Feb. 27, 1951 B. JAPIKSE 2,543,498

HYDRAULIC POWER PRESS

Filed Nov. 24, 1943 5 Sheets-Sheet 1

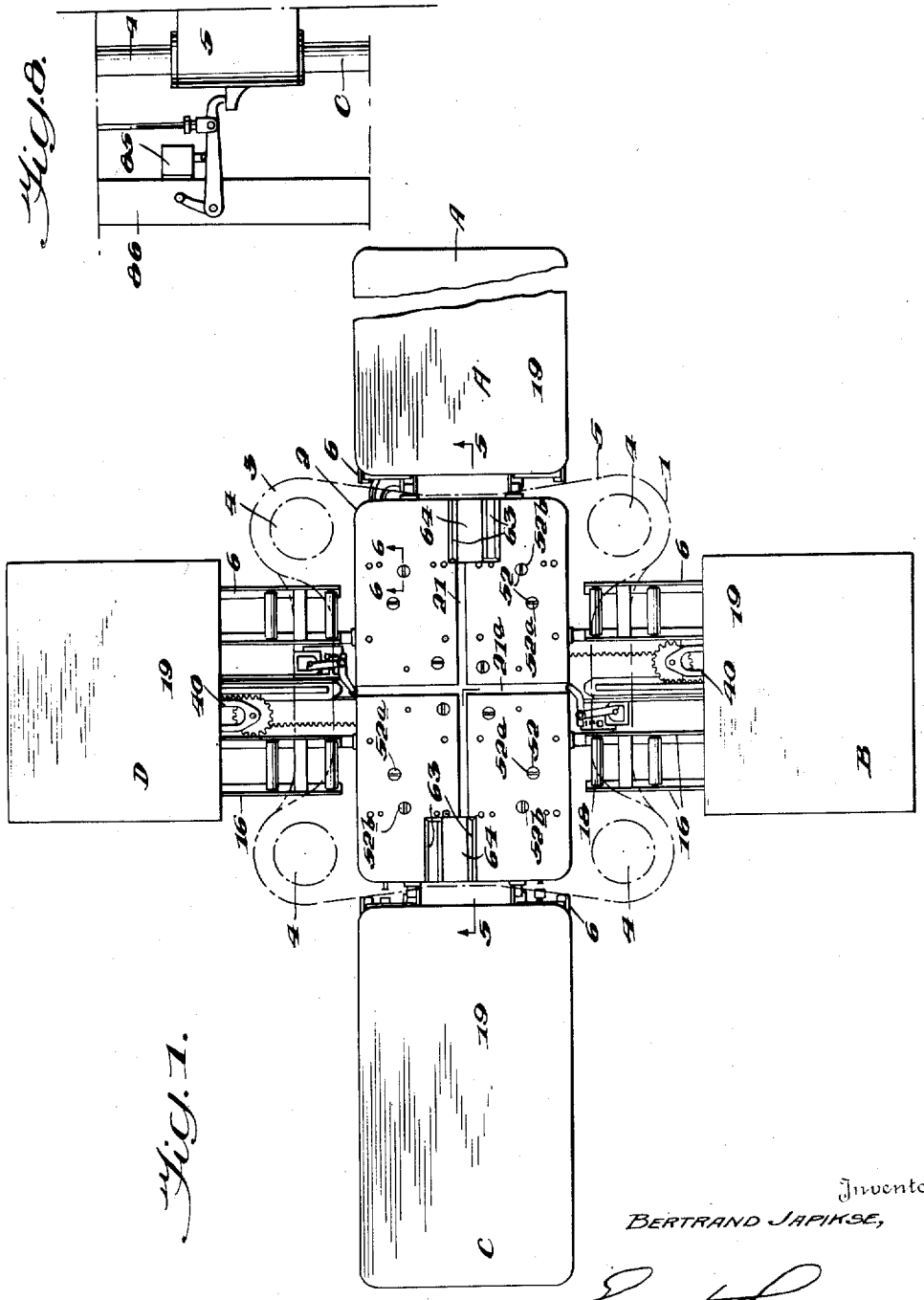


Fig. 1.

Fig. 8.

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HYDRAULIC POWER PRESS

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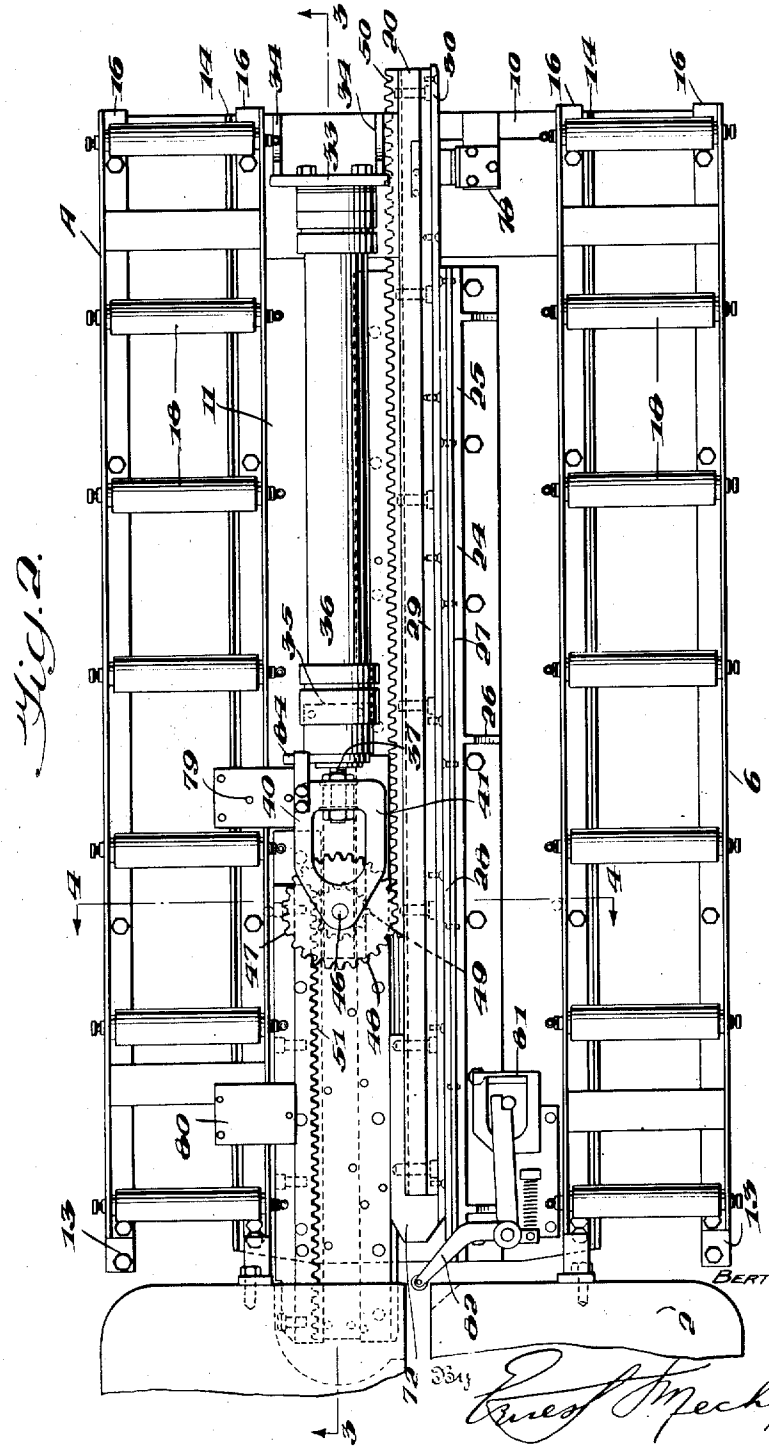


Fig. 2.

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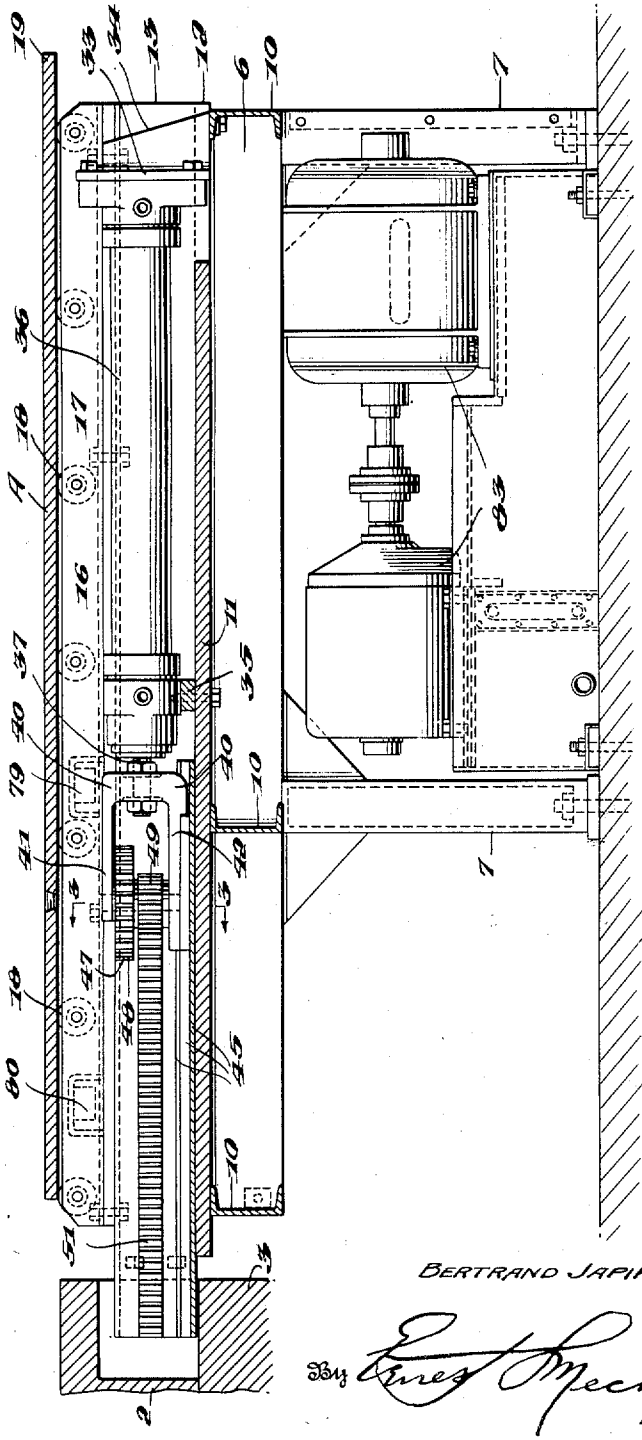


Fig. 3.

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HYDRAULIC POWER PRESS

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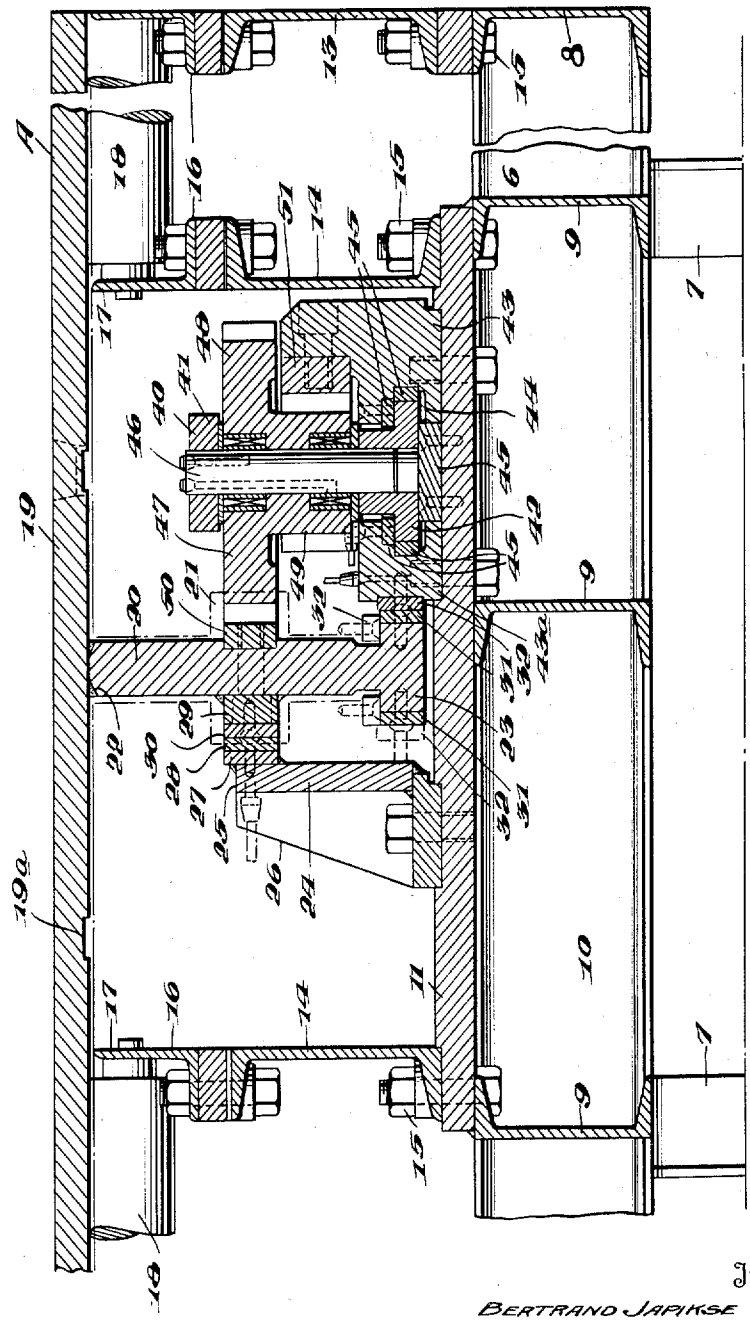


Fig. 4.

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Feb. 27, 1951 B. JAPIKSE 2,543,498

HYDRAULIC POWER PRESS

Filed Nov. 24, 1943 5 Sheets-Sheet 5

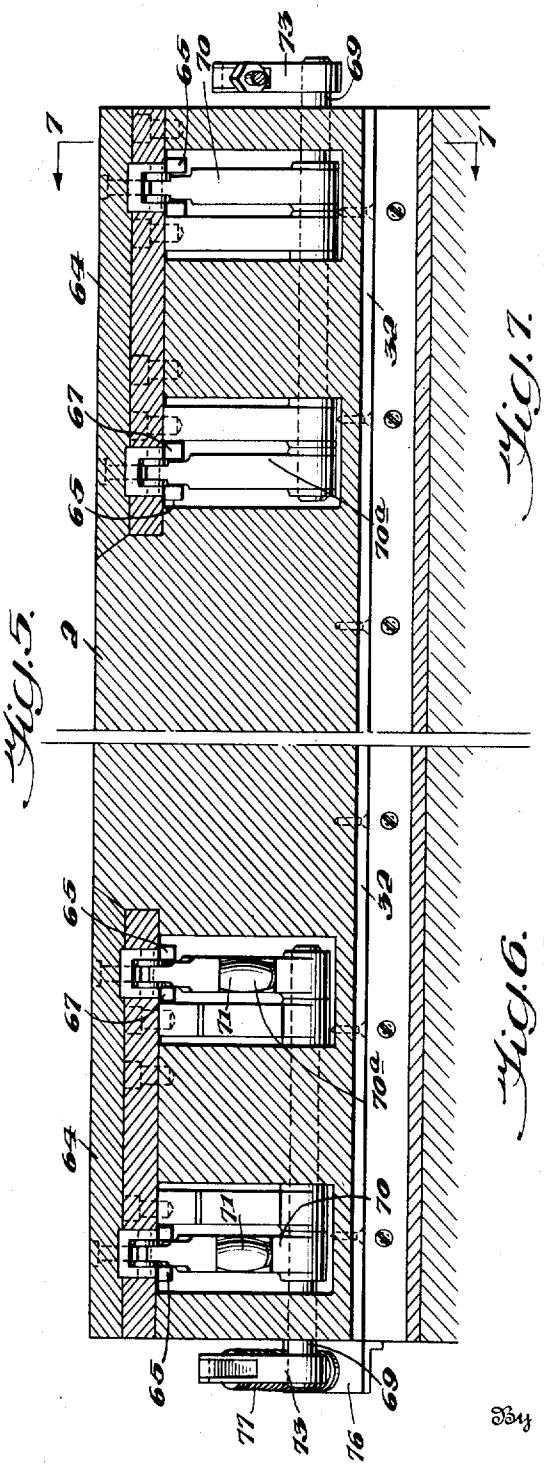


Fig. 5.

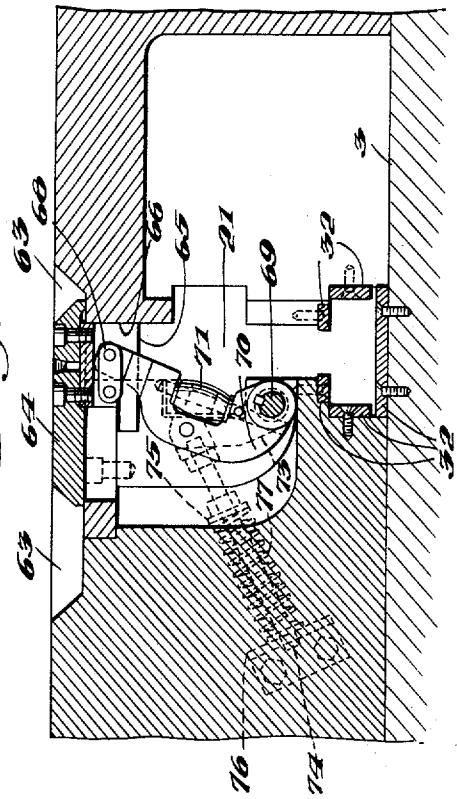


Fig. 7.

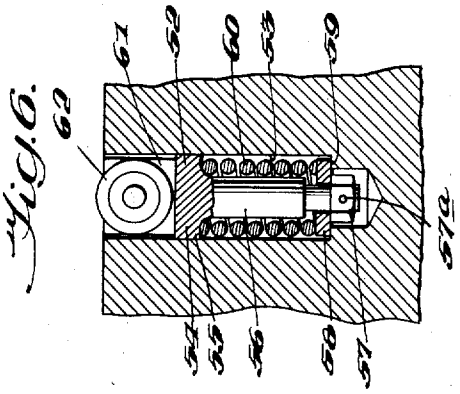


Fig. 6.

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Patented Feb. 27, 1951

2,543,498

UNITED STATES PATENT OFFICE

2,543,498

HYDRAULIC POWER PRESS

Bertrand Japikse, Reiffton, Pa.

Application November 24, 1943, Serial No. 511,619

8 Claims. (Cl. 113—38)

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This invention relates to a hydraulic power press and more particularly to an arrangement of transfer tables stationed about and associated with the hydraulic power press.

An object of the invention is to provide a plurality of transfer tables about a hydraulic power press so that work pieces may be positioned properly on one or more of the tables while another table is beneath a movable platen of the hydraulic power press.

Another object of the invention is to provide a plurality of transfer tables about a stationary element of a hydraulic power press with the transfer tables so arranged and constructed that they may be selectively actuated to move successively or at the selection of an operator.

Another object of the invention is to provide a plurality of transfer tables about a stationary element of a hydraulic power press with the hydraulic driving mechanism for the transfer tables so arranged and constructed that no part of the driving mechanism protrudes beyond the outer limits of the transfer tables, thus, giving the operator maximum access to his work.

These general objects and other objects of the invention will become apparent from the succeeding description considered with the accompanying drawings which show in various views an exemplified form of the invention and wherein:

Figure 1 is a horizontal sectional view taken through a hydraulic power press embodying the present invention.

Figure 2 is a plan view looking down upon the right hand portion of Figure 1 but with the top cover member removed.

Figure 3 is a vertical cross sectional view taken along the lines 3—3 of Figure 2, looking in the direction of the arrows.

Figure 4 is a vertical sectional view taken along the lines 4—4 of Figure 2, looking in the direction of the arrows.

Figure 5 is a vertical sectional view taken along the lines 5—5 of Figure 1, looking in the direction of the arrows.

Figure 6 is a cross sectional view taken through a vertical plane and along the lines 6—6 of Figure 1, looking in the direction of the arrows.

Figure 7 is a cross sectional view taken along the lines 7—7 of Figure 5, looking in the direction of the arrows, and with certain parts, cut-away by the section, shown in dotted lines.

Figure 8 is a partial view of a hydraulic power press control.

Referring now in detail to the drawings, wherein like reference numerals refer to like parts, the

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character 1 is employed to designate, in a somewhat general manner, a hydraulic press embodying the present invention. The hydraulic power press proper illustrated in more or less of a schematic fashion is primarily of a type employed as a metal forming press. However, as will be clearly understood, the invention herein described may be associated with any type of a hydraulic press. The press generally comprises a lower bolster or stationary platen 2 firmly fixed upon a suitable foundation or bottom platen 3 and having rising therefrom the usual guide columns or pillars 4 rectangularly disposed which have as one of their functions the proper or true guidance of an upper or movable platen 5. The movable platen is arranged through suitable mechanism (not shown) to move toward and away from the bolster in the natural course of the successful operation of the hydraulic power press.

Quadrantly spaced about and adjacent to the lower area or extremity of the hydraulic power press and particularly in the proximity of the bolster are a plurality of, preferably four, transfer tables and related structures which, for the sake of clarity and convenience in referring to them hereinafter, have been designated as A, B, C and D starting with the right hand table as viewing Figure 1 and moving in a clockwise direction about the press. It will, therefore, be noted that tables A and C are diametrically opposed to one another and tables B and D are similarly situated. Because of the particular disposition of the illustrated guide columns or pillars, tables B and D are of lesser proportions than tables A and C. However, as will be more clearly described in detail, portions of the tables are so proportioned that they cover or substantially cover the press bolster and by reason of this arrangement the full benefit of the hydraulic power press is utilized.

Since the transfer tables are alike in practically every detail, with of course, the exception as to proportion, the hereinafter description will be devoted to the consideration of one of the tables and any deviation will be specially treated. In considering A as characteristic of all the tables, there is provided a framework or supporting superstructure 6 comprising vertical posts 7 conveniently situated and having their lower extremities anchored suitably in the foundation or floor. Extending between the upper extremities of the posts are a series of longitudinally extending, side and intermediate beams 8 and 9, respectively, and lateral or cross beams 10 forming a rigid and substantial base of the transfer table. Surmounted intermediate the longitudinal beams

is a preferably heavy gauge, platform plate 11 which covers a substantial horizontal area within the confines of the transfer table for a purpose to be hereinafter explained. Filler blocks 12 rest upon the beams not occupied by the platform plate. Side risers 13 extending longitudinally of the transfer table are mounted on the blocks 12 and intermediate risers 14 preferably parallel but spaced from the side risers are mounted on the platform plate adjacent the transverse limits thereof with all of the risers held securely in place by means of the bolts 15 or any other means which extend through the subjacent beams. Firmly and removably secured to the side and intermediate risers are substantially coextensive conveyor brackets 16 preferably of angular configuration in cross section so as to present upstanding legs 17. As will be noted, each table is provided with two pair of conveyor brackets running lengthwise of the table with each pair disposed in spaced relation adjacent a transverse edge of the table. Extending across or transversely of the table are a series of conveniently spaced rollers or rotating means 18 having their extremities journaled or otherwise mounted in the upstanding legs 17 and freely revolvable about their axes to thereby form a conveyor at or adjacent each side of the table. The flight of the conveyors or, in other words, the extended plane horizontal surface tangential to the tops of the rollers is desirably a slight distance above the upper or top surface of the bolster 2 for the purpose to be hereinafter explained.

Surmounted on the conveyors is a sliding cover, cap or transfer plate 19 which, in the case of the transfer tables A and C, is designed to completely cover or is equal in extent horizontally to the bolster while in the case of the transfer tables B and D the sliding cover is of a length equal to the width of the bolster and may be of a width less than the length of the bolster as hereinbefore explained.

As will now be apparent the cap or transfer plate is arranged to move from the transfer table over the bolster and because of the slight difference in elevation between the top surface of the bolster and the flight of the conveyors there is no interference between any of the transfer plates and the bolster as the sliding covers are moved in position over the stationary platen. Means to be hereinafter described in detail, are associated with the bolster to compensate for this difference in elevation. As previously indicated, means has been provided to move or control the movement of each transfer plate and as exemplary of such a means there is arranged with each sliding cover a depending arm or guide plate 20 in the form of a rectangular plate which is disposed in alignment with a corresponding slot or opening 21 or 21*a* in the bolster. The openings are arranged perpendicularly to one another so that the slot 21 may accommodate the guide plates of the tables A and C while the opening 21*a* may accommodate the guide plates of the tables B and D. The upper extremity of the arm 20 is welded or otherwise secured as at 22 to the underneath portion of the transfer plate and the arm extends downwardly to adjacent the upper surface of the platform plate 11 where it terminates in a cross or tee head 23. So as to guide the transfer plate along a predetermined and fixed path there is provided a barrier or bulkhead 24 adjacent to the near side of the arm when considering the transfer table A or the left side when considering the sectional view of Figure 4. This barrier is desirably removably mounted upon the platform plate with the connection so designed that the barrier may be firmly retained against movement transversely of the table to insure a true alignment of the arm with the corresponding opening. The bulkhead has an upstanding leg 25 reinforced by knee braces 26 and carries adjacent its upper extremity a backing or shim plate 27 having a guide bar 28 suitably secured thereto and facing inwardly of the transfer table. Secured to the side plate by means of welds preferably and intermediate the height thereof on the side related to the bulkhead, is a shim plate 29 carrying a guide bar 30 in intimate contact with the guide bar 28 so that the cap or transfer plate will be prevented from shifting transversely of the table. So as to positively insure a true predetermined travel of the cap and to counteract the applied forces for propelling the cap, the tee head of the depending arm is also provided with spaced guiding or wear plates 31 secured to the head and arranged to engage in intimate contact properly secured buffer bars 32. By reason of this hereinabove described construction no shifting of the cap can occur in the direction transversely of the table.

Means have been provided to shift the cap or transfer plate from a normal position, that is to say, from a position supported entirely by the conveyor rollers 18 to a position overlying the bolster or stationary plate. Toward the accomplishment of this end the platform plate has, upstanding and adjacent an extremity thereof removed from the bolster, a back-stop 33 reinforced by gussets 34. Spaced forward from the back-stop toward the bolster and desirably in alignment with the back-stop is a cradle 35 and anchored to the cradle and back-stop is a hydraulic ram, power means or cylinder 36 having a piston rod 37 actuated in a desired direction by the admission of fluid pressure to the respective ends of the cylinder. Firmly and removably attached to the free or outer end of the piston rod is a crosshead, yoke or jaw-like member 40 having joined, vertically spaced, upper and lower arms 41 and 42 respectively. Enclosing the lower arm 42 of the yoke are blocks or housings 43 and 43*a* mounted upon the platform plate between the intermediate risers and of which block 43*a* also carries one of the buffer bars 32. By such an arrangement it will be noted that the cap is again prevented from shifting transversely of the table in a direction toward a double spur gear hereinafter described. The housings extend a sufficient distance longitudinally of the transfer table comparable with the stroke or travel of the yoke for the purpose which will hereinafter become apparent.

The blocks have formed in the interior thereof an inverted T-shaped cavity 44 defined by vertically or horizontally spaced wear strips 45 snugly accommodating the lower arm of the yoke to insure a true and fixed travel of the yoke longitudinally of the transfer table. Bisecting the yoke or crosshead is a vertically disposed pin or shaft 46 which may or may not be free running in the yoke. Journaled to the shaft and freely rotatable therewith is a compound pinion or double spur gear 47 having an upper large gear portion 48 desirably in the horizontal plane of the shim plate 29 and usually of larger diameter than a subjacent and integrally formed small gear portion 49. Mounted upon the depending arm in the horizontal plane of and opposed from the shim plate 29 is an arm rack 50 having teeth outstanding horizontally therefrom arranged to

accommodate and intermesh with the teeth of the large gear portion. Firmly secured to the housing in a plane above the yoke lower arm and desirably to one side thereof is a block rack 51 having teeth extending horizontally inwardly of the transfer table so as to intermesh with correspondingly formed teeth on the small gear portion.

As will therefore be clearly understood, any movement of the cylinder piston in an outward direction will cause the freely running spur gear to have its small gear portion run along the block rack thus rotating the spur gear in a clockwise direction and thereby forcing the sliding cover or transfer plate off of the conveyor on to the bolster and into the path of the movable platen. A reverse action of the cylinder piston will of course cause the sliding cover to be moved off of the bolster back to normal position on to the conveyor rollers and thus out of the path of the movable platen where the worked piece may be removed and another piece mounted. While the pistons for all transfer tables may, if desired, be of the same characteristics, the double spur gear may have the large and small portions so proportioned as to obtain practically any desired ratio in not only speed but also stroke. It is, therefore, to be noted that the hereinabove described and illustrated construction lends itself admirably well to a hydraulic power press in that a relatively short stroke cylinder can operate the sliding cover through a stroke exceeding the stroke of the cylinder and yet no portion of the cylinder or any of its associated structure protrudes beyond the sides or end removed from the bolster of the sliding cover or transfer table. This arrangement leaves the area about the transfer table free for the conservation of space and the easy access to the sliding cover. By the use of the rack and pinion arrangement in the transfer tables numerous other advantages will become apparent to those skilled in the art.

Conveniently situated within the horizontal limits of the bolster are a plurality of sliding roller mechanisms 52 arranged to receive and support, at a plurality of positions, the sliding covers of the respective transfer tables as they are shifted from their normal positions to a location over the bolster. Each mechanism housed within an accommodating cavity or bore 53 comprises a shank 54 having a collar 55 intermediate its height and a stem 56 depending therefrom. The shank has a reduced free extremity on to which is attached a rotatable element or nut 57 with locking pin 57*a* and carrying a seat or washer 58. The seat of each mechanism rests against a shoulder 59 formed in the cavity to present an abutment. Reacting between and against the washer and collar is a coil or helical spring 60 under initial compression and circumambient the stem to maintain the collar in a predetermined elevated position. Upstanding from the collar in a direction outwardly of the cavity are spaced fingers 61 having journaled thereto a roller 62 the upper flight of which or the horizontal plane tagential to the top of the roller, lies in the same plane as the flight of the conveyor rollers; that is to say a slight distance above the top surface of the bolster. Accordingly, therefore, when a sliding cover is moved off of the conveyor rollers it is received or intercepted in supporting relation by the sliding roller mechanisms to permit the cap to move in a true horizontal direction. When the movable platen in the course of a pressing action descends upon the work the springs 60 will be compressed still further to allow the bolster to properly support or back up the sliding cover. As soon as the work piece is relieved of the pressure of the movable platen the springs 60 will again raise the cap to its proper height for the receipt thereof by the conveyor rollers in its withdrawal action. The sliding roller mechanism 52 has been hereinabove described as serving any cover, however, by referring to Figure 1 of the drawings reference is made to the characters 52*a* and 52*b*. The character 52*a* is employed to designate sliding roller mechanisms which are arranged to serve or intercept the sliding covers for the transfer tables B and D while the character 52*b* is a designation of the sliding roller mechanisms disposed and adapted to receive and support the covers of the transfer tables A and C. Since, therefore, the flight of all the rollers 62 are in the same horizontal plane, means has been provided so that the covers of the transfer tables A and C will not slide over or contact intimately the rollers 62 of the sliding roller mechanisms 52*b* and, likewise, the covers of the transfer tables B and D will not rub the rollers 62 of the sliding roller mechanisms 52*a*. Toward the accomplishment of this end the under portion of each cover is provided with suitable longitudinally extending grooves or under cuts 19*a* so that as a cover is moved to a position over the bolster the rollers 62 in the bolster which are not intended to support that particular plate will clear the cover and avoid a rubbing action therebetween.

In some instances where the present invention may be employed a rubber blanket is confined in a metallic box or housing so that the rubber blanket may not flow or squeeze out edgewise but the bottom face of the rubber is exposed. The metallic housing is secured to the movable platen and functions in the nature of a die. In such instances a die or dies, made of metal or any desired material, is mounted upon each cover and superimposed on the die or dies is a blank or blanks to be pressed. The sliding cover so arranged is then propelled into the press and at a given time the movable platen will descend downwardly until the rubber blanket makes contact with the blank or blanks. At this stage the outer edge of the metallic housing will have engaged around the edges of the cover and upon a further downward action of the movable platen the rubber blanket is displaced to occupy the remaining voids between the rubber blanket, metallic box and the top of the cover thereby forcing the blank or blanks to take the contour of the die or dies. Upon release of pressure, the rubber blanket resumes its original shape and then the movable platen is elevated to affect a withdrawal action of the cover and a removal of the pressing or pressings.

If the transfer tables and their respective sliding covers are, as illustrated, of different horizontal proportions it will be apparent that when the sliding covers for the transfer tables B and D are extended over the bolster the extremities of the opening 21 will, in the absence of some provision, be free to permit extrusion of the rubber blanket therein, also to receive foreign matter to thereby cause excessive wear to the blanket as well as to obstruct the opening 21 and prevent a free unrestricted passage of the depending arm 20 of the transfer tables A and C. In order to eliminate this contingency the bolster top surface adjacent each extremity of the

opening 21 is formed with a dish or relief 63 facing upwardly of the hydraulic power press. Seated within each relief and arranged to slide or be shifted normal to the opening 21 is a lid 64 equal in length to the relief but of less width thereof so that while the lid is capable of covering the entire exposed related portion of the opening 21 it may be shifted from its normal closing position out of the path of the depending arm of either transfer table A or C. These lids cover the otherwise exposed portions of the opening 21 when the transfer plate of either plate B or D is positioned over the bolster.

As previously indicated the lid is shifted transversely of the hydraulic power press so as to permit the free passage of the depending arm of either transfer table A or C and toward the accomplishment of this end there is arranged with each lid, a pair of spaced subjacent brackets 65 each presenting a shoulder 66 abutting the bolster to limit the movement of the lid in one direction. Projecting downwardly into the relief and forming a part of each bracket are extensions 67 having journaled therebetween one end of a horizontally disposed connecting link 68. Within the relief adjacent the lower extremity thereof is a longitudinally extending axle 69 suitably journaled and carrying a pair of spaced levers 70 and 70*a* keyed thereto. The levers have their ends, removed from the axle, pin connected to the free extremities of links 68 so that any forces transmitted to the levers will be reflected in the lids. Each lever has a barrel-shaped roller or ball means 71 journaled thereto intermediate the ends of the lever so that as a cover of either table A or C is moved from normal position the ball of the lever 70 or 70*a* maybe engaged by a preferably double faced cam 72 carried by the leading portion of the depending arm to urge the levers out of the way and consequently carry the lids off to one side of the opening 21. By considering table A when the cover of that table moves off the conveyor, the cam carried thereby will engage the ball means 71 and urging the lid to one side the cover arm is free to pass through the opening 21 until the cam approaches the end of the cover movement at which time the opposite face of the cam will strike the ball means of the lever 70*a* to urge this second lid to one side. The same operation is followed but in reverse, when the cover of the transfer table C is moved to a position over the bolster. The normal position of each lid is as illustrated in the drawings and each lid is maintained in that normal position, until displaced, by a resiliently actuated arrangement characterized by a branch 73 disposed outwardly of the bolster and key connected to a free outer extremity of an associated axle 69. Pin connected to an end of each branch removed from the axle is a push-rod 74 having, intermediate its ends, an abutment 75 and extending through a suitable aperture in a shelf 76 mounted on the adjacent side of the bolster. A resilient means in the nature of a compression spring 77 reacts between each shelf and related abutment so as to keep the push-rod extended and the lid in normal position.

Each table is provided with four limit switches 78, 79, 80 and 81 with the latter named limit switch being provided with a toggle lever 82 which, when contacted by its related table component, trips the associated limit switch as will be hereinafter more fully explained. Assuming that the tables have their covers withdrawn or resting upon their respective conveyor rollers and it is desired to move the cover of the transfer table A to a position over the bolster. The limit switch 78 of table A is depressed and since this switch has two circuits one of which when closed makes it possible to start up the motion of any table, however, when the cover or table A starts forward this circuit opens and thereby makes it impossible to operate more than one table at one time. Just before this circuit has been broken a second circuit in this same limit switch 78 closes which takes over the holding circuit and through its connection with the motor and pump combination 83 permits the forward motion of the cover to continue. The cross head or yoke of each cylinder is provided with a lug 84 which as it passes the limit switch 79, will trip this switch on the forward movement of the yoke and the function thereby derived is to reset this limit switch 79 so that the same lug or one placed in parallel therewith can start the slow down of the cylinder piston when the lug trips it again on or during the reverse travel. Continuing in a forward direction after limit switch 79 is tripped the lug strikes the limit switch 80 thereby breaking a circuit whereby the forward speed of the table A cover is decelerated. This deceleration takes place by means of suitable controls and the table will then finally be propelled gently at moderate speed, but under positive pressure against an extreme forward stop which is located internally within the operating cylinder. Just before it reaches a stopped position over the bolster a cover component strikes a toggle lever 82 associated with the transfer table C to trip the related limit switch 81 which will close a circuit whereby the operation of the hydraulic power press is started and at the same time open a second circuit whereby reversal of the table is made impossible until a time when the operating cycle of the hydraulic power press nears completion.

When the hydraulic power press cycle has been almost completed a limit switch 85 (see Figure 3) is tripped. While all of the structure associated with this last named limit switch is not shown in detail, reference is hereby made to my copending application Serial Number 479,934, filed March 20, 1943, issued as letters patent No. 2,426,509 dated August 26, 1947 wherein I disclose and claim a linkage arrangement constituting a hydraulic power press control. This limit switch 85 may be mounted on a bracket 86 associated with the referred to linkage so that upon the very last portion of the upward stroke of the movable platen this limit switch will be tripped. This limit switch is a momentary device and makes a momentary contact whereby the return movment of the cover of transfer table A, at this stage of the description disposed over the bolster, is initiated. The return of the cover will first allow the limit switch 81 on the transfer table C to reset itself. Then limit switch 80 is subsequently re-set to a position where it can again be operative during the next forward stroke of the cover and when the cover reaches the trip point of the limit switch 79 it will be decelerated and at the end of travel limit switch 78 will be depressed thus making the operation of this same table or another table again possible.

From the preceding description it will be noted that various changes and alterations may be made to the illustrated and described construction without departing from within the spirit of the invention and the scope of the appended claims.

I claim:

1. In a hydraulic power press, the combination of, support means in vertical alignment with a movable platen, a pair of transfer tables having covers arranged to move longitudinally of said hydraulic power press, a second pair of transfer tables having covers arranged to move transversely of said hydraulic power press and being of lesser horizontal extent than said supporting means and said first named pair of covers, perpendicularly disposed openings in said support means for the accommodation of means depending from said covers, and shiftable lids normally covering portions of one of said openings and arranged to be displaced by said first named covers.

2. In a hydraulic power press, the combination of, support means in vertical alignment with a movable platen, a pair of oppositely disposed transfer tables having covers spaced from and of substantially the same size as said support means, a second pair of oppositely disposed transfer tables having plates spaced from and of lesser extent than said support means, cross openings in said support means arranged to accommodate means depending from said covers and plates, and shiftable lids in said support means arranged to close portions of said openings, said covers being arranged to displace said lids from normal position on movement thereof toward said support means.

3. In a hydraulic power press, the combination of, support means in vertical alignment with a movable platen, a pair of oppositely disposed transfer tables having covers spaced from and of substantially the same size as said support means, a second pair of oppositely disposed transfer tables having plates spaced from and of lesser extent than said support means, cross openings in said support means arranged to accommodate means depending from said covers and plates, shiftable lids in said support means arranged to close portions of said openings, said covers being arranged to displace said lids from normal position on movement thereof from said support means, and fluid pressure responsive means connected to said covers and plates to move said covers and plates over said support means.

4. In a hydraulic power press, the combination of, support means in vertical alignment with a movable platen, a pair of oppositely disposed transfer tables having covers spaced from and of substantially the same size as said support means, a second pair of oppositely disposed transfer tables having plates spaced from and of lesser extent than said support means, cross openings in said support means arranged to accommodate means depending from said covers and plates, shiftable lids in said support means arranged to close portions of said openings, said covers being arranged to displace said lids from normal position on movement thereof from said support means, and means in alignment with said cross openings arranged to be contacted at the completion of the travel of the covers and plates in one direction to thereby start the pressing operation of said hydraulic power press.

5. In a hydraulic power press, the combination of, a support, a movable platen positioned over said support, a transfer table spaced from said support and comprising a cover and cover carrying means, an arm depending from said cover and arranged to pass into said support, a rack mounted on said arm, a rack fixed with respect to said cover carrying means, fluid responsive means associated with said cover carrying means within the confines thereof, and pinion means rotatably associated with said fluid responsive means and contacting both of said racks for moving said cover toward and away from said support; said racks and pinion means being so arranged and constructed that the distance traveled by said cover will exceed the distance traveled by said pinion means.

6. In a hydraulic power press, the combination of, a support, a movable platen in alignment with said support, a pair of transfer tables having covers arranged to move longitudinally of said press, a second pair of transfer tables having covers arranged to move transversely of said press and being of lesser horizontal extent than said support and said first named pair of covers, perpendicularly disposed openings in said support for the accommodation of means depending from said covers, a rack carried by each of said depending means, rack means carried by each of said transfer tables, fluid responsive means within the confines of each of said transfer tables, a compound pinion means rotatably associated with each of said fluid responsive means and intermeshed with associated racks for moving the related cover toward and away from said support, and shiftable lids normally covering portions of one of said openings and arranged to be displaced by said first named covers.

7. In a hydraulic power press, the combination of, a support, a movable platen in vertical alignment with said support, a transfer table having a cover arranged to move longitudinally of said support, a second transfer table having a cover arranged to move transversely of said support, said last named cover being of less horizontal extent than said first named cover, guide means depending from each of said covers, perpendicularly disposed openings in said support for the accommodation of said guide means, fluid responsive means associated with each of said transfer tables for moving said covers toward and away from said support, and shiftable lids normally covering portions of one of said openings and arranged to be displaced by said first named covers.

8. In a hydraulic power press, the combination of, a support, a movable platen in alignment with said support, a pair of transfer tables having covers arranged to move longitudinally of said press, a second pair of transfer tables having covers arranged to move transversely of said press and being of lesser horizontal extent than said support and said first named pair of covers, perpendicularly disposed openings in said support for the accommodation of means depending from said covers, a rack carried by each of said depending means, rack means carried by each of said transfer tables, fluid responsive means within the confines of each of said transfer tables, a compound pinion means rotatably associated with each of said fluid responsive means and intermeshed with associated racks for moving the related cover toward and away from said support, and means disposed adjacent outer ends of said openings for contact by said means depending from said covers upon completion of movement of said covers in a direction toward said support so as to initiate the pressing cycle of the hydraulic power press.

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(References on following page)

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,150,153	Strauss	Aug. 17, 1915
1,607,073	Gros	Nov. 16, 1926
2,009,487	Ernst et al.	July 30, 1935
2,241,344	Graham	May 6, 1941
2,247,464	Arndt	July 1, 1941
2,259,576	MacMillin	Oct. 21, 1941
2,317,440	Cannon	Apr. 27, 1943
2,332,135	Dievers	Oct. 19, 1943

OTHER REFERENCES

"507 Mech. Movements," Fig. 118, pp. 32 and 33, published 1908, Brown and Seward, New York, N. Y.