

F. E. STEVENSON.

PRESS.

APPLICATION FILED MAY 24, 1920.

1,357,258.

Patented Nov. 2, 1920.

3 SHEETS—SHEET 1.

Fig. 1.

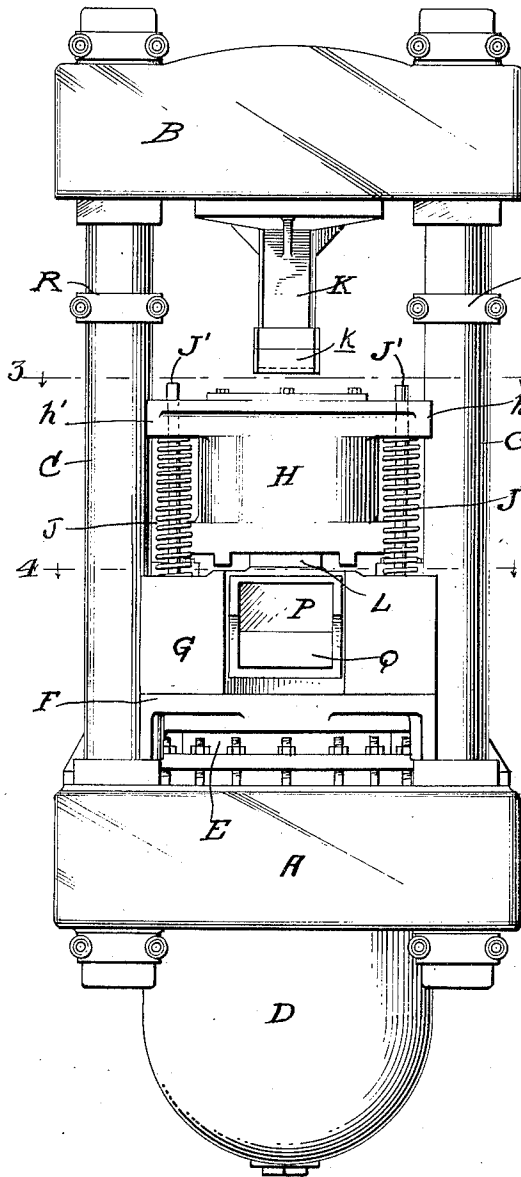
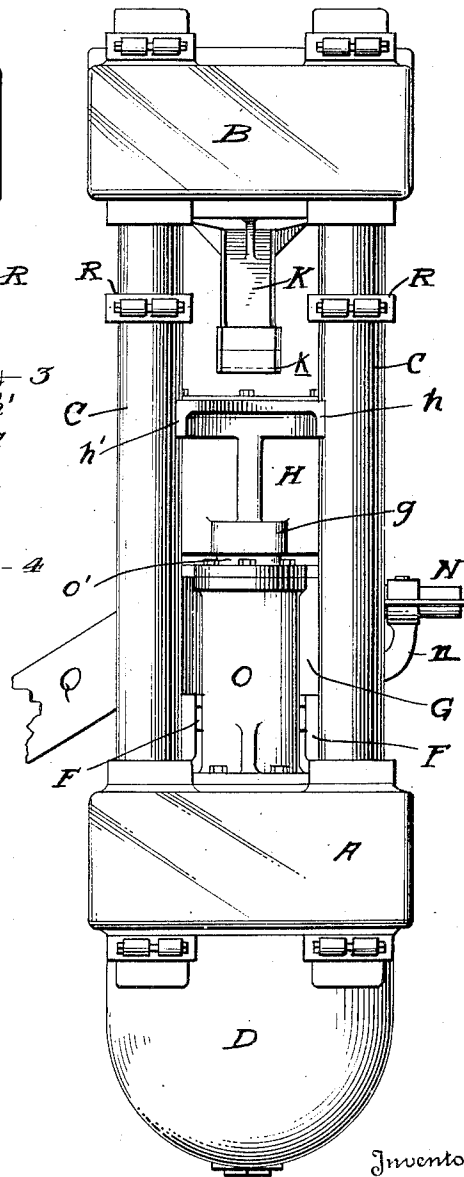


Fig. 2.



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3 SHEETS—SHEET 2.

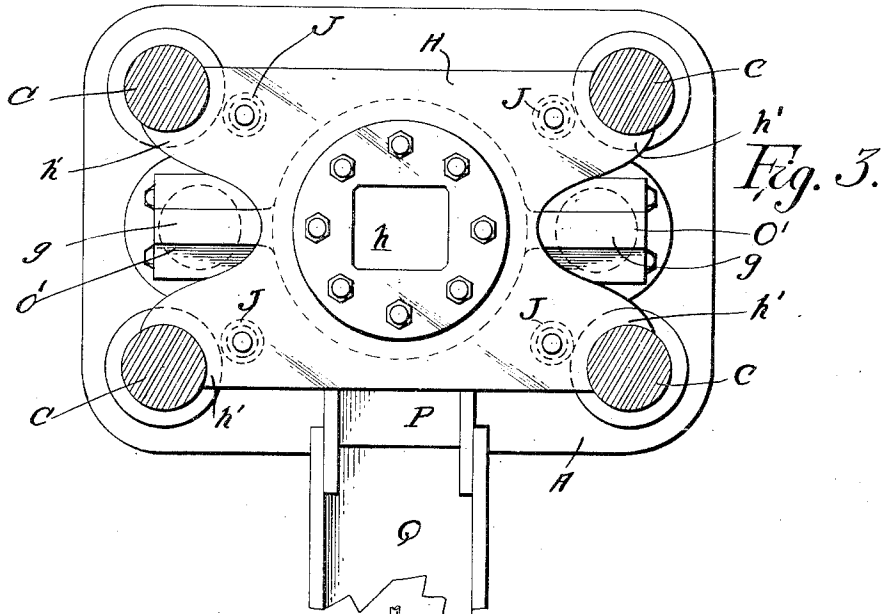


Fig. 3.

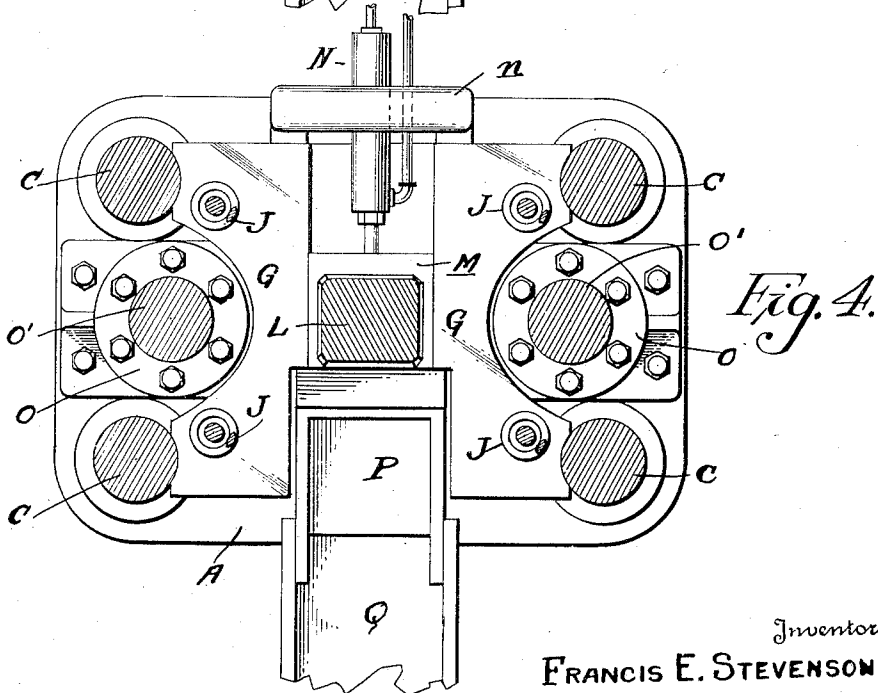


Fig. 4.

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3 SHEETS—SHEET 3.

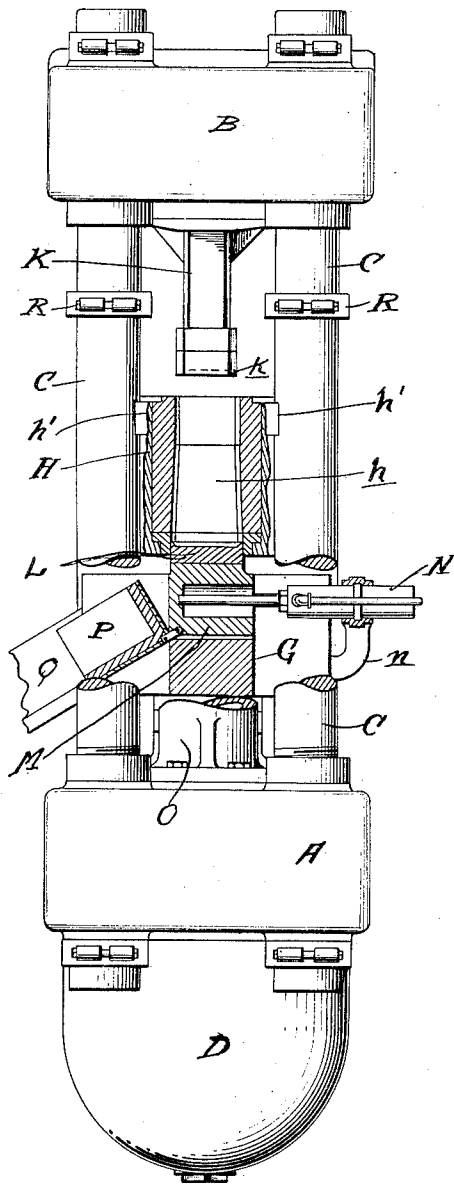


Fig. 5.

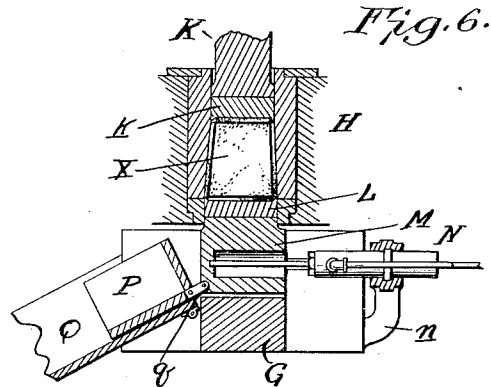


Fig. 6.

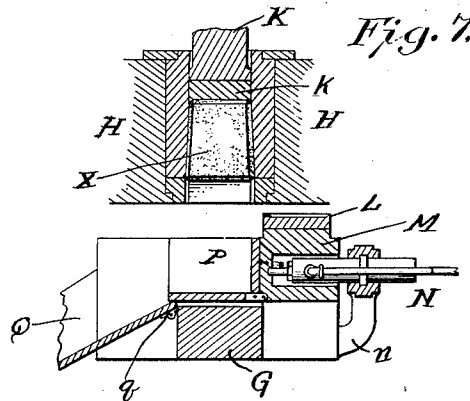


Fig. 7.

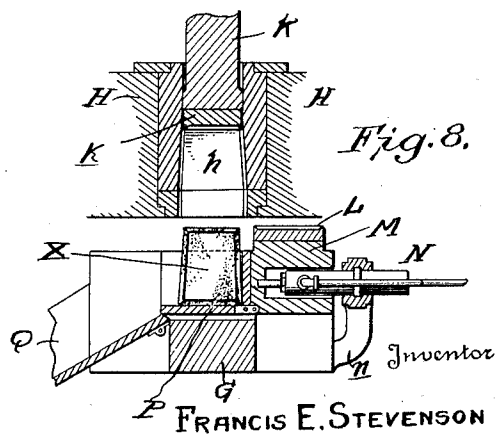


Fig. 8.

By his Attorneys

Baldwin & Wright

UNITED STATES PATENT OFFICE.

FRANCIS E. STEVENSON, OF MOUNT GILEAD, OHIO, ASSIGNOR TO THE HYDRAULIC PRESS MANUFACTURING COMPANY, OF MOUNT GILEAD, OHIO.

PRESS.

1,357,258,

Specification of Letters Patent.

Patented Nov. 2, 1920.

Application filed May 24, 1920. Serial No. 383,808.

To all whom it may concern:

Be it known that I, FRANCIS E. STEVENSON, a citizen of the United States, residing in Mount Gilead, in the county of Morrow and State of Ohio, have invented certain new and useful Improvements in Presses, of which the following is a specification.

This invention relates to presses of the kind shown in Letters Patent of the United States No. 1,166,558, granted Jan. 4, 1916 to The Hydraulic Press Manufacturing Company, of Mount Gilead, Ohio, as assignee of Francis E. Stevenson and Harry C. Little. That patent shows a press especially adapted to compress salt and similar material to form blocks or briquets of convenient size.

The press shown in said patent is so constructed and operated that the material is uniformly compressed and uniform density is obtained throughout the compressed block or briquet. In the press referred to, the material is fed to a mold supported by springs and into the lower end of which extends a die supported by a transversely movable carrier. A ram extends into the mold from above and compresses the material in the mold chamber between the ram and the die. During the operation of the ram the spring-supported mold yields and is depressed to a slight extent causing the lower die to further enter the mold chamber and thus, co-operating with the ram, to uniformly compress the material between them. When pressure is relieved and the ram is elevated, the mold-supporting springs cause the mold to return to its normal position and in order to eject the formed block or briquet, hydraulic jacks are operated to lift the mold above the plane of the lower die so that the latter, with its carrier, may be withdrawn to one side of the press, leaving a clear space to receive the block which is ejected by a downward movement of the ram.

The press of my present invention is similar in purpose and in general construction to that just described, but I have found that improved results are obtained and a cheaper construction afforded by employing a fixed or stationary upper die co-operating with a mold, into the lower end of which extends a die yieldingly supported by the platen of a hydraulic ram. Hydraulic cylinders or jacks are employed to lift the mold and to thus cause the upper die to engage the com-

pressed material in the mold chamber and eject it therefrom. The lower die is movable laterally into position below the mold chamber and to one side thereof and means is provided for receiving the ejected block and conveying it to any desired place. Other features of the invention will be hereinafter described.

In the accompanying drawings:—

Figure 1 is a front elevation of a compressing press embodying my improvements.

Fig. 2 is a side elevation thereof.

Fig. 3 is a transverse section on the line 3—3 of Fig. 1.

Fig. 4 is a similar section on the line 4—4 of Fig. 1.

Fig. 5 is a view of the press partly in side elevation, partly in section, and with parts broken away.

Fig. 6 is a detail sectional view, showing the relation of the mold, the lower die and the plunger just after the compressing operation has been completed.

Fig. 7 is a similar view, showing the mold raised by the hydraulic jacks from the lower die and the latter moved to one side of the mold.

Fig. 8 is a similar view, showing the position of the related parts after the compressed block has been ejected from the mold.

The press heads A and B are firmly connected by strain rods C, and the main hydraulic pressure cylinder D is applied to the lower press head. The ram E, operating in the cylinder D, carries a platen F on which is mounted a block G which rises and descends with the platen, being guided by the strain rods C.

The mold H has a chamber *h* preferably provided with tapered walls as shown, the corners being beveled, as indicated. This mold is supported by springs J, resting on the platen-supported block G and surrounding vertical rods J' connected with block G and extending through the lugs *h'* of the mold, which lugs slidingly engage the strain rods and serve to guide the mold during its vertical movement. A plunger K is rigidly secured to and depends from the upper press head B and carries a die *k* adapted to enter the mold H. This mold is normally held below the plunger but is raised by the ram in such manner as to cause the plunger to enter the mold and

compress the material therein when the lower end of the mold is closed by the die L, which latter is supported by a carrier M mounted to slide horizontally in a recess in the block G. The die carrier may be moved in various ways but preferably it is moved by a device N of well known construction which may be hydraulically operated or air operated. The piston of this device is connected with the die carrier M and the cylinder is supported by a bracket *n* rigidly attached to the block G. Hydraulic cylinders O provided with rams O' constitute jacks which engage the lugs *g* of the mold and are employed for raising the mold when it is desired to bring the lower die into position below the mold chamber or to withdraw it therefrom and they are also used to give further movement to the mold to cause the mold to pass over the upper die and plunger in such manner as to eject the completed block when the compressing operation is completed.

A box P adapted to receive the compressed block when ejected is hinged at *q* to the die carrier and discharges into a trough Q by which the block is carried to its destination.

In order to limit the upward movement of the mold, I provide stop collars R which are adapted to engage the lugs *h'*, projecting from the mold.

In starting the press, the mold is first jacked up by the dies O, O' sufficiently to raise the bottom of the mold above the lower die L. This position is shown in Fig. 7. Then the device N is operated to move the lower die L to a position beneath the mold. Then the jacks are lowered and the mold drops and is then yieldingly supported by the springs J on the platen of the compressing ram. Material to be compressed is then fed into the mold chamber *h* and then the compressing ram is operated to raise bodily the mold, the lower die and parts connected therewith, sufficiently to cause the upper die to enter the mold chamber and to compress the material into a block X, in the manner shown in Fig. 6. During this operation, pressure is applied by the upper die directly to the top of the mass of material but considerable friction is exerted by the side walls of the mold chamber and the mold is caused to slightly descend against the force of the springs J and to thus cause the lower die to further enter the mold chamber *h* to apply pressure directly to the lower portion of the material. By this operation uniform density is obtained throughout the block. After this operation is completed the compressing ram is lowered and the jacks O, O' operated to lift the mold clear of the lower die, as indicated in Fig. 7, and then the device N is actuated to withdraw the lower die to one

side and to bring the box P to a position below the mold chamber ready to receive the block X. The mold is now supported by the jacks, the compressing ram having been withdrawn.

In order to eject the block, the jacks O, O' are operated to raise the mold to a sufficient extent to cause the plunger K to enter the mold chamber, engage the compressed block and eject it from the mold, in the manner indicated in Fig. 8. By then operating the device N the die carrier may be moved from below the mold chamber, and the box P with the block X shifted to one side, as indicated in Fig. 6, and then the block will pass to the trough Q which carries it to its destination. It will be observed that when the box P is beneath the mold chamber it is in a horizontal position, but when it is moved to one side with the block it is tilted and the block is automatically discharged.

I have not shown valve mechanism for controlling the various operations, but it is obvious that suitable valve mechanism may be employed and operated in well known ways to control the compressing cylinder and ram, the hydraulic jacks and the fluid-pressure device N. It is also obvious that by such valve control the various operations may be performed with great facility.

A distinctive characteristic of this invention is that my improvements are embodied in an upward pressure press in which the ram is operated in one direction by hydraulic pressure, a pull-back or retracting cylinder not being necessary. In this way, the cost of the press is greatly reduced. It will be observed that the mechanism is largely supported on the hydraulic compressing ram; that is to say, the mold, the die carrier, the lower die, the box for receiving the compressed block and the device for moving the die carrier are all supported on the compressing ram while the plunger, carrying the upper die, is firmly and rigidly secured to the upper press head. In these particulars my invention is distinguished from the apparatus shown in U. S. Patent No. 1,166,558 above referred to.

I claim as my invention:

1. A press, comprising a compressing ram, a mold yieldingly supported by the ram, a lower die supported by the ram for closing the lower end of the mold, means supported by the ram for moving the lower die laterally, and a plunger operating in the mold in opposition to the lower die.
2. A press, comprising a compressing ram, a mold, springs interposed between the mold and the ram for supporting the ram, a lower die supported by the ram for closing the lower end of the mold, means supported by the ram for moving the lower die laterally, and a plunger operating in the mold in opposition to the lower die.

3. A press, comprising a compressing ram, a mold yieldingly supported by the ram, a lower die supported by the ram for closing the lower end of the mold, means supported
5 by the ram for moving the lower die laterally, a plunger operating in the mold in opposition to the lower die, and means for lifting the mold above the plane of the lower die to permit the die to be moved laterally.

10 4. A press, comprising a compressing ram, a mold yieldingly supported by the ram, a lower die supported by the ram for closing the lower end of the mold, means supported by the ram for moving the lower die laterally, a plunger operating in the mold in
15 position to the lower die, means for holding the mold above the plane of the lower die, and means for moving said lower die laterally.

20 5. A press, comprising a compressing ram, a mold yieldingly supported by the ram, a lower die supported by the ram for closing the lower end of the mold, means supported by the ram for moving the lower die laterally, a plunger operating in the mold in
25 position to the lower die, and means operating independently of the compressing ram for raising the mold sufficiently to cause the

plunger to enter the mold chamber and eject the block of compressed material therefrom. 30

6. A press, comprising a compressing ram, a mold yieldingly supported by the ram, a lower die supported by the ram for closing the lower end of the mold, means supported
35 by the ram for moving the lower die laterally, a plunger operating in the mold in opposition to the die, and hydraulic jacks engaging the mold for at times supporting it, for at other times slightly raising it above the plane of the lower die and at other times
40 for moving the mold upward to cause the plunger to enter the mold chamber and eject a compressed block from the mold.

7. A press, comprising a compressing ram, a mold supported by the ram, a lower die
45 supported by the ram for closing the lower end of the mold, means for moving the lower die laterally, a plunger for moving the mold in opposition to the lower die, a box for receiving a compressed block having a
50 hinge connection with the lower die, and a trough into which said block discharges.

In testimony whereof, I have hereunto subscribed my name.

FRANCIS E. STEVENSON.