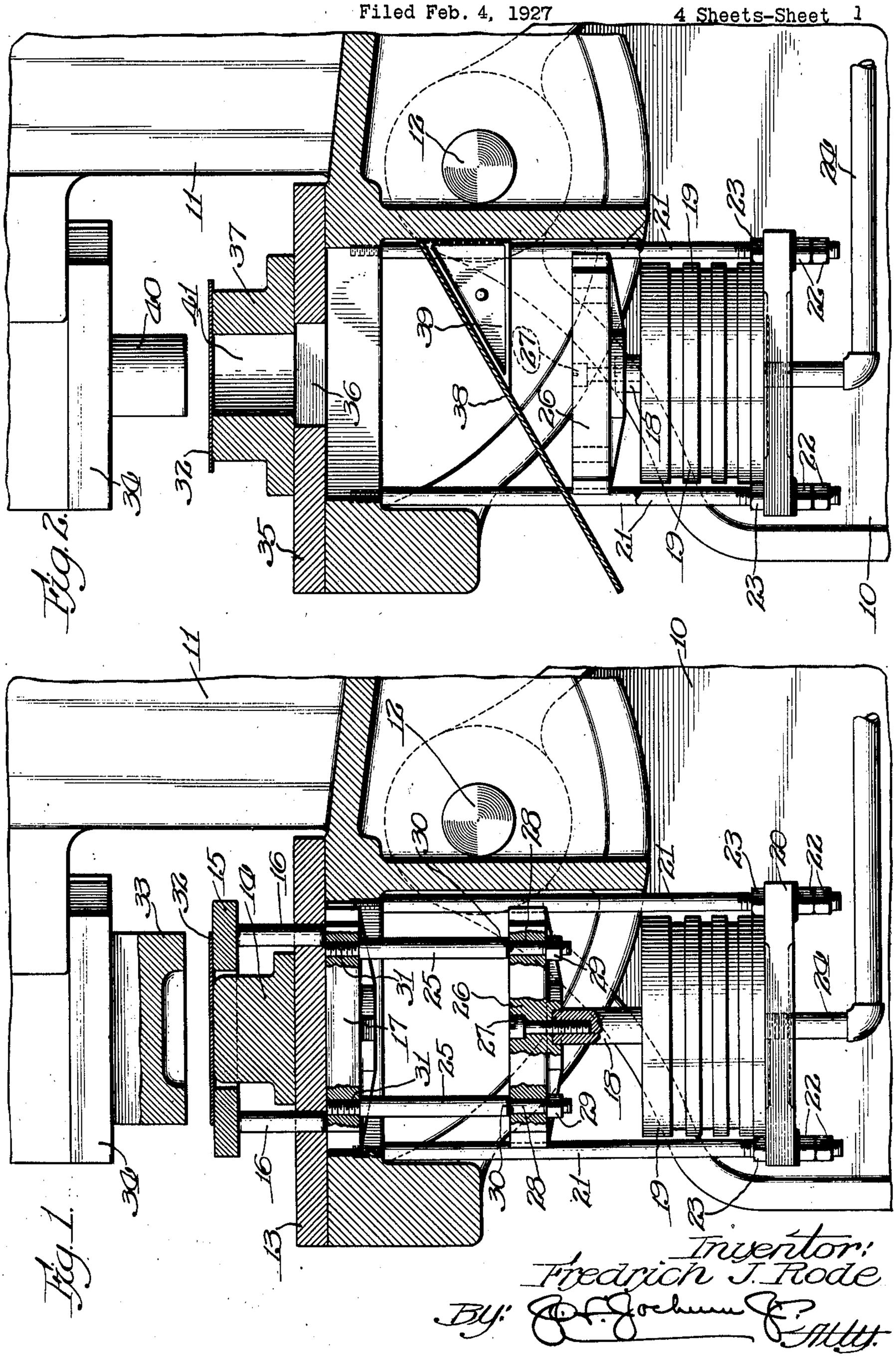
Sept. 4, 1928. 1,682,937

F. J. RODE

SHEET METAL PRESS

Filed Feb. 4, 1927 4 Sheets-Sheet 1



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4 Sheets-Sheet 2

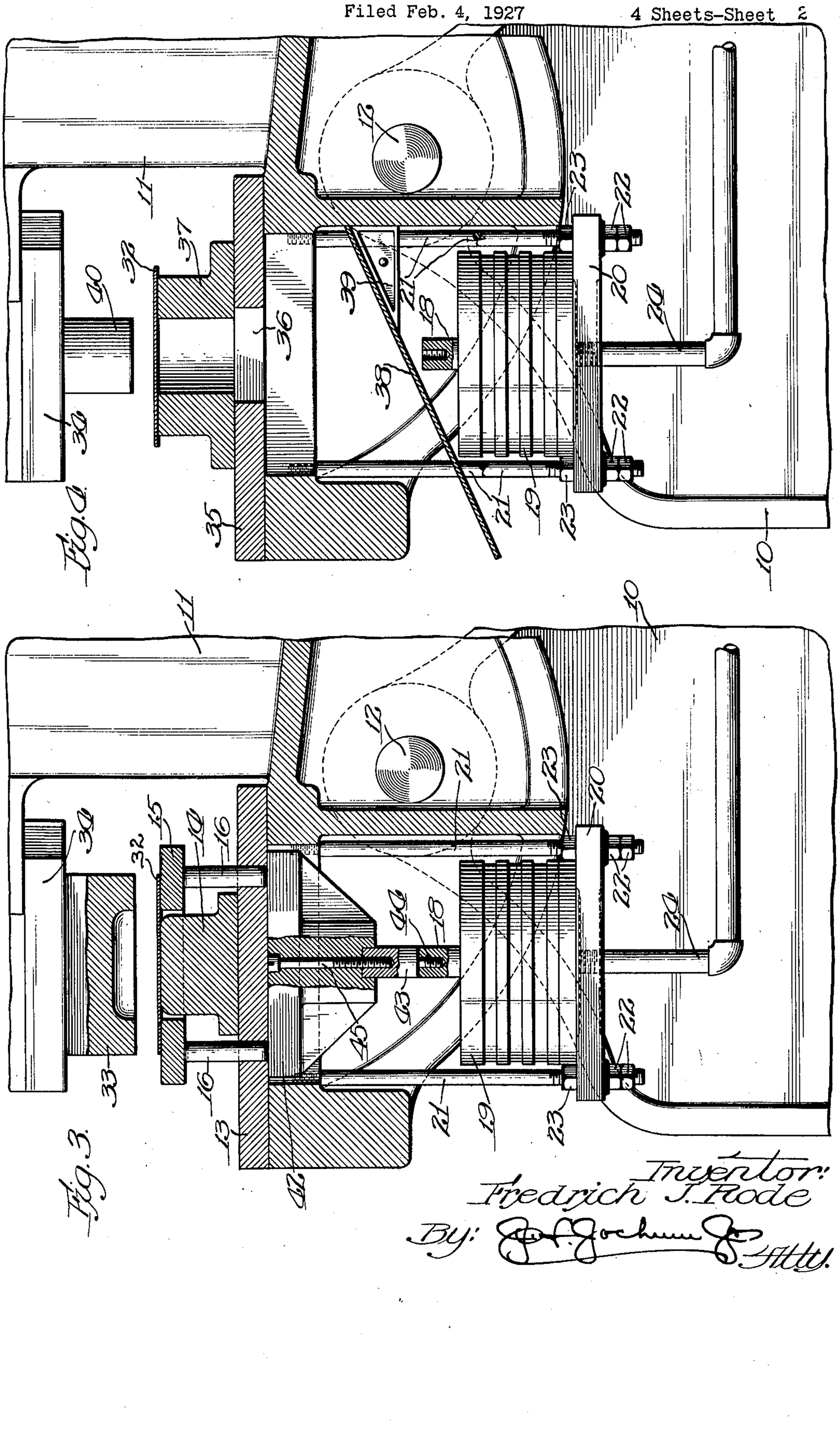

Fig. 2.

Fig. 3.

Inventor:
Fredrich J. Rode
By: J. F. Jochum & Attys.

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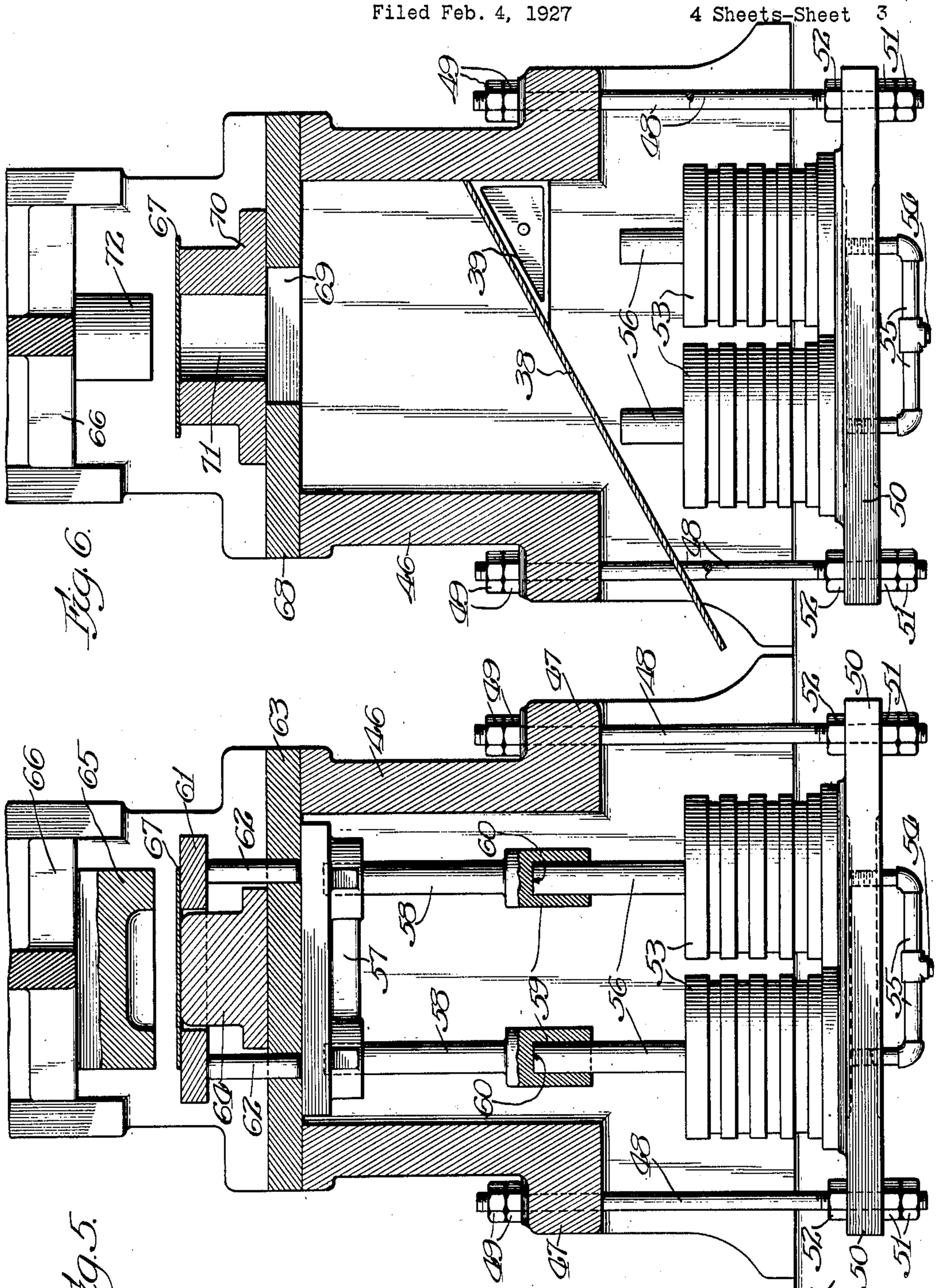

Fig. 6.

Fig. 5.

Inventor:
Friedrich J. Rode
By: [illegible] Atty.

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F. J. RODE

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4 Sheets-Sheet 4

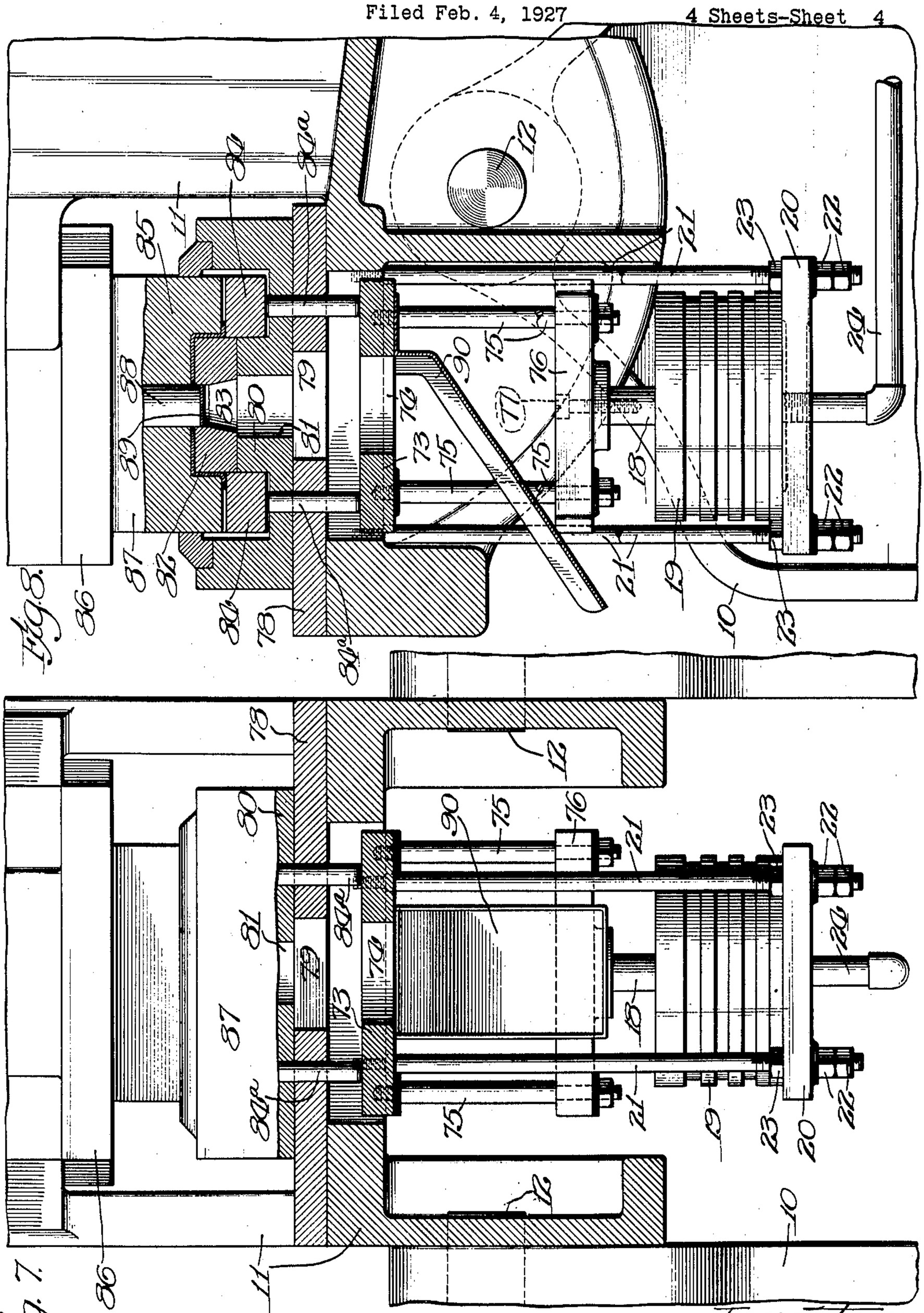

Fig. 8.

Fig. 7.

Inventor:
Fredrich J. Rode
By: [illegible]
Attys.

Patented Sept. 4, 1928. 1,682,937

UNITED STATES PATENT OFFICE.

FREDRICH J. RODE, OF CHICAGO, ILLINOIS, ASSIGNOR TO MARQUETTE TOOL & MFG. COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

SHEET-METAL PRESS

Application filed February 4, 1927. Serial No. 165,764.

This invention relates to improvements in sheet metal working machines, but more particularly to sheet metal drawing machines which have incorporated therewith a pressure cushion for resisting the movement of the blank or work holding means in one direction, during the drawing operation, and which cushion embodies a pressure pad which is adapted to be detached or rendered inactive with relation to the operating dies, while the remaining portion of the cushion is maintained intact and in operative position with respect to the dies to permit the same press to be converted from a drawing press to a blanking or punching press, the portion of the cushion which is maintained intact upon the machine being so arranged that it will be out of the way so as not to obstruct the delivery or discharge of the punchings from the machine.

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 side elevation and partly in section of a portion of a sheet metal press constructed in accordance with the principles of this invention, and showing the same as used for drawing or shaping sheet metal.

Figure 2 is a view similar to Figure 1 with parts omitted and showing the press or machine converted into a punching press.

Figure 3 is a view similar to Figure 1 of another form of the invention.

Figure 4 is a view similar to Figure 2, showing parts of the mechanism removed and the press converted into a punching press.

Figure 5 is a view similar to Figure 1 of another form of the invention.

Figure 6 is a view similar to Figure 5, with parts omitted and showing the press converted into a punching press.

Figure 7 is a view in front elevation of Figure 8.

Figure 8 is a view partly in side elevation and partly in section of a double acting press in which the punchings from the material will be discharged through the bed of the press and pin plate.

Referring more particularly to the drawings and particularly Figures 1 and 2, the numeral 10 designates generally the supporting base of a press, and the numeral 11 represents the upper portion of the press, here shown as being pivotally connected as at 12 to the base so that the bed plate and upright of the press may be tilted at any desired angle with respect to the base 10. Mounted upon the upper portion of the press is a bed plate 13, which supports a die 14.

Co-operating with the die 14 is a blank holding member 15 which is supported by means of pins 16 that pass loosely through the bed plate 13. These pins, any number of which may be provided, rest upon a pin plate or pad 17, the latter being supported by means of a piston rod 18 that is connected with a piston (not shown) that reciprocates in a cylinder 19.

The cylinder is supported by means of a support 20, which in turn is supported by means of hanger members or bars 21 that are secured in any suitable manner to a stationary part of the press.

Nuts or collars 22 are threaded on the ends of the hanger rods 21 for maintaining the support 20 in position, and a nut or collar 23 is secured upon the hanger members 24 above the support 20.

Fluid pressure is supplied to the cushion 19 through a pipe 24 that receives its supply from any suitable source.

The pin plate or pad 17 is supported by means of rods 25 from a crosshead or member 26, the latter being secured to the end of the piston rod 18 preferably by means of a screw or bolt 27 passing through the cross head and into the end of the piston rod 18.

The rods 25 are removably connected with the cross head 26, preferably by means of the reduced ends 28 of the rods passing loosely through the cross head.

Nuts or collars 29 are threaded upon the reduced portions of the rods 28 beneath the cross head and co-operate with shoulders 30 formed on the rods by the reduced portions 28 to clamp the rods in position.

The upper extremities of the rods 25 are

preferably threaded as at 31, and these threaded extremities are connected with the pin plate or pad 17.

When the fluid pressure is admitted into the cylinder 19 the pin plate or pad 17 will be elevated so as to hold the blank or work holding member 15 substantially flush with the top of the die 14 for supporting the work 32 in position to be shaped by a die 33, which latter is connected with the reciprocating ram or member 14 that moves upon the upright portion 11 of the press.

As the die 33 descends the edges of the die will cooperate with the work holding member 15 to clamp the work 32, and a further lowering movement of the die 33 will shape the work over the die 14, and the blank holding member 15 will be lowered against the stress of the fluid pressure in the cylinder 19.

When it is desired to convert the press from a shaping and drawing press into a punching press the blank holding member 15 together with the pins 16 are first removed. The fluid is then permitted to escape from the cylinder 19, thereby allowing the cross head or member 26 to be lowered to the position shown in Figure 2.

The pad or pin plate 17 will also be lowered, at which time the nuts or collars 29 may be removed so as to permit the pad or pin plate 17, together with the rods 25, to be detached from the cross head 26.

After the pin plate or pad 17 together with the rods 25 have been removed and the bed plate 13 interchanged with a bed plate 35, the latter having an opening 36 therethrough and a die 37 has been arranged upon the bed plate 35, a deflector plate 38 may then be placed in position above the cross head 26.

This deflector plate 38 may be held in position in any suitable manner preferably by means of brackets 39, removably secured to a fixed portion of the machine beneath the bed plate.

The deflector plate 38 inclines downwardly and is arranged beneath the opening 36 so that the punchings which pass through the die 37 will be deflected by the plate 38 and carried away from the machine.

A die 40 is interchanged with the die 33 and is adapted to enter an opening 41 in the die 37, after the work 32 has been pierced.

With this arrangement it will be manifest that the press may be readily converted from a drawing press to a punching press and the punchings will be deflected by means of the deflector plate 38.

In the form of the invention shown in Figure 3, the pin plate 42 corresponding with the pin plate 17 of the form shown in Figure 1, is supported directly from the piston rod 18 preferably through the medium of an extension 43 which is detachably connected with the end of the piston 18 by means of a reduced threaded extremity 44 of the extension 43 screwing into the piston.

The end of the extension 43 is secured to the pin plate 42 by means of a screw or bolt 45 that passes through the pin plate and into the end of the extension 43.

The operation of this form of the invention is the same as that disclosed in the form shown in Figures 1 and 2, and when the fluid is allowed to escape from the cylinder 19 and the piston rod 18 is lowered the pin plate 42 is detached from the extension 43 by removing the screw or bolt 45, after which the extension 43 is removed.

The deflector 38 is placed in position beneath the opening 36 in the bed plate 35, the brackets 39 having been secured in position to a fixed part of the machine.

In the form of the invention shown in Figures 5 and 6, the base 46 of the machine is provided with flanges 47 through which hanger rods 48 pass, nuts or collars 49 being threaded upon the ends of the hangers 48 to rest upon the flanges 47.

The lower ends of these hanger rods 48 pass through a support 50, nuts or collars 51 being threaded upon the free ends of these rods beneath the support 50, and a collar 52 is also threaded upon the hanger rods above the support 50 and co-operate with the collars 51 for clamping the support in position.

In this form of the invention the pressure cushion embodies a plurality of cylinders 53 which receive fluid through a pipe 54 connected with any suitable source and a branch 55 leads from the pipe 54 into each of the cylinders 53.

The piston rods 56 are connected with pistons (not shown) reciprocable in the respective cylinders.

Connected with the pin plate 57 are rods or uprights 58, the upper ends of these rods or uprights being secured in any suitable manner to the pin plate either by threading thereinto or by entering unthreaded sockets.

The lower ends of the rods or uprights 58 are preferably enlarged as at 59 and are respectively provided with sockets 60, which receive the upper extremities of the respective piston rods 56.

A blank holding member 61 is supported by pins 62 which pass loosely through the bed plate 63 so as to engage the pin plate or pad 57, and upon which bed plate a die 64 is supported.

A die 65 connected with a reciprocating part 66 of the press co-operates with the blank or work holder member 61 for clamping the work 67, while the latter is being shaped over the die 64 and while the blank holding member 61 is lowered against the fluid pressure in the cylinder 63.

To convert this form of press into a punching press, the work or blank holding

member 61, together with the pins 62 are first removed and the fluid is allowed to escape from the cylinders 53 so that the piston rods will drop to the position shown in Figure 6.

The bed plate 63 is interchanged with the bed plate 68, the latter having an opening 69 therethrough.

The pin plate or pad 57 together with the rods 58 are then detached and the deflector member 38 is placed in position beneath the opening 69 in the bed plate 68 to rest upon the brackets 39.

A die 70 having an opening 71 therein is placed upon the bed plate 68 so that the opening 71 registers with the opening 69, and a punching die 72 is interchanged for the die 65.

With this form of the invention it will be manifest that when the die 72 punches the work 67 the punching will pass through the opening 71 in the die 70, through the opening 69 in the bed plate 68 to fall upon and be deflected by the deflector member 38.

In Figures 7 and 8, there is shown a double acting press in which the metal is first shaped over a shaping die and then punched.

In this form of the invention the pad or pin plate 73 is provided with an opening 74 therein and is supported by means of rods or uprights 75 detachably connected with a cross head 76 which is in turn detachably connected by means of a screw or bolt 77 with the piston rod 18, that in turn is connected with a piston (not shown) that reciprocates in the cylinder 19.

The bed plate 78 is provided with an opening 79 that registers with the opening 74 in the pad or pin plate 73.

A die 80 is supported by the bed plate 78 and this die in turn is provided with an opening 81 which registers with an opening 79 in the bed plate.

Supported by the die 80 is a supplemental die 82 having an opening 83 therein which registers with the opening 81 of the die 80.

A work holding member 84 co-operates with the die 82 for supporting the work 85, the work holding member being supported by means of pins 84ª which pass through the bed plate 78 and rest upon the pad or pin plate 73. When the reciprocating member 86 of the press carrying the die 87 is elevated, the upper surface of the blank holding member 84 will be substantially flush with the top of the die 82 for supporting the work upon the die 82.

When the reciprocating member 86 descends the work will be clamped between the die 87 and the blank holding member 84 to be shaped over the die 82.

After this operation has occurred and the work 85 shaped over the die 82 a punch 88 carried by the reciprocating member is brought into operation and punches out a portion of the work 85 and forces the same through the opening 83 in the die 82 so that the punching 89 will drop through the opening 81 in the die 80, through the opening 79 in the bed plate 78 and opening 74 in the pin plate or pad 73 to fall upon a deflector 90 for directing the punching away from the machine.

With this construction it will be manifest that the punchings will be taken care of so that they will not have to pass through the cushion or cylinder 19.

This deflector 90 may be secured in position in any suitable manner and is preferably carried by the pin plate or pad 73.

When it is desired to convert this form of a press into a punching press, the dies may be removed and interchanged for punching dies and the fluid allowed to escape from the cylinder 19, after which the pin plate or pad 73 and the supporting rod 75 together with the deflector 90 may be removed and another deflector placed in position. At the same time the bed plate 78 may be removed so as to permit another bed plate with a larger opening to be interchanged therefor.

With all of the forms of the invention will be manifest that the drawing press may be readily converted into a punching press by simply dropping the pin plate or pad and removing the same from the machine, together with the work holding means.

The dies may then be interchanged and a punching operation performed.

This arrangement and construction is advantageous in that the cylinders and pistons which constitute a portion of the pressure pad will always remain intact and in proper position so as to permit the ready assembling of the other parts without the necessity of having to deflect or readjust the cylinders and pistons.

This construction is also advantageous in that it permits different types of operations to be performed upon the same press and thereby obviates the necessity of the owner having to procure two different machines to accomplish these results, as has heretofore been necessary.

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 sheet metal drawing press embodying a pressure pad, a fluid pressure controlled cushion for resisting the movement of the said pad in one direction, said cushion embodying a cylinder and piston relatively

movable one with relation to the other, said cylinder and piston being connected one with the stationary part of the press and the other with the said pad, means adapting said pad to be rendered inactive while the said cushion is maintained intact and in operative position upon the press, whereby the press may be converted from a drawing into a blanking or punching press, and means removably supported beneath the bed of the press for receiving and deflecting the punchings away from the press.

2. A sheet metal drawing press embodying a cushion, said cushion embodying a cylinder and piston relatively movable one with relation to the other, hanger members anchoring said cushion to the press and supporting the cushion below the bed of the press, a pressure pad, means detachably connecting the said pad with the said piston, the bed of the press having an opening therethrough through which punchings may pass, whereby said press may be converted into a blanking or punching press when the said pad is removed, the said cushion being maintained intact and in operative position upon the press, and a deflector adapted to be inserted beneath the said opening in the press bed and between the said cylinder and press bed for receiving and deflecting the punchings which pass through the press bed.

3. A sheet metal drawing press embodying a pair of movable members between which the work is clamped, a cushion supported in a permanent position on the press and below the bed thereof for resisting the movement of one of said members in one direction, said cushion embodying a pressure pad or plate acted upon by one of said movable members, the said pad or plate being adapted to be readily lowered with respect to the bed of the press, in order to permit the press to be used for punching operations, and a deflector member adapted to be removably supported beneath the bed of the press and above the said cushioning means for receiving and deflecting the punchings away from the press.

4. A sheet metal drawing press embodying a pair of movable members between which the work is clamped, a pad or plate, a fluid pressure cushion for resisting the movement of said pad in one direction, said cushion embodying a cylinder element and a piston element, one of said elements being permanently connected with the press beneath the bed thereof and the other being connected with said pad, means adapting said pressure pad to be dropped with respect to the bed of the press and out of the way, by releasing the fluid pressure in the cylinder and while the cylinder and piston remain in active position upon the press, in order to permit the press to be used for punching operations, the bed of the press being provided with an opening therethrough, and a deflector member adapted to be removably supported beneath the bed of the press above the cushioning means and beneath said opening for receiving and deflecting the punchings away from the press.

In testimony whereof I have signed my name to this specification, on this 10th day of January, A. D. 1927.

FREDRICH J. RODE.