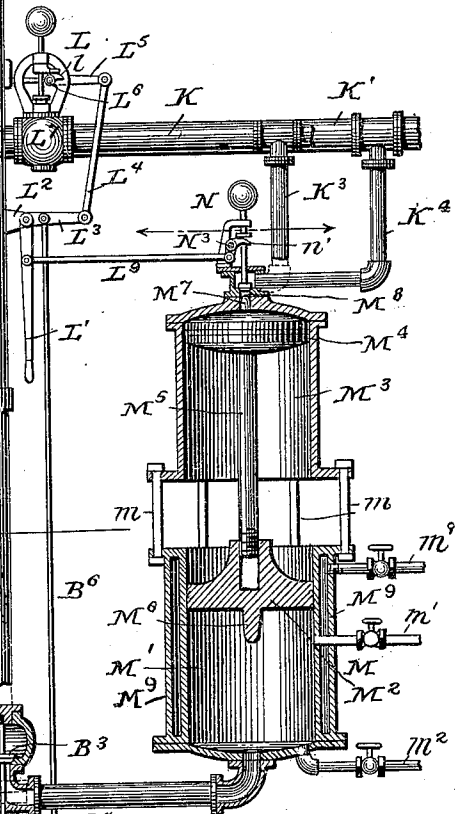
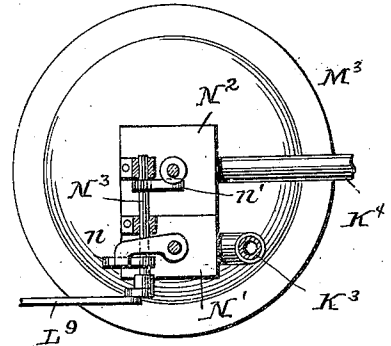


APPLICATION FILED MAR. 11, 1899. RENEWED SEPT. 19, 1907.

4 SHEETS—SHEET 1.

Fig. 1.



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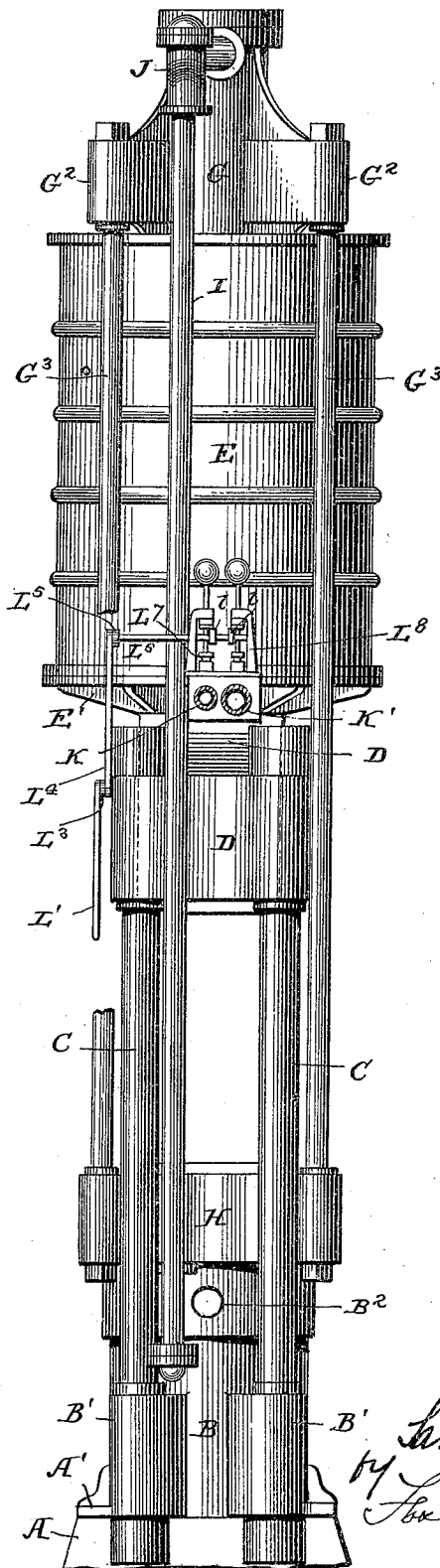
APPLICATION FILED MAR. 11, 1899. RENEWED SEPT. 19, 1907.

944,392.

Patented Dec. 28, 1909.

4 SHEETS—SHEET 2.

Fig. 2.



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APPLICATION FILED MAR. 11, 1899. RENEWED SEPT. 19, 1907.

944,392.

Patented Dec. 28, 1909.

4 SHEETS—SHEET 3.

Fig. 3.

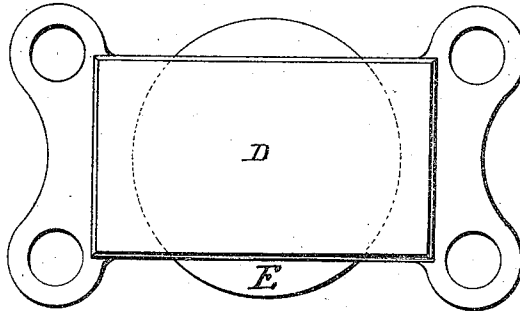


Fig. 4.

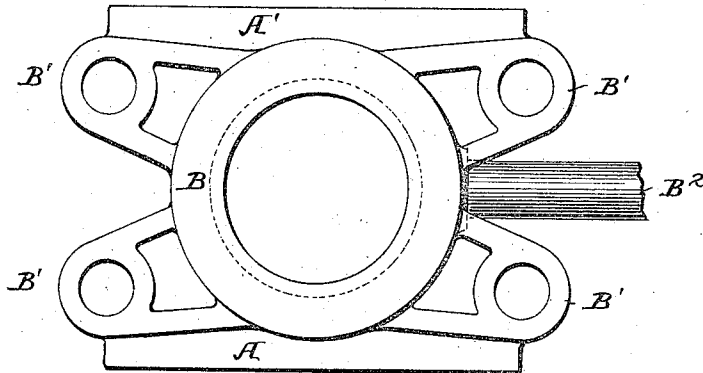


Fig. 5.

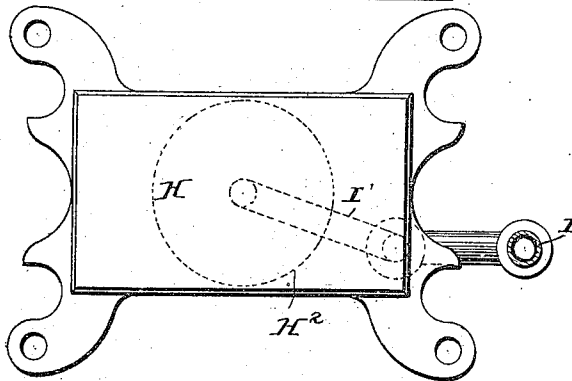
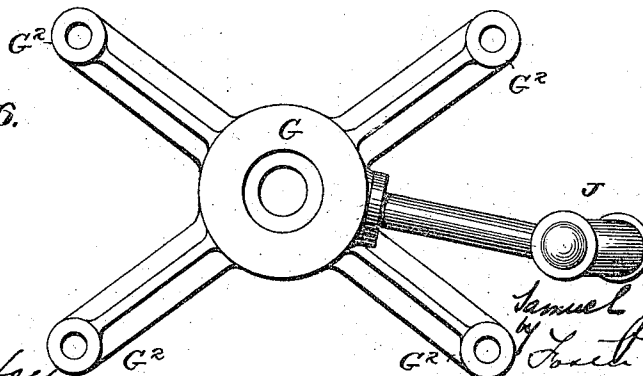


Fig. 6.



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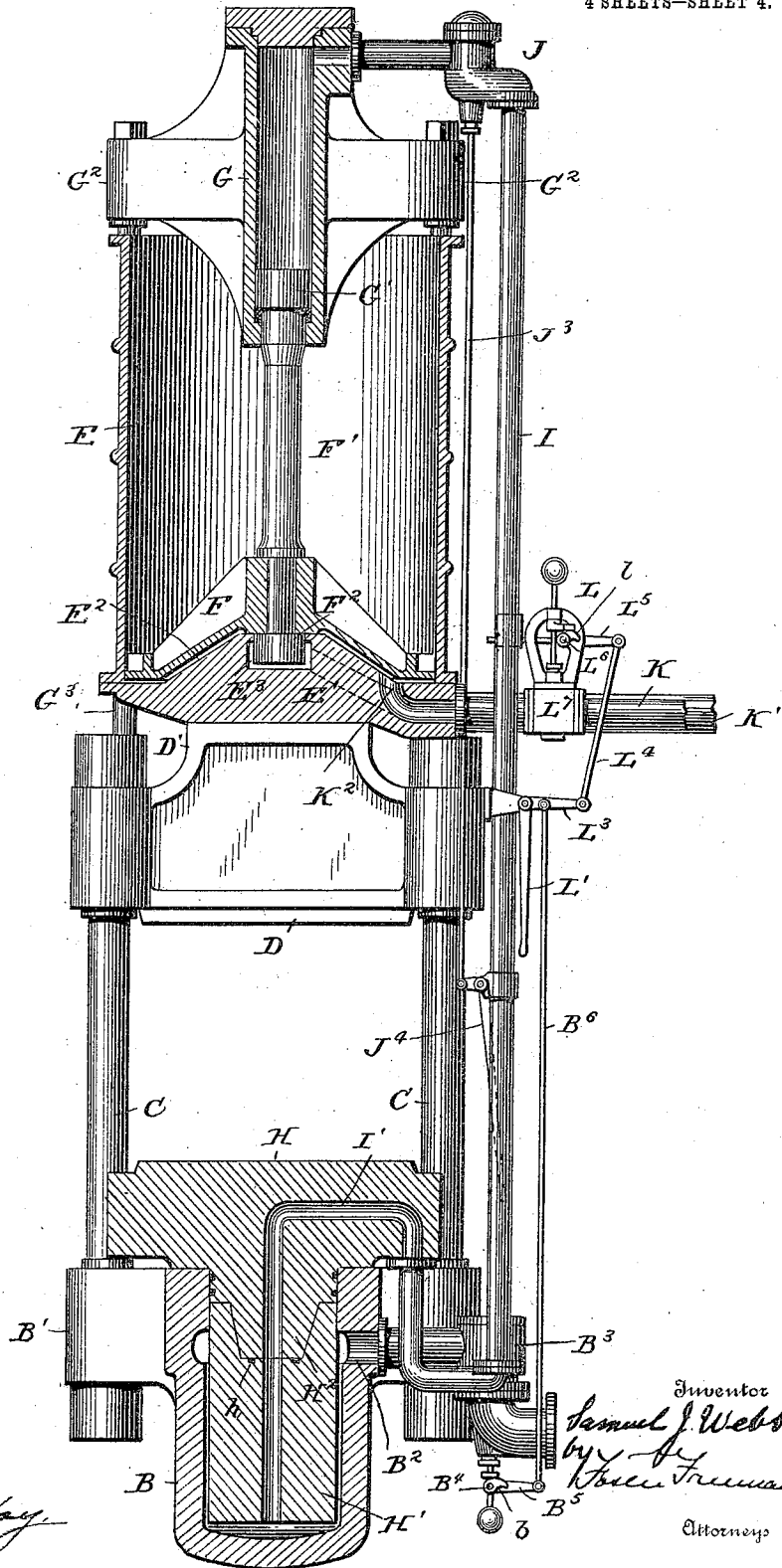
APPLICATION FILED MAR. 11, 1899. RENEWED SEPT. 19, 1907.

944,392.

Patented Dec. 28, 1909.

4 SHEETS—SHEET 4.

Fig. 8



Witnesses
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UNITED STATES PATENT OFFICE.

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PRESS.

944,392.

Specification of Letters Patent. Patented Dec. 28, 1909.

Application filed March 11, 1899, Serial No. 708,775. Renewed September 19, 1907. Serial No. 393,615.

To all whom it may concern:

Be it known that I, SAMUEL J. WEBB, a citizen of the United States, residing at Minden, in the parish of Webster and State of Louisiana, have invented certain new and useful Improvements in Presses, of which the following is a specification.

My invention relates to presses and while it may be adapted to presses of different kinds and for different purposes it is more especially intended for use in cotton compresses and the like, and I have shown my invention embodied in such a press.

The object of the invention is to improve and simplify the construction of such presses and particularly in the present instance to make a press of relatively great power that is of simple construction and of relatively light parts and which is intended to operate primarily to make three movements or stages in pressing a bale of cotton, for instance, and thereby to economize in fuel necessary to produce the power, and to these ends my invention consists in a press of the general character described embodying the features of construction and arrangement of parts and having the general mode of operation substantially as hereinafter set forth.

Referring to the accompanying drawings: Figure 1 is a vertical section showing an embodiment of my invention; Fig. 2 is an end elevation the ram M being omitted; Fig. 3 is a bottom plan view of the stationary bed or platen; Fig. 4 is a top plan of the main hydraulic cylinder; Fig. 5 is a top plan of the lower or movable platen; Fig. 6 is a plan of the top cross head and upper hydraulic cylinder; Fig. 7 is a top view of the steam cylinder of the ram, its valve-boxes and a portion of the valve lifting devices; and Fig. 8 is a vertical section of a press showing a slight modification.

In carrying out my invention I provide a press adapted to utilize steam and hydraulic pressure and I also provide for effecting the desired compression in what may be termed three steps or movements, the first of which in the present instance is produced by hydraulic pressure, the second by direct steam pressure, and the third and final step by hydraulic pressure.

While different embodiments and constructions can be made for carrying out this mode of operation I have shown in the accompanying drawings a preferred embodiment which I have found to be satisfactory

and I will now proceed to describe more in detail its construction.

Upon some suitable foundation, A, Fig. 2, the press is supported and in the present instance I provide certain flanges, A', which rest on the base or foundation and are bolted or otherwise attached to a stationary part of the press. In the present instance I have shown them connected to the main hydraulic cylinder, B. This hydraulic cylinder is a large casting forming the cylinder proper and having either cast thereon or attached thereto arms or lugs, B', to which the uprights, C, are attached, there being four in the present instance.

Connected to the upper portion of the uprights, C, is a stationary bed or platen, D, and this is rigidly connected to the uprights and may be of any desired or usual construction. In the present instance I arrange on or mount upon the stationary bed or platen a steam cylinder, E, the bottom, E', of which rests upon an upward projection, D', of the stationary bed or platen. This cylinder, E, is open at its top and contains a piston, F, which is preferably cone-shaped as shown and fits a similar cone, E², on the bottom of the cylinder. Connected to the piston is a piston-rod, F', having a piston, G', working in an upper hydraulic cylinder, G, which upper cylinder, G, is provided with arms or lugs, G², to which are attached the lifting rods, G³, the lower ends of which are connected with the lower or movable platen, H. The lower or movable platen, H, is provided with a plunger, H', working in the main hydraulic cylinder, B. This main hydraulic cylinder, B, and upper hydraulic cylinder, G, are in hydraulic connection by means of a pipe, I, which moves with the movable platen and is connected to a port, I', passing through the platen and through the plunger, H', and is also connected to a controlling valve, J, which may be arranged in any convenient position in the pipe, I, but in the present instance is shown as being bolted to the upper end of the upper hydraulic cylinder, G. This controlling valve, J, is preferably of the form indicated in Fig. 1, being broadly described as a check valve provided with a pilot valve and I do not herein claim the specific construction of this valve, it being claimed in my application, Serial No. 678,899, filed April 26, 1898. To briefly describe this, however, it consists essentially

of a check valve, J' , having a hollow extension, with ports, j , and a pilot valve, J^2 , provided with a stem, j^2 , connected to some suitable connection for operating it, in this instance it being the rod, J^3 , connected to an arm or lever, J^4 , arranged for convenience of operation near the lower part of the press.

The piston, G' , in the hydraulic cylinder, G , as before stated is mounted on the piston-rod, F' , of the steam piston, F , and in its normal position this piston is arranged at some distance from the lower portion of the hydraulic cylinder, G , for the purpose hereinafter explained. The piston-rod, F' , at its upper portion is enlarged, as shown, so as to closely fit the opening, g , and to form an air cushion therein and I preferably also provide a ring, g^2 , of elastic material, as rubber, to take up any shock or jar in the operation of the parts. I find it preferable to make the main body portion of the piston-rod, F' , smaller than the opening, g , so that in the operation of the press as herein-
after described there will be no chance of binding if, for instance, there is any tendency of the upper hydraulic cylinder to cant under strain, which may be caused by the bale being uneven or placed near one end of the movable platen.

Steam is supplied to the steam cylinder, E , through the pipe, K , and exhausted through the pipe, K' , and it is controlled by the valves, L . The pipe, K , connects with the bottom of the cylinder, E , at any convenient position, as shown at K^2 , and the exhaust pipe, K' , is connected to a central recess, E^3 , formed in the upper portion of the base of the steam cylinder. Coöperating with this recess is a projection, F^2 , which fits the recess as the piston-head, F , moves downward and closes the exhaust port and forms a cushion to prevent shock or jar. This projection may be a part of the piston, F , or as shown in the present instance it may be a round nut serving to connect the piston-rod, F' , to the piston, F .

Arranged in some suitable relation with the press and connected to the exhaust port, B^2 , of the main hydraulic cylinder is what I call a ram, M , comprising a hydraulic cylinder portion, M' , provided with a piston, M^2 , and also provided with a steam cylinder, M^3 , in which moves a steam piston M^4 , mounted on the stem, M^5 , of the hydraulic piston. The hydraulic piston in this case is provided with an extension, M^6 , fitting an opening in the bottom of the hydraulic cylinder so as to form a cushion, and the steam piston, M^4 , is provided with a similar projection, M^7 , fitting an opening in the exhaust port, M^8 to also form a cushion at the other end. The two cylinders are suitably connected by suitable bolts or rods, m , passing through top and bottom flanges of the

cylinders and these not only serve to hold the cylinders together but furnish a means of access to both pistons to adjust the packing rings. To accomplish this the hydraulic piston, M^2 , is shown as adjustably mounted on the stem, M^5 , and it will be seen that the stem, M^5 , may be screwed down into the opening in the piston, M^2 , sufficiently to bring the packing rings on the steam piston, M^4 , below the end of the cylinder, and when thus screwed down either the hydraulic piston, M^2 , or the steam piston, M^4 , can be brought into such position above or below its respective cylinder as will permit of the rings being manipulated.

Steam is supplied to the steam cylinder, M^3 , in the present instance by a branch pipe, K^3 , connected to the steam pipe, K , and the exhaust pipe, K^4 , may be connected to the exhaust pipe, K' , if desired. The steam is controlled by the valve device, N , and while any suitable valve device may be used I prefer that illustrated in the drawing and it will be seen that it comprises two valves, N' , N^2 , the former controlling the inlet steam and the latter the exhaust steam, and I preferably arrange the exhaust steam port in the center of the steam cylinder, M^3 , so that the projection, M^7 , will enter the exhaust port and form a cushion, as above indicated.

While, of course, the valve devices L and N may be separately operated I prefer to operate them conjointly, and for this purpose I provide a lever L' , in the present instance mounted on a bracket, L^2 , connected to the stationary platen and provided with an arm, L^3 , connected by a rod, L^4 , to an arm, L^5 , on the valve shaft L^6 , to which shaft are attached the cams, l , l' , operating respectively the inlet and exhaust valves, L^7 , L^8 . The lever, L' , is provided with a rod, L^9 , connecting with the valve shaft, N^3 , carrying the cams, n , n' , arranged to operate the inlet and exhaust valves, N' , N^2 , respectively.

The exhaust port, B^2 , is provided with a check valve, B^3 , operated by a cam, b , on the shaft, B^4 , having an arm, B^5 , connected by a rod, B^6 , with the arm, L^3 .

It may be observed that the plunger, H' , may be made in one piece with the lower platen, but for convenience of construction I preferably make it separate from the platen and as shown in the drawings the bottom of the platen is provided with a projection, H^2 , fitting a recess in the upper portion of the plunger, H' , and there is a suitable gasket, h , to prevent the entrance of air when the plunger is part way out of the cylinder or on the other hand to prevent escape of water under the same conditions. These parts are secured together in any suitable way, as by bolts or screws, H^3 , and the advantage is that by loosening the bolts, H^3 , the platen

may be raised away from the plunger, H', and the packing rings h' in the top of the cylinder are adjusted.

Such being the general construction and arrangement of parts the operation will be largely understood from what has been set forth but I will now describe more particularly the purposes of the construction and the results attained.

The parts of the press being in the position shown in Fig. 1 the material to be pressed is placed upon the lower movable platen, H, and the first operation is to raise the platen with the material, as a bale of cotton, up against the stationary bed or platen and give it what may be termed an initial compression. This is done by means of the hydraulic ram. To do this the valve device, N, is operated admitting steam into the steam cylinder, M³, above the steam piston, M⁴, and this forces the hydraulic piston, M², downward and the fluid flows from the hydraulic cylinder, M', through the port, B², into the main hydraulic cylinder, B. It will be observed that this fluid passes through what has heretofore been termed the exhaust port of the hydraulic cylinder and it is thus defined for the reason that the hydraulic cylinder, M', practically takes the place of the usual fluid reservoir and receives the exhaust fluid from the main hydraulic cylinder when the plunger moves to the bottom thereof. It will further be noted that the port, B², is arranged near the top of the hydraulic cylinder and that the plunger fits the cylinder, B, below the port loosely, sufficiently so to permit the fluid to pass between the plunger and the side walls of the cylinder. One of the chief advantages of this construction is that any air, occluded or otherwise, which gets into the cylinder is first forced out into the reservoir or cylinder, M', so as to leave a practically solid column of fluid under the plunger when the final or greater pressure is applied. Of course, if there be air in the main hydraulic cylinder it will pass into the cylinder, M', of the reservoir or ram and rise to the top of the fluid and while it is more or less objectionable even here it is far less objectionable than when the air is in the main hydraulic cylinder. Furthermore, the air may be exhausted from the cylinder, M', by means of a cock, m', when the piston is up and an additional supply of water or fluid can be injected into the cylinder through the pipe, m².

It will be observed that the steam cylinder, M³, compared with the main steam cylinder, E, is relatively small but it is of sufficient capacity to operate its piston and the hydraulic ram to force fluid enough into the main hydraulic cylinder to overcome the weight of the moving parts together with the article to be compressed and pref-

erably to produce a greater or less initial pressure. In this way with a comparatively small amount of steam in the small steam cylinder, M³, I am enabled to not only secure a quick movement of the movable platen and an initial compression of the material but also make a large saving in the use of steam and consequently in the amount of fuel necessary to operate the press.

It will be observed that when the movable platen is thus raised the hydraulic cylinder, G, which is rigidly connected to the movable platen, is also raised. The position of the piston, G', being as indicated permits this to be done without moving the steam piston, F. This movement is also aided by what may be termed the back pressure of the fluid from the hydraulic cylinder, B, on the piston, G'; that is to say, when the fluid from the cylinder, M', is forced into the hydraulic cylinder, B, through the port, B², it passes down between the plunger and the walls of the cylinder to the bottom of the latter and thence through the port, I', pipe, I, valve, J, (which in this condition operates as a check valve) into the cylinder, G, and consequently exerts its force on the piston, G', helping to lift the movable parts of the press, leaving as before stated the steam piston at the bottom of its cylinder ready to exert its full stroke when it is brought into operation. When this operation is completed the main steam valve device, L, is operated to admit steam to the cylinder, E. The valve, J, being closed at this time the piston, G', connected to the steam piston, F, bears against a solid column of fluid and the movable parts all move together as one, giving a further movement to the platen and compressing the material to its second stage. In this way it will be seen that the full force of the steam under the piston, F, is applied practically directly to the compression of the article and there is no lost movement to the steam piston, it having started from the bottom of the steam cylinder. This having been accomplished it now remains to give the final or third pressure to the material and it is well known that in order to accomplish this the greatest force must be exerted while the movement of the platen is relatively small. The pilot valve, J², is now operated by means of the lever, J⁴, and the hydraulic cylinder, G, with its piston, G', now becomes as it were a ram in that the fluid in its cylinder (the size of which is relatively small) is forced by the steam pressure on the relatively large steam piston, F, through the pilot valve, J², the pipe, I, port, I', to the bottom of the plunger, H', in the hydraulic cylinder, B, and this plunger being relatively large in comparison with the piston, G', the force or pressure is multiplied in proportion to their

areas and the final pressure on the bale or other material is produced. It will thus be seen that in this operation the steam pressure in the cylinder, E, is exerting a direct pressure through the piston, F, and its connections on the bale and an indirect and more powerful pressure through the piston, G', and cylinder, G, operating as a ram in connection with the main hydraulic cylinder and the total pressure on the bale is the sum of the direct pressure of the steam on the steam piston and the multiplied pressure under the main hydraulic plunger. Moreover, this construction incidentally enables the use of a relatively short steam cylinder and necessarily lessens the dead weight to be lifted and permits of a reduction in the size of the main hydraulic cylinder, thereby enabling the press to be made relatively lighter to accomplish the given work, the strains being distributed over the various parts of the press. When this has been accomplished the valve devices N and L are operated to exhaust the steam from their respective cylinders and the check valve, B³, is lifted to permit the fluid to flow from the main hydraulic cylinder to the ram or reservoir and the weight of the parts restores them to their normal positions and the fluid in the main hydraulic cylinder, B, is forced through the exhaust port, B², into the reservoir or ram cylinder, M', raising the piston and putting the parts in condition for continued operation. It will be observed that in this operation a portion of the fluid flows upward through the pipe, I, by the check valve, J', into the cylinder, G.

It may be remarked right here that while I have shown the pilot valve, J², as being a part of and working with the check valve, J', they may be separately arranged to accomplish the same results but the construction shown is compact and has proven satisfactory.

It is also to be observed that while the ram is made with two separate cylinders and pistons there could be practically one piston and if this is hollow it would act practically as a floating piston and save somewhat in the condensation of steam, but I prefer the construction indicated.

In some instances the cylinder of the ram may be jacketed and supplied with water through pipe m^o to maintain a proper temperature in the usual way and as indicated at M^o.

Sometimes it is desirable to compress two bales together and in doing this the first bale is compressed as above described and the next uncompressed bale is placed above it and the two compressed as before stated. To do this it is a convenience in handling the bales to have the movable platen extend below the floor of the building or platform

connected with the press and I have indicated at P the normal floor or platform line, which is some distance above the normal position of the movable platen. By my arrangement it will be observed that the movable platen can be allowed to descend to the position shown in Fig. 1 or if preferred by operating the shaft, B⁴, so as to allow the check valve, B³ to close the platen can be stopped at any desired position.

Sometimes I find it unnecessary to use the ram in connection with the remaining parts of the press and in Fig. 8 I have shown such a construction where the bale is compressed by two movements, only the first being by the direct action of the steam under the piston F and the second by the multiplied action through the hydraulic cylinders. It will be observed that the construction is practically the same except that the ram and its connections are omitted and the space below the piston, G', in the cylinder, G, is omitted, the operation being substantially as before described in connection with the second and third pressures.

Having thus described the preferred construction of my device and illustrated the same sufficiently to enable those skilled in the art to make and use my invention, without limiting myself to the precise details, what I claim is:

1. In a press, the combination with a fixed platen, of a movable platen, a main hydraulic cylinder connected to the fixed platen, a plunger on the movable platen operating in said hydraulic cylinder, a steam cylinder mounted on and connected to the upper fixed platen, a hydraulic cylinder above the upper fixed platen and connected to the movable platen, and a piston for the steam cylinder carrying a piston operating in the movable hydraulic cylinder, substantially as described.

2. In a press, the combination with a fixed platen, of a movable platen, a main hydraulic cylinder connected to the fixed platen, a plunger on the movable platen operating in said hydraulic cylinder, a steam cylinder mounted on and connected to the upper fixed platen, a hydraulic cylinder above the upper fixed platen and connected with the movable platen, hydraulic connections between the movable hydraulic cylinder and the main hydraulic cylinder, and a piston for the steam cylinder carrying a piston operating in the movable hydraulic cylinder, substantially as described.

3. In a press, the combination with a fixed platen, of a movable platen, a main hydraulic plunger and cylinder operating directly on the movable platen, a hydraulic cylinder connected to move with the movable platen, a steam cylinder mounted on and connected to the upper fixed platen, and a steam piston for said steam cylinder carry-

ing a piston cooperating with said movable hydraulic cylinder, substantially as described.

4. In a press, the combination with a fixed
5 platen, of a movable platen, a hydraulic
plunger and cylinder operating directly on
the movable platen, a movable hydraulic
cylinder connected with the movable platen, a
10 steam cylinder connected with the stationary
platen, a piston for said steam cylinder carrying
a piston cooperating with said movable hydraulic cylinder, and a steam-operated
15 ram hydraulically connected to both of the hydraulic cylinders, substantially as described.

5. In a press, the combination with a fixed
platen, of a movable platen, a hydraulic
plunger and cylinder operating directly on
the movable platen, a hydraulic cylinder
20 moving with the movable platen, a steam
cylinder connected with the fixed platen, a
piston for said cylinder carrying a piston for
the moving hydraulic cylinder, hydraulic
connections between the two hydraulic cylinders,
25 a ram comprising a hydraulic cylinder,
a steam cylinder and pistons therefor,
and hydraulic connections between the said
hydraulic cylinder of the ram and the hydraulic
connections of the hydraulic cylinders,
30 substantially as described.

6. In a press, the combination with a fixed

platen, of a movable platen, a hydraulic cylinder
connected with the fixed platen, a
plunger therefor connected with the movable
platen, a hydraulic cylinder connected with
35 the movable platen, a steam cylinder connected
with the fixed platen, a piston therefor
carrying a piston for the movable hydraulic
cylinder, hydraulic connections between the two
hydraulic cylinders, a steam-
40 actuated hydraulic ram connected with said
hydraulic connections, and valve devices substantially
such as described whereby pressure may be applied
to the movable platen in three stages, substantially as set forth.
45

7. In a press, the combination with the
stationary and movable platens, of a hydraulic
cylinder connected with the movable
platens, a steam cylinder, a piston therefor,
and a piston-rod entering said hydraulic
50 cylinder and carrying a piston therefor the
upper portion of the piston-rod being enlarged
to form a cushioning device for the hydraulic
piston, substantially as described.

In testimony whereof I have signed my
55 name to this specification in the presence of
two subscribing witnesses.

SAMUEL J. WEBB.

Witnesses:

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W. C. DUVALL.