(No Model.) 2 Sheets—Sheet 1.

A. FITTS, H. M. RICE & A. E. BLANCHARD.

PRESS.

No. 295,159. Patented Mar. 18, 1884.

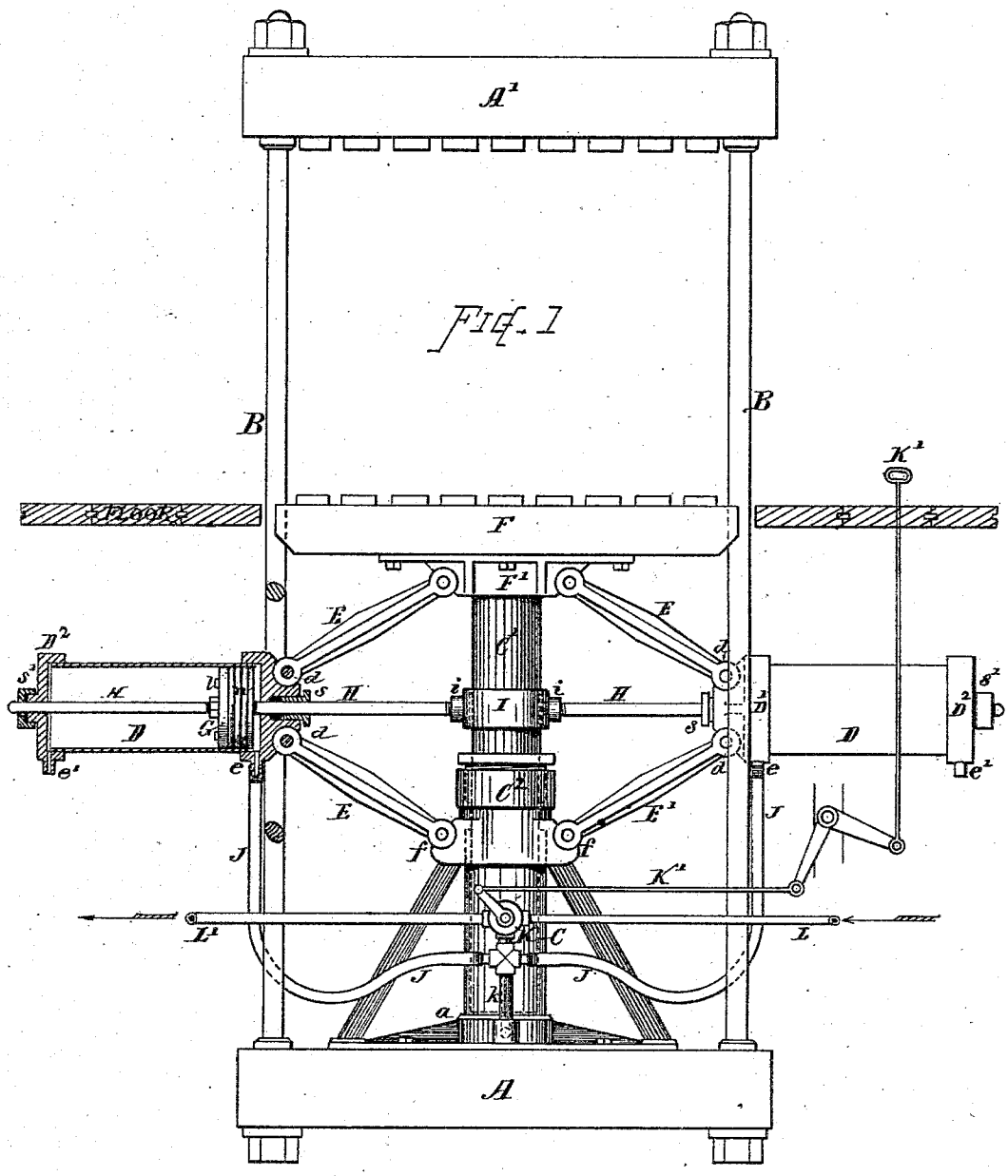


FIG. 1

Witnesses.
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(No Model.) 2 Sheets—Sheet 2.

A. FITTS, H. M. RICE & A. E. BLANCHARD.

PRESS.

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FIG. 4

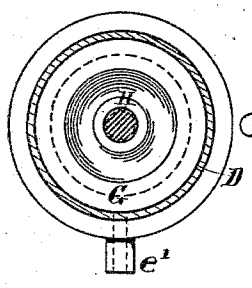


FIG. 3

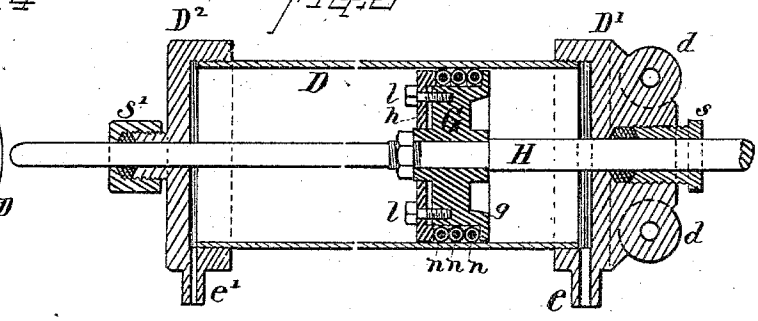
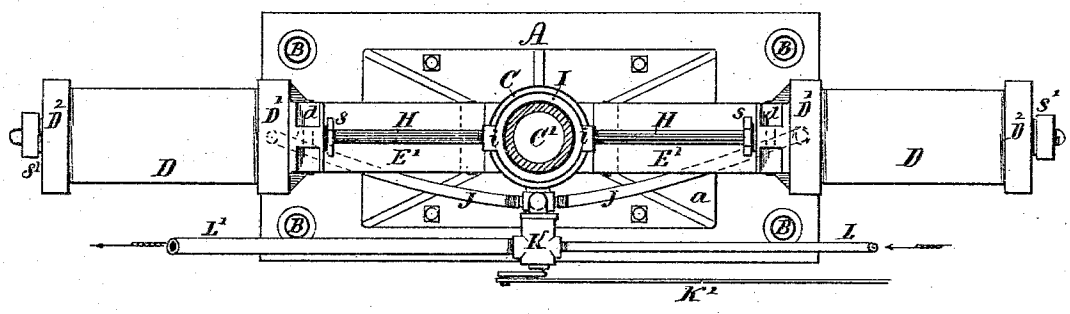


FIG. 2



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UNITED STATES PATENT OFFICE.

ABRAHAM FITTS, HERBERT M. RICE, AND ALONZO E. BLANCHARD, OF WORCESTER, MASSACHUSETTS.

PRESS.

SPECIFICATION forming part of Letters Patent No. 295,159, dated March 18, 1884.

Application filed May 16, 1883. (No model.)

To all whom it may concern:

Be it known that we, ABRAHAM FITTS, HERBERT M. RICE, and ALONZO E. BLANCHARD, all of Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Presses; and we declare the following to be a description of our said invention, sufficiently full, clear, and exact to enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

The objects of our present invention are to combine the principles of knuckle-joint and hydrostatic or hydraulic action in a practical, convenient, and efficient press for baling goods, and for other purposes; to afford means in a knuckle-joint press for directly elevating or moving the follower while the knuckle-joint arms are folded, or in a position where they exert their least effective power; to provide a powerful, economical, and rapidly-operative press that can be manufactured with facility and at moderate expense. These objects we attain by mechanism, the nature of which is illustrated in the accompanying drawings and explained in the following description, the particular subject-matter claimed being hereinafter definitely specified.

In the drawings, Figure 1 is an elevation view of a press illustrating our invention, parts at one side being shown in section. Fig. 2 is a horizontal sectional view, showing cylinders and knuckle-joints and lower arms. Figs. 3 and 4 are longitudinal and transverse sections, showing construction of the cylinders and pistons on a larger scale.

In referring to the drawings, A denotes the bottom or bed, and A′ the top or head, of the press, which parts are connected, in the usual manner, by rods or standards B, the ends of which are properly secured to the parts A A′, so as to support the strain of the pressing mechanism.

A hydraulic cylinder, C, supported on the bed A, is provided with an elevating piston or column, C′, that extends directly up to the under side of the press-follower F, and is connected with the seat-plate F′, on which the arms or levers E have their bearings.

Hydraulic cylinders D D are arranged in connection with the knuckle-joints of the arms E E′, the cylinder-heads D′ being integral with or rigidly attached to the seat-plates of the knuckle-joints *d d*, while the cylinders D extend outward therefrom in horizontal direction, as shown.

The pistons G G in the cylinders D are rigidly connected together by a rod, H, or by two rods connected to a central ring, I, so that said pistons remain at stationary positions relatively to the center line of the press, while the cylinders D move inward and outward with the arms E E′ when hydraulic force is exerted within the cylinders for effecting movement of the press-follower F.

The central ring, I, surrounds the piston rod or column C′, and retains the piston G at a proper position in relation to the central axis of the press, and also acts as a guide for the parts as they move up and down with the expansion and folding of the arms, the said ring being fitted to slide easily on the column C′. In the present instance the ring I is provided with hubs or bosses *i*, in which the ends of the rods H are secured by screw-threads; but any other suitable method of connecting the parts may be employed, if preferred.

Water is conveyed into and from the inner end spaces of the cylinders D for operating the press by means of jointed pipes or flexible hose-pipes J from the directing-valve K, said pipes being properly connected to the cylinder-heads at *e*. Water is also conducted by pipe *k* from the valve K to the lower part of the cylinder C for elevating the column C′. The arms E′ have their lower ends seated in bearings *f f* on the sides of the cylinder C, or may be otherwise supported from the press-bed A, so as to withstand the strain when the press is in operation. The valve K may be of any suitable kind, whereby the water can be directed to flow into and from the cylinders in the desired manner and with convenient operation.

L indicates the pipe for supplying water to the press; L′, the pipe for conducting the water away after use, and K′ the rods for operating the valve K. These pipes and operating-rods may be arranged in any convenient manner, according to the location and situation of the press when set up for use.

The cylinders D may be formed in any suit-

able manner and of any suitable material—as, for instance, of wrought-iron tubing externally screw-threaded at the ends, with the cast-metal heads D′ and D^2 fitted with screw-threaded flanges and screwed onto the ends thereof, as illustrated, the openings or ports *e* being formed in the castings of the heads D′, so that a plain straight piece of tubing will suffice for the cylinder-shell, thus avoiding any expensive labor and fitting to construct the parts. The upright cylinder C may also be made of tubing, with its ends screwed into the bed-plate *a* and neck-piece C^2. The neck C^2 of the cylinder C around the column C′ is fitted with a packing of tubular rubber rings arranged as on the pistons, or in equivalent manner, for making a tight connection, and suitable stuffing-boxes, *s*, are arranged in the cylinder-heads D′ D^2 around the rods H.

The pistons G may be constructed as shown, the part *g* being securely fastened onto the rod H, the part *h* adjustably attached thereto by bolts *l*, and packing-rings *n*, of heavy rubber tubing, placed between the rims, as illustrated. By screwing in the bolts *l* the packing can be compressed and tightened, the rings, owing to their tubular form, making an elastic and very close joint, that wears a long time without leaking. The rods H are extended through the outer head, D^2, of the cylinder D, so as to act as guides for keeping the cylinder in horizontal position and parallel with the plane of the bed. If preferred, the knuckle-joint plates and cylinder-heads could be formed in separate pieces and be attached together by bolts, or otherwise. We prefer, however, to make them by forming the arm-seats for knuckle-joints *d* directly upon this piece which forms the cylinder-head.

The operation of our improved press is as follows: The valve K being opened, the water, which is forced by a pump or otherwise under pressure, flows to the lower end of cylinder C and to the inner end spaces of cylinders D, the force or hydrostatic pressure exerted under the piston or column C′ moves upward said column and elevates the follower F with a quick movement during the first part of the press action, when the knuckle-joint arms E E′ are folded together, or at their position of least power, and when the bale or material in the press offers the least resistance to the follower; then as the arms E E′ are straightened to more advantageous position the pressure exerted against the pistons G and cylinder-heads D^2 moves the cylinders D inward along the rods H and forces the knuckle-joints of the arms toward each other with powerful effect, closing the follower F upon the bale with increasing force as the material is compacted together.

For many purposes, and if desired, the press may be made without the elevating-cylinder C and piston C′. In such cases the rod H may be extended straight through from one piston G to the other without the ring I, or the ring I, or an equivalent piece, may be fitted to work on an upright stationary guide rod or timber in place of the column C′.

The size of the cylinders D and C may be proportioned according to the requirements of the press, or so as to give the requisite degree of hydrostatic pressure for operating the knuckle-joints and straightening the arms E E′, so as to force the follower toward the head of the press with the power required.

With the press constructed for pressing upward, or with the operating mechanism below the follower F, the press is opened, when the valve K is reversed and the water released from the cylinders D simply by the weight of the mechanism, the gravity and motion being in the same direction; but in presses operated from above, or with the arms and cylinders arranged above the follower, it would be necessary to force the cylinders outward for opening the press, and in that case pipes or hose similar to that shown at J would be connected from a suitable supply-valve to the inlet-ducts *e′*, for filling the spaces between the pistons G and outer heads, D^2, and thereby imparting hydraulic pressure for forcing the cylinders apart and folding the arms E E′ to raise the follower F.

What we claim as of our invention, and desire to secure by Letters Patent, is—

1. In a knuckle-joint press, the combination, substantially as described, with the operating-arms, of two cylinders arranged in connection with the knuckle-joints, and respectively provided with pistons that are connected one with the other, as specified, and means for producing pressure within said cylinders for effecting the operation of the arms and press-follower by the movement of said cylinders, in the manner set forth.

2. The combination, substantially as described, of the operating-arms, the cylinders arranged in connection with the knuckle-joints of said arms and movable therewith, and the pistons supported at stationary position in relation to the press, for the purposes set forth.

3. The combination, substantially as described, of the operating-arms, the cylinders arranged on the knuckle-joints of said arms, the pistons attached to rods passing through the respective cylinders and rigidly connecting said pistons to a ring or slide-piece supported on a central guide, and means for producing pressure within said cylinders for effecting movement of the parts, as set forth.

4. The combination, substantially as described, of the pressing-follower, the operating-arms, the cylinders supported on the knuckle-joint plates, the pistons in the respective cylinders joined to each other by a rigid connecting-rod, the flexible pipes communicating with the interior of said cylinders, and a valve for directing the flow to or from said cylinders, as set forth.

5. The combination, substantially as described, with the operating-arms, of the knuckle-joint plates provided with joints or seats *d* for the arms, stuffing-boxes *s*, and con-

necting-flanges for attaching cylinders thereto, the cylinders D, and pistons G, as and for the purpose set forth.

6. In a knuckle-joint press having operating-arms that fold together in the manner set forth, the combination, with the pressing-follower, the knuckle-jointed operating-arms, and an actuating mechanism for effecting pressure through said arms, of a hydraulic elevating-cylinder and piston-column arranged between the press-bed and follower, and means for producing pressure within said cylinder, substantially as and for the purpose set forth.

7. The combination, substantially as described, of the pressing-follower, the hydraulic elevating-cylinder and column arranged beneath said follower, the operating-arms, the hydraulic cylinders arranged upon the knuckle-joints of said arms, the pistons of said cylinders rigidly interconnected by the coupled rods guided by a ring upon the elevating-column, the pipes for delivering water to the respective cylinders, and a directing-valve for regulating the flow thereto, as set forth.

8. The combination, substantially as described, with the operating-arms in a knuckle-joint press, of the joint-plates or cylinder-heads having screw-threaded flanges, stuffing-boxes and ports, as shown, and the cylinder-shell externally screw-threaded and screwed into the flanges of said joint-plates.

9. A press the follower in which is operated by knuckle-jointed arms, in combination with hydrostatic presses mounted upon or acting directly in connection with the knuckle-joints of said arms, and means for connecting together said hydrostatic presses, whereby they are adapted for exerting their resistant forces one against the other, as set forth.

Witness our hands this 14th day of May, A. D. 1883.

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HERBERT M. RICE.
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