Aug. 1, 1933. A. A. BYERLEIN 1,920,547

PRESS

Filed Dec. 26, 1931

FIG. 1

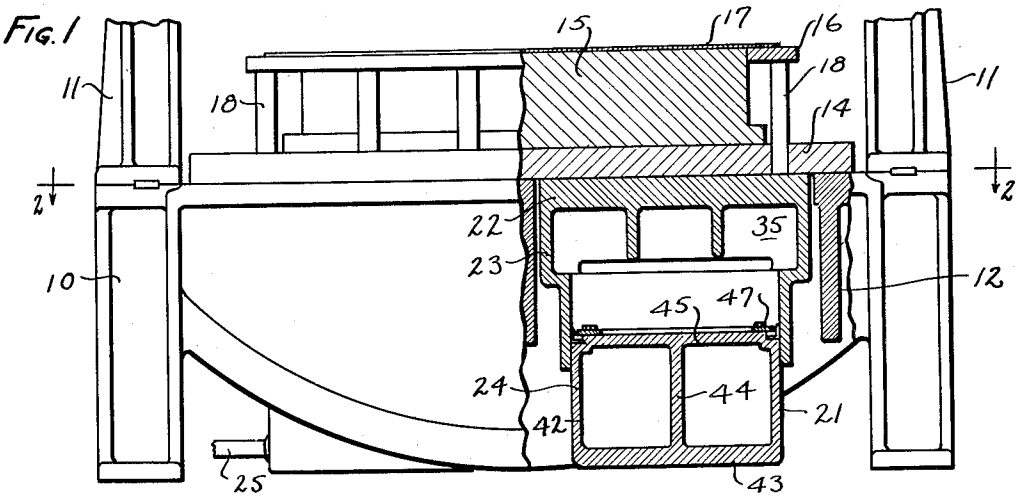


FIG. 2

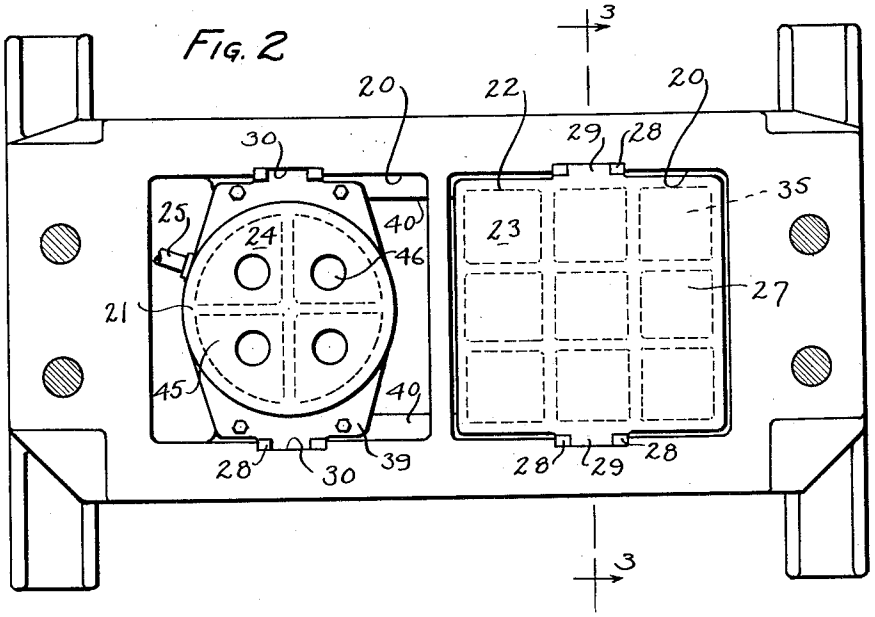
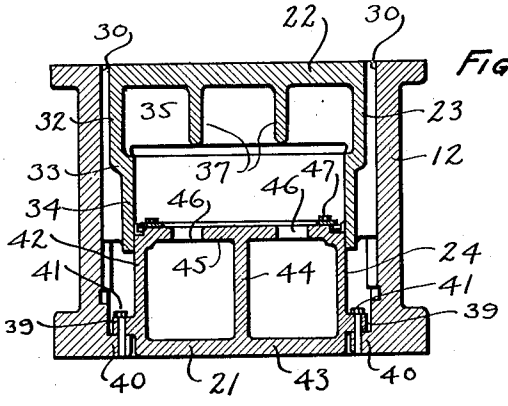


FIG. 3



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Patented Aug. 1, 1933

1,920,547

UNITED STATES PATENT OFFICE

1,920,547

PRESS

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Application December 26, 1931. Serial No. 583,188

4 Claims. (Cl. 267—1)

This invention relates to presses, and more particularly to presses for drawing sheet metal.

One object of the invention is the provision of a drawing press in the bed of which are arranged upper and lower telescopically related cushion members, the upper cushion member being guided in the press bed and forming a pressure plate cooperating with the pressure ring.

Another object of the invention is the provision, in a press, of a fluid pressure cushion of the character mentioned, the upper portion of the cushion providing a chamber which is of substantially larger cross-sectional area than the telescopically related wall portion.

Other objects and advantages of the invention will be apparent from the following description, the appended claims and the accompanying drawing, in which—

Fig. 1 is a front view, partly in section, showing the lower portion of a drawing press embodying the present invention;

Fig. 2 is a horizontal section on the line 2—2 of Fig. 1 with the left-hand pressure plate removed; and

Fig. 3 is a vertical section on the line 3—3 of Fig. 1.

Referring more particularly to the drawing by reference numerals, 10 designates the frame of a press, only the lower portion of which is shown as the top portion may be of any conventional character of the single or double acting type. This frame embodies uprights 11, the lower parts of which form portions of the press bed designated generally 12.

On the bed 12 is a bolster plate 14 which supports a lower die 15. Surrounding the lower die 15 is a pressure ring or ejector ring 16, supporting the peripheral edges of the sheet metal blank 17. The pressure ring 16 is supported by a series of pins 18 that project up through holes in the bolster plate, the lower ends of these pins resting on a pressure plate or plates provided in the bed of the press. These pressure plates serve to exert a desired pressure on the pins, causing the peripheral portions of the metal blank to be held yieldingly under desired pressures between the pressure ring 16 and the lower side of the upper die, which has not been shown.

The bed of the press is provided with any suitable number of openings or wells 20, there being two such wells in the embodiment of the invention illustrated. In each of these wells is a pressure cushion designated generally 21, the upper side 22 of which forms the pressure plate on which the pins 18 rest. The pressure cushion embodies upper and lower cushion members 23 and 24 respectively. Air or other suitable fluid is supplied to the cushion by means of a supply pipe 25 which may extend to a check valve and to a suitable pressure regulating valve so that compressed air from the building air supply may be supplied to the cushion under a controlled pressure depending upon the particular character of the work to be performed. For example, air may be supplied at fifty pounds pressure in order to produce the desired upward pressure in the pressure ring, the check valve preventing back flow of air from the cushion to the supply line when the cushion members are collapsed or partly collapsed toward one another. When the cushion members are moved toward one another, the air pressure of the cushion is increased to some extent since the air can not flow back to the building pressure lines.

The upper cushion member 23 has a substantially rectangular upper portion 27 preferably a little smaller in size than the well or opening in the press in which it is provided. The sides of this upper portion, however, are guided for vertical movement in the pressure bed by means of guide plates 28 fixed either to the projecting guide extensions 29 of the cushion member or else to the press bed, being provided in the recesses 30 of the press bed. In this way the upper cushion member is prevented from moving in a horizontal direction, but it is permitted to move up and down freely.

Extending down from the top pressure plate portion of the cushion member 23 are the flat side walls 32, which merge at 33 into a cylindrical wall 34. At the location of the wall 34 is provided a space of considerably smaller cross-sectional area than the extension space 35 which is in the hollow rectangular upper portion of the cushion member. As shown, depending reinforcing ribs 37 arranged in intersecting planes are provided on the pressure plate 22.

The lower cushion member 24 is fixed in position, having opposite projecting ledges 39 which rest on the flanges 40 at the lower ends of the press bed, as shown in Fig. 3. Bolts 41 secure the cushion member 24 in position. This cushion member 24 has a cylindrical wall 42, which telescopically engages the downwardy extending cylindrical wall 34 of the upper cushion member. As shown, the upper cushion member is mounted on or around the lower cushion member. The lower cushion member has a bottom wall 43 extending up from which are the crossed reinforcing webs 44, merging at their upper ends into the

reinforcing cross plate 45. A number of large openings 46 are provided in the cross plate 45, the cross plate merely serving to strengthen and interbrace the upper ends of the wall 42. Suitable packing means, indicated generally 47 may be provided to prevent the loss of air from the cushion.

Since the cross-sectional area at the point of telescopic engagement of the two cushion members is considerably less than the cross sectional area of the rectangular shaped upper portion or extension space 35, the pressure of the air in the cushion will not increase in proportion to the decrease in total cushion height, the spaces 43 afforded by the corner portions of the top of the cushion member 23 affording expansion spaces of substantial size while still permitting the entire cushion to be mounted in the confines of the press bed.

In accordance with the described arrangement, it will be apparent that the pressure cushion is of very simple construction, being formed essentially of only two parts, namely the upper cushion element which is guided vertically in the press bed and constitutes the pressure plate, and the lower stationary element.

While the form of apparatus herein described constitutes a preferred embodiment of the invention, it is to be understood that the invention is not limited to this precise form of apparatus, and that changes may be made therein without departing from the scope of the invention which is defined in the appended claims.

What is claimed is:

1. In a power press of the character described, a press bed, a pressure plate slidably guided in said bed, said plate having a downwardly extending cylindrical wall and a stationary member having an upwardly extending wall telescopically related to said cylindrical wall, said pressure plate and member forming a closed fluid pressure chamber, the upper portion of said chamber having substantially greater cross-sectional area than its area at the telescopically related walls.

2. In a power press of the character described, a press bed having an opening, a pressure cushion in said opening and comprising upper and lower cushion members having telescopically related walls, said upper member having a top portion guided in the bed and forming a chamber extension of the pressure cushion of greater cross-sectional area than the telescopically related portion of the cushion.

3. In a power press of the character described, a press bed having an opening, a pressure cushion in said opening and comprising upper and lower cushion members, said lower cushion member being of substantially cylindrical shape, said upper cushion member having a lower cylindrically shaped portion and an integrally connected upper rectangularly shaped hollow portion, and means guiding said rectangularly shaped portion in the sides of said opening.

4. A pressure cushion for drawing presses comprising upper and lower telescopically related cushion members, said upper cushion member having a substantially rectangular hollow top portion and a substantially cylindrical downwardly extending wall portion telescopically engaging said lower cushion member, said top portion constituting a pressure plate and having guide surfaces at opposite sides thereof.

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