April 23, 1929. T. F. STACY 1,709,921

HYDRAULIC PRESS

Filed Feb. 4, 1928

Fig. 1.

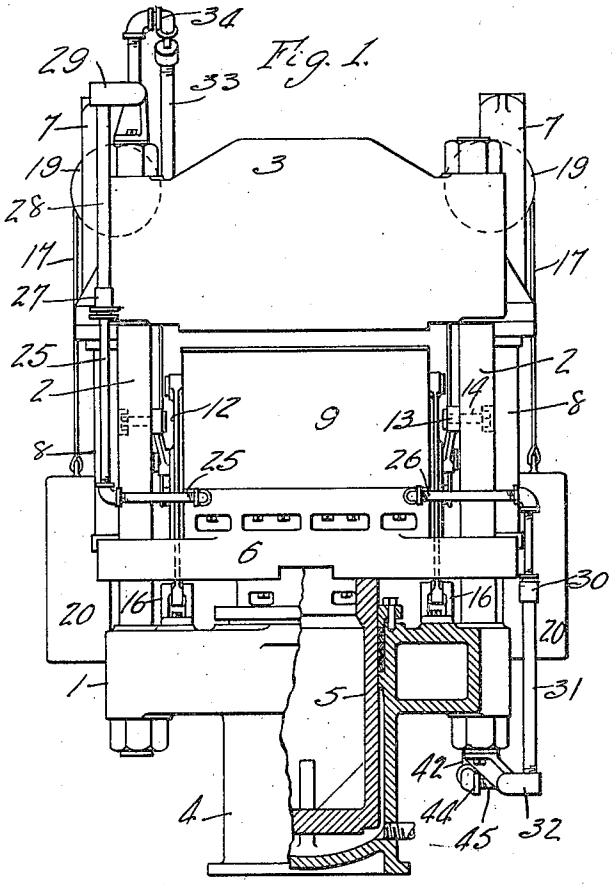
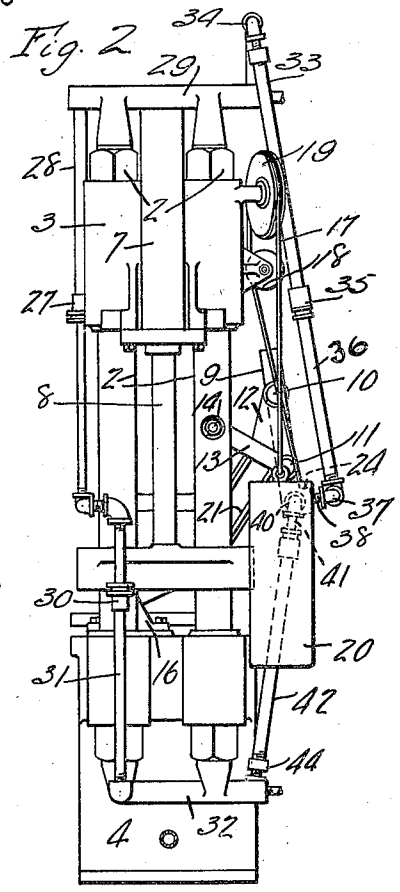


Fig. 2.



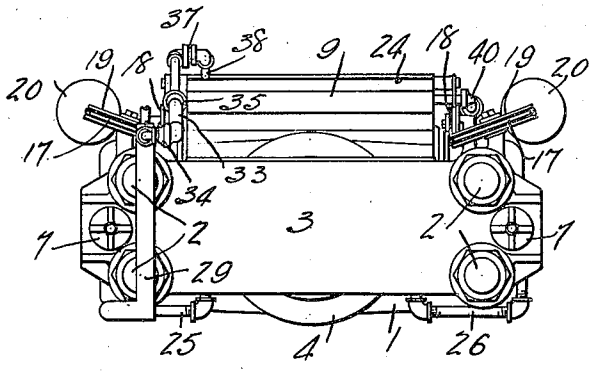
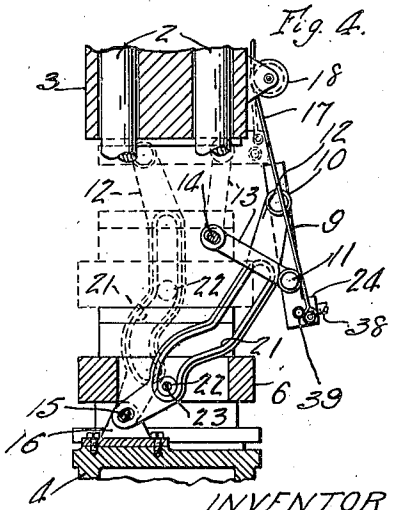


Fig. 3.

Fig. 4.



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UNITED STATES PATENT OFFICE.

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HYDRAULIC PRESS.

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This invention relates to hydraulic presses, and particularly to the type having a tilting die carrying head.

An object of the invention is to generally improve and simplify hydraulic presses of the tilting head type.

A further object of the invention is to provide an improved attachment for presses of the type having a fixed head and a movable ram, which may be easily applied to such a press; which will convert such a press into one of the tilting head type; and which will be relatively simple, practical, compact, efficient and relatively inexpensive.

A further object of the invention is to provide an improved and simplified press of the tilting head type; with which the tilting head may be operated automatically into and out of contact or pressure position in a simple and dependable manner; with which pressure stresses on the tilting means will be avoided; and with which the tilting head will be always held in proper aligned position when the ram contacts therewith.

Various other objects and advantages will be apparent from the following description of an embodiment of the invention, and the novel features will be particularly pointed out hereinafter in connection with the appended claims.

In the accompanying drawings:

Fig. 1 is a front elevation, partly in section, of a press constructed in accordance with this invention;

Fig. 2 is a side elevation of the same;

Fig. 3 is a plan of the same; and

Fig. 4 is a partial sectional elevation of the same, illustrating the operation of the tilting head into and out of contact or pressing position.

In the illustrated embodiment of the invention, the press includes a frame formed of a base or lower head 1 from which a plurality of strain rods 2 extend upwardly. A relatively fixed pressure head 3 is mounted upon ends of said strain rods 2 in the usual manner. The base or lower head 1 may have a cylinder 4 mounting the ram 5 having a cap 6 which is moved by hydraulic pressure in a well known manner toward and from the fixed head 3. Suitable pull-back cylinders 7 may have pistons or rams 8 operating therein and connected to the cap 6 for retracting the same after a pressing operation. Presses of this type are well known in the art and per se form no part of the present invention.

The upper face of the cap 6 may be formed for mounting a suitable die. Complementary dies may be mounted on the lower face of a tilting head or carrier 9, and the carrier 9 at each side may be connected by pivot pins 10 and 11 to the ends of levers 12 and 13 respectively. The levers 13 may be pivotally connected by pins 14 to the strain rods 2, and the levers 12, which may be longer, are pivotally connected by pins 15 to suitable brackets 16 which are removably attached to a suitable part of the frame such as to the base or lower head 1. The levers 12 and 13 are so arranged, relatively to one another, that the carrier 9 may be shifted laterally into and out of a position across or against the lower face of the head 3, such position being shown by dash lines in Fig. 4.

When the carrier 9 is shifted laterally out of such position it will be tilted into an inclined position, preferably closely approaching a vertical position at the rear of the press, as shown in full lines in Fig. 4. A flexible cable 17 may be connected to each side of the carrier 9, preferably adjacent the rear or lower end thereof, each cable passing over sheaves or pulleys 18 and 19 and at its free end attached to a counterweight 20. Thus the counterweight 20 will offset the weight of the carrier 9 and dies carried thereby, so that the work required to shift the carrier and its dies laterally into and out of the pressing position shown by dash lines in Fig. 4 will be a minimum. The upper pulleys 19 are preferably disposed diagonally of the corners and hold the counterweights 20 out of the path of movement of the carrier, so as not to interfere with the operation of various parts of the press.

One or both levers 12 may be provided with a cam slot 21 extending in a direction lengthwise thereof, and a cam follower or roller 22 carried by a pin 23 on the adjacent side of the cap 6 runs in the slot 21 so that as the ram 5 moves toward the head 3, the followers 22 will operate the levers 12 in a manner to shift the carrier 9 into the con-

tact position shown by the dash lines in Fig. 4. When the ram 5 is retracted, the carrier 9 will be similarly shifted laterally out of such position, and into the tilted position shown in full lines.

The lower section of each cam slot 21 is of such a character, as shown, that during the initial advance movement of the ram, the followers 22 will shift the levers 12 in a manner to position the carrier 9 in contact or pressure position, aligned with the cap 6, and then when the followers 22 reach the upper section of the slots 21, they will hold the levers 12 against movement in either direction during the remaining advance movement of the ram. By so holding the levers 12 against movement in either direction, the carrier 9 will be held against movement out of aligned position. To further aid in positioning the carrier 9 in aligned position, the carrier may have, at its rear end, an abutment or shoulder 24 which is adapted to engage with a side of the head 3 and determine the aligned position of the carrier. When the carrier 9 is in its rearward or inclined position as shown in full lines, its lower or die mounting surface will face forwardly so as to be visible and accessible to the operator for inspection and for removal of any molded articles which may be retained in or attached to the dies carried thereby.

Inasmuch as some slight clearance between the carrier 9 and the lower face of the head 3 will usually be necessary in order to permit of lateral movement of the carrier 9 into and out of pressure or aligned position, the levers 12 and 13 at their ends which are connected to the pivot pins 14 and 15 may have slots fitting those pins and elongated somewhat lengthwise of the lever, as shown in Fig. 4, so that when the carrier 9 is shifted into aligned position, the slots in the levers 12 and 13 which fit the pins 14 and 15 will permit of a limited endwise movement of the levers 12 and 13 and thus a limited movement of the carrier 9 vertically against the under face of the fixed head 3. Hence, when the cap 6 engages the carrier 9, the two can move together to a limited extent until the carrier 9 firmly contacts with the lower face of the head 3, and then the pressure strain or stresses on the carrier 9 will be entirely borne by the head 3 and not by the pivot pins 14 and 15.

When the press is utilized for the molding of articles of bakelite, celluloid, rubber, or other materials where thermal treatment is desired, such as in order to harden the molded articles in the dies, the cap 6 and the carrier 9 may each be connected to a source of a thermal treating medium. For example, in the illustrated embodiment of the invention, pipes 25 and 26 may be connected to the cap 6, the pipe 25 extending vertically and passing through a packing gland 27 into another pipe 28 leading to a header 29 carrying a supply of a heating medium such as steam. The pipe 26 descends downwardly through a stuffing box or gland 30 into a pipe 31 and the latter in turn is connected to a header 32 for conveying away the heating medium after use. Thus the stuffing boxes or glands 27 and 30 permit vertical movements of the pipes 25 and 26 with the cap 6, without loss of the heating medium conveyed to the cap while in any position during its movements.

A pipe 33 is provided with a flexible or swivel connection 34 to the upper header 29 so as to depend therefrom at the rear face of the press and be capable of swinging forwardly and rearwardly of the press at one end thereof (Figs. 1 and 2). The pipe 33, at its lower end, is provided with a stuffing box or gland 35, and a pipe 36 extends slidingly into the pipe 33 through the gland 35. The lower end of the pipe 36 is connected by a swivel connection 37 to a nipple 38 leading into one side of the carrier 9, and thus a heating medium from the header 29 may be conducted through the swivel connection 34, pipes 33 and 36, connection 37 and nipple 38 to one side of the carrier 9. An outlet nipple 39 may be connected to the other side of the carrier 9, and in turn has a swivel connection 40 to a pipe 41 which is slidingly mounted in a pipe 42, the latter having a packing gland 43 at its open end through which the pipe 41 extends. The lower end of the pipe 42 has a swivel connection 44 (Fig. 1) to a nipple 45 entering the lower header 32. Thus the heating medium leaving the carrier 9 will be conducted through the swivel connection 40, pipe 41, pipe 42, swivel connection 44 and nipple 45 to the exhaust header 32. When the carrier moves laterally into and out of contact or pressing position, the pipes 36 and 41 will slide vertically in the pipes 33 and 42 to compensate for or permit of vertical movements of the rear end of the carrier 9, and the pipes 33 and 42 will swing forwardly and rearwardly to compensate for or permit of forward and rearward movements of the carrier 9.

The operation of the press herein described and illustrated should be obvious from the foregoing description, but will be briefly stated. When the ram 5 is in retracted position, the carrier 9 will be in its tilted or nearly vertical position at the rear of the press, as shown in all the figures of the drawing, and the dies in the tilting head or carrier 9 will be facing, and therefore visible and accessible to, an operator in the front of the press. After the material to be molded or pressed has been placed in the dies, the ram is operated or advanced by the admission of a suitable compressed fluid

medium to the cylinder 4. As the ram 5 advances, the followers 22 will first shift the levers 12 forwardly so as to carry the carrier 9 into aligned or pressure position shown in dash lines in Fig. 4, and will then hold the carrier in that position during the remaining advance movement of the ram. After contact of the cap 6 and carrier 9 has been established, the carrier 9 can move vertically slightly so as to be firmly pressed against the fixed head 3. When the desired pressure has been established, the heating medium may be admitted to the header 29 and will then pass to the dies of the cap 6 and the carrier 9, the heating medium being removed through the headers 32. After the pressure has been maintained for a desired length of time, the heating medium may be cut off, and the ram 5 retracted by a release of pressure in the cylinder 4 and suitable operation of the pull-back rams 8. During the initial retraction of the ram 5, the carrier 9 will be held in aligned or pressure position, and then during the latter portion of the retraction of the ram 5, the followers 22 running in the lower section of the slots 21 will shift the levers 12 rearwardly and thus shift the carrier 9 rearwardly. By the cooperation of the levers 13, the carrier in moving rearwardly, will be tilted into an inclined or nearly vertical position as shown in full lines on the drawings. The operator may then dislodge the molded articles from the dies of the carrier 9 and the cap 6, and prepare the dies for another operation.

It will be obvious that various changes in the details, which have been herein described and illustrated in order to explain the nature of the invention, may be made by those skilled in the art within the principle and scope of the invention as expressed in the appended claims.

Claims:—

1. In a hydraulic press, a fixed press head having a pressure face, a die mounting press head movable toward and from said first head, a die carrier, means mounting said carrier for movement laterally into and out of a position across said pressure face, with its dies aligned for cooperative contact with the dies of the movable head.

2. In a hydraulic press, a fixed press head having a pressure face, a die mounting press head movable toward and from said first head, a die carrier, means mounting said carrier for movement laterally into and out of a position across said pressure face, with its dies aligned for cooperative contact with the dies of the movable head, said mounting means permitting limited movement of said carrier against said fixed head with said movable head, to relieve said mounting means of the pressure stresses.

3. In a hydraulic press, a fixed press head having a pressure face, a die mounting press head movable toward and from said first head, a die carrier, means mounting said carrier for movement laterally into and out of a position across said pressure face, said carrier and fixed head having cooperating portions preventing said lateral movement of said carrier in one direction beyond a position in which its dies are aligned for cooperative contact with the dies of said movable head, but permitting movement of said carrier toward said fixed head by pressure thereon from said movable head, said mounting means permitting movement of said carrier against said fixed head by pressure from said movable head.

4. In a hydraulic press, a fixed press head having a pressure face, a die mounting press head movable toward and from said first head, a die carrier, and means mounting said carrier for movement laterally into and out of a position across said pressure face, with its dies aligned for cooperative contact with the dies of the movable head, said means permitting tilting of said carrier into an inclined position as said carrier moves laterally out of aligned position.

5. In a hydraulic press, a fixed press head having a pressure face, a die mounting press head movable toward and from said first head, a die carrier, means mounting said carrier for movement laterally into and out of a position across said pressure face, with its dies aligned for cooperative contact with the dies of the movable head, said means and movable head having cooperative portions automatically moving said carrier laterally to one side of the fixed head when the movable head is retracted, and returning it to aligned position during approach of the movable head towards the fixed head.

6. In a hydraulic press, a fixed press head having a pressure face, a die mounting press head movable toward and from said first head, a die carrier, means mounting said carrier for movement laterally into and out of a position across said pressure face, with its dies aligned for cooperative contact with the dies of the movable head, said means and movable head having a connection to one another operative, upon retraction of said movable head, for causing movement of said carrier laterally away from aligned position and, upon advance of said movable head, for first returning said carrier to aligned position and then holding it aligned during the remaining advance movement of the movable head.

7. In a hydraulic press, a fixed press head having a pressure face, a die mounting press head movable toward and from said fixed head, a die carrier, levers hinged to and mounting said carrier for movement laterally into and out of a position across and approximately abutting said pressure face,

said levers tilting said carrier towards the vertical as it moves laterally away from said position.

8. In a hydraulic press of the type having a frame, with a fixed head and a ram movable toward and from said head, a die carrier, and means mounting said die carrier and attachable to said frame for guiding said carrier laterally into and out of a position across and approximately abutting said head in a position for pressure contact with said ram.

9. In a hydraulic press of the type having a frame, with a fixed head and a ram movable toward and from said head, a die carrier, means mounting said die carrier and attachable to said frame for guiding said carrier laterally into and out of a position across and approximately abutting said head in a position for pressure contact with said ram, said means tilting said carrier towards the vertical as the carrier moves laterally out of said position, and means for counterweighting said carrier to facilitate the movement thereof into and out of said position.

10. In a hydraulic press of the type having a frame, with a fixed head and a ram movable toward and from said head, a die carrier, means mounting said die carrier and attachable to said frame for guiding said carrier laterally into and out of a position across and approximately abutting said head in a position for pressure contact with said ram, and means connected to said means and said ram, operative upon retraction of said ram to cause movement of said carrier out of said position, and upon advance of said ram to first return said carrier to said position and then hold it in that position during the remaining advance of said ram.

11. In a hydraulic press, a frame provided with a fixed head having a pressure face, a ram movable toward and from said head, a die carrier, means connected to said frame and carrier and mounting the carrier for movement laterally into and out of a position against said head in alinement with said ram, and connections to said ram and said carrier for conducting a heating medium thereto and permitting movements of said ram and carrier.

12. In a hydraulic press of the type having a frame with a fixed head, and a ram movable toward and from said head, the combination therewith of a die carrier, a pair of levers connected to each side of said carrier and also connected to said frame for guiding said carrier laterally of the direction of movement of said ram, into and out of a position against said head for compression between said ram and said head, one of said levers having a cam slot, and a cam follower connected to said ram, engaging in said slot, and operative when said ram moves toward said head to shift said carrier laterally into a position against said head and aligned with said ram, and to hold it in said position during the remainder of the advance of said ram, and upon retraction of said ram to hold said carrier in said position until the ram has completed a part of its retraction and then shift it laterally towards a vertical position at one side of the press.

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