No. 631,422. Patented Aug. 22, 1899.

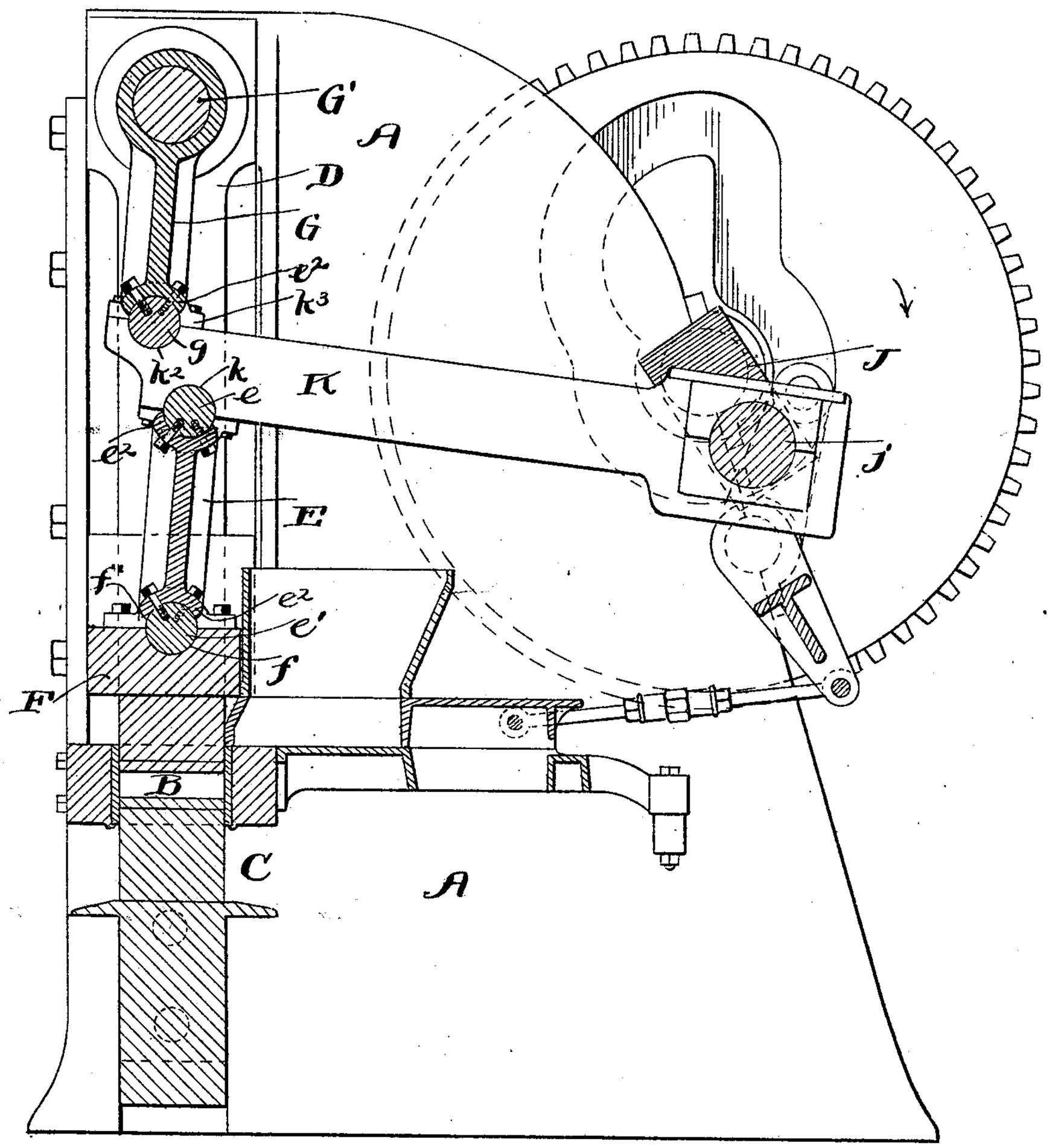
J. M. ERVIN.

MEANS FOR OPERATING BRICK PRESSES.

(Application filed Oct. 19, 1896. Renewed Jan. 16, 1899.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.



Witnesses:
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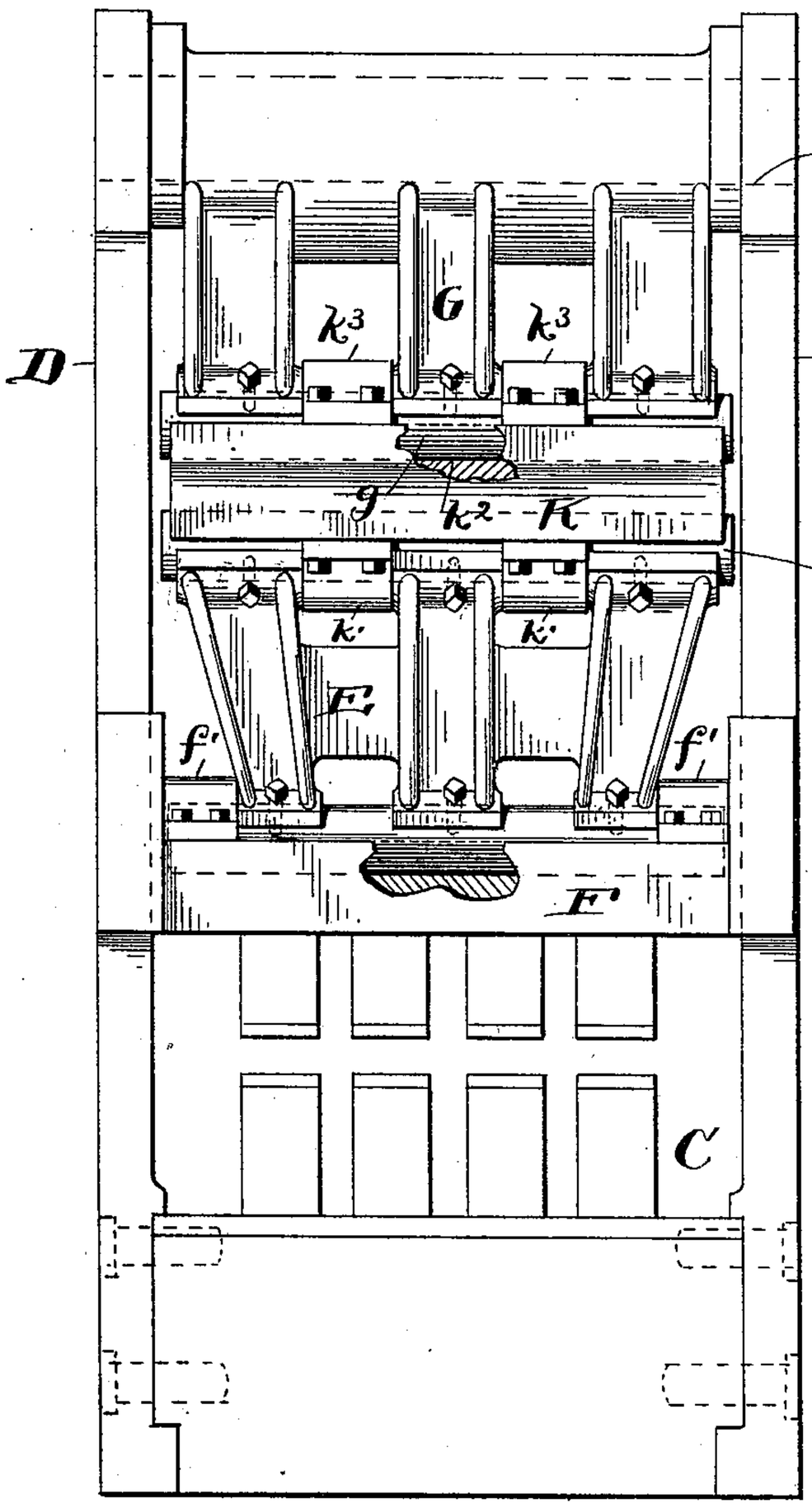

Fig. 2.

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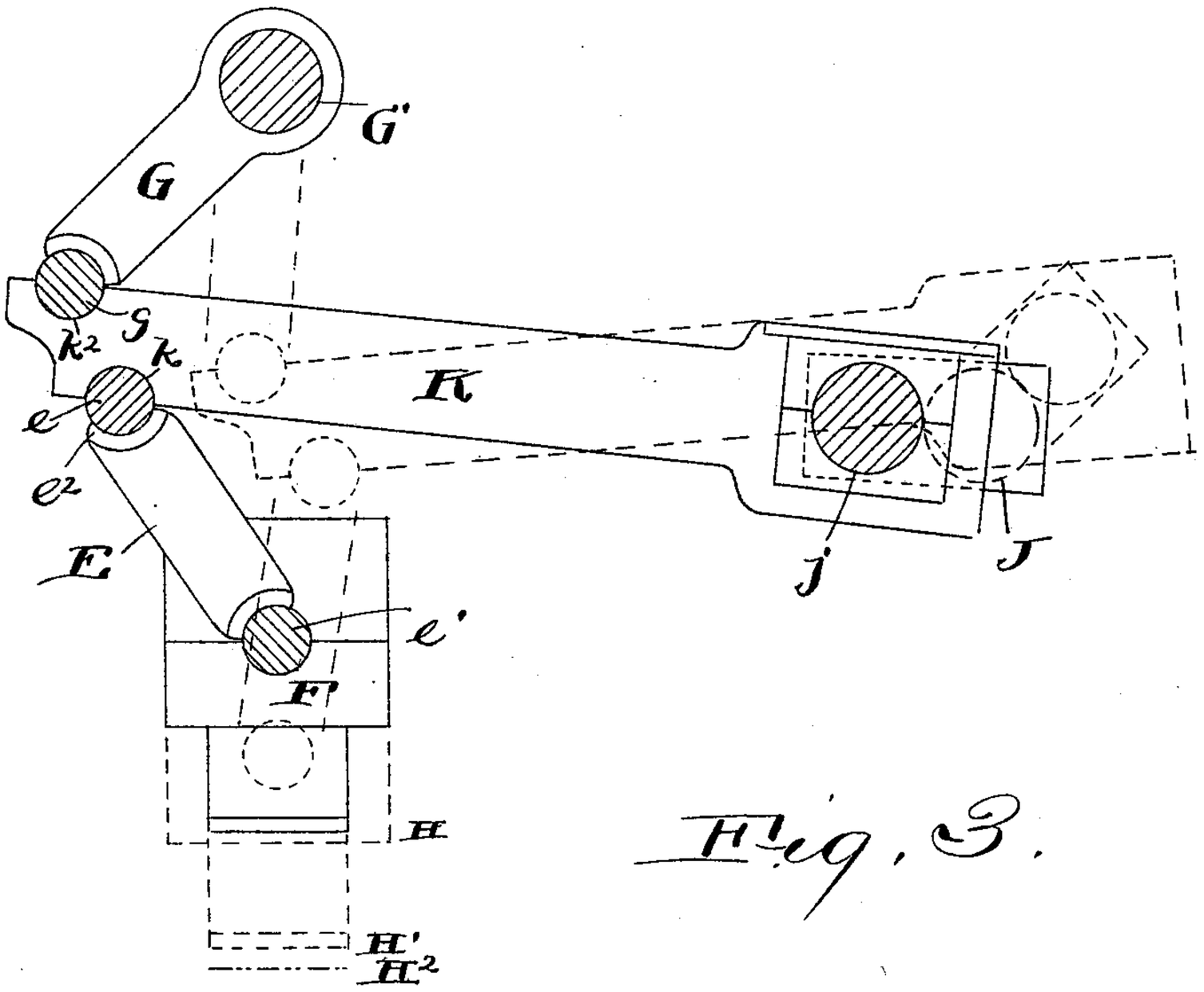
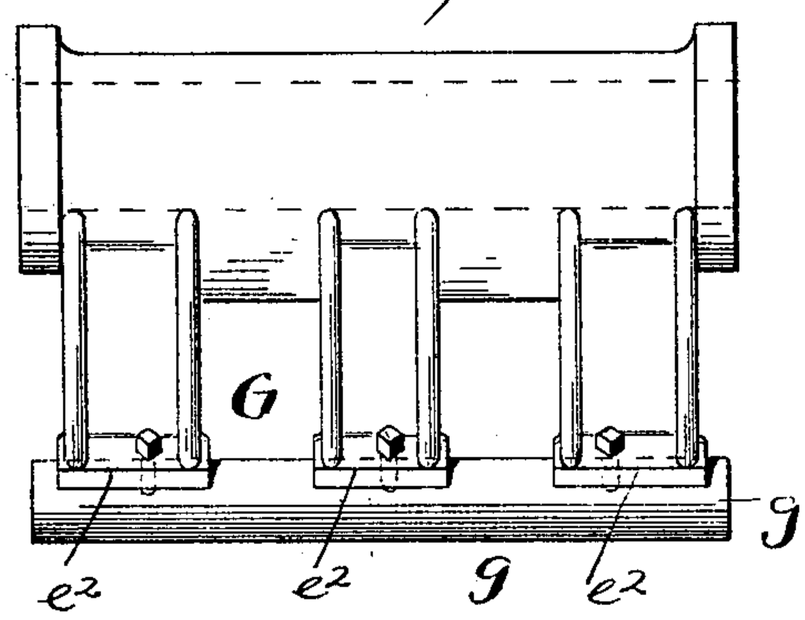


Fig. 3.

Fig 4.



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UNITED STATES PATENT OFFICE.

JAMES M. ERVIN, OF CLEVELAND, OHIO, ASSIGNOR TO ERVIN SPECIAL MACHINE AND TOOL CO., OF SAME PLACE.

MEANS FOR OPERATING BRICK-PRESSES.

SPECIFICATION forming part of Letters Patent No. 631,422, dated August 22, 1899.

Application filed October 19, 1896. Renewed January 16, 1899. Serial No. 702,354. (No model.)

To all whom it may concern:

Be it known that I, JAMES M. ERVIN, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Means for Operating Brick-Presses; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

In order to manufacture good dry-pressed brick it is necessary that the clay in molds shall be subject to great pressure and also that the pressure shall be applied slowly enough and maintained long enough to thoroughly expel the air and effect a permanent compression of the clay. It is also necessary to employ for making dry-pressed brick a press which will act with considerable rapidity, or otherwise the cost of the bricks will be too great to render their manufacture practically successful. It has been a difficult problem to construct a press which shall fulfil these two apparently conflicting conditions. Most of the successful brick-presses employ a toggle as a means for moving the upper and lower plungers relatively toward each other to compress the clay in the molds. This construction meets the requirements as to speed, but a simple toggle does not apply the maximum pressure nor even approximately the maximum pressure for a sufficiently large proportionate part of its stroke to thoroughly expel the air and permanently and regularly compress the clay. The result is that none of the brick-machines now in practical use make uniformly perfect dry-pressed bricks.

The object of my invention is to provide effective and comparatively simple mechanism for operating the plungers of a brick-press or other machine, whereby the maximum pressure shall be applied more slowly than it is in presses employing the ordinary toggle, and approximately the maximum pressure shall be maintained for a greater proportionate part of each complete stroke of the plungers.

Another object of the invention is to provide simple connections between the toggle members and the operating-rod and between the lower toggle member and the upper plunger, whereby the wear will be on steel shafts or rods and not upon the parts of the (usually) cast-iron toggle members.

The invention consists in the construction and combination of parts hereinafter described, and definitely pointed out in the claims.

In the drawings, Figure 1 is a sectional side elevation of my improved operating mechanism and so much of a brick-press as is necessary to show its connection and mode of operation. Fig. 2 is a front elevation of the plungers and their operating mechanism. Fig. 3 is a side elevation of the mechanism for operating the plungers. Fig. 4 is a front elevation of the upper toggle member.

Referring to the parts by letters, A represents a part of the framework of a brick-press.

B represents the mold.

C represents the lower plunger; D, the vertically-movable side bars to which the lower plunger is secured, and F the upper plunger, which is vertically movable upon the side bars D.

So much of the mechanism as is above described is old in substantially the form shown.

My invention may be used with the described parts constructed substantially as shown or with any other suitable form of similar or equivalent parts.

The purpose of my improvement is to move the two plungers relatively toward each other to compress the clay in the mold. I have not shown in the drawings any mechanism for lifting the lower plunger to expel the finished brick from the mold, because such mechanism is no part of my present invention. There are a variety of well-known mechanisms adapted for this purpose, and any suitable mechanism of this kind may be used as well with my mechanism for operating the plungers as with any other mechanism for the same purpose.

E represents the lower toggle member, which in so far as my broad invention is concerned may be pivoted at its lower end to

the upper plunger by any suitable means. The upper toggle member G is pivoted to the upper ends of the side bars D, preferably by being hung loosely upon a transverse shaft G′, which extends between and is secured to said side bars.

K represents the rod by means of which the toggle is flexed and straightened. One end of this rod is mounted upon the crank-pin *j* of the crank-shaft J. The other end of this rod is not connected with the two toggle members in the usual manner—that is to say, by a single pivot which connects all three of the parts together—but the toggle members are pivotally connected with said rod by independent pivots *e g*, and these pivots are located at unequal distances from the axis of the crank-pin *j*.

The full lines in Fig. 3 show the position of the toggle members, crank-shaft, and connecting-rod when the plungers are at their greatest distance apart. The dotted lines in this figure show the position of said parts after the crank-shaft has revolved approximately one-third of a revolution, at which time the toggle is approximately straight and the plungers have been moved toward each other as far as they will move by the mere straightening of the toggle. In Fig. 1 the position of the parts is shown after the crank-shaft has revolved another third of a revolution. While the crank-shaft has been passing from the position shown in dotted lines in Fig. 3 to the position shown in Fig. 1, the connecting-rod has acted like a powerful lever to move the pivots connecting said toggle members with said rod more nearly into line, and consequently to move the two plungers more nearly together. During the first third of the revolution of the crank-shaft the plungers move toward each other a distance equal to the distance between the two lines indicated by H H′ in Fig. 3. During the next third of the revolution the plungers move slowly toward each other the much shorter distance between the two lines marked H′ H² in Fig. 3. It will be seen, therefore, that for approximately one-third of a revolution the pressure is applied rapidly until the clay in the mold is well compacted, and that for the next third of a revolution this pressure is slowly increased, the result being that the air is thoroughly expelled from the clay and the brick is thoroughly compressed. As the crank-shaft moves from the position shown in Fig. 1 to that indicated by the full lines in Fig. 3—that is to say, during the last third of its revolution—the plungers are rapidly moved apart. Two-thirds of the revolution of the crank-shaft are therefore given to the compressing of the brick, and one-half of this time is given to slowly applying and maintaining the maximum pressure upon the brick.

In presses employing a single toggle the plungers can move in the compressing operation only one-half of a revolution of the operating-shaft, and the final or maximum pressure is applied and maintained during only a very small part of this half of the revolution.

This constitutes a description of the broad invention, and in embodying the same any suitable pivotal connection may be made between the toggles and the connecting-rod and the lower plunger; but in the drawings I have shown a very cheap, effective, and durable pivotal connection between said parts. Upon both the upper and lower edges of the lower toggle member E and upon the lower edge of the upper toggle member are formed three (more or less) concave seats for the steel shafts *e* and *e′*. The shaft being placed in said seats is secured therein and to the toggle by bolts passing through flanges e^2 on the edges of the toggle member and screwing into the shaft. In the top of the plunger F is a transverse concave groove *f*, which receives said shaft *e′*. Caps *f′* pass over and embrace the shaft *e′* and are bolted to said plunger F. A similar concave groove *k* is formed in the lower side of the laterally-extended front end of the connecting-rod K. The shaft *e* rests in this groove, and the shaft and connecting-rod are pivotally connected by the caps *k′*, which embrace said shaft and are bolted to the connecting-rod K. In like manner a shaft *g* is secured on the lower end of the upper toggle member, and it lies and operates and is secured in a concave groove k^2 on the upper side of said connecting-rod by the caps k^3.

It is clear from the foregoing description of the specific construction of the connections between the toggle members and the other parts that none of the wear incident to the operation of the mechanism is borne by the toggle members directly. They may therefore be made of cast-iron adapted only to stand the strain incident to the work which they perform. The connecting-rod and the top plate of the upper plunger may be constructed, like the shafts, of steel adapted to resist the wear.

Having described my invention, I claim—

1. In a press, the connecting-rod provided with seats in its opposite edges to receive the shafts, and the shafts which fit in said seats, combined with the toggle members which are made separate from the shafts, and provided with flanges upon their ends, and suitable bolts which are passed through the flanges into the shafts, substantially as shown.

2. In a press, a connecting-rod, a mechanism for operating it, and the transverse shafts which fit in recesses made in opposite sides of the inner end of the rod, combined with the upper toggle member and the transverse shaft G′ upon which said toggle member is loosely hung, said member being provided with flanges upon its lower end, which end is

made to conform to the shape of the shaft; the lower toggle member provided with flanges upon both of its ends, the plunger, the transverse shaft *e'* fitted in a recess in the top of said plunger, and bolts which are passed through the flanges upon both ends of the member into the shafts *e*, *e'*, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES M. ERVIN.

Witnesses:
E. L. THURSTON,
E. B. GILCHRIST.