

(No Model.)

J. A. BACHMAN.
COTTON PRESS.

No. 512,790.

Patented Jan. 16, 1894.

FIG. 3. FIG. 4. FIG. 5.

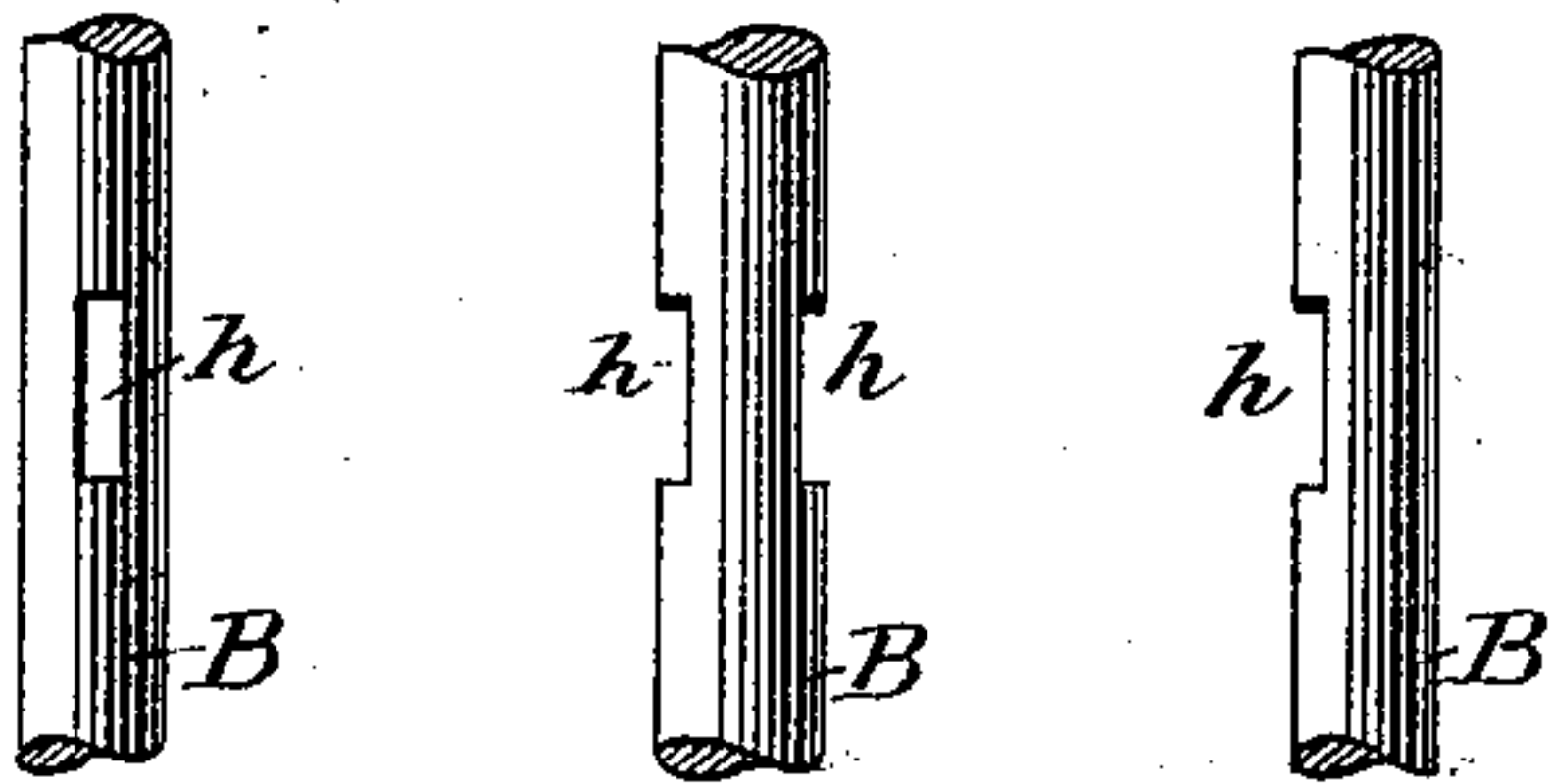


FIG. 2.

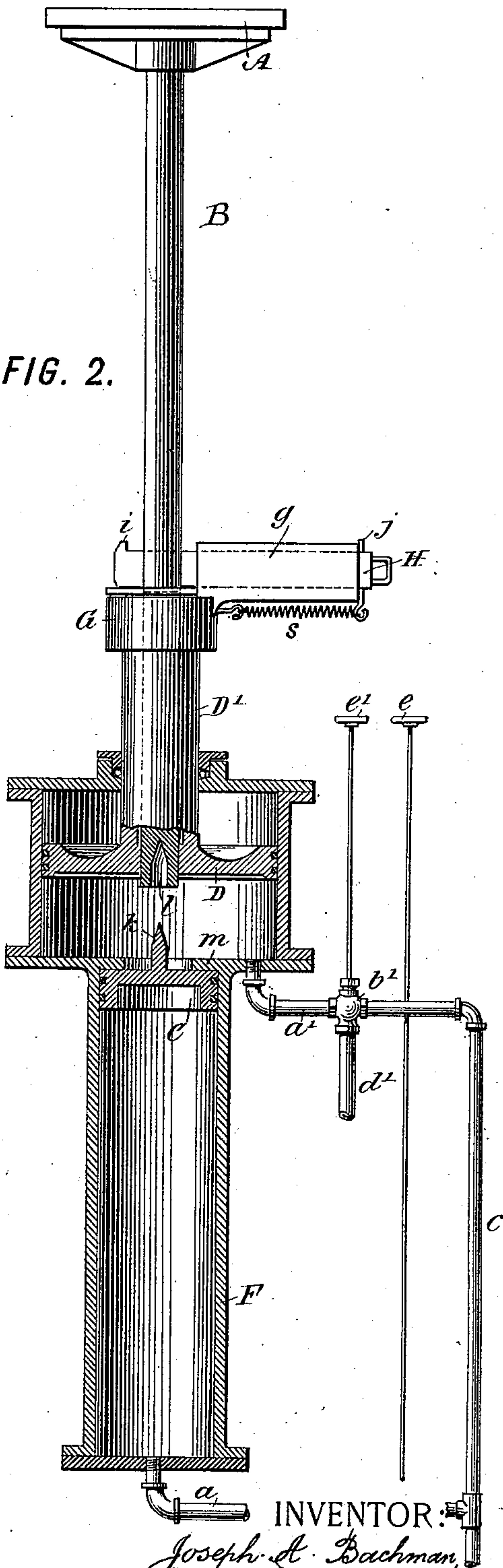
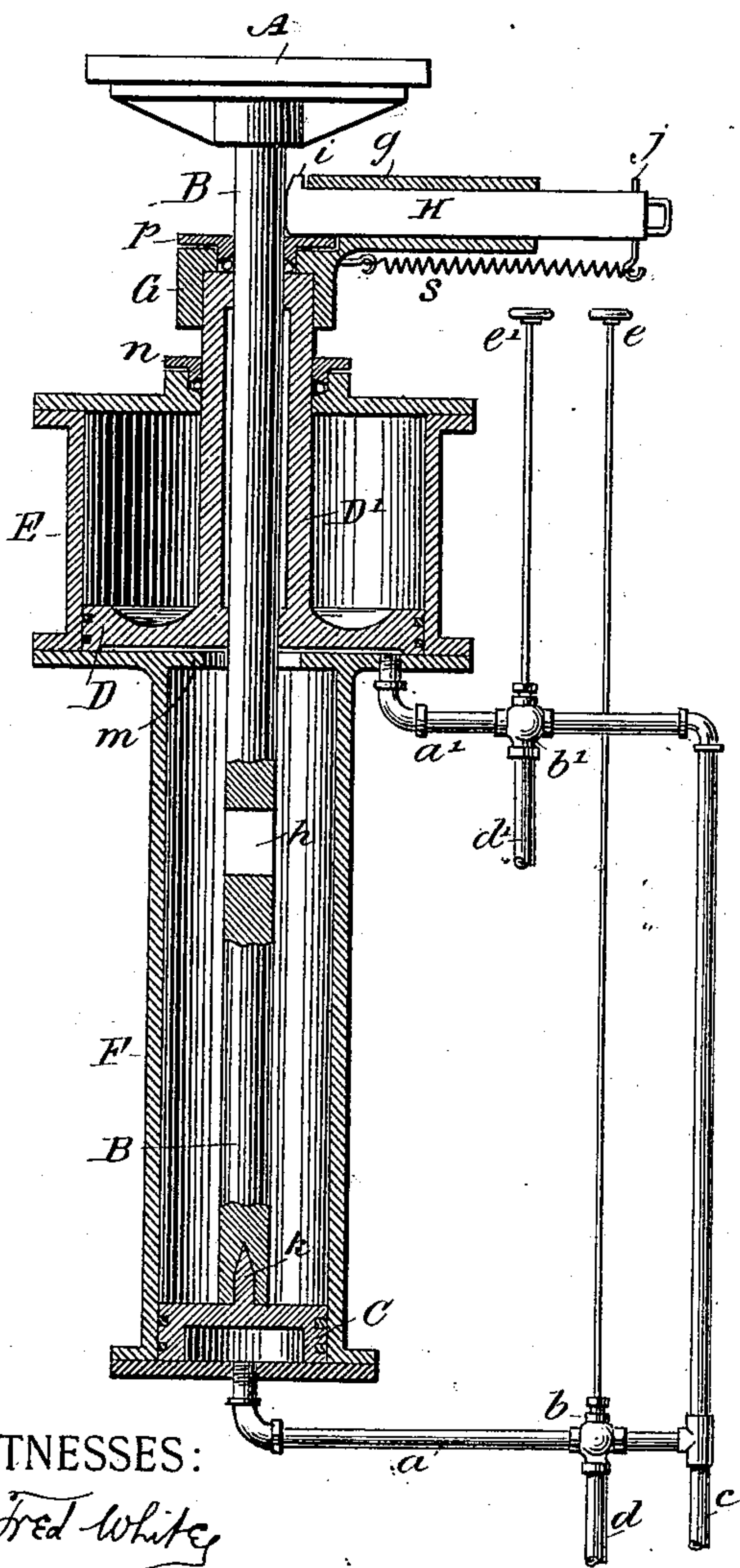


FIG. 1.



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JOSEPH A. BACHMAN, OF AUSTIN, TEXAS.

COTTON-PRESS.

SPECIFICATION forming part of Letters Patent No. 512,790, dated January 16, 1894.

Application filed May 25, 1893. Serial No. 475,437. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH A. BACHMAN, a citizen of the United States, residing at Austin, in the county of Travis and State of Texas, have invented certain new and useful Improvements in Cotton-Presses, of which the following is a specification.

This invention relates to mechanism for pressing cotton, wool, hemp, hay, or other comparatively loose or open substance requiring to be compressed for purposes of baling or storage. It is well known that in pressing such substances the first portion of the movement of the follower against the material to be compressed encounters but little resistance because of the loose or open condition of the material and consequently requires but little power; that as the movement progresses and the material being compressed becomes more compact, its resistance to the follower increases and the power becomes greater; and that consequently during the final portion of the movement of the follower when the material is being compressed to the greatest density the maximum power is required. To accomplish the required work without a wasteful expenditure of power during the initial portion of the stroke when but little power is needed, several different expedients have heretofore been devised. That to which my present invention most nearly relates and upon which it is most nearly a direct improvement, is the construction of cotton press embodied in my Letters Patent No. 451,846, dated May 5, 1891. In that patent compound cylinders and pistons are provided, the two cylinders being united so as to be adapted for one steam or compressed air supply, and the smaller and larger pistons working in the respective cylinders being adapted to exert their power successively through a single piston-rod to the follower or platen of the press. In my said patent the piston-rod is fixed to the smaller piston and slides freely through a packed opening in the larger piston; upon turning steam or compressed air into the smaller cylinder the smaller piston is forced upward, lifting the piston-rod and follower for about one-half the stroke of the latter or more, and thereupon encountering and lifting the larger piston and being automatically locked thereto by locking devices, so that

upon the emergence of the smaller piston from its cylinder, the steam, compressed air or other fluid, being thus admitted to the larger cylinder, acts upon the greater area of the larger piston and thereby forces it upward and, through the intervening locking devices, forces upward the piston-rod and follower with a power that is increased in proportion to the increase of area of the larger over the smaller piston, in order to afford the increased power for completing the compression of the mass of cotton or other material.

My present invention provides an improved construction whereby the employment of automatic locking devices inclosed within the compound cylinders is superseded by the substitution of a locking device in the nature of a key mounted upon the exterior of the apparatus and operated either automatically or manually by the man who works the valves for controlling the movements of the pistons. The larger piston has a tubular piston-rod passing out through a stuffing-box in the end of the larger cylinder, and through the bore of which freely passes the main piston-rod receiving at one end the thrust of the smaller piston, and connected at the other end to the follower. In the preferred construction the smaller piston does not pass out of its cylinder, and is not attached to its piston-rod.

Figure 1 of the accompanying drawings is a vertical section showing the preferred construction of my improved cotton press, the follower and pistons being in the lowest position. Fig. 2 is a similar section showing the apparatus when the follower has reached nearly the limit of its upward stroke. Figs. 3, 4 and 5 are fragmentary elevations of the piston-rod showing different constructions of the key-seat.

In the drawings, the fixed top or bed of the press against which the follower compresses the cotton or other material is not shown, nor is the well or box through which the follower works, the construction of these parts being well understood and forming no part of my invention.

Let A designate the follower or follower-block, or platen of the press, which is attached to the upper end of the piston-rod B, which preferably is mounted to move vertically. To the lower end of the rod B is connected the

smaller piston C, and above it is the larger piston D. These pistons work in compound cylinders E, F, the cylinder E being the larger in which works the piston D, while the cylinder F is the smaller in which works the piston C. The two cylinders are connected together so that communication is established from one to the other, although this is not strictly essential to my present invention.

The larger piston D is formed with or attached to a tubular piston-rod D', which extends up through a stuffing-box *n* at the top of the larger cylinder E. The main piston-rod B passes freely through the bore of the piston-rod D' which has at its top a stuffing box *p*. On top of the rod D' is formed or mounted a head or key-seat G, formed according to the preferred construction with a socket *g* in which slides a locking bar or key H which is arranged horizontally. In the piston-rod B is formed a key-way *h* large enough to receive the key H, so that when the piston-rod is raised to bring this key-way into coincidence with the key, the latter may be thrust through it. The socket *g* may be any suitable shelf or support forming proper guides for retaining the key. It is preferably constructed to inclose the key as shown, and the key is formed at its opposite ends with projections *i* and *j* forming stops for limiting its motion. The key is preferably a flat bar or plate arranged in a vertical plane, and the key-way *h* is preferably formed as a slot cut through the rod B, and of corresponding shape to the cross-section of the key, as shown in Fig. 3. The key-way might however consist of a single notch formed in one side of the piston-rod as shown in Fig. 5, or two opposite notches as shown in Fig. 4, in which latter case two parallel keys would be employed in lieu of one. Although the key might be entered by hand, it is preferably provided with a spring *s* which keeps its end pressing against the rod B, so that as soon as the key-way *h* rises into coincidence with the key the latter instantly shoots through it.

For admitting steam, compressed air or other fluid to the smaller cylinder F, a pipe *a* is provided controlled by a valve *b*, and for the admission of fluid to the larger cylinder E a pipe *a'* is provided controlled by a valve *b'*. The pipes *a a'* may both be connected with a main pipe *c* leading from the source of compressed fluid, and waste pipes *d d'* may be provided for conducting away the spent fluid exhausted from the cylinders. The valves *b b'* are provided with handles *e e'* extended up to such height as to bring them within ready reach of the operator, that is to say, within the neighborhood of the key H.

The smaller piston C is not fastened to the lower end of the piston-rod B, but is constructed to receive the thrust thereof in any suitable manner, being preferably provided with some sort of centering fitting by means of which the two parts when they come together shall be socketed the one in the other,

as for example by the construction shown, wherein the piston C is formed with a projecting pin or stud *k* which enters a socket *l* in the lower end of the piston-rod. The piston C does not pass out of the cylinder F, since the latter is formed with an inwardly projecting flange *m* on its top which overhangs the piston C and serves as a stop for limiting its upward movement. This has the advantage that the packing of the piston C is greatly facilitated, since any suitable sort of ring packing may be used constructed to press outwardly so as to maintain a tight joint, which would not be admissible if the piston C were to pass out of the smaller cylinder as heretofore. The result of this construction is that when steam or other fluid is turned into the cylinder F, it forces up the piston C until the latter strikes against the flange *m* and is stopped. During this movement the piston-rod B is lifted until the key-way *h* comes opposite the key H. The key is then slid by its spring *s* through the key-way to approximately the position shown in Fig. 2, so that the key rests on both sides of the piston-rod against the top of the head G, or against the upper end of the piston-rod D' of the larger piston. Upon the operator then turning steam by means of the valve *b'* into the cylinder E, it acts against the piston D to lift it, and the thrust is communicated through the piston-rod D' and key H to the main piston-rod B, thereby lifting the latter and disconnecting it from the piston C. The larger piston D thus moves the follower A during the latter part of the stroke thereof when the material under compression has become of considerable density, so that the material is compressed with the greater pressure that is proportional to the increased area of the larger piston. To lower the follower, the fluid is permitted to escape first from the cylinder E, which may be done by constructing the valve *b'* as a three-way valve to exhaust the fluid through the pipe *d'*; the piston D thus descends to the bottom of the cylinder, whereupon it comes to a stop, the end of the piston-rod B being thus brought again into engagement with the piston C. The operator then slides out the key H, and then by turning the valve *b* he permits the fluid to escape from the smaller cylinder, so that the follower descends to the bottom of its stroke.

By the provision of the projection *i* on the end of the key, the operator is prevented from withdrawing the key except when the piston-rod B is upheld by the piston C, it being necessary to maintain a pressure beneath the piston C during the entire time that the piston-rod is lifted above this piston.

I claim as my invention the following-defined novel features, substantially as hereinbefore specified, namely:

1. The combination with the compound cylinders and their pistons and piston-rods, the rod of the smaller piston passing through the tubular rod of the larger piston and being formed with a keyway, of a key-seat formed

on the head of said tubular rod, and a sliding key movable in said seat and adapted to enter said key-way with its ends projecting therefrom and resting on the head of said
5 tubular piston.

2. In a press, the combination of compound cylinders E F, the latter formed with an overhanging flange *m*, with pistons D and C in the respective cylinders, and a piston-rod B separably connected to the smaller piston, movable through the larger piston and provided with means for connecting it to the larger piston after it has been lifted by the smaller piston, whereby the smaller piston is confined
10 within the smaller cylinder.

3. The combination with compound cylinders E F, pistons C D and piston-rod B, of a separable centering connection between said

piston-rod B and piston C, consisting of a projecting stud *k* on the one part and a socket *l*
20 in the other.

4. The combination with compound pistons C D and piston rods B D', the rod B formed with a key-way *h* of key H mounted to slide, and a spring *s* pressing it against rod B, so
25 that when the key-way *h* comes into coincidence with it it is automatically engaged therewith.

In witness whereof I have hereunto signed my name in the presence of two subscribing
30 witnesses.

JOSEPH A. BACHMAN.

Witnesses:

C. E. JONES,
JAS. W. SMITH.