

Oct. 4, 1932.

J. DERRY

1,880,873

PRESS

Filed Oct. 4, 1928

3 Sheets-Sheet 1

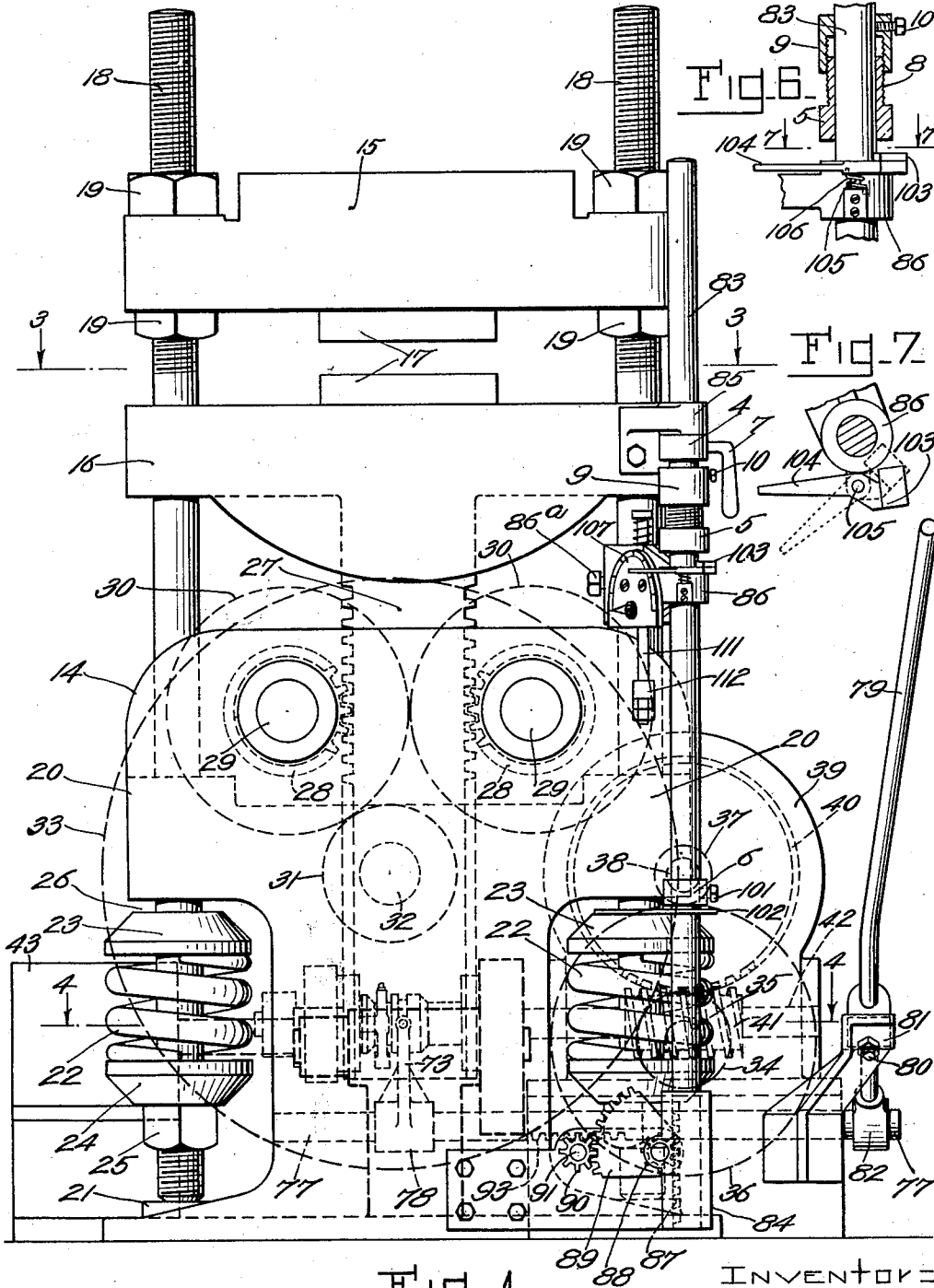


FIG-1

INVENTOR

by *Maclachlan, Calver, Copeland & Dike*
ATTYS.

Oct. 4, 1932.

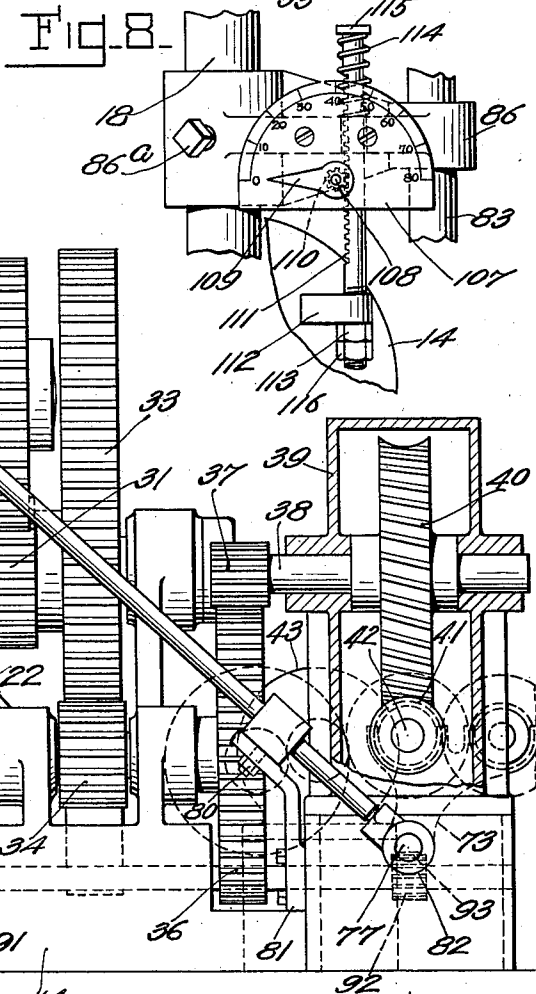
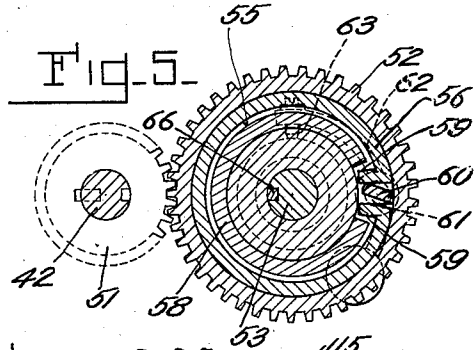
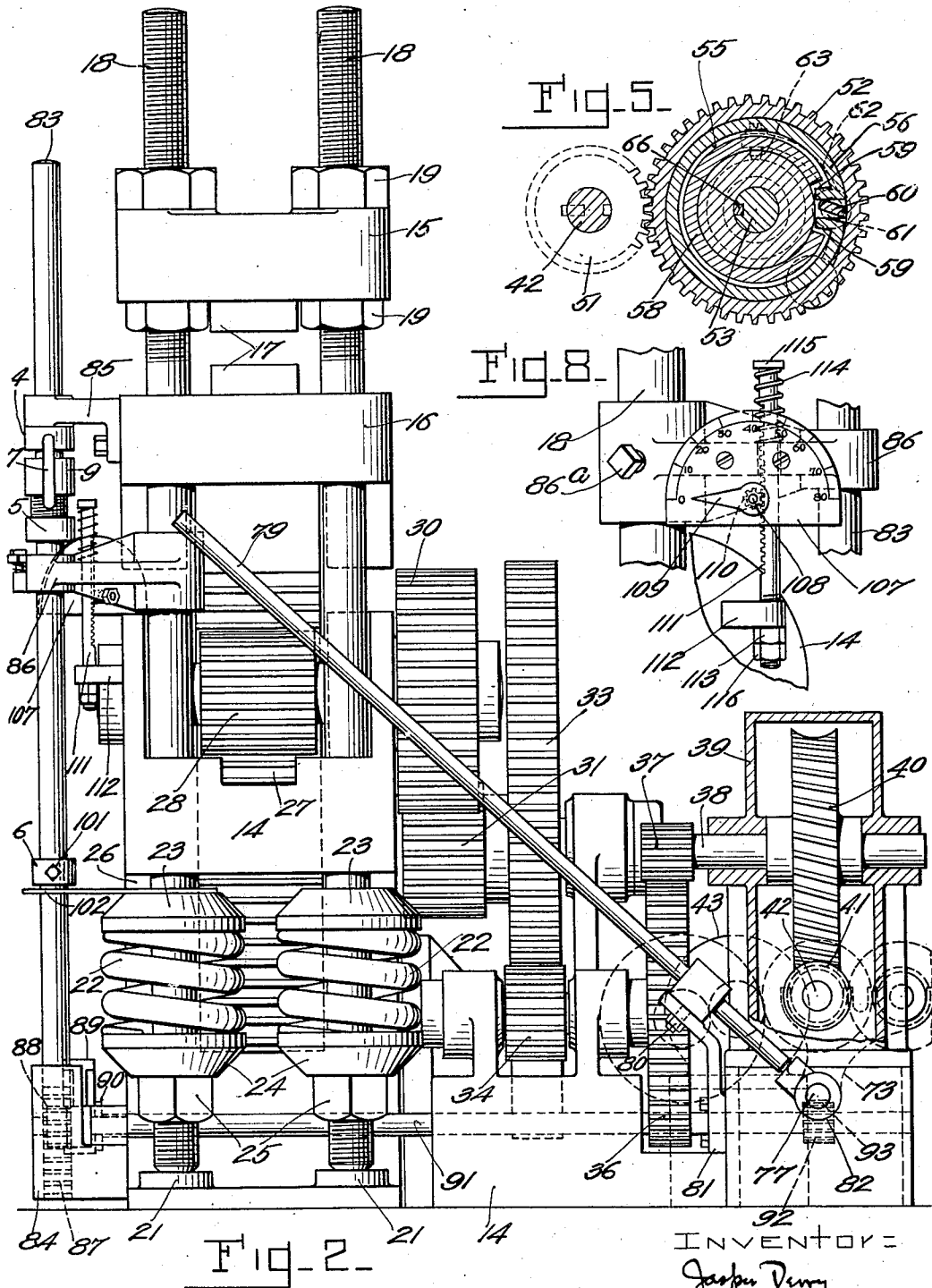
J. DERRY

1,880,873

PRESS

Filed Oct. 4, 1928

3 Sheets-Sheet 2



INVENTOR:
Jas. Derry
by Macdonald, Calver, Copeland & Tice
Attys.

Oct. 4, 1932.

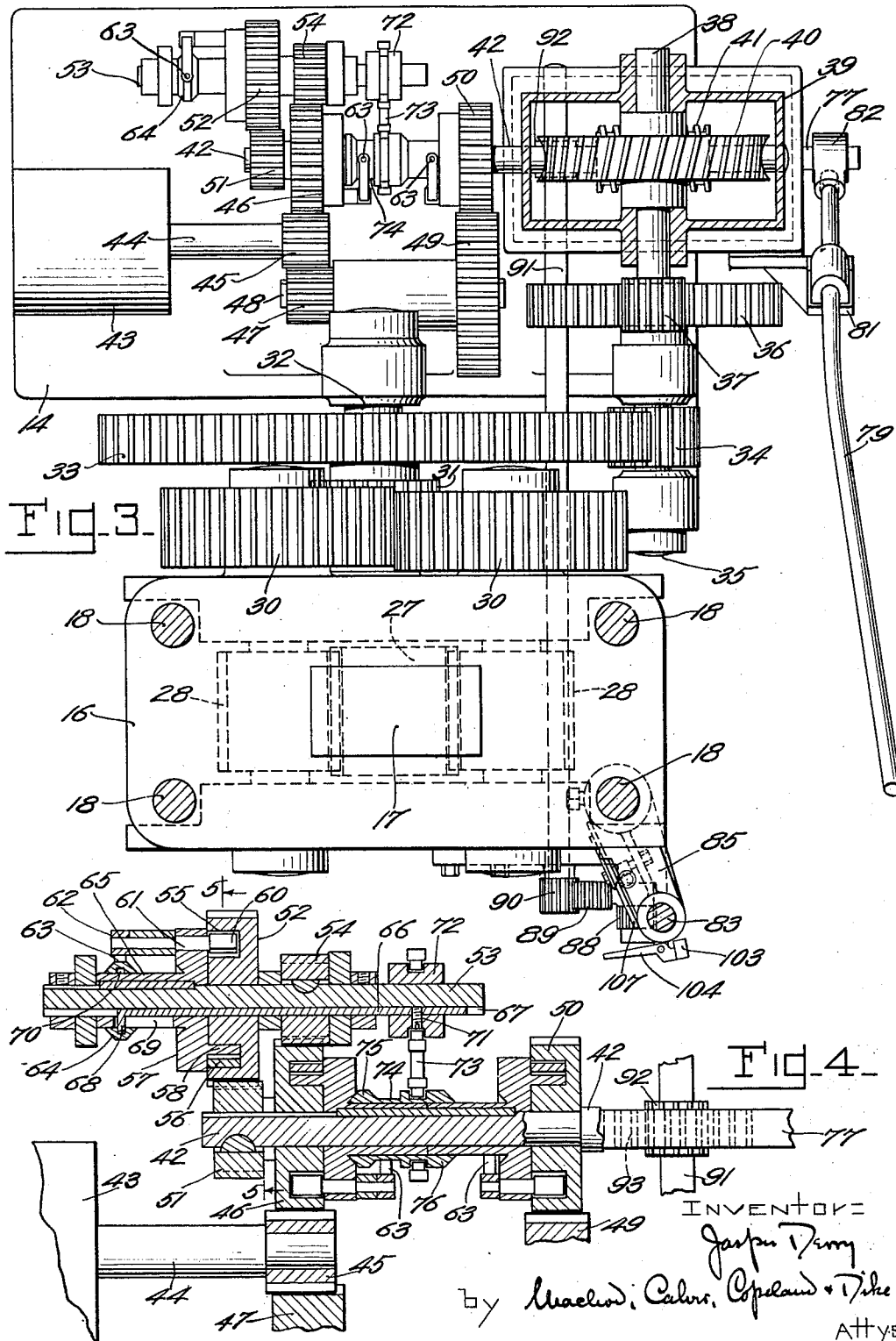
J. DERRY

1,880,873

PRESS

Filed Oct. 4, 1928

3 Sheets-Sheet 3



UNITED STATES PATENT OFFICE

JASPER DERRY, OF MEDFORD, MASSACHUSETTS, ASSIGNOR TO ANDREW TERKELSEN,
OF NEWTON, MASSACHUSETTS

PRESS

Application filed October 4, 1928. Serial No. 310,340.

This invention has for its primary object to provide a mechanically operated press which is capable of performing operations for which hydraulic presses have heretofore been required. The advantages of mechanical presses, as compared to hydraulic presses, from the standpoint of economy, compactness, convenience, and speed of operation, have long been recognized but their practical utility and availability have been limited to certain classes of work. For the application of heavy pressure to other classes of work, as where it is necessary to exert a fixed predetermined pressure upon pieces of work of varying sizes or in molds of varying thickness, or where it is necessary to maintain a constant pressure upon the work under volumetric changes in the latter, or where it is necessary to exert a substantial pressure throughout a stroke of substantial length, or where it is necessary to hold the work under a relatively light pressure for a time and thereafter apply the full pressure, practical considerations have heretofore necessitated the use of hydraulic presses. Such presses, however, with their accumulators and other accessories, are expensive to install and operate, are troublesome to maintain in working order, and are cumbersome and require undue space for their accommodation in the plant.

The present invention has, therefore, for an object to provide a compact and wholly mechanical press wherein the closing movement of the press elements is automatically controlled and limited by the pressure exerted upon the work irrespective of the size and character of the latter, and wherein said pressure is maintained after the stopping of the press notwithstanding subsequent volumetric changes in the work.

Further objects of the invention are to provide mechanism whereby the press elements are moved rapidly toward one another until they close upon the work and are thereafter moved more slowly and with greater force until the predetermined pressure has been reached whereupon their relative movement is automatically stopped and said pressure maintained, to provide mechanism for auto-

matically stopping the opening movement of the press elements when they have been separated by a predetermined but variable amount, to provide means whereby the predetermined pressure exerted upon the work can be conveniently adjusted and varied in accordance with the requirements, to provide means for measuring and indicating the amount of the pressure exerted, to provide means whereby the operation of the press can be manually as well as automatically controlled, and to provide means whereby a part only of the predetermined pressure may be applied to the work, the press automatically stopped, and the full amount of said pressure thereafter applied.

While, as above pointed out, the invention, considered in its more specific aspect, has for its primary object to adapt a mechanically operated press to the work of a hydraulic or other fluid pressure operated press, in its broader aspect the invention has for an object to provide a press wherein the movements of the press elements are automatically and variably controlled as above mentioned irrespective of the particular means or motive power employed to move them.

The foregoing and other objects of the invention, together with means whereby the latter may be carried into effect, will best be understood from the following description of a preferred embodiment thereof illustrated in the accompanying drawings. It will be recognized, however, that the particular construction and adaptation described and shown have been chosen for purposes of exemplification merely, and that the invention, as defined by the claims hereunto appended, may be otherwise embodied without departing from the spirit and scope thereof.

In said drawings:

Fig. 1 is a front elevation of the press embodying the invention.

Fig. 2 is a side elevation, partly broken away.

Fig. 3 is a plan view, partly broken away, as viewed from the line 3—3, Fig. 1.

Fig. 4 is a horizontal section, taken substantially on the line 4—4, Fig. 1, of the variable power transmitting mechanism.

Fig. 5 is a detail section taken substantially on the line 5—5, Fig. 4.

Fig. 6 is an enlarged detail front elevation, partly in section, of a portion of the automatic controlling mechanism.

Fig. 7 is a detail horizontal section taken substantially on the line 7—7, Fig. 6.

Fig. 8 is an enlarged detail elevation of the pressure indicating mechanism.

The relatively movable press elements comprise a bed 15 and a ram 16 which may carry suitable complementary dies 17 or other devices in accordance with the nature of the work to be performed by the press.

The bed 15 is supported by four parallel upright posts or rods 18 to which it is secured in any suitable manner, as by means of nuts 19. The post or rods 18 are guided for vertical longitudinal movement in suitable bearings 20 in the frame 14 and normally rest at their lower ends on abutments 21 provided at the base of said frame. Surrounding the posts or rods 18 below the bearings 20 are heavy coil springs 22 which are interposed between upper and lower collars, 23 and 24 respectively, loose on said posts but, together with the springs 22, held in a predetermined position thereon by nuts 25. The position of the spring and collar assembly on each rod, as determined by the adjustment of the corresponding nuts 25, is such that, when the posts rest upon the abutments 21, a limited clearance, indicated at 26 in Fig. 1, is provided between the upper collars 23 and the lower faces of the bearings 20. With this arrangement it will be seen that when the press elements approach one another, so as to engage the work therebetween at opposite sides, continued movement of the ram toward the bed will cause the latter, together with the posts 18, to be lifted until the lost motion provided by the clearance 26 is taken up, and that thereafter the pressure of the ram against the work and bed will be transmitted to the springs 22 which will yield to permit further movement of the bed and displacement of the posts to an extent determined by the pressure applied and consequent compression of the springs.

The ram 16 is carried by a double rack 27 guided in the frame 14 and engaged at opposite sides by pinions 28 fast on parallel shafts 29 journaled in the frame and having also fast thereon intermeshing gears 30. One of the gears 30 meshes with a pinion 31 fast on a shaft 32 journaled in the frame and having fast thereon a gear 33. The gear 33 meshes with a pinion 34 fast on a shaft 35 journaled in the frame and having fast thereon a gear 36. The gear 36 meshes with a pinion 37 fast on a shaft 38 which is journaled in a gear casing 39 carried by the frame. The shaft 38 has fast thereon a worm gear 40 which meshes with a worm 41 on a shaft 42 likewise journaled in gear casing 39.

The mechanism last described constitutes a train of powerful and non-reversible speed reducing gearing by which is applied to the ram 16 the power of an electric or other motor 43 supported upon the base of the frame, the power of said motor being transmitted to said gearing through variable-speed transmission mechanism which will now be described.

Referring particularly to Figs. 3 and 4, the shaft 44 of the motor 43 has fast thereon a pinion 45 which meshes at one side with a gear 46 normally loose on the worm shaft 42 and at the other with a pinion 47 fast on a counter-shaft 48 journaled in a bearing on the frame and having fast thereon a gear 49 which meshes with a gear 50 also normally loose on the shaft 42. Fast on the worm shaft 42 is a pinion 51 which meshes with a gear 52 normally loose on a second counter-shaft 53 journaled in suitable bearings on the frame and having fast thereon a pinion 54 which meshes with the gear 46.

The gears 46, 50 and 52 are adapted to be connected with their respective shafts for rotation therewith by clutches which may be of any suitable type but which preferably are of the internal expanding type. Said clutches, as shown, are all substantially alike, and description of one, shown in detail in Fig. 5, will suffice for all. As shown in said figure and in Fig. 4, each of said gears is formed in one face with an annular groove 55 in which is located a band 56 having spaced, inwardly-turned ends 59. The band 56 is retained within the groove 55 by a collar 57 keyed to the shaft and having an arcuate flange 58 extending into the groove 55 within the band 56, said flange having spaced ends between which are received the intumed ends 59 of the band. Said band normally floats loosely within the groove 55 but may be expanded into close engagement with the outer wall thereof by means of a cam 60 operating between the ends 59 of the band, said cam being carried by a shaft 61 journaled in the collar 57 and having at its outer end an arm 62 carrying a cam follower 63. Expansion of the band 56 serves to clutch the gear to the collar 57, and consequently to the shaft, by frictional engagement of its outer surface with the outer wall of the groove 55 and by positive engagement of the ends 59 thereof with the cam 60 and the ends of the flange 58.

The several clutches for connecting the gears 46, 50 and 52 to their respective shafts are severally operated by annular cam members mounted to slide longitudinally of the shafts and cooperating with the respective cam followers 63. The cam member 64 for operating the clutch controlling the gear 52 comprises a ring slidably mounted on a reduced hub portion 65 of the corresponding collar 57, said ring having bevelled edges separated by a short cylindrical peripheral

surface, whereby when said ring is moved into the position shown in Fig. 4 the clutch will be closed, and when moved longitudinally out of said position the clutch will be released. Said cam member is moved longitudinally by a sliding key 66 guided in a slot 67 in the shaft 53 and having an angular end 68 working in a slot 69 in the hub portion 65 and engaging an internal annular groove 70 in the cam member. At its opposite end the key 66 is secured, as by a screw 71, to a collar 72 slidably mounted on the shaft 53 and engaged by one arm of a double-armed clutch fork 73 (see also Figs. 1 and 2).

For operating the clutches for connecting the gears 46 and 50 with the shaft 42, there is provided a hub 74 slidably mounted on the abutting hub portions of the corresponding collars 57 and operated by the other arm of the clutch fork 73. Said hub 74 is provided with an annular projection 75 constituting a cam member similar in form to the cam member 64 and cooperating with the cam follower 63 which operates the clutch for controlling the gear 46, and with a second similar cam projection 76 (which, however, has only one bevelled face) adapted to cooperate with the cam follower 63 which operates the clutch for controlling the gear 50.

The several cam members 64, 75 and 76 are operated simultaneously, and in such manner as to produce the results hereinafter referred to, through the clutch fork 73, by a shipper rod 77 slidably mounted for longitudinal movement in the frame and to which the hub 78 (Fig. 1) of said clutch fork is secured. The arrangement is such that when the shipper rod 77 is in its extreme position toward the left, as shown in Fig. 1, the parts will be in the position shown in Figs. 3 and 4, and the gear 52 will be clutched to the shaft 53. When the shipper rod is moved toward the right from the position shown, the clutch controlling the gear 52 will be released and that controlling the gear 46 simultaneously closed, thereby releasing the gear 52 from the countershaft 53 and clutching the gear 46 to the worm shaft 42. Further movement of the shipper rod 77 toward the right first causes it to occupy a neutral position in which all of the clutches are disengaged, and thereafter causes the cam member 76 to close its respective clutch to clutch the gear 50 to the worm shaft 42, this being the extreme position of the shipper rod toward the right.

The shipper rod 77 may be manually operated as above described by a hand lever 79 pivoted at 80 to a bracket 81 secured to the frame and having at its end a ball and socket connection with a collar 82 secured to said shipper rod.

The shipper rod 77 is also automatically operated by a vertically disposed controller rod 83 guided for longitudinal movement at its lower end in a bearing 84 at the base of

the frame and also slidably engaging a bracket 85 carried by the ram 16 and a similar bracket 86 secured, as by a set screw 86a (Figs. 1 and 8) to one of the posts 18. At its lower end the controller rod 83 is formed with rack teeth 87 which engage a pinion 88 rotatably mounted in the frame. The pinion 88 has secured thereto or formed integral therewith a gear segment 89 which meshes with a pinion 90 fast on a shaft 91 suitably journaled in the frame and extending rearwardly thereof. Adjacent its rear end the shaft 91 has fast thereon a second pinion 92 which meshes with rack teeth 93 formed on the shipper rod 77. It will be seen that, with the connections shown, upward movement of the controller rod 83 will result in movement of the shipper rod 77 toward the right in Fig. 1, and downward movement of said controller rod will result in movement of the shipper rod toward the left.

The controller rod 83 is provided with three collars 4, 5 and 6 respectively. The collar 4 is adjustably secured to said rod by a manually operable clamping screw 7 and is arranged beneath the bracket 85 for engagement by the latter when the ram 16 descends. The collar 5 is arranged above the bracket 86 for engagement thereby when the corresponding post 18 moves upwardly under the yielding action of the springs 22. Said collar 5 is formed with an extended hub portion 8 (see Fig. 6) in adjustable threaded engagement with a second collar 9 secured to the rod 83 by a set screw 10. The collar 6 is secured to the rod 83 by a set screw 101 and is arranged for engagement by an arm 102 carried by the adjacent collar 23 when the bed moves upwardly to take up the lost motion afforded by the clearance 26.

The operation of a machine as thus far described is as follows: In Figs. 1 and 2 the ram 16 is shown in the lowest position provided for by the adjustments illustrated. To start the press, after the insertion of the work between the dies 17, the hand lever 79 is moved into its extreme position toward the right, Fig. 1, thereby moving the shipper rod 77 into its extreme position toward the left. This causes the gear 52 to be clutched to the shaft 53, as above explained, whereupon the worm shaft 42 will be driven from the motor 43 at relatively high speed through the pinion 45, gear 46 (which at this time is loose on the shaft 42), pinion 54, gear 52, and pinion 51. The ram will thereupon be moved upwardly at relatively high speed through the reduction gearing above described until the dies 17 close upon the work. Thereupon the movement of the ram will be transmitted through the work to the bed 15, and the latter will be lifted slightly, carrying with it the posts 18, until the lost motion provided by the clearance 26 has been taken up. This movement of the bed and posts causes the arm

102 to engage the collar 6, lifting the controller rod 83 which, through the connections described, moves the shipper rod 77 into its first position toward the right, causing the gear 52 to be unclutched from the countershaft 53 and the gear 46 to be clutched to the worm shaft 42. The latter shaft is thereupon driven from the motor 43, in the same direction but at a relatively low speed, through the pinion 45 and gear 46. The ram 16 is thereupon given a further upward movement at relatively low speed to exert upon the work a gradually increasing pressure as the springs 22 yield and are compressed, this being accompanied by a further upward movement of the bed 15 and posts 18, as heretofore explained. When the predetermined limit of this pressure has been reached, the bracket 86 engages the collar 5, resulting in a further movement of the shipper 77 toward the right into neutral position, thereby stopping the press. The work is thereupon resiliently held under the predetermined pressure by the springs 22 which, in case of any shrinkage of the work, can expand slightly to exert a follow-up pressure thereon. To release the pressure and separate the press elements, the hand lever 79 is moved toward the left in Fig. 1, thereby causing a further movement of the shipper rod 77 toward the right and causing the gear 50 to be clutched to the worm shaft 42. Said worm shaft is thereupon driven in a reverse direction from the motor 43 through the pinion 45, gear 47, shaft 48, gear 49, and gear 50. The ram 16 is thereby moved downwardly until the bracket 85 engages the collar 4, whereupon the controller rod 83 is moved downwardly, the shipper rod 77 moved toward the left into neutral position, and the press again stopped.

It will be observed that in the foregoing operations the upward movement of the ram is controlled entirely by the engagement of the press elements with the work, being rapidly closed upon the work and thereafter moved toward one another at slower speed with greater force until the predetermined pressure has been exerted, whereupon their movement is automatically stopped and the pressure maintained irrespective of any subsequent volumetric changes in the work. It will therefore be seen that the press automatically adapts itself to work of varying sizes and exerts the predetermined pressure thereon irrespective of its size or character. The amount of this pressure can be varied according to the requirements by adjustment of the collar 5, which determines the extent to which the springs 22 are compressed, and the consequent amount of vertical displacement of the posts 18, before the press is stopped. It will also be seen that the amount of separation of the press elements is automatically determined by engagement of the bracket 85 with the collar 4 and may there-

fore be varied in accordance with the requirements by adjustment of said collar on the rod 83.

In certain classes of work it is sometimes necessary or desirable to exert upon the work a part only of the predetermined pressure for which the machine is adjusted, to stop the machine for a period to let the work set, and thereafter to apply the full predetermined pressure thereto. For this purpose, in the construction shown, there is provided a stop 103 (Figs. 1, 6, and 7) carried by a manually operable lever 104 pivoted at 105 to the bracket 86 and normally held in the inoperative position shown in full lines in Fig. 7 by a spring 106. The arrangement is such as to permit the stop 103 to be moved by manual operation of the lever 104, into the position shown in dotted lines in Fig. 7 in which position it is interposed between the bracket 86 and collar 5. When the stop is in this position, the press will be automatically stopped before exerting the full predetermined pressure upon the work, after which said stop may be manually withdrawn and the press again started, by operation of the hand lever 79, to exert its full pressure, being again automatically stopped by engagement of the bracket 86 with the collar 5 when said pressure is reached.

In accordance with one feature of the invention, means are provided for indicating the pressure exerted by the press upon the work. As shown most clearly in Fig. 8, the indicating means comprises a dial plate 107 secured to the bracket 86 and having a scale which may be graduated in tons, thousands of pounds, or other convenient units. Journalled in the dial plate 107 is an arbor 108 carrying at one end a pointer 109 movable over the scale on said dial plate. Secured to the opposite end of the arbor 108 is a pinion 110 which cooperates with a rack bar 111 guided in an opening in the bracket 86. The lower end of the rack bar 111 is slidably received in an opening in a boss 112 on the frame 14 and is provided beneath said boss with an adjustable stop nut 113 whereby the indicator may be calibrated, as hereinafter explained, said stop nut being preferably secured in adjusted position by a lock nut 116. The upper end of the rack bar 111 is surrounded by a spiral spring 114 interposed between the bracket 86 and a head 115 on said bar. It will be seen that the pressure exerted upon the work, as determined by the compression of the springs 22 and consequent upward movement of the bed 15 and posts 18, may be indicated on the dial 107 by the pointer 109 due to the movement of the bracket 86 relative to the frame 14. When the press elements are fully separated, as shown in Figs. 1 and 2, the rack bar 111 is held by the spring 114 in the position shown in Fig. 8, the stop nut 113 being so adjusted that when the bed

has been moved upwardly to a sufficient extent to take up the lost motion provided by the clearance 26, a pressure corresponding to the weight of the bed and its connected posts will be indicated by the pointer 109 on the dial 107. Thereafter, the pressure due to the yielding of the springs 22, and accompanied by a further upward movement of the bed, will cause a further movement of the pointer over the dial to indicate such additional pressure.

Having thus described my invention, I claim:

1. In a press, the combination with relatively movable press elements, of an element subjected to the pressure exerted between said press elements and displaceable thereby amounts varying with the amount of said pressure, means for relatively moving said elements toward one another comprising a rack carried by one of said elements, a train of speed reducing gearing, a source of power, and variable-speed transmission mechanism for transmitting said power for moving said elements, and means actuated by a predetermined movement of said displaceable element for controlling said moving means and stopping the relative movement of said press elements thereby, said parts having provision for varying the movement of said displaceable element required to actuate said stopping means.

2. In a press, the combination with relatively movable press elements, of means for resiliently supporting one of said elements against the pressure exerted between them, of means for relatively moving said elements toward one another at variable speed and with inversely varying power, comprising a train of speed reducing gearing, a source of power and transmission mechanism for transmitting said power through said gearing to said elements and means, automatically controlled by the positions of said elements with respect to work therebetween, for controlling said moving means to cause the latter to move said elements toward one another at relatively high speed and low power until they engage the work at opposite sides and thereafter at reduced speed and increased power.

3. In a press, the combination with relatively movable press elements, of means for resiliently supporting one of said elements against the pressure exerted between them, of power mechanism including a rack carried by one of said elements and change-speed gearing for relatively moving said elements toward one another at variable speed and with inversely varying power, and means, automatically controlled by the positions of said elements with respect to work therebetween, for controlling said mechanism to cause the latter to move said elements toward one another at relatively

high speed and low power until they engage the work at opposite sides and thereafter at reduced speed and increased power.

4. In a press, the combination with relatively movable press elements one of which is arranged to have a limited lost motion under the influence of pressure exerted between them, of means for relatively moving said elements toward one another at variable speed and with inversely varying power, and means, automatically controlled by the taking up of said lost motion when said elements are brought together upon the work, for controlling said moving means to cause the latter to move said elements toward one another at relatively high speed and low power until they engage the work at opposite sides and thereafter at reduced speed and increased power.

5. In a press, the combination with relatively movable press elements, of means for resiliently supporting one of said elements against the pressure exerted between them, said last named element and its supporting means having provision for a limited lost motion, means for relatively moving said elements toward one another at variable speed and with inversely varying power, and means operatively connected with said resiliently supported element for controlling said moving means, said controlling means being actuated by said element when said lost motion is taken up to reduce the speed of operation of said moving means, and being further actuated by said element when said supporting means yields to stop said moving means.

6. In a press, in combination, a bed, a ram, mechanism for moving said ram toward said bed, springs for supporting said bed against the pressure of said ram, said parts being arranged to permit a limited lost motion of said bed, a source of power, variable speed transmission mechanism for connecting said first named mechanism with said source of power, a controller for said transmission mechanism having high and low speed positions and a neutral position wherein said mechanism is inoperative to transmit power, and operative connections between said bed and controller for moving the latter from high to low speed position when said lost motion is taken up and for moving the same into neutral position when said springs yield.

7. In a press, in combination, a bed, a ram, springs for supporting said bed against the pressure of said ram, mechanism for moving said ram toward and away from said bed, comprising a rack carried by said ram, a train of speed reducing gearing, a source of power, and variable-speed transmission mechanism for transmitting said power through said gearing to move said ram, a controller movable to disengage said transmission mechanism and thereby stop the movement of said ram, and cooperating stops

carried by said controller and ram respectively and adapted to be brought into engagement to move said controller when said ram has been moved a predetermined distance away from said bed.

8. In a press, in combination, a resiliently supported bed, a ram, means for moving said ram toward and from said bed, comprising a rack carried by said ram, a train of speed reducing gearing, a source of power and variable speed transmission mechanism for transmitting said power through said gearing to move said ram and a controller operatively connected with both said ram and said bed for controlling said moving means and stopping the movement of said ram upon a predetermined movement of either of said elements.

9. In a press, in combination, a bed, a ram, springs for supporting said bed against the pressure of said ram, mechanism for operating said ram, comprising a rack carried by said ram, a train of speed reducing gearing, a source of power, and variable-speed transmission mechanism for transmitting said power through said gearing to move said ram, a controller for said mechanism having a neutral position wherein said mechanism is inoperative to move said ram and positions on opposite sides of said neutral position wherein said mechanism is operative to move said ram toward and away from said bed, a connection between said bed and controller for moving the latter from one of its operative positions into its neutral position when said springs and bed yield under the pressure exerted thereagainst by said ram, and a connection between said ram and controller for moving the latter from the other of its operative positions into its neutral position when said ram has been moved a predetermined position away from said bed.

10. In a press, in combination, relatively movable press elements, means for relatively moving said elements toward and away from one another, comprising a train of speed reducing gearing, a source of power, and variable speed transmission mechanism transmitting said power for relatively moving said elements, and a movable controller for said means operatively connected with both of said elements.

11. In a press, in combination, relatively movable press elements, mechanism for relatively moving said elements toward and away from one another, comprising a rack carried by one of said elements, a train of speed reducing gearing, and a source of power, variable transmission mechanism for connecting said first named mechanism with said source of power and disconnecting the same therefrom, and a movable controller member for said transmission mechanism operatively connected with both of said elements.

12. In a press, in combination, relatively movable press elements, means for relatively

moving said elements toward and away from one another comprising a rack carried by one of said elements, a train of speed reducing gearing, a source of power, and variable-speed transmission mechanism for transmitting said power through said gearing to move said elements, and a single movable controller for said means having adjustable stops thereon, both of said press elements having connected therewith cooperating stops adapted to engage the stops on said controller to move the latter.

13. In a press, in combination, relatively movable press elements, mechanism for relatively moving said elements toward and away from one another comprising a rack carried by one of said elements, a train of speed reducing gearing, a source of power, and variable transmission mechanism for connecting said first named mechanism with said source of power and disconnecting the same therefrom, a shipper rod for controlling said transmission mechanism, and a controller rod operatively connected with both of said press elements for operating said shipper rod.

14. In a press, in combination, relatively movable press elements, means for relatively moving said elements toward and away from one another comprising a rack carried by one of said elements, a train of speed reducing gearing, a source of power, and variable-speed transmission mechanism for transmitting said power for moving said elements, manually operable means for controlling said moving means, and identical means operatively connected with both of said press elements for automatically operating said controlling means.

15. In a press, in combination, relatively movable press elements, means for relatively moving said elements toward one another comprising a rack carried by one of said elements, a train of speed reducing gearing, a source of power, and variable-speed transmission mechanism for transmitting said power for moving said elements, automatic means controlled by the pressure exerted between said elements for stopping their relative movement, and means associated with said automatic means for rendering the latter operative to stop said movement at any one of a plurality of predetermined pressures.

16. In a press, in combination, relatively movable press elements, means for relatively moving said elements toward one another, an element subjected to the pressure exerted between said press elements and displaceable thereby amounts varying with the amount of said pressure, a controller member movable to stop the movement of said elements, a stop carried by said controller member, a stop associated with said displaceable element and cooperating with said first named stop to move said controller member when said displaceable member has been displaced a pre-

determined amount, and a third manually operated stop associated with one of said aforementioned stops and operable to vary their position of operative engagement and the consequent displacement of said displaceable member required to move said controller member.

17. In a press, the combination of a bed, a ram, springs for supporting said bed against the pressure of said ram, mechanism for moving said ram toward and away from said bed, comprising a rack carried by said ram, a train of speed reducing gearing, a source of power, and variable speed-transmission mechanism for transmitting said power through said gearing to move said ram, a shipper rod for manually controlling said transmission mechanism movable into high and low forward speed positions, neutral, and reverse speed position, and a hand lever for moving said shipper rod into said positions.

18. In a press, the combination of a bed, a ram, springs for supporting said bed against the pressure of said ram, mechanism for moving said ram toward and away from said bed, comprising a rack carried by said ram, a train of speed reducing gearing, a source of power, and variable speed-transmission mechanism for transmitting said power through said gearing to move said ram, a shipper rod for manually controlling said transmission mechanism movable into high and low forward speed positions, neutral, and reverse speed position, a hand lever for moving said shipper rod into said positions, and a controller rod for automatically moving said shipper rod into said respective positions.

19. In a press, the combination of a bed, a ram, springs for supporting said bed against the pressure of said ram, mechanism for moving said ram toward and away from said bed, comprising a rack carried by said ram, a train of speed reducing gearing, a source of power, and variable speed-transmission mechanism for transmitting said power through said gearing to move said ram, a shipper rod for manually controlling said transmission mechanism movable into high and low forward speed positions, neutral, and reverse speed position, a hand lever for moving said shipper rod into said positions, a controller rod for automatically moving said shipper rod into said respective positions and having operative connections with said bed for moving said controller rod from high to low speed position, and for moving the same into neutral position when said springs yield, and having operative connections with said ram for moving the controller rod from reverse to neutral position.

In testimony whereof I affix my signature.

JASPER DERRY.