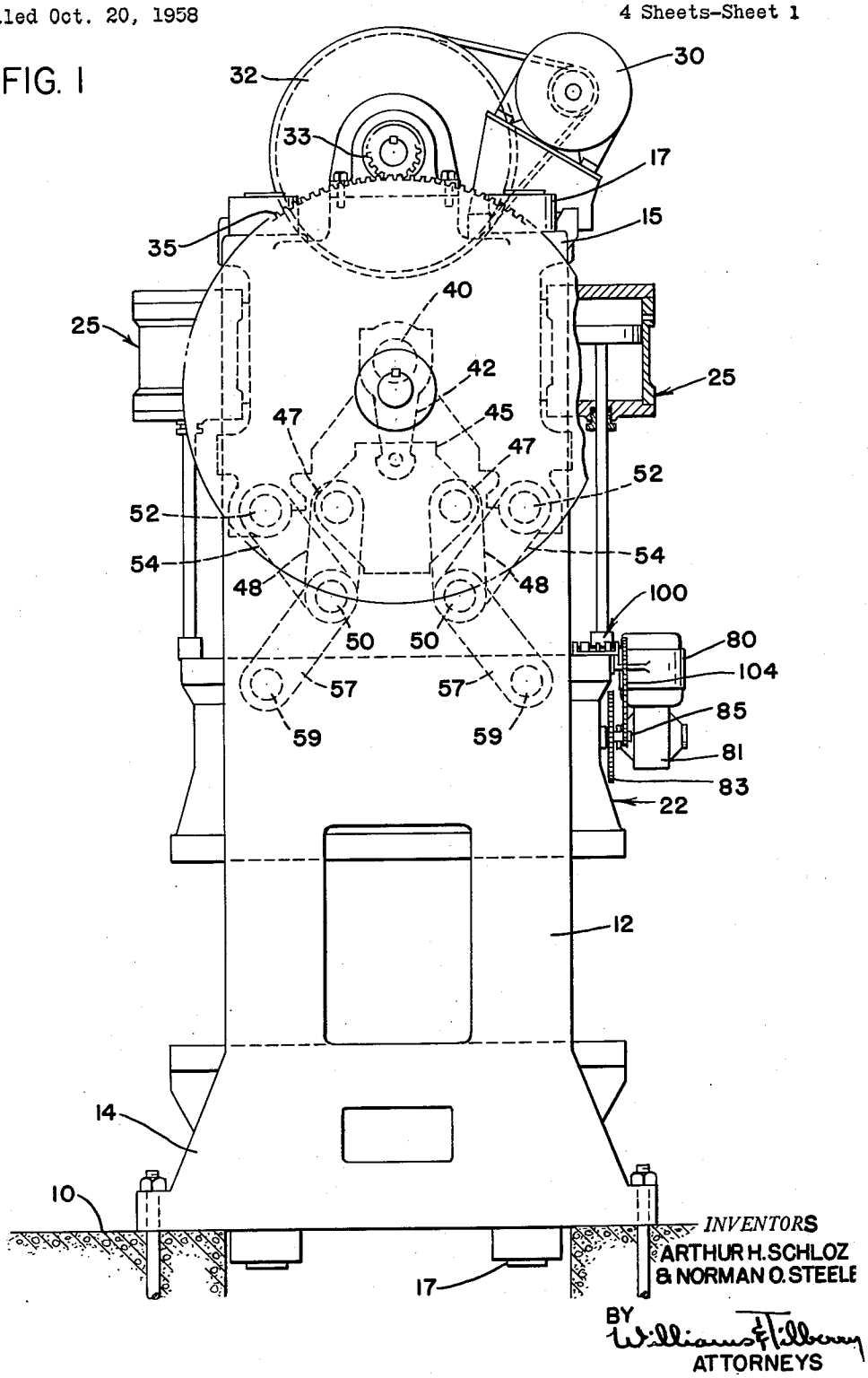
April 18, 1961 A. H. SCHLOZ ET AL 2,979,975

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Filed Oct. 20, 1958 4 Sheets-Sheet 1

FIG. 1



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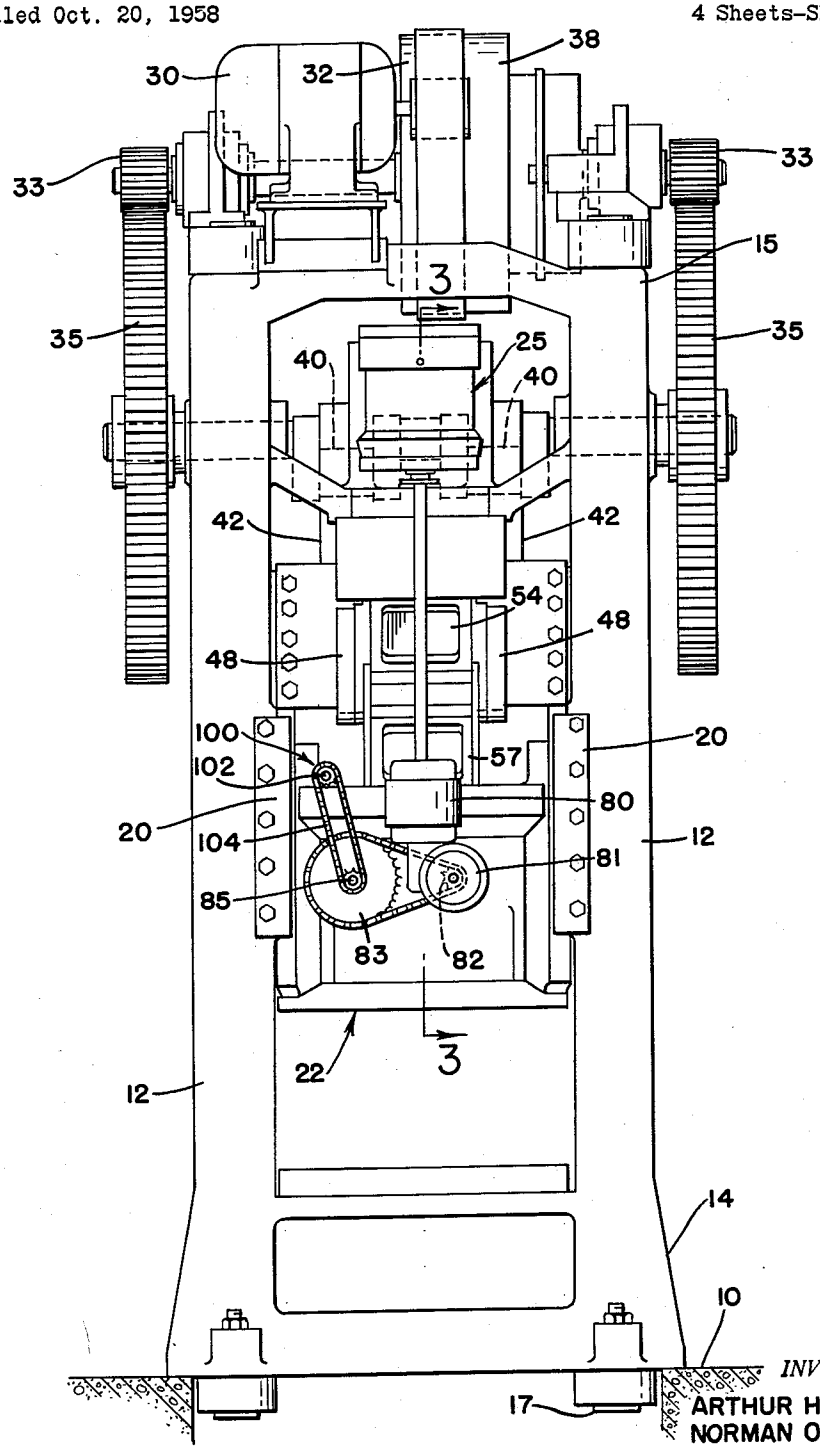


FIG. 2

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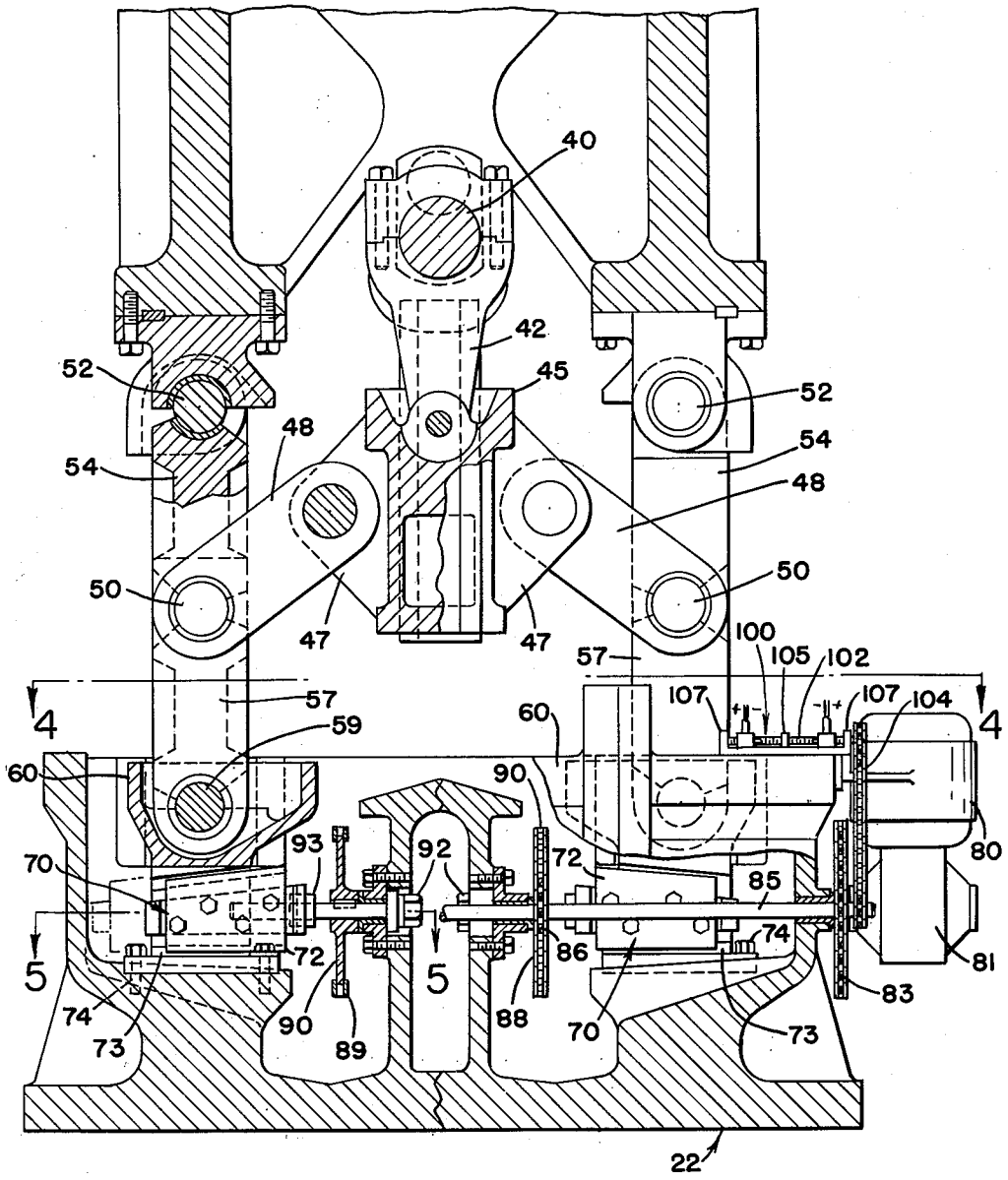


FIG. 3

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FIG. 4

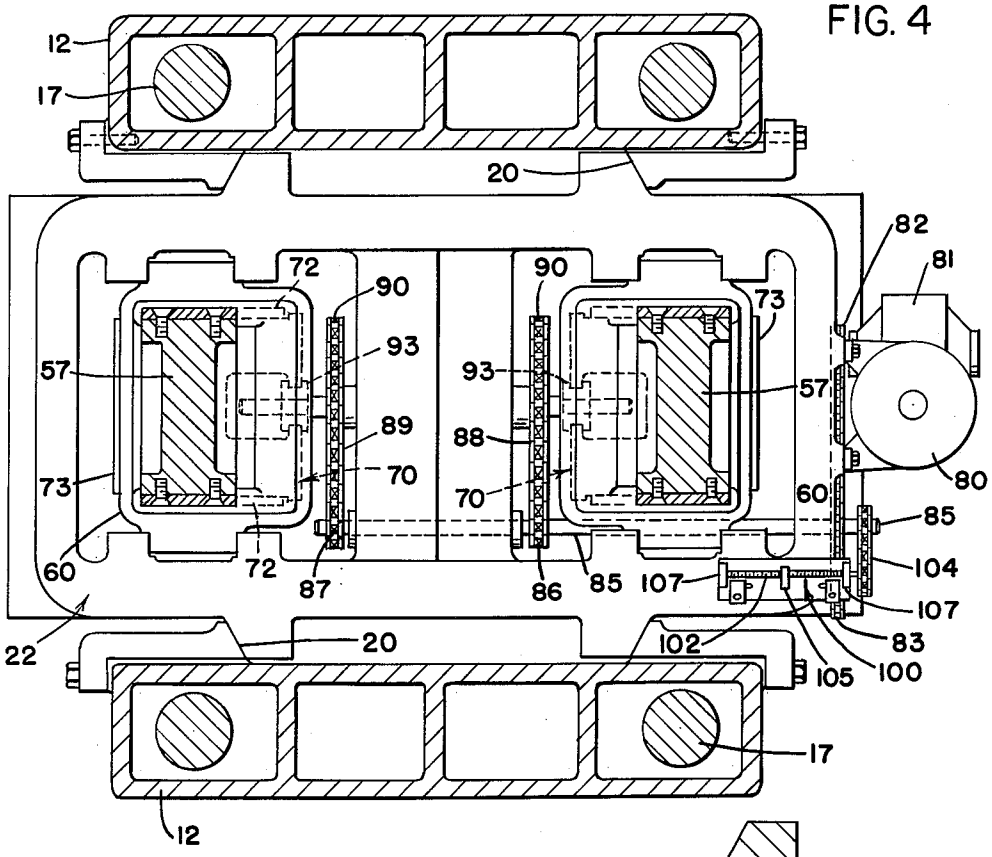
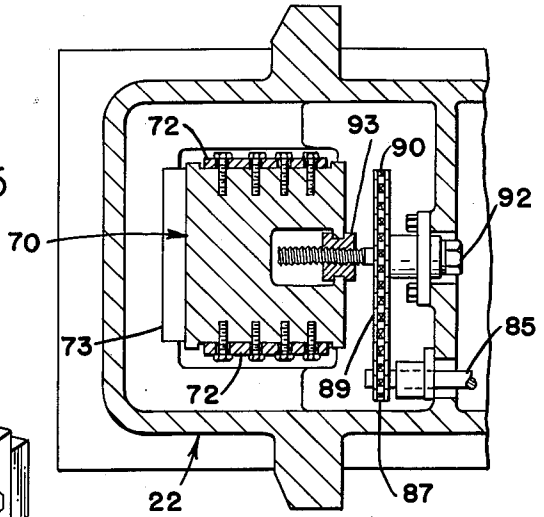


FIG. 5



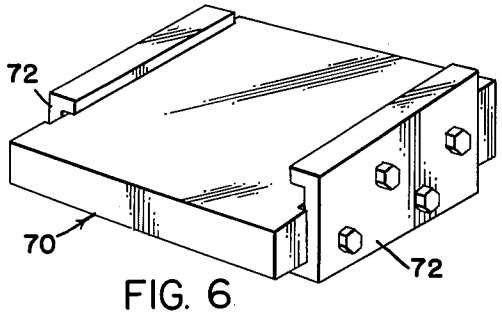


FIG. 6

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Filed Oct. 20, 1958, Ser. No. 768,215

3 Claims. (Cl. 78—41)

This invention relates to an improved press and, particularly, to a knuckle joint or toggle press and, most especially, to a double knuckle joint press in which the slide is controlled and actuated through toggles driven from a single driving source.

In the construction of knuckle joint presses and certain other types of presses, it has been customary to provide an inclined wedge construction in the crown of the press that is adjustable to control the vertical position of the crown bearing and thus to control the downstroke position of the die carrying face of the slide. Such a wedge construction is shown in Patent No. 2,320,103 owned by my assignee and issued May 25, 1943.

In recent years the press industry has developed certain presses of the double toggle variety in which the slide is supported from two separate toggle linkages such, for instance, as shown in Patent No. 2,780,117, issued February 5, 1957. It will be seen that there is no provision in this reference for adjustment of the slide face with respect to the bed so that proper positioning of the dies is not possible through adjustment of the press. To incorporate the crown carried wedge of Patent No. 2,320,103 to provide adjustment is not feasible or practical. In the first place, multiple wedges are required to effect such adjustment, and the crown construction of presses is such that it is difficult to provide room in the crown to accommodate the wedges with the requisite linkage material. A more important disadvantage with wedges mounted in the crown arises from the fact that adjustment of the upper pivot points of the toggles at the crown bodily displaces the toggles from center of the crown carried crankshaft which through related linkages causes them to drive the slide. This alters the position of certain pivot points in the press with respect to others, and thus each adjustment alters the operating characteristics of the press. A still further disadvantage with crown carried wedges arises from the fact that the heavy linkage, such as a double knuckle joint press requires, necessarily must be supported and carried by the wedge adjustments thus requiring stronger parts with more weight and space requirements than otherwise are necessary.

The principal object of the present invention is to provide a wedge adjustment for a press that is carried entirely by the slide. Another object is to provide a satisfactory multiple toggle press with a mechanical drive in which a power driven eccentric actuates the toggles, and the slide carries an adjustment to adjust the position of the under-face of the slide with respect to the bed. Such construction obviates all of the disadvantages heretofore recited and results in advantages of design and construction that in turn make for a more efficient, rugged, and at the same time lighter machine than was heretofore possible. Other advantages and objects will become apparent from the following specifications, and the novel features of the invention are summarized in the claims.

Referring now to the drawings:

Figure 1 is a side elevation of a press embodying our

improved form of slide construction showing the toggle mechanism in dotted lines and the slide raised;

Figure 2 is a back elevation of the press in Figure 1;

Figure 3 is a section through the center of the press, as shown by line 3—3 on Figure 2, showing the slide and wedge construction in detail, and the slide in down position;

Figure 4 is a section through Figure 3 as indicated by the lines 4—4 thereon;

Figures 5 is a detail showing the construction of one of the wedges, as shown by the lines 5—5 on Figure 3; and

Figure 6 is a perspective showing the wedge construction.

Referring now to Figures 1 and 2, there is shown a press embodying our invention mounted on the usual foundation 10 in customary manner. The press is provided with sides 12, a base 14, and a crown 15. Tie rods 17 hold the press together and take the operating load resulting from engagement of the dies.

Mounted between the sides 12 in gibs 20 (Figures 2 and 3) is a slide 22 mounted for reciprocation toward and away from the bed 14. Cooperating dies are mounted as usual in the die space on the bed 14 or bolster plate and on the underside face of the slide 22. The slide is provided with counterbalance pistons and cylinders indicated generally at 25, such construction not being further described since it is of a form known in the art.

The drive for the slide 22 originates at an electric motor 30 mounted on the crown which, through suitable V-belting, drives a pulley flywheel 32 and two pinions 33 carried on the ends of a common shaft. The pinions 33, in turn, drive bull gears 35 likewise journaled in the crown 15, as shown. It will be seen by reference to Figure 2 that there are provided two pinions 33 on opposite ends of their shaft and two bull gears 35 meshing therewith. Interposed between the motor and the pinions 33 is a clutch and brake 38 of a construction well-known in the art and not further described.

A crankshaft to apply the necessary eccentric motion to drive the slide 22 is formed with two cranks or eccentrics integral with the shaft on which the bull gears are supported. The eccentrics of the crankshaft are best shown at 40 in Figure 3. Secured to each eccentric 40 is a pitman member 42 hanging downwardly therefrom in position to support and drive a subslide 45 as shown. The subslide is provided with a pair of ears 47 on each side and each pair supports two links 48 terminating at their other ends at pivots 50.

The toggle linkage proper is supported by the crown and journaled therein at 52, there being one such connection 52 for each of the two toggle mechanisms. Depending from the pivoted connections 52 are the respective toggle links 54 that at their lower ends are pivotally connected at 50 to the respective links 48. Depending from the respective pivoted connections 50 are lower links 57 that, in turn, are each journaled at 59 in a separate sub-frame 60, each of said sub-frames being mounted as hereafter described in the slide 22.

It will be seen by reference to Figure 3 that two identical toggle mechanisms are provided, each driven from the subslide 45 through links 48, and each comprising links 54 and 57, and that each toggle is at one end journaled in the crown at 52 and at the other end in the slide at 59.

Each sub-frame 60 in the slide 22 is connected to the slide and adjustable with respect thereto by a wedge construction. Since the construction of each of the two wedges is identical, except that they are reversed in the position of their taper, only one will be described, namely that one shown in the left-hand side of Figure 3. The wedge itself is indicated generally at 70 and comprises a

tapered block portion to which is secured two channel shaped and tapered gibs 72 as shown in Figure 6. Two gibs are provided one on each side of the wedge, and they are adapted to ride in matching slots formed in the respective sub-frame 60 and the slide 22. The gibs are seated in recesses of the wedge, such recesses being longer than the gibs so the latter may be adjusted lengthwise of the wedge from time to time to take up wear. To this end the parts are bolted together through lengthwise widened holes in the gibs and shims may be provided to take up any clearance at the ends of the recesses.

Referring now to Figure 3, the upper and inclined channel portion of the gib is shown as riding in a slot formed in the depending part of the adjacent sub-frame 60. Likewise, the lower channel portion of the gib, parallel with the bottom of the slide, is shown as riding in a corresponding slot in a block 73 secured by bolts 74 to the slide. From the description thus far, it will be evident that if the wedge 70 is moved toward the left to the dotted line position shown in Figure 3, the gibs will move the subframe 60 and the slide 22 farther apart than appears in that figure. On the other hand, when the wedge 70 is returned toward the right from the assumed dotted line position, it will draw the corresponding slots of the sub-frame 60 and 22 closer together. Any adjusted position desired between these two points may be obtained by motion of the wedge back and forth. Thus, the wedge 70 and its gibs 72 act both to connect the slide 22 and sub-frame 60 with its toggle mechanism together and also to permit adjustment between the slide and sub-frame.

As stated, the wedge 70 shown at the right-hand side of Figure 3 is like the construction just described except that it is reversed in the position of the tapers. This reversal of taper provides uniform application of thrust by the wedges as they are adjusted and moved in opposite directions, which would not be the case if the angle of the tapers were parallel with each other.

To move the wedges in and out, and adjust the slide and sub-frames thereby, a reversible driving motor 80 is provided, as shown in Figures 2 and 3, that operates through a gear box 81 to drive a sprocket wheel 82. This sprocket wheel carries a sprocket chain that, as shown in Figure 2, drives a gear 83 secured to a shaft 85 (Figure 3) extending across and journaled in the slide 22. As best shown in Figure 4, the shaft 85 is, in turn, provided with two sprocket wheels 86 and 87 that, through sprocket chains 88 and 89, drive identical sprocket wheels (one of which is shown at 90 in Figure 3) keyed to shafts or screws journaled at 92 in the slide 22.

Here again, only one sprocket wheel 90 and associated elements will be described in connection with one wedge 70, because the parts are identical with one exception. The shaft or screw is threaded, as shown in Figure 3, and engages a nut 93 locked against rotation in the wedge 70. Thus, as the sprocket wheels 90 are driven by the motor 80, and the screws rotated, the effect is to push the respective wedges back and forth in the slide 22. The threading on the nut and screw for the wedge 70 on the right-hand side of Figure 4 is reversed from the threading on the left-hand wedge. Thus, as the motor 80 is driven, and the drive transmitted through the gear box 81 to the shaft 85 in one direction of rotation of the motor, the wedges 70 push apart from each other and move toward the outsides of the slide 22. When the drive is reversed, the wedges pull together, each moving toward the center of the slide.

To indicate the position of the wedges at any time, a mechanism shown generally at 100 in Figures 3 and 4 is provided. There also is provided a safety cut-off mechanism that consists of a screw 102 rotated from the motor 80 through a sprocket chain 104 (Figure 2) driven from the shaft 85. Limit switches are carried by the slide adjacent the shaft 102 and positioned on opposite sides of a nut 105 carried by the screw 102 and restrained against rotation. Thus, as the screw 102 rotates, the nut will traverse the same, corresponding to the movement of the wedges. If the motor 80 is driven to a point where damage to the wedges is likely, then the nut 102 will contact one of the limit switches and cut off the current to the motor. For instance, if the wedges are approaching each other, then the nut 105 will finally contact the left-hand limit switch (Figure 2) cutting off the current to the motor. On the other hand, if the wedges are separating and approaching a point where the parts of the sub-frame and wedge may become damaged, contact will be made between the nut and the right-hand limit switch again to cut off current to the motor 80. The screw 102 is mounted for rotation in end bearings 107 as it is driven from the motor 80 through its sprocket chain 104.

In operation of the invention, dies are secured in the usual manner to the bolster of the press and to the under face of the slide, and the press is turned over slowly unitl the dies approach each other. Then final adjustment of the dies and of the stroke of the slide 22 is accomplished through use of the wedges 70. Thus, if the wedges are in their outer-most position, the slide at bottom of downstroke will be spaced farther from the bolster than would be the case if the wedges were in their innermost position. The wedges are moved until the dies register properly with each other, and they are then locked in this position by stopping the motor 80, and the press is ready for use.

It is to be understood that while only one embodiment of the invention is shown herein, it is by way of example only and is not to be construed in a limiting sense. The invention may be incorporated in other types of presses than that shown although it is particularly well adapted to coining presses and the like that have a short stroke and develop great power. Other arrangements and modifications will occur to those skilled in the art and may be resorted to without departing from the scope of the invention.

We claim:

1. In a press, a frame including a crown, a bed and a slide with a die supporting face mounted in said frame between said bed and crown, and eccentric shaft carried by said crown, power means to rotate said eccentric, a pair of journals carried on the underside of said crown with their axes parallel to the axis of said eccentric shaft and on opposite sides thereof, toggle links posit oned to engage respective crown journals, two sub-frames carried in said slide and adapted to provide journals for the lower ends of said toggles respectively, each of said toggles comprising two elements pivotally connected adjacent their mid-points, a sub-slide interposed between said toggles, a link pivotally connecting said sub-slide with the pivotal connection of each of said toggles, a pitman member connecting said sub-slide with said eccentric such that rotation of said eccentric opens and closes said toggles to raise and lower said slide, a wedge interposed between each of said sub-frames and said slide, and serving as the connecting link to secure each of said sub-frames to said slide, a threaded member secured to one of said sub-frames and rotatably mounted in said slide, a second threaded member engaging said other sub-frame and rotatably mounted in said slide and threaded opposite to the threading of said first threaded member, and power means to rotate said threaded members in unison and adjust the position of said wedge elements to vary the position of said die supporting face with respect to said bed.

2. In a press, a frame including a crown, a bed and a slide with a die supporting face mounted in said frame between said bed and crown, an eccentric shaft carried by said crown, power means to rotate said eccentric, a pair of journals carried on the underside of said crown with their axes parallel to the axis of said eccentric shaft

and on opposite sides thereof, toggle links positioned to engage respective crown journals, two sub-frames carried in said slide and adapted to provide journals for the lower ends of said toggles respectively, each of said toggles comprising two elements pivotally connected adjacent their mid-points, a sub-slide interposed between said toggles, a link pivotally connecting said sub-slide with the pivotal connection of each of said toggles, a pitman member connecting said sub-slide with said eccentric such that rotation of said eccentric opens and closes said toggles to raise and lower said slide, a wedge interposed between each of said sub-frames and said slide, and serving as the connecting link to secure each of said sub-frames to said slide, a threaded member secured to one of said sub-frames and rotatably mounted in said slide, a second threaded member engaging said other sub-frame and rotatably mounted in said slide and threaded opposite to the threading of said first threaded member, a shaft member parallel to the axes of said threaded members and spaced therefrom, driving connections from said shaft member to each of said threaded members, and power means to drive said shaft and thereby rotate said threaded members in unison and adjust the position of said wedge elements to vary the position of said die supporting face with respect to said bed.

3. In a press, a frame including a crown, a bed and a slide with a die supporting face mounted in said frame between said bed and crown, an eccentric shaft carried by said crown, power means to rotate said eccentric, a pair of journals carried on the underside of said crown with their axes parallel to the axis of said eccentric shaft and on opposite sides thereof, toggle links positioned to engage respective crown journals, two sub-frames carried in said slide and adapted to provide journals for the lower ends of said toggles respectively, each of said toggles

comprising two elements pivotally connected adjacent their mid-points, a sub-slide interposed between said toggles, a link pivotally connecting said sub-slide with the pivotal connection of each of said toggles, a pitman member connecting said sub-slide with said eccentric such that rotation of said eccentric opens and closes said toggles to raise and lower said slide, a wedge interposed between each of said sub-frames and said slide, and serving as the connecting link to secure each of said sub-frames to said slide, a threaded member secured to one of said sub-frames and rotatably mounted in said slide, a second threaded member engaging said other sub-frame and rotatably mounted in said slide and threaded opposite to the threading of said first threaded member, and power means to drive said shaft and thereby rotate said threaded members in unison and adjust the position of said wedge elements to vary the position of said die supporting face with respect to said bed and adjustment means independent of said power means carried by at least one of said wedges to permit bodily displacement of said wedge with respect to the other wedge and thereby maintain the wedge surfaces in a synchronized cooperating position.

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