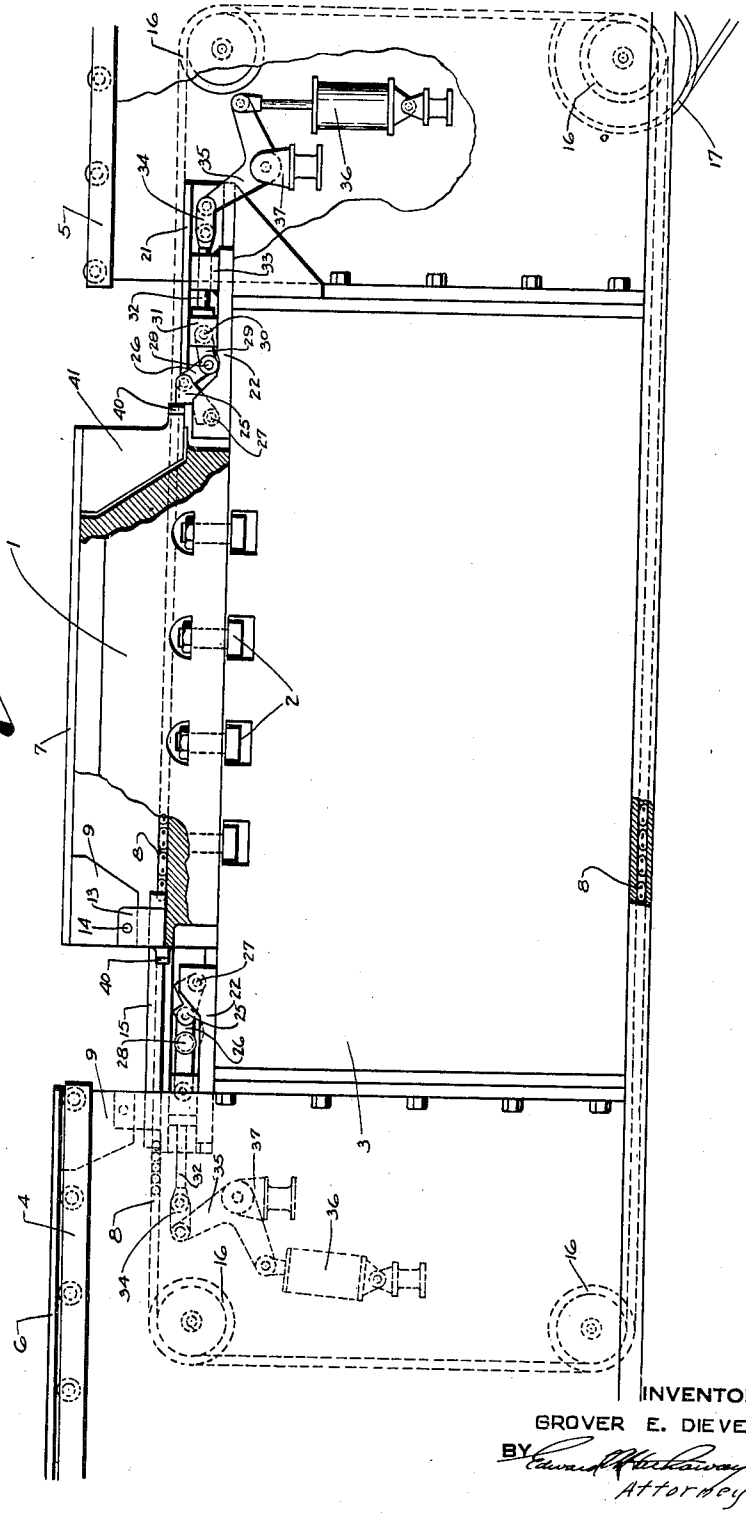
Oct. 19, 1943. G. E. DIEVERS 2,332,135

REGISTERING AND LOCKING APPARATUS FOR TRANSFER PRESSES

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Fig. 1



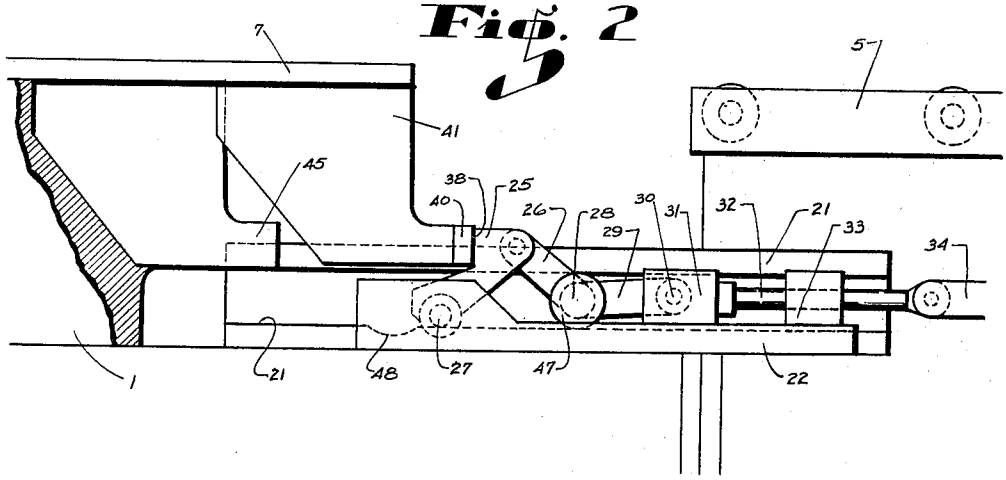
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REGISTERING AND LOCKING APPARATUS FOR TRANSFER PRESSES

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Fig. 2



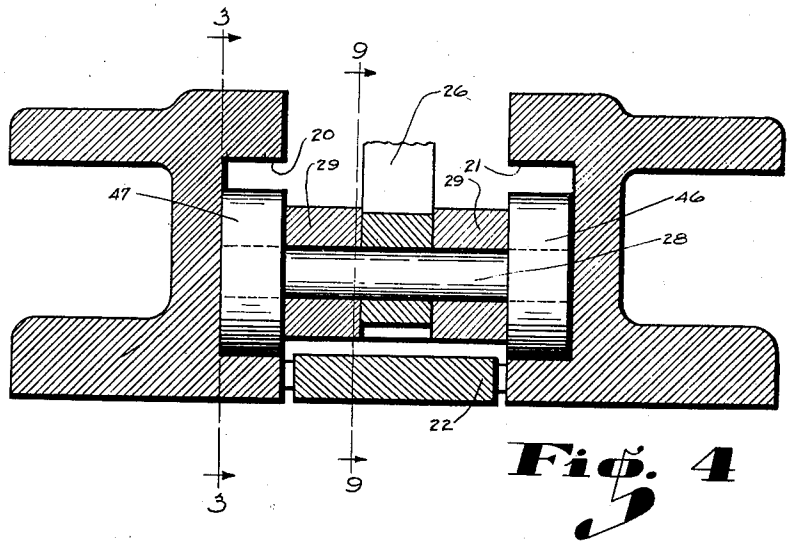


Fig. 4

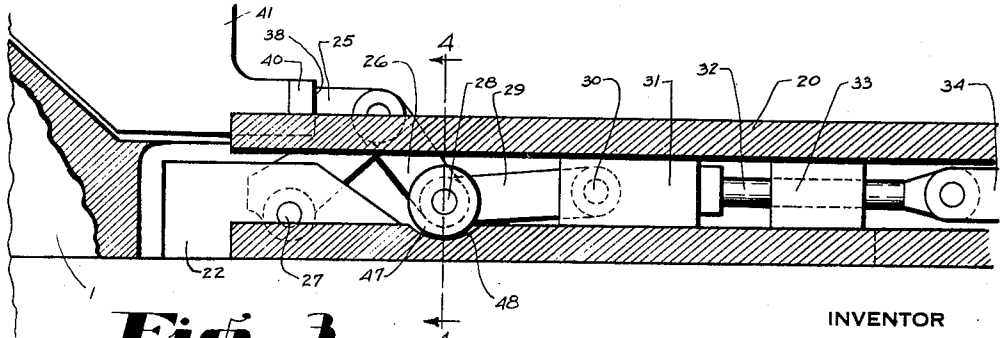


Fig. 3

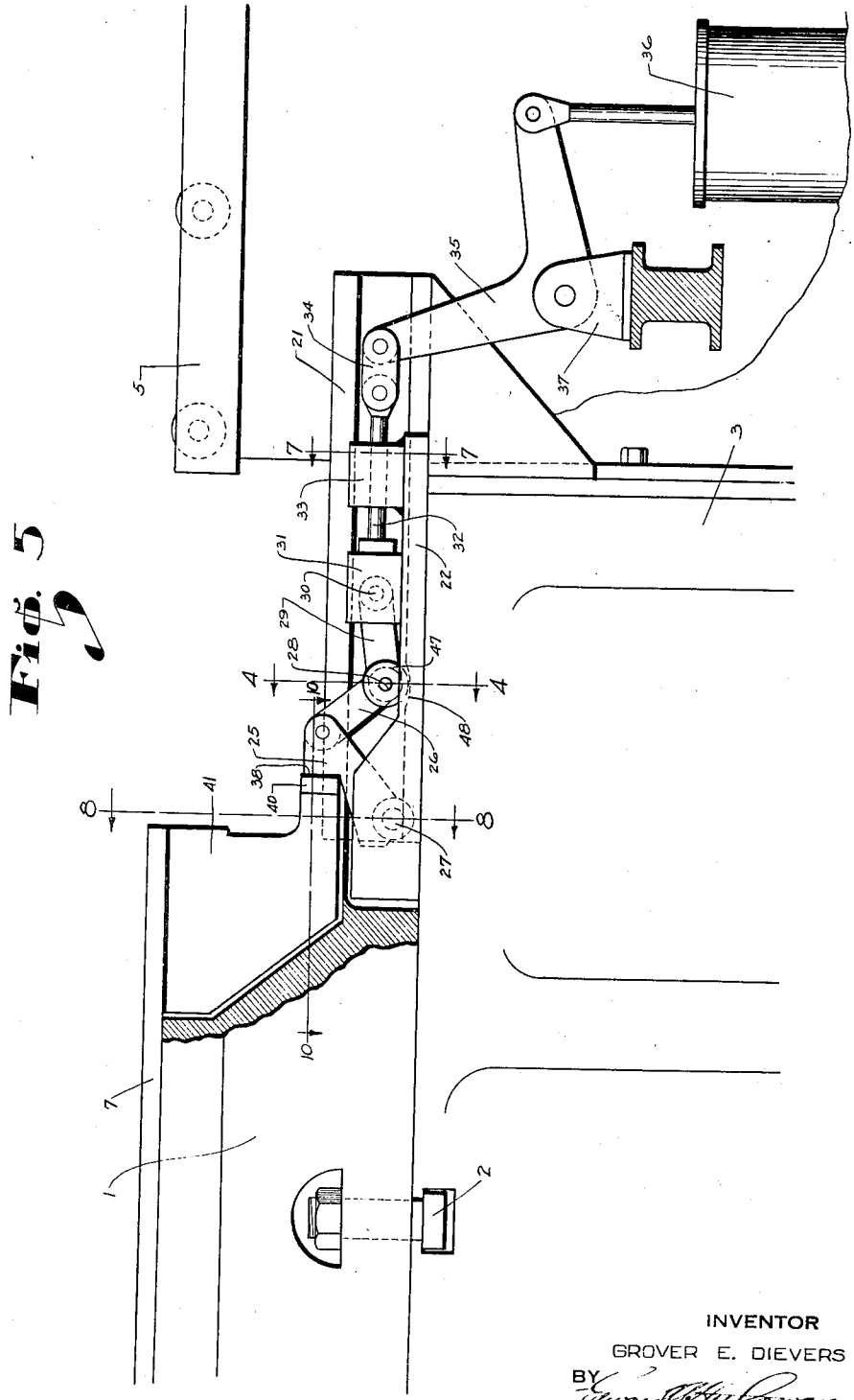
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REGISTERING AND LOCKING APPARATUS FOR TRANSFER PRESSES

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Fig. 5



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REGISTERING AND LOCKING APPARATUS FOR TRANSFER PRESSES

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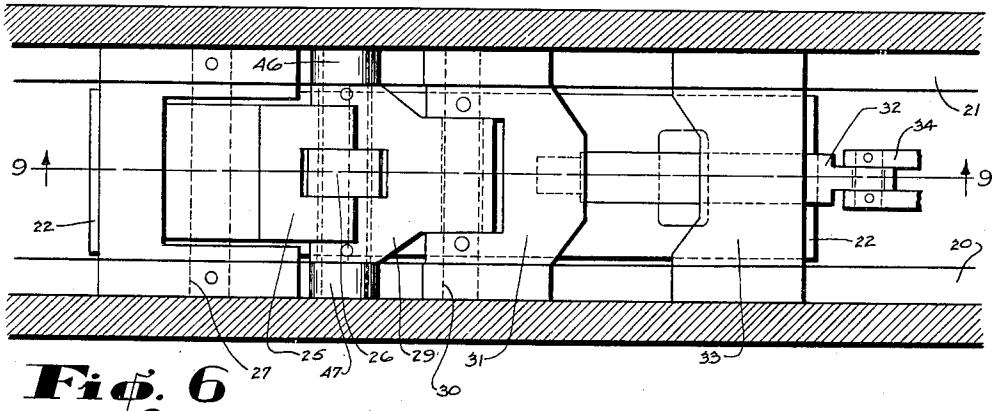


Fig. 6

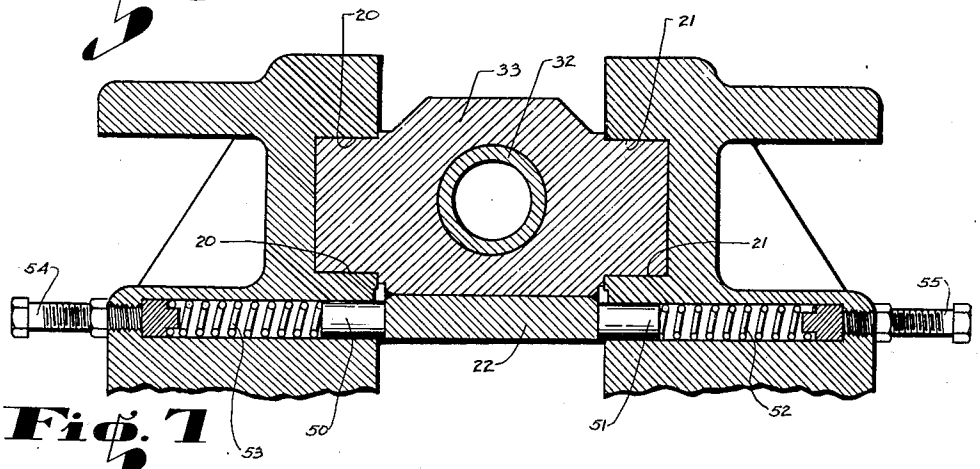


Fig. 7

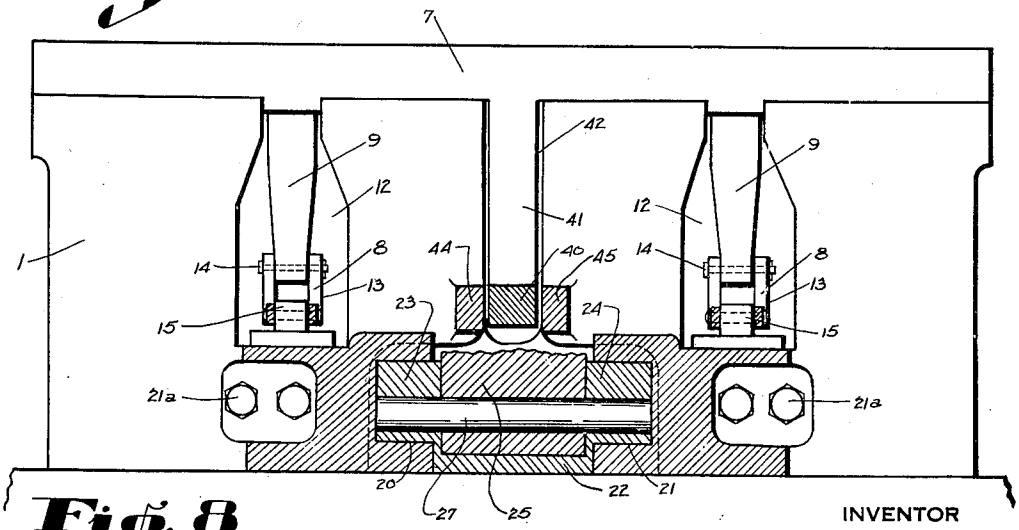


Fig. 8

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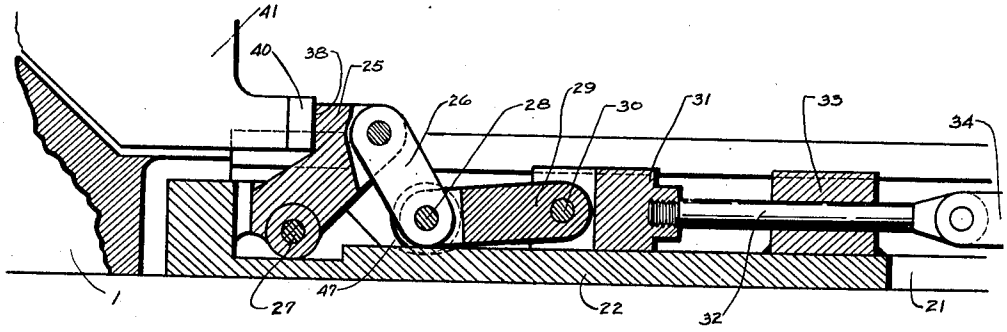


Fig. 9

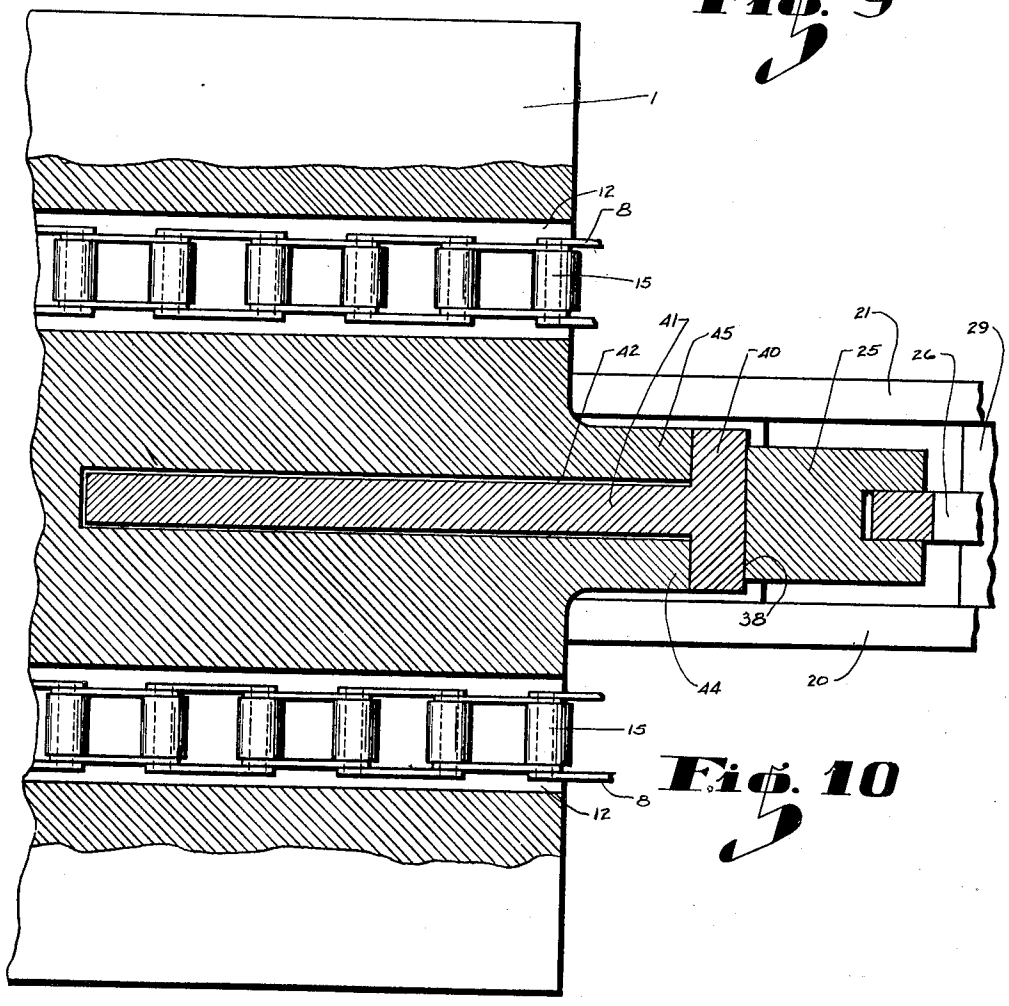


Fig. 10

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2,332,135

UNITED STATES PATENT OFFICE

2,332,135

REGISTERING AND LOCKING APPARATUS FOR TRANSFER PRESSES

Grover E. Dievers, Norristown, Pa., assignor to The Baldwin Locomotive Works, a corporation of Pennsylvania

Application May 23, 1941, Serial No. 394,951

9 Claims. (Cl. 113—38)

This invention relates generally to presses of a type employing transfer plates and more particularly to improved apparatus for registering and locking a transfer plate in its proper position in the press.

Transfer plates are employed for certain types of die and stamping work where it is desirable to have two sets of dies, one of which is within the press while the other is outside thereof. The workmen may thereby remove a punched or stamped sheet metal plate from the displaced dies and place another piece of blank sheet metal thereon preparatory to moving the same into pressing position within the press. When this plate is transferred into the press the other plate with its stamped or pressed articles will be simultaneously transferred out of the press, its articles removed and then reloaded preparatory to repeating the foregoing operation in the opposite direction. This mode of operation is well-known but difficulties have sometimes been encountered in lining up with reasonable accuracy the transfer plates relative to the upper dies or pressing elements. This problem is particularly difficult in large presses because of the relatively large weight of the shiftable parts and the fact that they are being shuttled into and out of the press as frequently as possible.

It is an object of my invention to provide an improved registering means whereby the transfer plates may be positively and expeditiously positioned within the press with a reasonably high degree of accuracy. Another object is to provide improved registering mechanism in combination with improved means for locking the transfer plates in their registered position. A still further object is to provide an improved mechanism for positioning and locking the transfer plates within the press in a simple, direct and quick acting manner and do this with a structure that has ruggedness combined with accuracy.

A further object is to provide an improved registering means that is operative on either side of the press platen thereby allowing a pair of transfer plates to be respectively moved into aligning position from opposite sides of the press platen.

Other objects and advantages will be more apparent to those skilled in the art from the following description of the accompanying drawings in which:

Fig. 1 is a fragmentary side elevation of the stationary platen of a press in combination with the transfer mechanism and my improved registering and locking mechanism;

Fig. 2 is an enlarged elevation of the registering and locking mechanism shown in its position for moving one of the transfer plates into its registered relation;

Fig. 3 is a sectional view showing my improved means in its locked position after having moved the transfer plate to its normally aligned position;

Fig. 4 is a transverse section taken on the lines 4—4 of Figs. 3 and 5;

Fig. 5 is a view similar to Fig. 3, but showing the relation of the transfer plate and press platen and other elements when the registering and locking mechanism is in its locked position;

Fig. 6 is a plan view of the operating links of the registering and locking means;

Fig. 7 is a transverse section taken substantially on the line 7—7 of Fig. 5;

Fig. 8 is a transverse section taken substantially on the line 8—8 of Fig. 5;

Fig. 9 is a longitudinal vertical section taken substantially on the line 9—9 of Fig. 6; and

Fig. 10 is a horizontal section taken substantially on the line 10—10 of Fig. 5.

In the particular embodiment of the invention disclosed herein for the purpose of illustrating one specific form of the invention, I have shown in Fig. 1 a lower platen or bolster 1 of a press which may be of any suitable or usual type commonly and well-known in the art as having an upper die slide or platen (not shown) for carrying an upper half of a die whose lower half is normally positioned above the bolster. The bolster 1 is suitably mounted as by bolts 2 upon a base 3 which, if desired, may form part of the press structure. Laterally located of bolster 1 to each side thereof is a pair of roller tables 4 and 5 arranged so that table 4 is adapted to support a transfer plate 6 at the time when a second transfer plate 7 is resting on bolster 1 and similarly, when plate 7 is resting on table 5 then plate 6 is supported on bolster 1. To transfer the plate 7 from bolster 1 to table 5 and simultaneously transfer the plate 6 from table 4 on to the bolster or vice versa during reverse operation, each plate is provided, Fig. 8, with a pair of arms 9 connected to a pair of chains 8 through a chain attachment 13 pivotally connected at 14 to arms 9. The arms and chains pass through longitudinal vertical slots 12 formed in the bolster 1. The two plates are maintained in a fixed spaced relation to each other and are connected together by rigid connecting links 15. The foregoing plate and chain connecting arrangement is identical for each plate except that one is right

hand and the other is left hand, as shown in Fig. 1, and hence the same reference numbers for one connection are also used for the other. Chain 8, as is usual in transfer mechanism of this type, passes around a series of sprockets 16, one of which is suitably reversibly driven by power through a chain and sprocket 17 from any suitable source. By driving chains 8 in one direction, say in a clockwise direction, plate 7 will be moved off of bolster 1 on to table 5 and plate 6 will be moved from table 4 on to the bolster and conversely when the chain is driven in a counterclockwise direction.

The transfer mechanism above described cannot be stopped with sufficient precision to assure accurate vertical alignment of the upper and lower dies, the lower ones of which are supported upon plates 6 and 7 but not shown herein. To accomplish accurate registering and locking of plates 6 and 7, I move the plate 7, for example, into its approximate position over bolster 1 and then continue the plate movement by a positive registering and locking mechanism comprising, as shown in Figs. 4 and 7, a pair of longitudinal stationary guideways 20 and 21 centrally bolted at 21a, Fig. 8, to the ends of the bolster for slidably supporting, Figs. 8 and 9, a carriage 22 which has lateral guide flanges 23 and 24. As shown in Fig. 9, a pair of pivotally connected links 25 and 26 are respectively pivotally connected as at 27 to slide 22 and at 28 to a link 29 which in turn is pivotally connected at 30 to an enlarged head 31 of a reciprocating rod 32. This rod slidably extends through a boss 33 which is formed as an integral part of slide 22. As shown in Figs. 1 and 5, rod 32 is pivotally connected by a link 34 to a bell crank arm 35 which is oscillated by a suitable fluid actuated piston and cylinder 36 suitably controlled in any desired manner by a valve not shown. The bell crank 35 is suitably pivotally supported on a stationary bracket 37. The link 25 has a shoulder 38 adapted to engage, Figs. 9 and 10, a T head 40 formed on an arm 41, Fig. 5, secured to and depending centrally from plate 6 or 7. When plate 7, Fig. 1, moves to the left, arm 41, Figs. 8 and 10, moves into a longitudinal vertical slot 42 in bolster 1 until the T head 40 of arm 41 engages a pair of rearwardly projecting stationary bosses 44 and 45 formed on the fixed bolster on opposite sides of slot 42.

The locking mechanism for the above linkage comprises, as shown in Figs. 2–4, a pair of rollers 46 and 47 journalled upon the pivot pin 28. These rollers ride on the lower surface of the stationary guideways 20 and 21 until the carriage 22 has moved inwardly a predetermined distance whereupon rollers 46 and 47 move down into arcuate recesses 48 formed in the lower surfaces of the stationary guideways 20 and 21. The arcuate recesses 48 are positioned so that the rollers enter the same just after the T head 40 engages bosses 44 and 45. After the transfer plate 6 or 7 is accurately registered, the link 26 and rollers 46 and 47, link 29, crosshead 31 and rod 32 continue to move forward under the action of cylinder 36 until rollers 46 and 47 are both fully seated in the bottom of recesses 48. Guideways 20 and 21 and link 26 are so related to link 25 that any force applied to transfer plate 7, tending to move the plate out of its registered position, will cause arm 26, Fig. 9, to tend to move its rollers 46 and 47 further into the arcuate recesses thereby producing a self-locking action which firmly holds the transfer plate.

The heretofore described registering and locking mechanism is duplicated at each end of bolster 1 thereby permitting plate 7 to be registered and locked from the right side, Fig. 1, and permitting plate 6 to be registered and locked from the left side of the bolster 1. Inasmuch as the two registering and locking mechanisms are identical, except that one works toward the left and the other toward the right it is not deemed necessary to describe the second registering and locking device and hence the same reference numerals for corresponding parts of the two devices are used.

Operation

Assuming that plate 7 is on table 5, Fig. 1, the operator applies power to sprocket 17 to cause chain 8 to pull plate 7 from table 5 to the left as through the chain connections 13, 14 and 15. During this time servo-motor 36 is in its lower position and links 25 and 26, Fig. 9, are substantially in alignment with each other and carriage 22 is located at its rearmost position within guideways 20 and 21. However, when plate 7 is approximately positioned on bolster 1 then fluid is admitted to servo-motor 36 thereby rotating crank arm 35 in a counterclockwise direction and accordingly moving rod 32 through the now temporary stationary boss 33 so as to swing arms 25 and 26 upwardly until shoulder 38 engages T head 40 of the plate bracket 41. Application of fluid or air pressure in the servo-motor is continued thereby moving plate 7 and its bracket 41 to the left, the carriage 22 and the entire linkage and rod structure supported thereon move as a unit with plate 7. After the plate has been moved to its predetermined position rollers 46 and 47, Figs. 3 and 4, drop into the arcuate recesses 48 thereby positively locking the transfer plate 7 against movement to the right, it being understood that the T head 40 positively engages stationary bosses 44 and 45, Fig. 10, of bolster 1 at the time when the locking rollers are in their recesses. Hence the transfer plate is prevented from moving in either direction. During the foregoing operation the left hand registering and locking mechanism, Fig. 1, has been moved to its inoperative straightened position as shown and plate 6 has been transferred from bolster 1 to roller table 4 whereupon the operator may remove such articles as have been punched or pressed and may place another piece of sheet metal over the dies of plate 6 while the press is performing an operation on the sheet metal now resting on the dies of plate 7. To unlock the registering mechanism the servo-motor 36 is moved downwardly thereby first moving the locking rollers 46 and 47 out of their arcuate recesses and then when the links 25 and 26 are straightened so as to be in substantial alignment with each other they will pull the carriage 22 rearwardly through either pin 27 or by engagement of head 31 with boss 33. The operator now applies reverse power to sprocket 17 to transfer plate 7 to table 5 and plate 6 to bolster 1 whereupon the left hand registering and locking mechanism is actuated to act on the left end of plate 6 in the same manner as was done for registering and locking plate 7. As shown in Fig. 7, a pair of cylindrical friction shoes 50 and 51 pushed against the sides of carriage 22 by springs 52 and 53 are suitably supported in the stationary structure of guideways 20 and 21. The tension on the springs is adjustable by screws 54 and 55. The friction of shoes 50 and 51 insures that links 25 and 26 will be thrown from the lower aligned relation to their upper pushing position before carriage 22

starts to move forward and vice versa on the reverse stroke.

From the foregoing disclosure it will be seen that I am able with great dispatch to register and lock a transfer plate in position with a high degree of accuracy and positiveness and do so with a structure that is relatively simple and economical in construction, operation and maintenance and that is sturdy and compact.

It will of course be understood that various changes in details of construction and arrangement of parts may be made by those skilled in the art without departing from the spirit of the invention as set forth in the appended claims.

I claim:

1. The combination in a press having a bolster and tables at each end thereof for alternately supporting transfer plates one of which is supported on said bolster while the other is on one of said tables comprising, means for transferring one or the other of said plates from their respective table to an approximate position on said bolster and vice versa, mechanism at one end of said bolster for moving one of said plates into a predetermined registered position on said bolster after being approximately positioned thereon, mechanism located at the other end of said bolster for moving the other of said plates into its predetermined registered position on said bolster after being approximately positioned thereon, and means for locking said plates in their registered position automatically when the registered position is substantially reached.

2. The combination in a press having a bolster and a transfer plate structure adapted to be moved transversely on to or off of said bolster comprising, a transversely movable registering mechanism for transversely moving said plate into a predetermined registered position on said bolster, and said registering mechanism having means movable into and out of the path of movement of a portion of said plate structure for engaging the same to effect said predetermined transverse positioning thereof and for disengaging the same to allow transfer of the plate structure off of the bolster.

3. The combination in a press having a bolster and a transfer plate structure adapted to be moved on to or off of said bolster comprising, a registering mechanism for moving said plate into a predetermined registered position on said bolster including toggle links and means for moving the links into a non-aligned relation for engaging and moving said plate structure into a predetermined position on the bolster, and means whereby said toggle links are disengageable from said plate to allow removal from the bolster.

4. The combination in a press having a bolster and a transfer plate structure adapted to be moved on to or off of said bolster comprising, a registering mechanism for moving said plate into a predetermined registered position on said bolster including toggle links and means for moving the links into a non-aligned relation for engaging and moving said plate structure into a predetermined position on the bolster, and means whereby said toggle links are movable into a substantially aligned relation to each other to disengage said toggle links from said plate to allow removal thereof from the bolster.

5. The combination set forth in claim 3 further characterized by the provision of a carriage, and means for supporting said toggle mechanism on said carriage so that the carriage and toggle mechanism is movable as a unit during positioning of a transfer plate structure on the bolster.

6. The combination in a press having a bolster and a transfer plate structure adapted to be moved on to or off of said bolster comprising, a registering mechanism for moving said plate into a predetermined registered position on said bolster, said mechanism including toggle links and means for moving the links into a non-aligned relation for engaging and moving said plate structure into a predetermined position on the bolster, a carriage, means for supporting said toggle mechanism on said carriage so that the carriage and toggle mechanism is movable as a unit during positioning of a transfer plate structure on the bolster, and means for locking said transfer plate structure in its predetermined position on the bolster automatically when said carriage has moved a predetermined distance during the positioning operation.

7. The combination in a press having a bolster and a transfer plate movable on to or off of said bolster comprising, a positive stop on said bolster, an element on said plate for engaging said stop, means for moving said plate on to said bolster until said element engages said stop, said means being adapted to have continued movement after said stop is engaged, and mechanism actuated by said means during said continued movement thereby to automatically lock said plate in position when said stop is engaged.

8. The combination in a press having a bolster and a transfer plate movable on to or off of said bolster comprising, a positive stop on said bolster, an element on said plate for engaging said stop, means for moving said plate on to said bolster until said element engages said stop, and means actuated by said latter means for automatically locking said plate in position when said stop is engaged, said means for moving said plates on to said bolster including toggle links and a reciprocatory member connected thereto, movement of said reciprocatory member in one direction causing said links to move laterally into a disaligned position so as to engage said plate structure to effect a predetermined position thereof on the bolster and said reciprocatory member being movable in the opposite direction for moving said toggle links in substantial alignment with each other so as to disengage said plate structure and allow the same to be removed from the bolster.

9. The combination set forth in claim 8 further characterized by the provision of a reciprocable carriage for supporting said toggle links and a stationary guideway provided with an arcuate recess, a locking element carried by said links and adapted upon a predetermined movement of said carriage to move laterally with one of said toggle links into said recess thereby to lock the transfer plate in position.

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