Feb. 28, 1967 R. SOMAN 3,306,185

ROLLING BOLSTER

Filed July 8, 1965 3 Sheets-Sheet 1

Fig. 1.

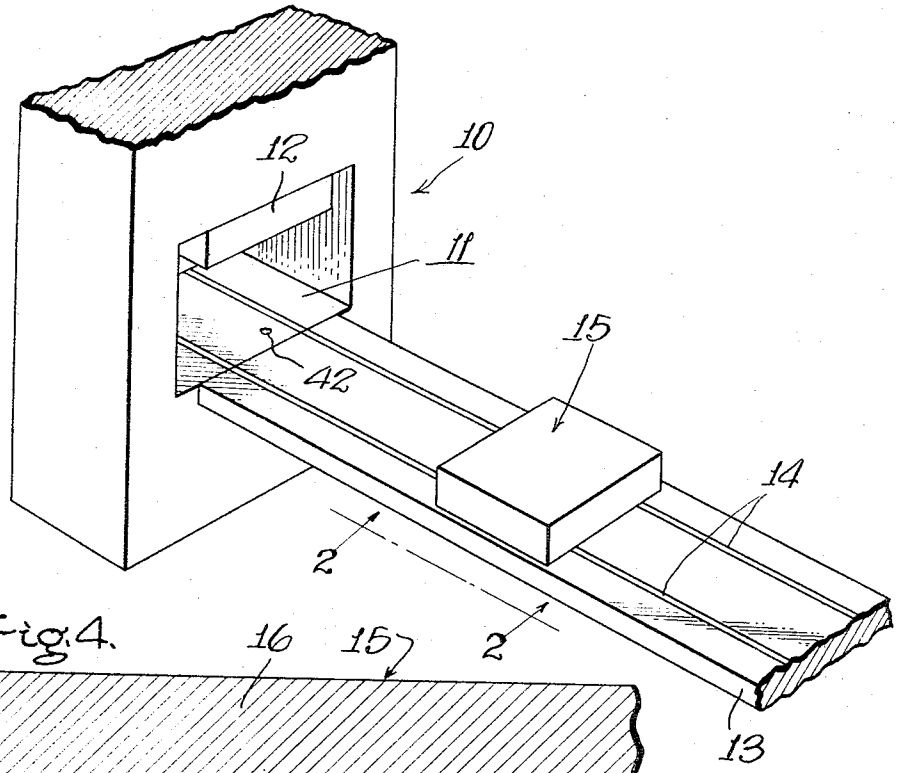
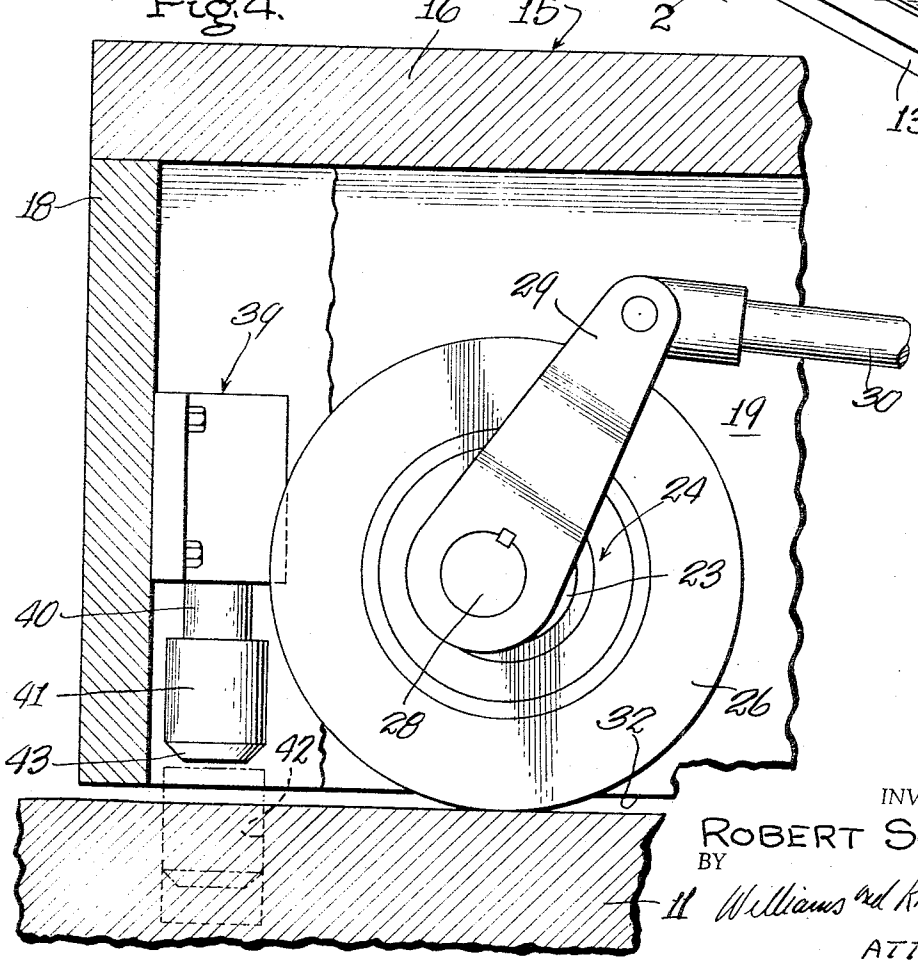


Fig. 4.



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Filed July 8, 1965 3 Sheets-Sheet 2

Fig. 2.

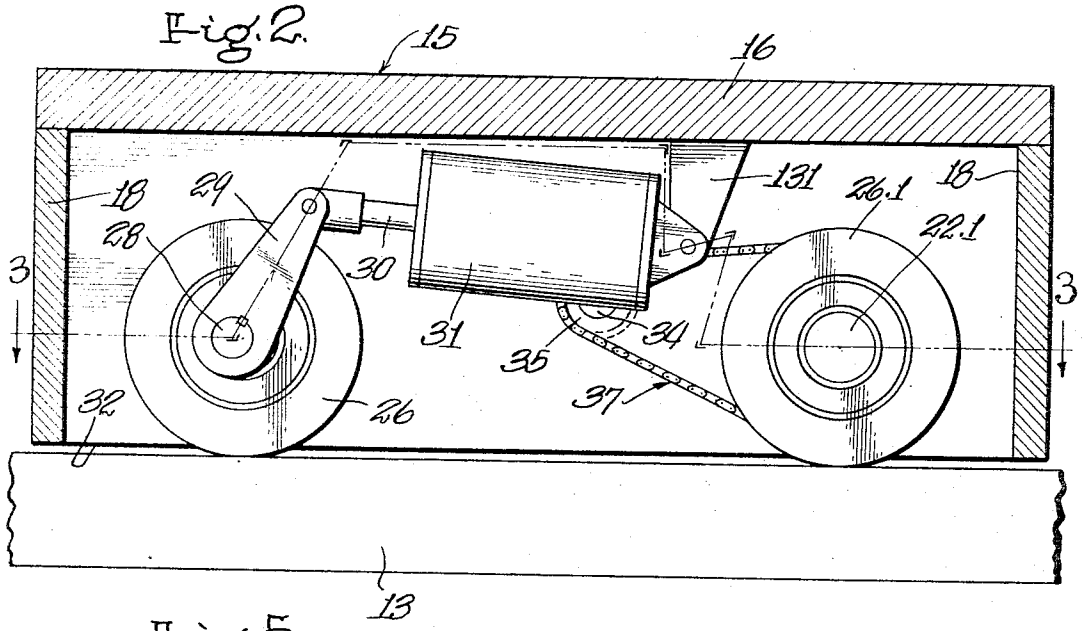
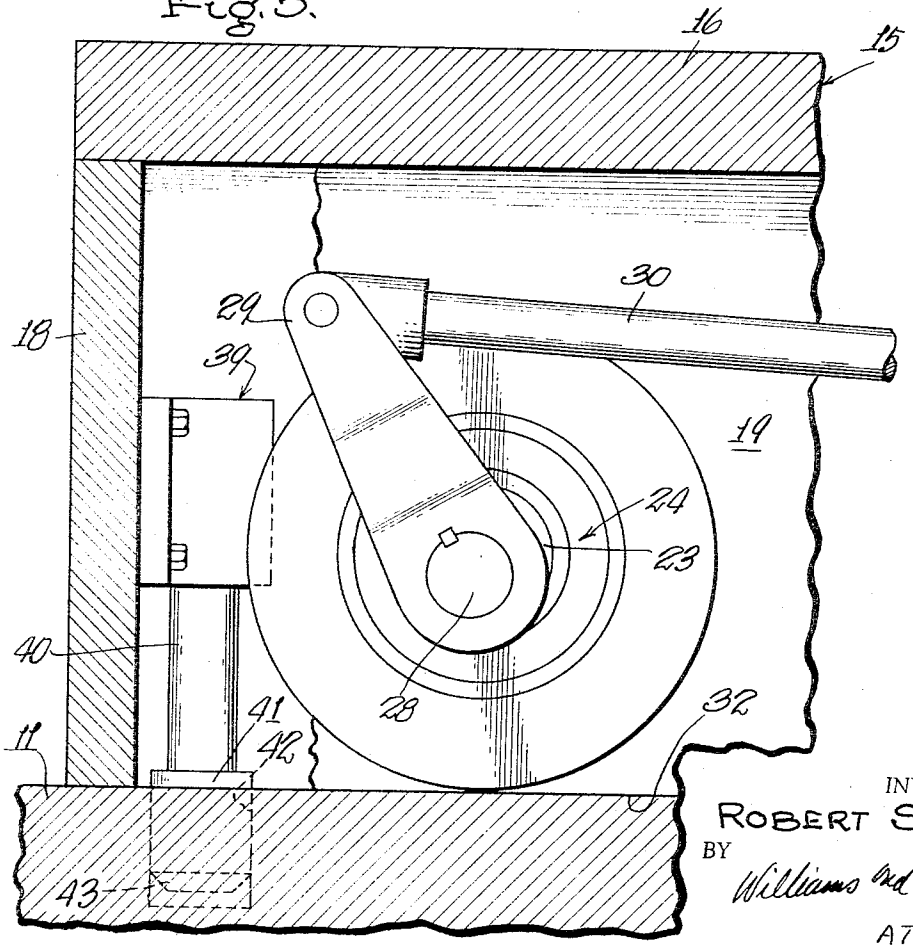


Fig. 5.



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Filed July 8, 1965 3 Sheets-Sheet 3

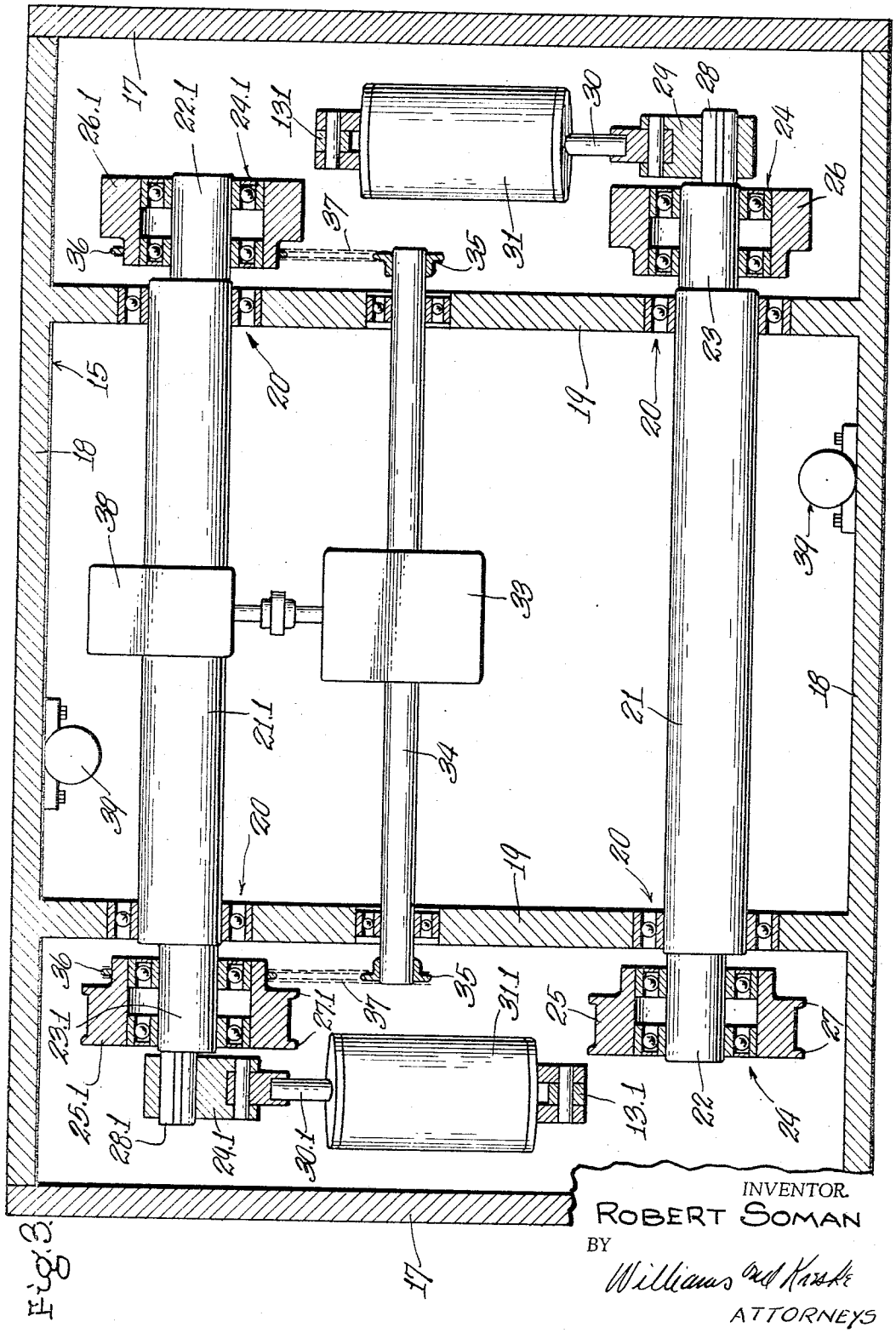


Fig. 3

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3,306,185

ROLLING BOLSTER

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3 Claims. (Cl. 100—229)

The present invention relates to rolling bolsters for use with presses and the like and the principal object of the invention is to provide new and improved devices of the character described.

The large, heavy dies used in massive presses have always presented somewhat of a problem in mounting them in and removing them from the press. Where a large, heavy die must frequently be removed from a press and replaced by another die, and where downtime must be held to an absolute minimum because of production requirements, the problem becomes acute.

In solving the problem aforesaid, it has been proposed to mount the die on a wheeled carriage, or bolster, so that the die can be rolled into and out of working position in the press. While this is generally satisfactory, the precise structure employed has not been satisfactory. It is, therefore, a principal object of the invention to provide a rolling bolster for dies and the like which is superior to those heretofore known. This and other objects will readily become apparent from a study of the following description and from the drawings appended hereto.

In the drawings accompanying this specification and forming a part of this application there is shown, for purpose of illustration, an embodiment which the invention may assume, and in these drawings:

FIGURE 1 is a generally diagrammatic, perspective view of the invention, and of apparatus with which it may be associated,

FIGURE 2 is an enlarged, side elevational view of apparatus constructed in accordance with the present invention and generally corresponding to the line 2—2 of FIGURE 1, parts on the near side being removed to show the underlying structure,

FIGURE 3 is a sectional plan view, generally corresponding to the line 3—3 of FIGURE 2,

FIGURE 4 is an enlarged, fragmentary view similar to FIGURE 2, and

FIGURE 5 is a view similar to FIGURE 4 but with certain parts in another position.

With reference to FIGURE 1, there is diagrammatically shown a press 10 having a bed 11 and ram 12 reciprocable toward and away from the bed. Normally, when a bolster is not used, one portion of the die to be actuated by the press (not shown) is secured to the bed 11 of the press and another portion of the die is secured to the press ram 12. Thus, when the press ram is elevated, the die parts are separated to provide for insertion therebetween of the stock to be operated upon by the die and when the ram is forced downwardly, the die parts are forceably moved together to perform the desired operation on the stock disposed in the die.

When a bolster is used, the aforesaid operation of the press is unchanged; however, since the bolster is interposed between the die and the press bed, the die is thus secured to the bolster and the latter is secured to the press bed.

Still referring to FIGURE 1, there is shown a table or the like 13 provided with tracks 14 along which a bolster 15 may travel. For reasons to appear, tracks 14 extend into the press bed and, while a pair of spaced tracks are herein shown, frequently only one track is provided, the upper surface of the table and the press bed in effect, serving as a track.

As best seen in FIGURES 1, 2, and 3, bolster 15 comprises a platform-like carriage having a top wall 16, side walls 17, and end walls 18. Extending between the end walls 18 and in spaced relation both with each other and with the side walls 17 are intermediate walls 19. Preferably, the end and intermediate walls will be welded or otherwise connected to form a unitary structure while the top and side walls wall be removable for inspection and maintenance of the internal working parts.

Rotatably mounted in the intermediate walls 19 by means of bearings 20 are shafts 21 and 21.1 disposed adjacent respective end walls 18. Since such shafts are presently identical, only shaft 21 will be described in detail. Shaft 21 has integral, axially aligned end portions 22, 23 which are laterally offset from the shaft axis, or are eccentric with respect thereto, and rotatably mounted by suitable bearings 24 on respective eccentric shaft portions 22, 23 are respective wheels 25, 26. For a purpose to appear, wheel 25 may be provided with spaced flanges 27; however, wheel 26 is not presently provided with flanges.

Means are provided for rocking the shaft 21 about its axis and with reference to FIGURES 2 and 3, shaft portion 23 has an integral axial extension 28 which is concentric with the axis of shaft 21 rather than with the axis of shaft portion 23. Keyed or otherwise secured to extension 28 is an arm 29 to whose free end is pivoted the piston rod 30 of a fluid cylinder 31. The latter has its blank end pivoted to a bracket 131.

With the parts positioned as seen in FIGURES 2, 3, and 4, piston rod 30 is in retracted position to thus so hold the shaft 21 that its wheels 25, 26 project below the lower face 32 of the bolster. When, however, piston rod 30 is extended from its cylinder to the position seen in FIGURE 5, shaft 21 will be rotated an amount to raise the eccentric shaft portions 22, 23 and thus the wheels 25, 26 mounted thereon above the lower face 32 of the bolster.

As previously mentioned, shaft 21.1 is identical with shaft 21 and thus corresponding parts assoicated therewith are identified with the same reference characters as those associated with shaft 21 but with the suffix .1 appended. Thus, the shaft 21.1 mounts wheels 25.1, 26.1 on respective eccentric portions 23.1, 22.1 and an arm 29.1 on a shaft extension 28.1. Similarly, a cylinder 31.1 has a piston rod 30.1 pivoted to the free end of arm 29.1. As will be evident and with respect to the position of parts viewed in FIGURE 3, while cylinder 31 is disposed on the right side of the bolster cylinder 31.1 is disposed on the left side thereof. Although not shown, it is to be understood that the wheels 25.1, 26.1 will be raised and lowered in the same manner as wheels 25, 26 upon extension and retraction of the piston rod 30.1.

Means are provided for driving the wheels 25.1, 26.1 and in the present embodiment, a speed reducer 33 has a double-end output shaft 34 rotatably carried by the intermediate walls 19, 19. Mounted on respective ends of output shaft 34 are sprockets 35 and mounted on wheels 25.1, 26.1 are sprockets 36. Chains 37, see also FIGURE 2, connect respective adjoining sprockets 35, 36 for unitary rotation. A motor 38, preferably of the pneumatic type, drives the reducer 33, its output shaft 34 and thus the wheels 25.1, 26.1 through the sprockets 35, 36 and the chains 37.

In order to insure precise location of the bolster 15 in position on the press bed 11, each wall 18, 18 of the bolster (see FIGURES 3, and 4) carried a vertically disposed fluid cylinder 39 whose depending piston rod 40 has an enlarged head 41. The press bed 11 is provided with pockets 42 (FIGURES 1, and 4) for closely receiving respective heads 41, the lower ends of the latter

being chamfered at 43 to facilitate their entry into respective press bed pockets 42.

Assuming a die assembly (not shown) to be mounted upon the bolster top wall 16, operation to shift the bolster along the table 13 and onto the press bed 11, will be as follows: The piston rods 30, 30.1 of pistons 31, 31.1 respectively, will be retracted as shown in FIGURES 2, 3, and 4, to so dispose the shafts 21, 21.1 that their wheels 25, 26, 25.1 and 26.1 project below the bolster bottom 32. Piston rods 40 of cylinders 39 will also be retracted at this time (as shown in full lines in FIGURE 4) to elevate their heads 41 above the bolster bottom.

Fluid pressure will be admitted to motor 38 to rotate the output shaft 34 of the reducer 33 and thus drive the wheels 25.1, 26.1 in a direction to move the bolster and its supported die along the table 13 and onto the press bed 11. It will be understood that the wheel flanges 27, 27.1 will cooperate with their track 144 to properly guide the bolster during travel thereof.

When the bolster is in its approximately correct position on the press bed, it will be stopped and fluid pressure will be admitted to the cylinders 39 to lower their heads 41 to the phantom line position seen in FIGURE 4 wherein such heads are received within respective press bed pockets 42. In case the bolster is not in precisely the correct position on the press bed, lowering the heads 41 will shift the bolster as required as a result of entry of the chamfered head ends 43 into respective pockets 42.

With the heads 41 fully entered within respective pockets 42, the bolster will be precisely located upon the press bed 11 whereupon fluid pressure will be admitted to cylinders 31, 31.1 to extend their piston rods 30, 30.1 to the position seen in FIGURE 5. This shifting of the piston rods aforesaid will rock the shafts 21, 21.1 to a position wherein the eccentric shaft portions 22, 23, 22.1 and 23.1 will elevate the wheels 25, 26, 25.1, 26.1 above the lower surface of the bolster. This will lower the latter and permit it to rest directly on the press bed as seen in FIGURE 5.

Suitable clamping means (not shown) may now be actuated to secure the bolster firmly to the press bed and to secure the press ram 12, when required, to the upper part of the die assembly mounted on the bolster. The press, with the die assembly thus secured in proper operating position, may now be operated in the usual manner to perform the requisite functions upon stock fed into the die.

When the die assembly is to be removed from the press, it is only necessary to unclamp the press ram from the die assembly and to unclamp the bolster from the press bed. Fluid under pressure may be admitted to the cylinders 39 to raise their piston rod heads 41 from the bed pockets 42 to the full line position seen in FIGURE 4. Fluid under pressure will be admitted to the cylinders 31, 31.1 thus rocking the shafts 21, 21.1 from the position seen in FIGURE 5 to the position seen in FIGURE 4. This will move the shaft eccentric portions 22, 23, 22.1 and 23.1 down thus shift the wheels 25, 26, 25.1 and 26.1 to project below the lower bolster surface 32 thus raising the bolster. With the bolster thus supported on the press bed by the bolster wheels aforesaid, motor 38 may be operated to cause the bolster to move along the tracks 14 from the press bed 11 onto the table 13.

It is an important feature of the present invention that in lowering the bolster, shafts 21, 21.1 are rocked in opposite directions. This, it will readily be understood, will obviate any tendency of the bolster to shift longitudinally during lowering thereof such as would occur if both shafts were rocked in the same direction.

While table 13 has been shown extending from but one side of the press, it will readily be apparent that it could also extend from the other press side. Thus, a bolster carrying a die assembly could be moved out of the press to one side thereof while another bolster carrying another die assembly could be moved into the press from the other side thereof. With this arrangement, press downtime during die changeover is minimized.

In view of the foregoing it will be apparent to those skilled in the art that I have accomplished at least the principal object of my invention and it will also be apparent to those skilled in the art that the embodiment herein described may be variously changed and modified, without departing from the spirit of the invention, and that the invention is capable of uses and has advantages not herein specifically described; hence it will be appreciated that the herein disclosed embodiment is illustrative only, and that my invention is not limited thereto.

I claim:

1. For use with presses and the like having a bed, the combination comprising a die-supporting carriage movable toward and away from working position on said press bed and in part formed of a pair of spaced-apart walls, said carriage having a lower portion for disposition upon said press bed and an upper surface for supporting a die, a pair of shafts extending between and journaled in said walls in spaced, side-by-side relation and said shafts having eccentric portions adjacent respective walls, a wheel journaled on each eccentric shaft portion aforesaid, drive means in part disposed between said walls and connected with one of said wheels for effecting rotation thereof, and an actuator disposed outside each of said walls and each being connected to a respective shaft aforesaid to effect rocking movement thereof between a first position wherein the wheels carried thereby project beneath the lower portion of said carriage when the latter is to be moved and a second position wherein said wheels are retracted above such lower carriage portion when said carriage is in working position on said press bed, said shafts, wheels, actuators, and drive means being disposed directly beneath said upper surface.

2. The construction of claim 1 wherein said wheels are disposed outside respective walls aforesaid, and wherein said drive means comprises a drive motor disposed between said walls, a drive shaft spaced from and disposed intermediate said pair of shafts and extending between and journaled in said walls, and connecting means extending between said drive shaft and respective wheels carried by one shaft of said pair.

3. The construction of claim 2 wherein one shaft of said pair has a projecting portion outside one of said walls and the other shaft of said pair has a projecting portion outside the other of said walls, wherein an arm is mounted upon each shaft projecting portion aforesaid, and wherein each of said actuators comprises a fluid pressure cylinder pivotally connected to respective arms to effect said shaft rocking movement.

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