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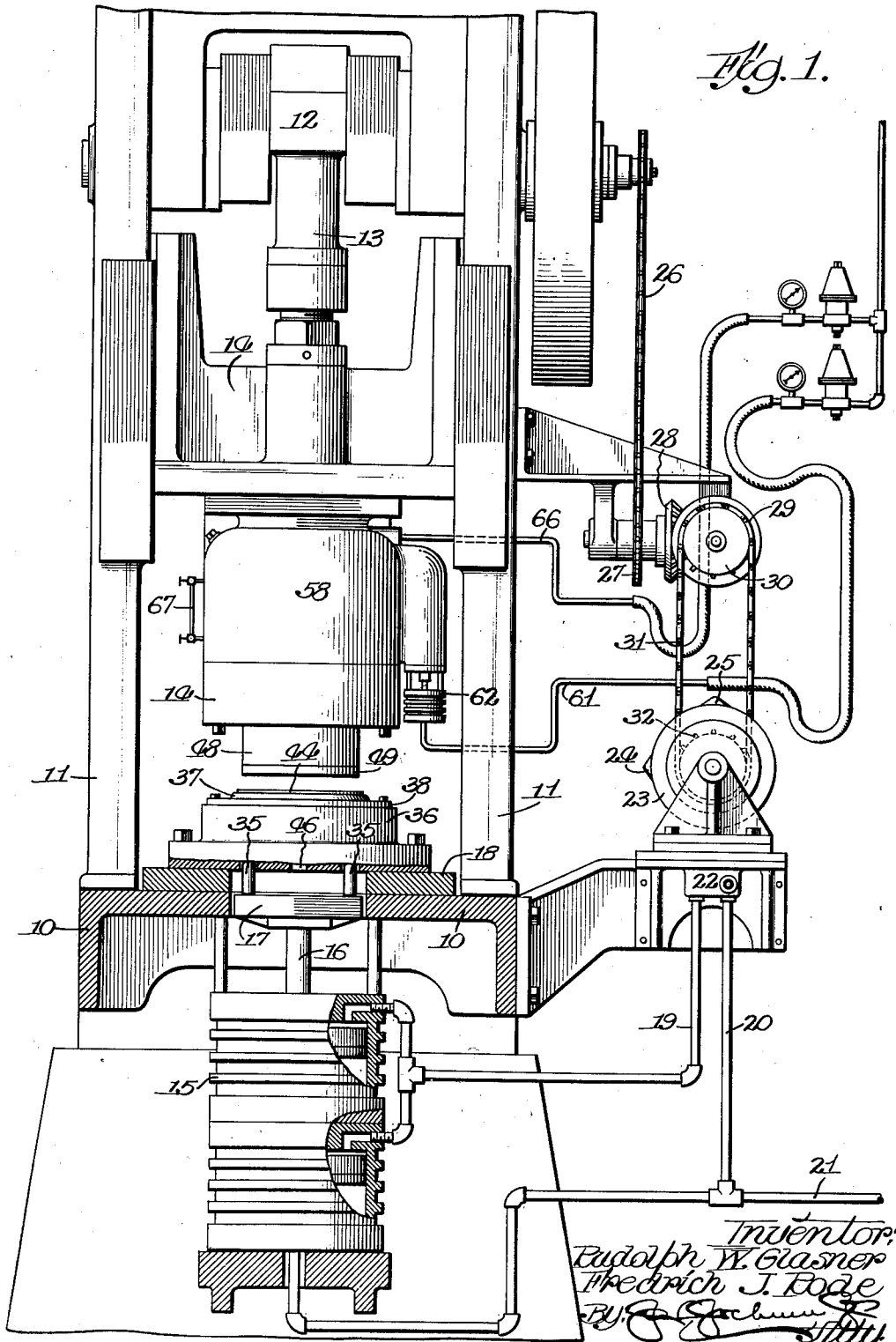
R. W. GLASNER ET AL

1,849,669

MACHINE FOR FORMING BRAKE DRUMS

Filed May 8, 1930

4 Sheets-Sheet 1



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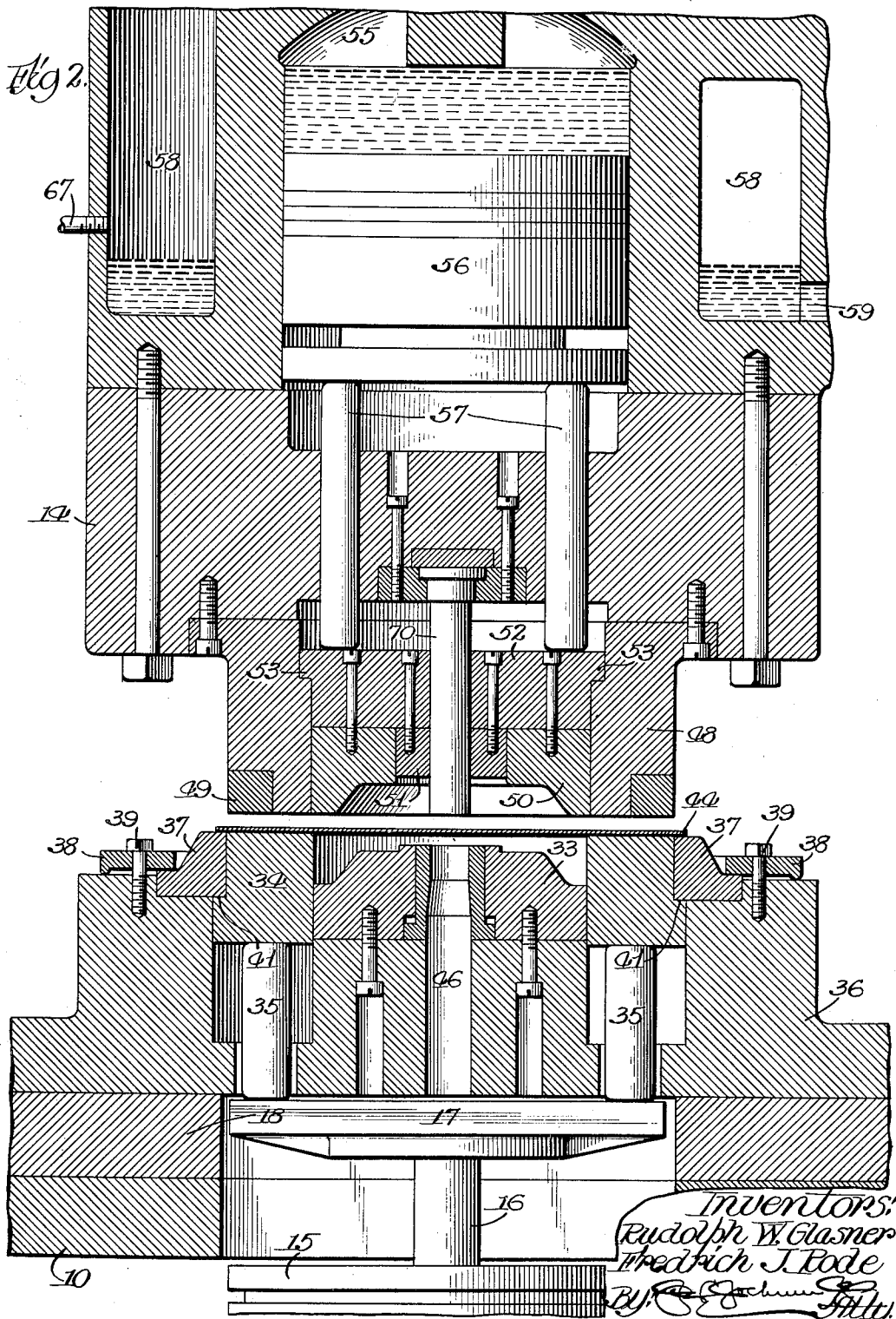
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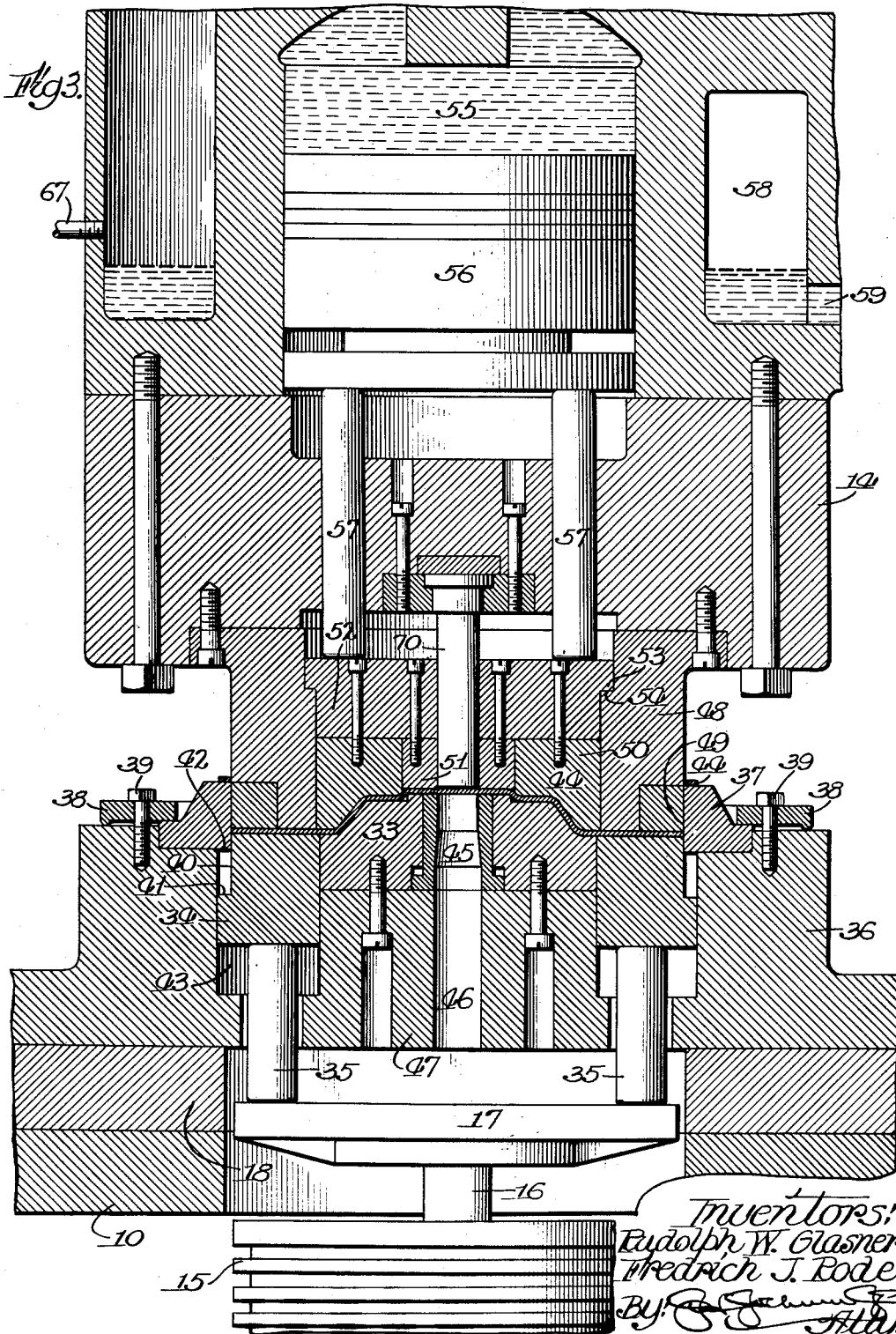
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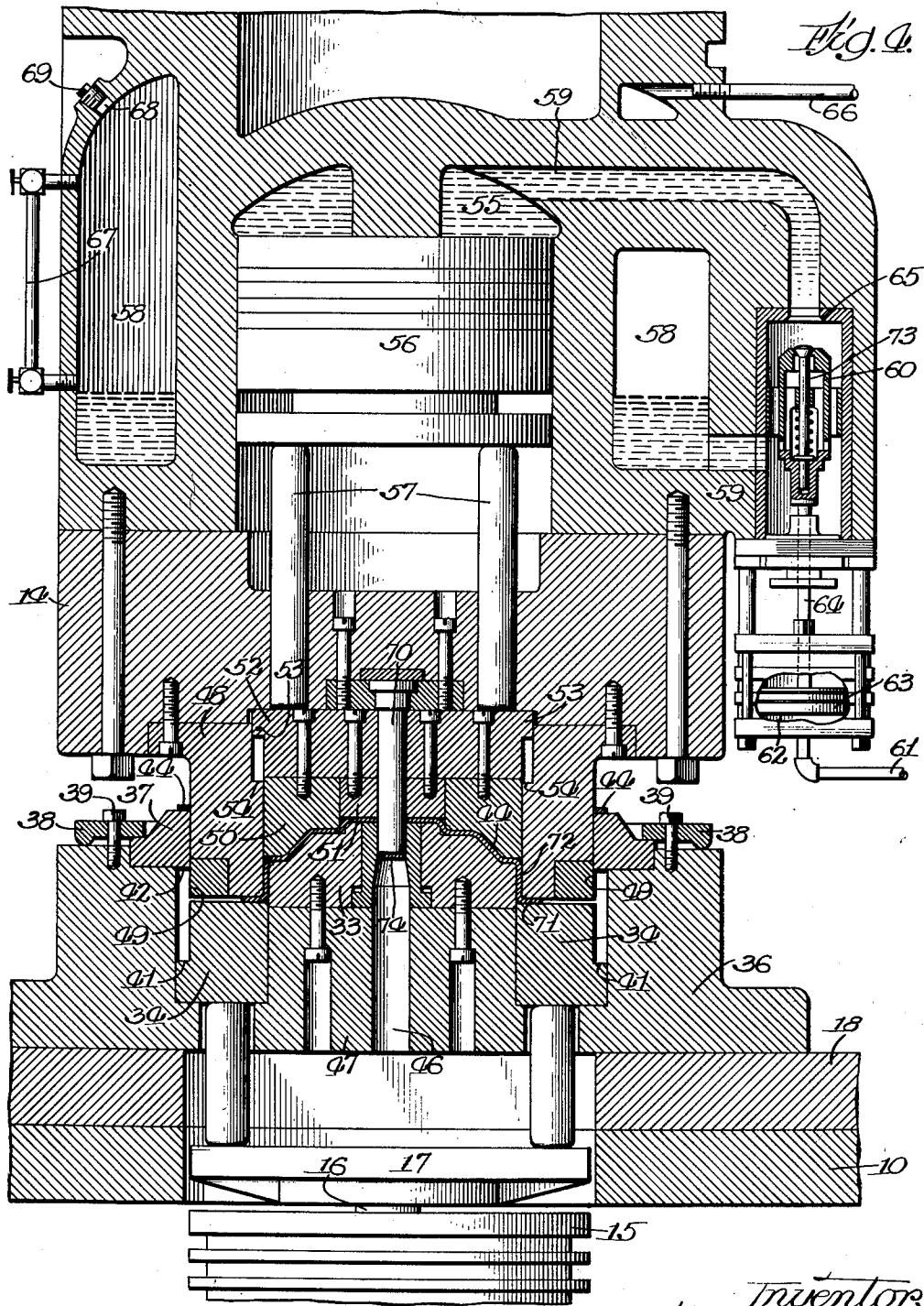
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MACHINE FOR FORMING BRAKE DRUMS

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## UNITED STATES PATENT OFFICE

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## MACHINE FOR FORMING BRAKE DRUMS

Application filed May 8, 1930. Serial No. 450,638.

This invention relates to improvements in machines for forming cup shaped articles such as brake drums or the like and which drums are particularly adapted, though not necessarily limited in use with wire wheels, formed of sheet metal by a drawing operation, and one of the objects of the invention is to provide an improved machine of this character in which a complete brake drum will be formed on a single operation of the press, and which drums have heretofore necessitated two or more operations in the production thereof.

A further object is to provide an improved machine of this character for forming a brake drum having a concentrically disposed brake flange.

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 in elevation, partly broken away and partly in section of a machine of this character constructed in accordance with the principles of this invention.

Figure 2 is an enlarged detail sectional view of a portion of the machine showing the parts in their normal position or at the starting of the operation of forming the drum.

Figure 3 is a view similar to Figure 2, showing the position the parts will assume when the drum is partially formed.

Figure 4 is a view showing the position of the parts at the completion of the formation of the drum and prior to the return movement of the ram of the press.

In the drawings there is shown what is known as a single action press, in which the numeral 10 designates the base of the machine, 11 uprights, 12 a crank shaft, 13 a link connected to the crank shaft by one end and at its other end to a ram 14, which latter slides upon the uprights 11.

Arranged beneath the bed of the press is

a cushioning device consisting essentially of cylinders 15 in which pistons (not shown) reciprocate. Connected to or supported by the piston rods 16 is a pressure pad 17 which is adapted to assume a position in close proximity to the lower face of the bed plate 18 when the parts are in normal position.

Fluid is supplied to the cylinders 15 through suitable pipes 19—20 from a main supply 21 leading from a suitable source.

Valve mechanism designated generally by the reference numeral 22 is provided for controlling the direction of flow of the fluid and a rotatable element 23 having cams 24—25 is provided for controlling the valve mechanism. The rotatable element is given motion preferably from the crank shaft 12 through the medium of a belt 26 which passes over a pulley or sprocket wheel 27 connected to a gear 28, which latter in turn meshes with a gear 29 that has connected with it for rotation therewith a sprocket wheel 30, over which a sprocket chain 31 passes, and the sprocket chain in turn passes over another sprocket wheel 32, which in turn is connected with the rotatable element 23.

The specific construction of the above referred to parts constitute no part of the present invention except in so far as the rotatable element 23 will operate to control the valves 22 to permit the pressure pad 17 to be locked in its lowermost position in a manner substantially as shown and described in applications, Serial Nos. 365961 and 365962, filed May 25, 1929.

Mounted upon the bed 18 and secured thereto in any suitable manner is a die 33 and co-operating therewith is a work holding member 34 which encompasses the die. The work holding member is supported by means of pins 35 which pass loosely through a housing 36 which encompasses the die 33, and engage and rest upon the pressure pad 17 so that when the work holder 34 is depressed the pressure pad will be correspondingly depressed and the movement of the pressure pad in one direction will be yieldingly resisted by means of the fluid in the cushioning device 15.

Mounted upon the housing 36 is a supporting member 37 which also encompasses the

work holding member 34, and this member 37 is secured in position in any suitable manner such as by means of an annular member 38 through which fastening screws 39 pass, and which screws enter the housing 36.

The work holding member 34 is preferably provided with a reduced portion 40 to form a shoulder 41, which latter co-operates with the lower face 42 of the supporting member 37 which extends over an opening or recess 43 in which the work holding member 34 operates and the shoulder 41 co-operating with the member 37, serve to limit the return movement of the work holder 34 and to arrest the work holder in its movement so that the upper face thereof will be substantially flush with the upper surface of the member 37 to form a support for the work 44 when the parts are in normal position.

The die 33 is provided with an opening 45 therethrough which registers with an opening 46 formed through a member 47 that supports the die 33 and the opening 46 is provided so as to permit punchings to drop therethrough.

Mounted upon the ram 14 is a die 48 which is of a diameter to fit snugly within the annular member 37 and the die 48 is provided with a portion 49 which serves as a cutter that co-operates with the edge of the member 37 to cut the material during the first stage of operation of the machine as shown in Figure 3.

The die 48 is hollow and arranged therein is another die 50 which may be of a single element or may be built up of a plurality of elements 50—51 as shown in Figure 3 of the drawings, and these die members are secured to another member 52 which also operates within the die 48. The member 52 is shaped to form a projecting shoulder 53 which engages a stop or shoulder 54 on the die 48 to limit the movement of the die 50 in one direction.

Within the ram of the press is formed a cylinder 55 in which a piston 56 operates and interposed between the piston 56 and the supporting member 52 of the dies 50—51 are pins 57 which pass loosely through a portion of the ram and engage and rest upon the member 52 and also project into the cylinder 55.

Another portion of the ram 14 is shaped to form a reservoir 58 which has communication with the cylinder or chamber 55 by means of a passage 59 through which passage liquid will flow from the cylinder 55 into the reservoir 58 and from the reservoir 58 back into the cylinder. A suitable valve mechanism designated generally by the reference numeral 60 is provided for controlling the passage and the valve is preferably a combined check and relief valve, the specific construction of which also forms no part of the present invention but constitutes a portion of applica-

tion, Serial Number 436,374 filed March 11, 1930.

The valve 60 is controlled by fluid pressure from a suitable source through a pipe 61 which discharges into a cylinder 62 in which a piston 63 operates. A piston rod 64 is connected with the piston 63 and also with the valve 60 and by means of the action of the fluid upon the piston 63 the valve 60 will be held against its seat 65 to cause a variable yielding resistance pressure to be created in the cylinder 55 during the operation of the machine. Discharging also into the reservoir 58 is a pipe or passage 66 by means of which fluid pressure, such as air, may be supplied to the reservoir 58 to create a pressure upon the liquid therein. A gauge glass 67 may be provided for the reservoir and a fill opening 68 closed by a plug 69 may also be provided.

In the operation of the device, and assuming the parts to be in normal position or elevated position of the ram as shown in Figure 2, the pressure of the fluid in the reservoir 58 when the valve 60 is open, causes the liquid to fill the cylinder 55 above the piston 56 and this will move the piston 56 downwardly to the lower end of its movement and cause the shoulder 53 of the member 52 which supports the dies 50—51, to rest upon the shoulder 54 and as the upper surface of the work holding member 34 is substantially flush with the supporting member 37 (see Figure 2) the work 44 will rest thereupon.

Carried also by the ram 14 is a punch 70 which is adapted to pass through an opening in the member 52 and the die 51 and is in alinement with the opening 46 through the die 33 and the member 47.

When the parts are in the position shown in Figure 2, when the ram 14 starts to descend the active face of the die 50 will be held substantially flush with the active face of the die 48.

As soon as the die 48 contacts with the work 44 and co-operates with the work holding member 34 to grip the work, upon a further movement of the ram 14 in the same direction the cutting edges 49 of the die 48 co-operating with the edge of the member 37 will shear or cut off the material as shown in Figure 3. During this operation the work holding member will be depressed by the die 48 and this movement of the work holding member 34 will be yieldingly resisted by the pressure in the cylinder 15 through the medium of the pins 35 and pressure pad 17, and which latter will be yieldingly resisted in its movement in such direction by the pressure in the cylinder 15.

After the work has been cut off, on a further movement of the ram 14 in the same direction, the die 48 will continue to depress the work holding member 34 to form the work 44 over the die 33. As soon as the dies 50—51 contact with the work and co-operate with the die 33,

the dies 50—51 and the member 52 will be arrested in their movement with the ram by reason of their contact with the work 44 upon the die 33. This however, will not arrest the further movement of the die 48 as it will continue to travel until the ram reaches the limit of its lowermost movement. As the work holder 34 moves away from the active face of the die 33 (see Figure 4), the work 44 will be formed over the edge and along one side of the die 33 to produce a flange 71 and the brake band engaging surface 72. When the dies 50—51 are arrested in their movement and when the die 48 continues to travel, the piston 56 and cylinder 55 will move relatively one with relation to the other. That is, the piston 56 will be moved against the liquid pressure in the cylinder 55 so that a resistance pressure will be created against the dies 50—51, thereby insuring the work being held firmly between the dies 50—51 and the die 33.

At the time that the dies 50—51 contact with the work 44 upon the die 33, the valve 60 is closed and will be held closed by fluid pressure in the cylinder 62 operating upon the piston 63. When the pressure upon the liquid in the cylinder 55 which is created in the manner just described, exceeds the pressure by means of which the valve 60 is held upon its seat 65, the valve will open and the liquid will escape from the cylinder 55 on top of the piston through the passage 59 through the valve and back into the reservoir 58.

When, however, the ram ascends and the pressure in the cylinder 55 is relieved, fluid pressure in the reservoir 58 will unseat a valve 73 which co-operates with the valve 60 and thereby permit the liquid to flow out of the reservoir 58 back into the cylinder 55.

Obviously the resistance pressure of the liquid may be controlled by the degree of pressure which holds the valve 60 upon its seat.

During the cycle of operation of the mechanism in order to prevent the work holder 34 from immediately following the ram on its upward movement, the latter will be locked in its lowermost position by shifting of the fluid in the cylinder 15 through the medium of the valves 22 in the manner described in the above referred to application.

With this improved construction it will be manifest that a brake drum will be formed upon a single stroke of the ram and upon each operation of the ram.

After the parts have assumed the position shown in Figure 3, a continued movement of the ram in the same direction so as to force the die 48 downwardly to the position shown in Figure 4, the punch 70 will perforate the drum and the punching 74 will be discharged through the opening 46 in the supporting member 47 of the die 33.

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. A press for forming a substantially cup shaped article during a single stroke of the press embodying co-operating dies for forming and clamping the central part of the article after it is shaped, additional dies for clamping and holding the peripheral portion of the article while the central portion is being shaped, the said additional dies co-operating with one of the first said dies to subsequently shape the portion of the article beyond the first said dies, and variable resistance pressure creating means individual to and against which one of the dies of each set is operable.

2. In a single action press for forming a substantially cup shaped article in one stroke of the press, a reciprocable ram, concentrically arranged dies both of which are bodily movable with the ram and one of which is also movable with respect to the ram, a stationary die with which the die that is movable with respect to the ram co-operates to form the central part of the article and clamp the same when formed, a work holder co-operating with the other die on the ram for clamping and holding the work while the central part of the article is being formed and for subsequently forming the outer portion of the article over the first recited stationary die, and a punch connected with the ram for punching the work after it has been shaped by and the movable one of the first pair of co-operating dies has come to rest.

3. In a press for forming a substantially cup shaped article, a pair of cooperating dies one of which is movable with respect to the other, fluid pressure variable resistance pressure creating means for one of the dies, said dies co-operating to form the central portion of the article and clamp said portion while the outer portion of the article is being formed, an additional die, a work holder co-operating with said additional die for clamping and holding the work while the central portion of the article is being formed and for subsequently shaping the outer portion of the article over one of the first recited dies, and fluid pressure variable resistance pressure creating means for said work holder.

4. In a press for forming a substantially cup shaped article, a pair of cooperating dies one of which is movable with respect to the other, fluid pressure variable resistance pressure creating means for one of the dies, said dies co-operating to form the central portion of the article and clamp said portion while the outer portion of the article is being

- formed, an additional die, a work holder co-operating with said additional die for clamping and holding the work while the central portion of the article is being formed and for subsequently shaping the outer portion of the article over one of the first recited dies, fluid pressure variable resistance pressure creating means for said work holder, and a punch operating to pierce the article during the formation of the outer portion thereof after the shaping die for the central portion of the article has come to rest.
5. In a single action press for forming substantially cup shaped articles during a single stroke of the ram, a stationary die, a work holder encompassing the die, fluid pressure resistance creating means for said work holder, a pair of dies carried with the ram one of which is also movable with respect to the ram, fluid pressure resistance creating means for the last recited die, one of the dies connected with the ram co-operating with the work holder to clamp the work in advance of the formation of the central part of the article by the other co-operating dies, and subsequently operating to form the outer portion of the article while the said co-operating dies which form the central portion of the article clamp the work.
6. In a press for forming substantially cup shaped articles from sheet material during a single stroke of the press, co-operating dies for forming and clamping the central part of the article after it is shaped, an additional die, a work holder co-operating with said additional die for clamping and holding the outer portion of the work while the central portion is being shaped and operating to subsequently shape the outer portion of the article over one of the first said dies, one of the first said dies being movable with and with respect to the ram, cylinder and piston elements carried with the ram, and means for supplying fluid under pressure between the piston and cylinder for creating a yielding resistance pressure upon one of the first said dies.
7. In a press for forming brake drums from sheet material during a single stroke of the press, co-operating dies for forming and clamping the central part of the drum after it is shaped, an additional die, a work holder co-operating with said additional die for clamping and holding the outer portion of the work while the central portion is being shaped and operating to subsequently shape the outer portion of the drum over one of the first said dies, one of the first said dies being movable with and with respect to the ram, a cylinder formed in the ram, a piston movable in the cylinder and connected with one of the first said dies, and means for supplying fluid to the cylinder to create a yielding resistance pressure upon the last said die.
- In testimony whereof we have signed our names to this specification on this 10th day of April, A. D. 1930.
- RUDOLPH W. GLASNER.  
FREDRICH J. RODE.

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