamber or cylinder 16 of considerable depth and the upper portion of the cylinder or chamber is open as at 17. A bolster plate 18 is supported by the bed of the press so as to close the opening 17 and mounted upon the bolster is a die 19 with which a work holder or

draw ring 20 co-operates so as to clamp the work 21 between the work holder 20 and the die 12.

Passing loosely through the bolster plate 18 are pins 22, which support the work holder or draw ring 20 and these pins rest upon and are supported by a pressure pad 23 which is disposed below the bolster plate 18 and is of a size and configuration to fit and move within the opening 17 in the bed of the press.

The chamber or cylinder 18 may be of any desired diameter but is preferably comparatively deep and is provided with a partition 24 spaced above the bottom 25 of the chamber. A supporting wall 26 may be provided, if desired, so as to co-operate with the partition 24 and the base 25 to divide the chamber 16 into two compartments 27 having communication with each other through any desired number of openings 28 in the upright partition 26.

Tubular members or sleeves 29 are seated within openings in the partition 24 and are provided with flanges 30 resting upon the partition 24 and the upright partition 26 for supporting the tubular members, the latter preferably projecting for a considerable distance beyond the partition 24 into the respective compartments 27. These tubular members may be secured in position in any suitable manner such as by means of fastening devices 30.

Pistons 32 fit within the tubular members 29 and packing 33 is provided which encompasses the respective pistons and rests upon shoulders 34 in the tubular members 29. Packing rings 35 also encompass the pistons and co-operate with the shoulders 34 to provide the desired pressure upon the packing material 33. These packing rings may be secured in position by means of suitable fastening screws 36.

Connected with each of the pistons 32 is a piston rod 37 which passes loosely through the bottom 25 of the chamber 16 and also through suitable stuffing boxes 38. The lower extremities of the piston rods 37 are preferably threaded as at 39 to receive nuts or collars 40 which latter may also serve as a means for limiting the upward movement of the pistons 32.

The pistons 32 serve as supports for the pressure pad 23 and when the pressure pad 23 abuts the bottom of the bolster plate 18 the pistons 32 will be at the limit of their upward movements.

When the parts are in the position shown in Figure 1 and when the ram 11 is lowered so as to cause the die 12 to shape the work 21 over the die 19 as shown in Figure 3, the work holder or draw ring 20 will be depressed and the pressure pad 23 in turn will also be depressed through the medium of the pins 22.

As the pressure pad 23 is lowered the pistons 32 will be lowered in the respective tubular members 29 and the lowering movement of the pressure pad 23 and the pistons 32 will be yieldingly resisted by the compression of the fluid in the respective compartments 27 in the chamber 16, the piston rods 37 sliding through stuffing boxes 38 to permit of such operation.

The fluid is supplied to the compartments 27 in any suitable manner preferably through the medium of a pipe 41 which has communication with the chamber 16 through an opening 42. A pressure regulating valve 43 may be provided in the pipe 41 and a pressure gauge 44 may also be provided to indicate the amount of pressure.

Thus it will be seen that the cushioning device forms a part and parcel of the press, the cushioning device being formed in the bed of the press, and as the pressure pad is lowered it will force the pistons 32 downwardly against the pressure of the fluid in the compartments 27, at the same time the pressure pad 23 will move into the chamber in the bed of the press formed above the partition 24.

In Figures 5, 6 and 7, there is shown and described an attachment of this character applied to what is known as a double acting press in which the ram 45 having the die 46 secured thereto is reciprocable by means of links 48 connected with a crank shaft 49 and the inner die 50 which moves with the ram is reciprocated by means of links 51 also connected with the crank shaft 49.

In this form of the invention the bolster plate 53 has mounted thereupon a work holder 54 which encompasses a die 55, the latter co-operating with the die 50 while the work holder co-operates with the die 46.

The die 55 is supported by means of suitable pins 56 passing loosely through the bolster plate 53 to engage and rest upon the pressure pad 23.

It is sometimes desirable to lock or restrain the pressure pad against returning immediately with the ram and the movable die when they start to ascend, so as to prevent any injury to the work or for any other desired purpose, such for instance as to overcome what is known as "back lash" or "back kick."

To that end there is provided a means whereby the pressure pad may be automatically locked at the limit of its lowermost movement and retained in this position for any desired length of time and then released so as to permit the pressure exerted upon the fluid in the compartments 27 of the chamber 26 to return the pressure pad.

This may be accomplished in any desired or suitable manner, but preferably by providing cylinder and piston means operatively connected with each of the pistons 32, and as the construction and operation of each of these locking means in connection with the

respective pistons is the same, the description of one will apply equally as well to them all.

Connected with the piston are rods 57 which constitute, in the form of the invention shown in Figures 5 to 7, the piston rods, these rods pass through suitable stuffing boxes 58 and also through the bottom 25 of the chamber 26. Secured to the bottom 25 of the chamber is a hollow piston member 59 which is stationary and the piston telescopes into a cylinder 60, which latter is connected with the piston rods 57 to be reciprocated thereby when the piston 32 reciprocates.

Packing 61 is provided for the piston so as to form a fluid tight joint and the hollow piston communicates with the respective compartments 27 in the chamber 26 through a suitable opening 62 in the bottom of the compartment, a predetermined amount of liquid 63 being provided in the compartments 27 and which liquid will flow into the cylinders 60 through the opening 64 in the piston (see particularly Figure 7). The supply of liquid is such that there will be maintained a portion of the liquid in the compartments 27 of the chamber 26 at all times.

The opening 64 in the piston 59 is shaped to form a valve seat 65 with which a valve 66 co-operates, a spring 67 being provided which tends normally to move the valve 66 in a direction to close the passage 64 and thereby prevent the liquid from flowing out of the cylinders 60 back into the compartments 27.

The valve 66 is provided with a stem 68 which pasess through a suitable stuffing box 69 and the end of the valve stem 68 is disposed in a position to be engaged by an arm 70 connected with a rocker shaft 71 journaled in suitable bearings or brackets 72. Connected also with the rocker shaft 71 is an arm 73 with which a rod or link 74 is pivotally connected by one end as at 75.

At the other end of the rod or link 74 is arranged a lever 76 which is pivotally supported intermediate its ends as at 77. One end of the lever is pivotally connected as at 78 with the rod or link 74 and the other end 79 is arranged in the path of movement of a cam 80 which is secured to any suitable moving part of the press, such as the shaft 49. This cam 80 is provided with a high portion 81 and a shoulder 82 adjacent such high portion. The weight of the parts, or if desired a spring may be provided, operates to hold the end 79 of the lever 76 against the periphery of the cam 80 and the cam 80 is so arranged and constructed that the rod or link 74 will normally move the rock shaft 71 in a direction to cause the cam 80 to engage the valve stem 68 and unseat the valve 66 against the stress of the spring 67.

This valve will be held open at all times until the ram, or the pressure pad 23, just about reaches the limit of their lowermost movement. At this time in the cycle of operation of the press the high portion of the cam 80 will have reached a position that the shoulder 82 will also be in a position to permit the end 79 of the lever 76 to drop off of the high portion of the cam on to the low portion 83 thereof. The spring 67 will assist in causing the lever 76 to so move.

As soon as the end 79 of the lever drops to the lower portion 83 of the cam 80, the valve 66 will be closed through the medium of the spring 67 and thereafter the passage 64 will be closed so that the liquid which is in the cylinder 60 and in the lower portion of the passage 64 in the piston 59 will be trapped and cannot escape, with the result that the cylinder 60 will be held against return movement and the pistons 32 will be locked in their lowermost position so that the pressure pad 23 cannot return.

As the ram starts to ascend, the periphery of the cam 80 will begin to operate upon the end 79 of the lever 76 to rock the latter and thereby through the medium of the rod or link 74 rock the shaft 71 to move the arm 70 in a direction that it will engage the end of the valve stem 68 and the valve 66 will then be unseated against the stress of the spring 67. The pressure of the liquid in the cylinder 60 will be manifested upon the liquid in the compartments 27 and also upon the fluid (air) in said compartments which in turn will operate upon the pistons 32 and return them together with the pressure pad 23 to their normal position.

It will therefore be manifest that by timing the operation of the cam 80, the period in the cycle of operation of the press at which the pressure pad 23 will be released, may be controlled and likewise the length of time in which the pressure pad 23 will be locked in its lowermost position may also be controlled.

A predetermined amount of liquid is delivered into the compartments 27 of the chamber 26 through an opening 84, which latter may be closed in any suitable manner and the fluid (air) may be supplied through an opening 85 by means of a suitable pipe 86 from any suitable source, only a predetermined amount of air being supplied to the compartments 27. A fluid regulating valve 87 may be provided in the pipe 86 and a pressure gauge 88 may also be provided.

Thus it will be seen that during the operation of the press and when the pressure pad 23 is lowered, the fluid above the liquid 63 in the compartments 27 will be compressed and as the liquid 33 is non-compressible it will be forced by the pressure of the fluid thereupon, into the cylinders 60 when the valves 66 are opened and when the valves are closed the pressure pad will be locked against return movement.

When the valves 66 are open the pressure of

the fluid (air) in the compartments 27 will return the pistons 32 and pressure pad 23, thereby raising the cylinders 60 and forcing the liquid therein back into the compartments 27.

In Figure 4 the same form of locking means is shown as applied to a single operating press of the type shown in Figures 1 to 3, and in which the locking mechanism is operated in the same manner as described in connection with Figures 5, 6 and 7.

In Figures 8 and 9 the locking means is omitted, and in this form of the invention the numeral 89 designates a suitable support for the press, and to this support the body or bed 90 of the press is pivotally connected as at 91, the uprights 92 being connected with the bed of the press. The ram 93 is reciprocable upon the uprights 92 by means of a crank shaft 94ª to which the ram 93 is connected by means of a link 95ª. The die 96ª is connected with the ram 93 to reciprocate therewith and co-operates with a die 94 mounted upon the bolster plate 95. A work holder element 96 co-operates with the die 94 and is supported by means of pins 97 which pass loosely through the bolster plate 95 and engage and rest upon the pressure pad 23.

In this form of the invention it will be manifest that all of the operating parts of the press may be swung to any desired position with respect to the supports 89 by loosening the fastening devices 91.

In this form of the invention the chamber 98 is formed in the bed 90 of the press by means of a partition 99 spaced above the bottom of the chamber. A tubular member 100 is arranged in the chamber 98 and is provided with a flange 101 by means of which the tubular member may be secured to the lower face of the partition 99 by means of fastening devices 102 in the form of bolts. This tubular member is of an external diameter considerably less than the internal diameter of the chamber 98 and extends to the bottom 103 of the chamber 98. A removable closure 104 is secured over an opening 105 in the bottom 103 of the chamber 98. The closure 104 is provided with a flange 106 adapted to be seated in the opening 105 in the bottom 103 of the chamber 98 between the wall of the opening 105 and the periphery of the tubular member 100, and serves as a means for holding the end of the tubular member 100 in position and also as a means whereby access may be had to the interior of the tubular member 101.

Fastening devices 107 in the form of bolts, are provided for removably holding the closure 104 in position.

The tubular member 100 is provided with openings 108, any number of which may be provided, preferably adjacent the bottom 103 of the chamber 98 to form restricted passages through which the fluid in the chamber 108 may flow into and out of the tubular member 100 beneath the piston 109. The piston is preferably hollow and is provided with packing 110 to form a fluid tight joint and the closed end of the piston is uppermost. The pressure pad 23 rests upon the piston 109 and when depressed is movable into a chamber 111 in the bed 90 above the partition 99.

Fluid is supplied to the chamber 98 through an opening 112 by means of a pipe 113 in which a fluid pressure regulating valve 114 is provided and a pressure gauge 115 may also be provided in the pipe 113.

Thus, with this form of the invention it will be seen that a predetermined amount of fluid (air) is supplied to the chamber 98 and when the pressure pad 23 is depressed the fluid in the chamber 98 will be compressed to yieldingly resist the lowering movement in the pressure pad, the fluid being forced out of the tubular member 100 through the openings 108 into the chamber 98.

As the ram starts to ascend, the pressure of the fluid in the chamber 98 will be manifested upon the piston 109 and will cause the latter to be returned to its normal position and with it the pressure pad 23.

With this improved construction it will be manifest that there will be provided a compact arrangement in which a separate fluid pressure supply tank will be dispensed with and the cushioning device will be formed in the bed of the press, to constitute a part and parcel thereof, with the result that a very compact arrangement will be produced and a great many of the extra parts as well as piping valves, etc., will be dispensed with.

While the preferred forms of the invention have 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. A press for drawing sheet metal and the like embodying a pressure pad, means for yieldingly resisting the movement of the pad in one direction, the said means embodying a chamber formed in the bed of the press, a piston movable in the chamber, said piston being operatively related to said pad, and means for maintaining a predetermined supply of fluid in the said chamber.

2. A press for drawing sheet metal and the like embodying a pressure pad, means for yieldingly resisting the movement of the pad in one direction, the said means embodying a chamber formed in the bed of the press, a piston movable in the chamber, said piston supporting said pad, and means for maintaining a predetermined supply of fluid in the said chamber.

3. As a unitary structure, a press for drawing sheet metal and the like embodying a pressure pad, cushioning means for yieldingly resisting the movement of the pad in one direction, said cushion embodying a chamber formed as a part and parcel of the press, a piston reciprocable in the chamber, said pressure pad operating upon the said piston, and means for supplying a predetermined amount of fluid to the chamber to be compressed by the movement of the piston with respect to the chamber.

4. As a unitary structure, a press for drawing sheet metal and the like embodying a pressure pad, cushioning means for yieldingly resisting the movement of the pad in one direction, said cushion embodying a chamber formed as a part and parcel of the press, a plurality of pistons reciprocable in the chamber, said pressure pad operating upon the said pistons, and means for supplying a predetermined amount of fluid to the chamber to be compressed by the movement of the pistons with respect to the chamber.

5. In a press for drawing sheet metal and the like, superposed chambers formed in the bed thereof, one of the chambers being open, a pressure pad movable into the open chamber, a piston reciprocable in both of the chambers, said piston being operably connected with the pressure pad and adapted to be moved thereby, and means for maintaining a predetermined supply of fluid in the closed chamber to yieldingly resist the movement of the pressure pad and piston in one direction.

6. In a press for drawing sheet metal and the like, superposed chambers formed in the bed thereof, one of the chambers being open, a pressure pad movable into the open chamber, a piston reciprocable in both of the chambers, said piston supporting the pressure pad and adapted to be moved thereby, and means for maintaining a predetermined supply of fluid in the closed chamber to yieldingly resist the movement of the pressure pad and piston in one direction.

7. In a press for drawing sheet metal and the like, a chamber formed in the press below the bed plate thereof, a work holder above the bed plate, a piston below the bed plate and operable in the said chamber, and fluid within the chamber against the pressure of which the piston is movable for yieldingly resisting the movement of said work holder in one direction.

8. In a press for drawing sheet metal and the like, a chamber formed in the press below the bed plate thereof, a work holder above the bed plate, a piston below the bed plate and operable in the said chamber, and means for supplying fluid to the chamber to yieldingly resists the movement of the piston and work holder in one direction.

9. In a press for drawing sheet metal and the like, a cushioning device for yieldingly resisting the movement of a movable part of the press in one direction, said cushioning device embodying a chamber formed within and as an integral part of the press, and a piston reciprocable in the chamber, both the said piston and chamber being disposed beneath the bed plate of the press.

10. In a press for drawing sheet metal and the like, a pressure pad, a cushioning device for yieldingly resisting the movement of the pad in one direction, said cushioning device embodying a chamber formed within and as an integral part of the press, and a piston reciprocable in the chamber, said pressure pad, chamber and piston being all disposed below the bed plate of the press.

11. In a press for drawing sheet metal and the like, a pressure pad, a cushioning device for yieldingly resisting the movement of the pad in one direction, said cushioning device embodying a chamber formed within and as an integral part of the press, a piston reciprocable in the chamber, said pressure pad, chamber and piston being all disposed below the bed plate of the press, and means for supplying fluid to said chamber.

12. In a press for drawing sheet metal and the like, a cushioning device for yieldingly resisting the movement of a movable part of the press in one direction, said cushioning device embodying a chamber formed within and as an integral part of the press, a piston reciprocable in the chamber, both the said piston and chamber being disposed beneath the bed plate of the press, and means for automatically and temporarily locking the said movable part of the press against return movement.

13. In a press for drawing sheet metal and the like, a cushioning device for yieldingly resisting the movement of a movable part of the press in one direction, said cushioning device embodying a chamber formed within and as an integral part of the press, a piston reciprocable in the chamber, both the said piston and chamber being disposed beneath the bed plate of the press, and hydraulic means for automatically and temporarily locking the said movable part of the press against return movement.

14. In a press for drawing sheet metal and the like, a cushioning device for yieldingly resisting the movement of a movable part of the press in one direction, said cushioning device embodying a chamber formed within and as an integral part of the press, a piston reciprocable in the chamber, both the said piston and chamber being disposed beneath the bed plate of the press, and hydraulic means for automatically and temporarily locking the said movable part of the press against return movement, the liquid of the said hydraulic means flowing into and out of said chamber.

15. In a press for drawing sheet metal and the like, a work holding member, a fluid pressure cushioning device for yieldingly resisting the movement of said member in one direction, said cushioning device constituting a part and parcel of the press, and hydraulic means co-operating with said cushioning device for temporarily locking said work holding member against return movement.

16. In a press for drawing sheet metal and the like, a fluid pressure cushion embodying a chamber and piston, said chamber being formed in the press as a part and parcel thereof and being disposed below the bed plate of the press, an hydraulic locking device embodying a cylinder and piston, said cylinder having communication with said chamber, said chamber having a supply of liquid adapted to flow into and out of said cylinder, means for restraining the liquid from flowing from said cylinder into the chamber to constitute a locking device, means for supplying another and different fluid to said chamber above said liquid to yieldingly resist the movement of the first said piston in one direction, and means for automatically controlling the flow of liquid out of the said cylinder.

17. In a press for drawing sheet metal and the like, a fluid pressure cushion embodying a chamber and piston, said chamber being formed in the press as a part and parcel thereof and being disposed below the bed plate of the press, an hydraulic locking device embodying a cylinder and piston, said cylinder having communication with said chamber, said chamber having a supply of liquid adapted to flow into and out of said cylinder, means for restraining the liquid from flowing from said cylinder into the chamber to constitute a locking device, means for supplying another and different fluid to said chamber above said liquid to yieldingly resist the movement of the first said piston in one direction, and means for automatically controlling the flow of liquid out of the said cylinder, the said cylinder being supported by and beneath the said chamber.

18. In a press for drawing sheet metal and the like, a cushioning device formed integral therewith and embodying a fluid containing chamber disposed below the bed plate of the press, a piston reciprocable in the chamber, a pressure pad to the movement of which said piston is responsive, whereby said pad will be yieldingly resisted in its movement in one direction, and means for supplying fluid to the said chamber.

19. In a press for drawing sheet metal and the like, a cushioning device embodying a fluid containing chamber disposed below the bed of the press and formed integral with the press, a piston reciprocable in the chamber and movable through the upper wall thereof, and a pressure pad supported by said piston and to the movement of which pad the piston is responsive to operate against the fluid pressure in said chamber, whereby the pressure pad will be yieldingly resisted in its movement in one direction.

20. In a press for drawing sheet metal and the like, a cushioning device embodying a fluid containing chamber disposed below the bed of the press and formed integral with the press, a piston reciprocable in the chamber and movable through the upper wall thereof, a pressure pad supported by said piston and to the movement of which pad the piston is responsive to operate against the fluid pressure in said chamber, whereby the pressure pad will be yieldingly resisted in its movement in one direction, and an hydraulic locking device for temporarily restraining the pressure pad against return movement, a portion of the liquid of the said locking device flowing out of and into the said chamber during the operation of the press.

21. A press for drawing sheet metal embodying a bed, the said bed embodying a reservoir chamber, said reservoir constituting an integral part of the bed itself, a fluid pressure blank holding means for said press, said blank holding means and the operating means for the press being above the bottom line of the bed.

22. In a press for drawing sheet metal and the like, a work holding member, a fluid pressure cushioning device for yieldingly resisting the movement of said member in one direction, said cushioning device constituting a part and parcel of the press, and fluid pressure means co-operating with said cushioning device for temporarily locking said work holding member against return movement.

23. In a press for drawing sheet metal and the like, a work holding member, a fluid pressure cushioning device for yieldingly resisting the movement of said member in one direction, said cushioning device constituting a part and parcel of the press, and fluid pressure means for temporarily locking said work holding member against return movement.

24. In a press for drawing sheet metal and the like, a cushioning device for yieldingly resisting the movement of a movable part of the press in one direction, said cushioning device embodying a chamber formed within and as an integral part of the press, and a piston reciprocable in the chamber.

25. In a press for drawing sheet metal and the like, a cushioning device for yieldingly resisting the movement of a movable part of the press in one direction, a chamber formed within and as an integral part of the press, and a plurality of pistons reciprocable in the chamber.

26. In a press for drawing sheet metal and the like, a cushioning device for yieldingly resisting the movement of a movable part of the press in one direction, chambers formed within and as an integral part of the press, and pistons individual to and reciprocable in the chambers.

In testimony whereof I have signed my name to this specification, on this 28th day of March, A. D. 1929.

FREDRICH J. RODE.