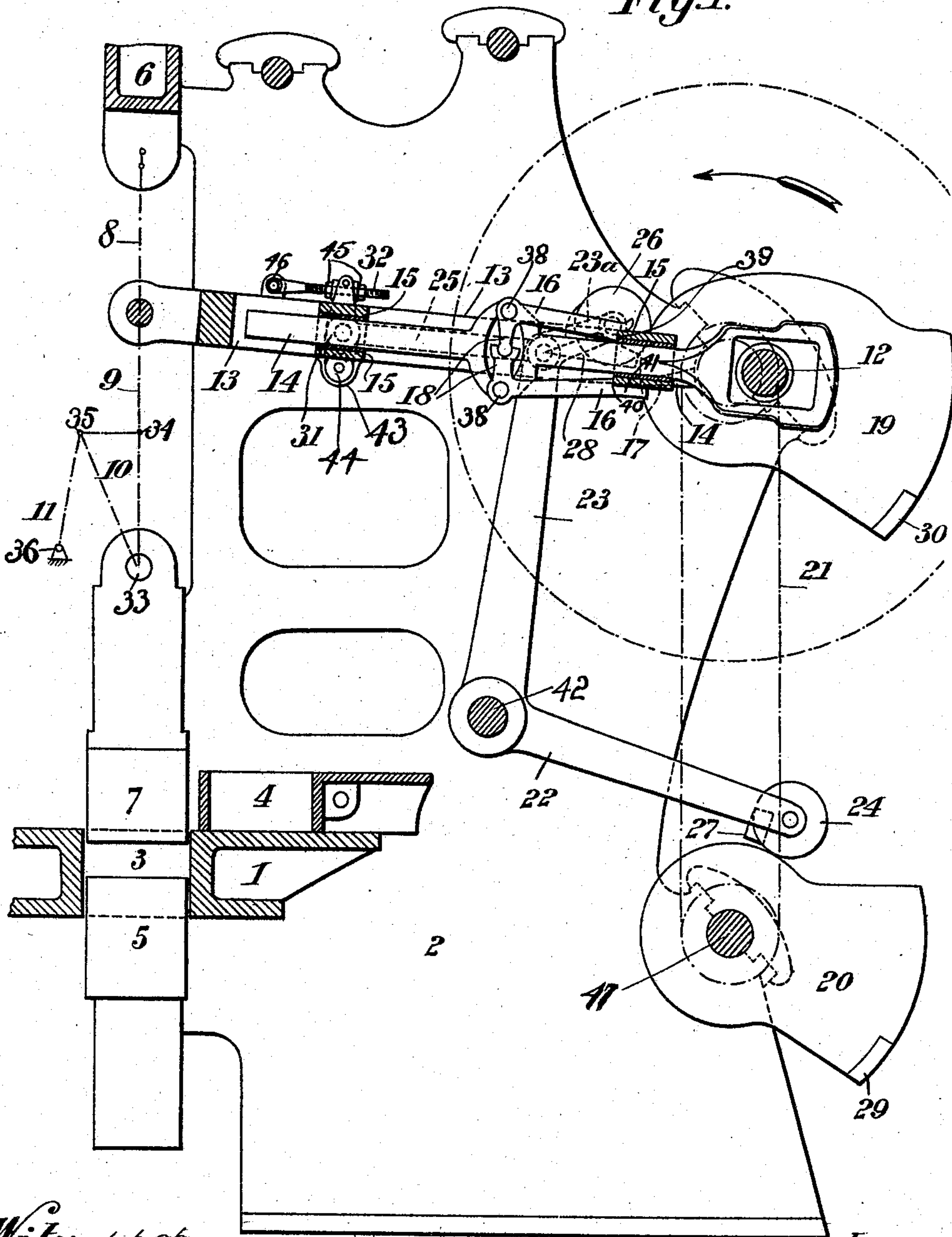


919,781.

J. SCHÜRING, JR.  
KNEE JOINT DRY PRESS.  
APPLICATION FILED MAR. 2, 1907.

Patented Apr. 27, 1909.  
4 SHEETS—SHEET 1.

*Fig. 1.*



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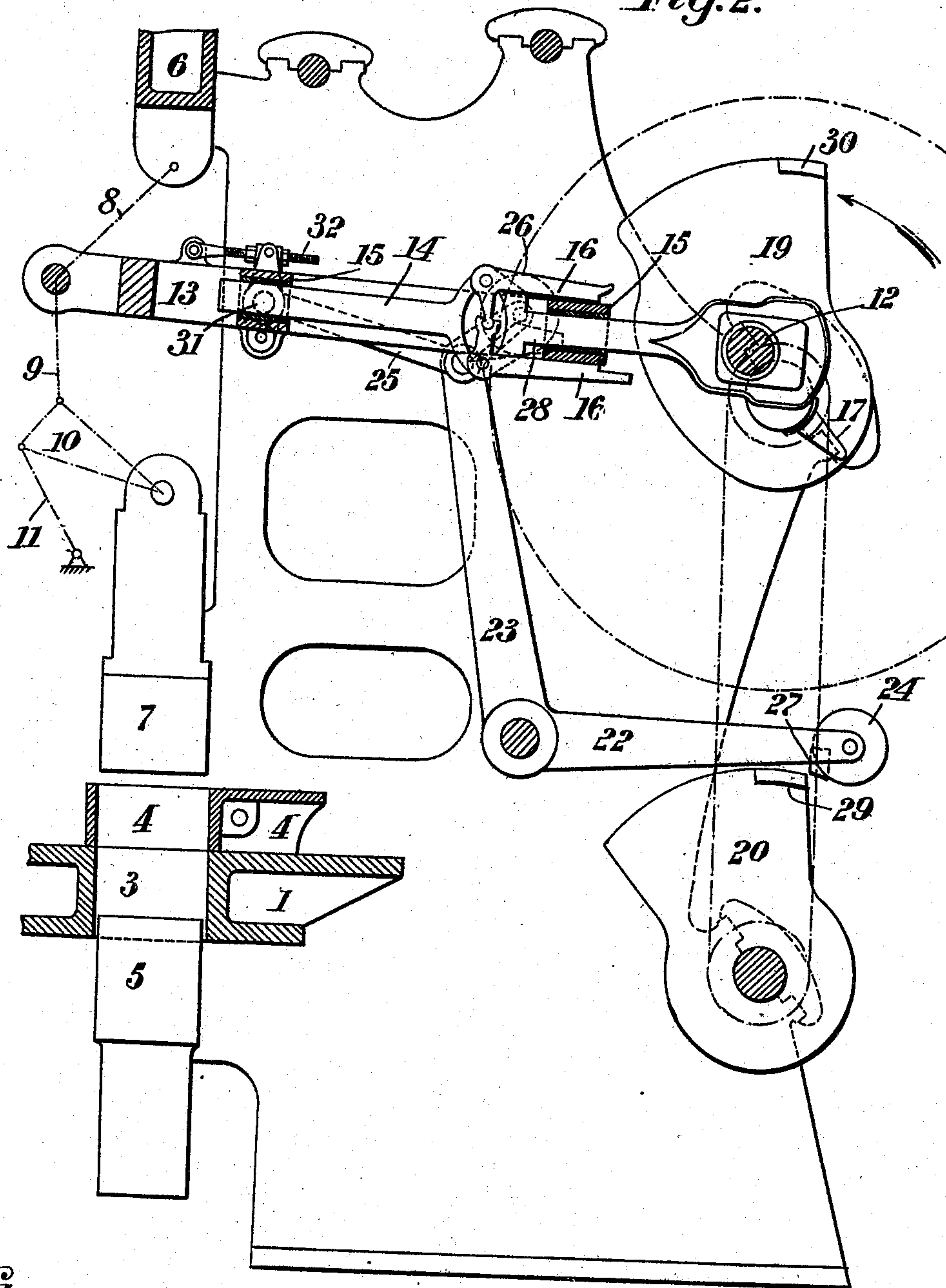
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Fig. 2.



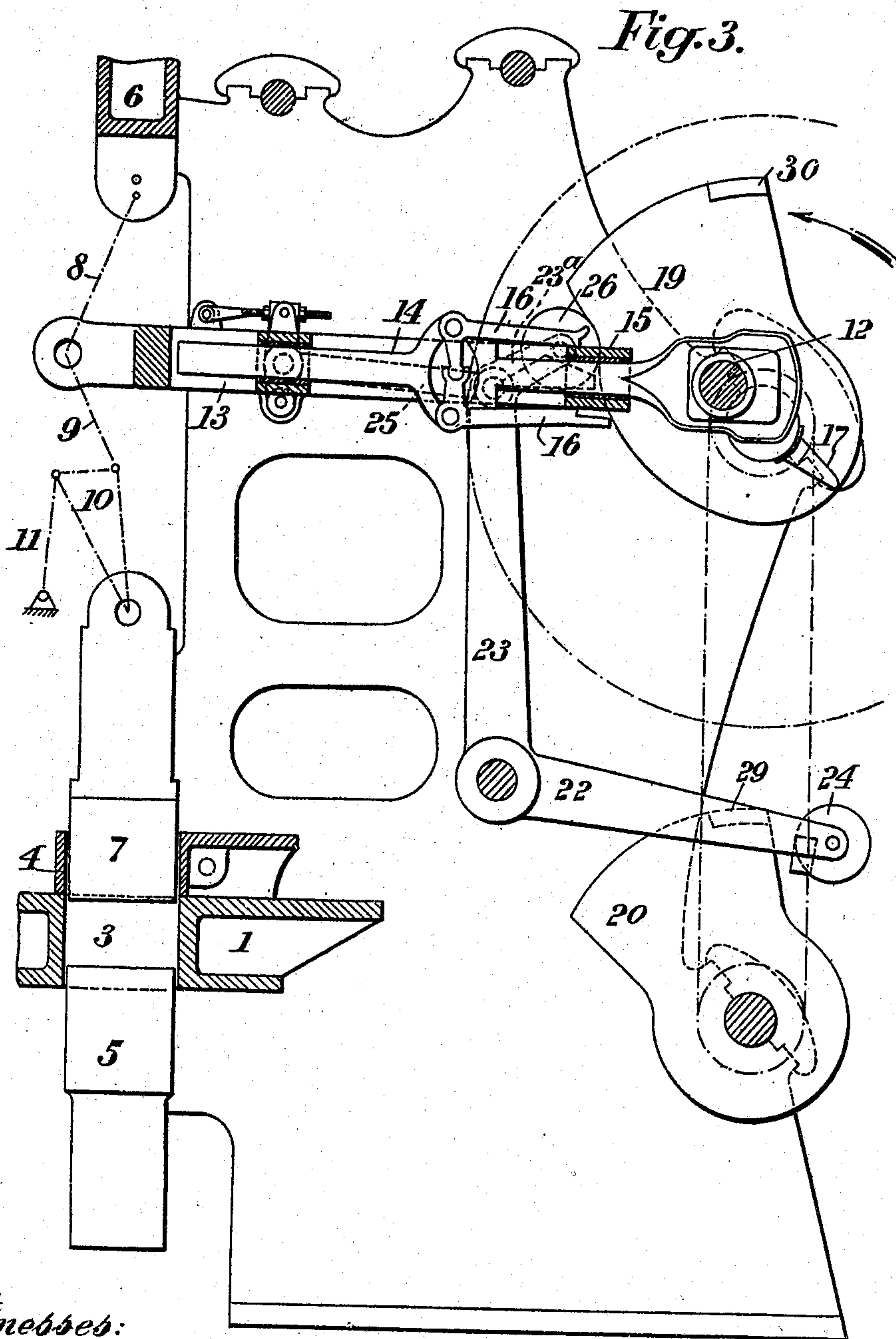
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4 SHEETS—SHEET 3.



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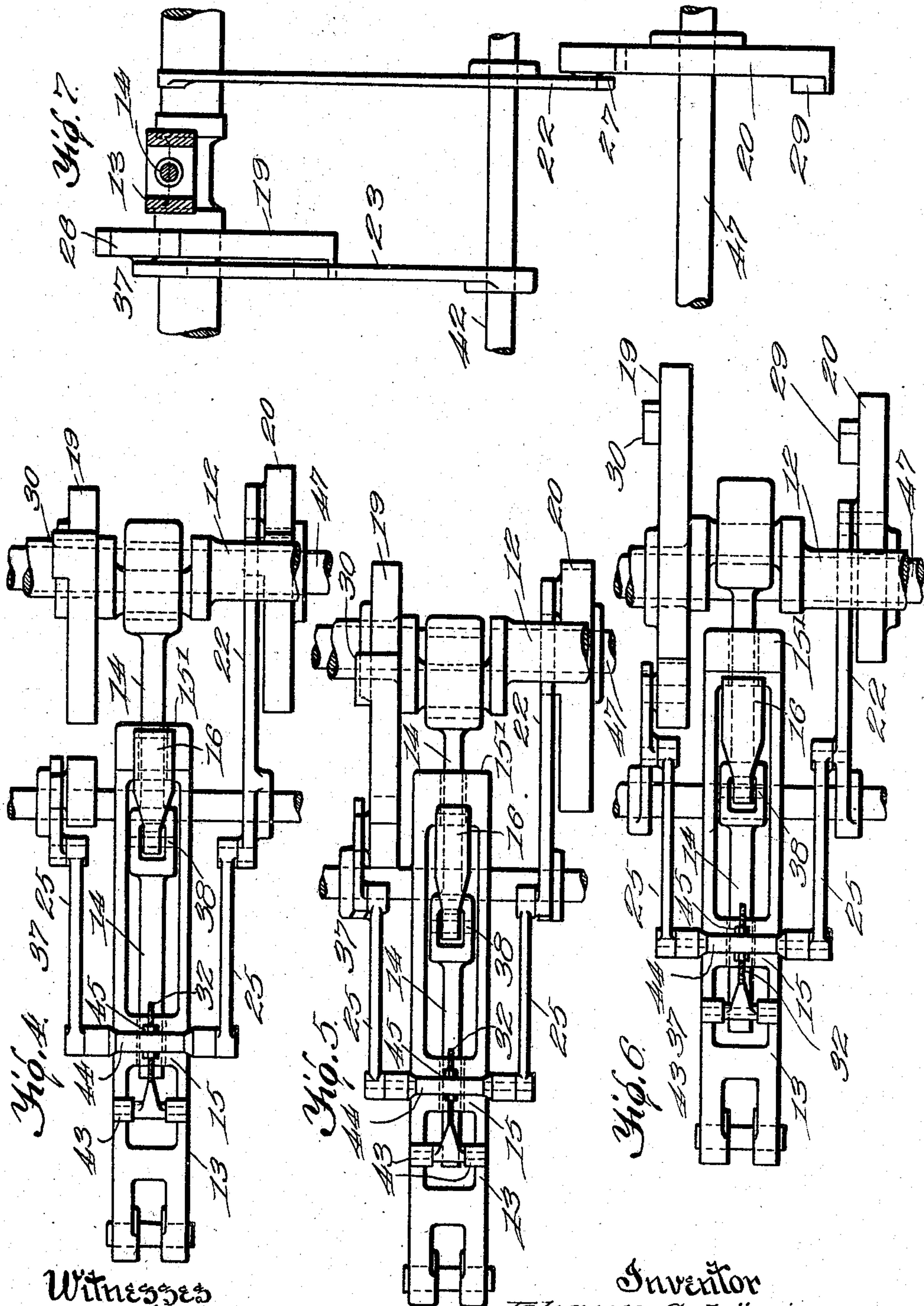
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4 SHEETS—SHEET 4.



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# UNITED STATES PATENT OFFICE.

JOHANN SCHÜRING, JR., OF ZEITZ, GERMANY.

## KNEE-JOINT DRY PRESS.

No. 919,781.

Specification of Letters Patent.

Patented April 27, 1909.

Application filed March 2, 1907. Serial No. 360,170.

*To all whom it may concern:*

Be it known that I, JOHANN SCHÜRING, Jr., a subject of the German Emperor, and resident of Zeitz, Germany, have invented certain new and useful Improvements in and Relating to Knee-Joint Dry Presses, of which the following is a specification.

This invention relates to improvements in machines designed to compress loose material into a hardened mass of a prescribed or definite form and has to do more particularly with the manufacture of briquets, building blocks and the like.

The invention has to do with that form of machine of this general character wherein the loose material in the mold is given one or a plurality of preliminary stamping compressions prior to the final compression. In the most preferred embodiment of the invention the preliminary compressions are not power compressions while the final compression is effected by the application of power.

The invention will be more fully described in connection with the accompanying drawings and will be more particularly pointed out and ascertained in and by the appended claims.

In the drawings:—Figure 1 illustrates a vertical sectional view of a machine embodying the main features of my invention. Fig. 2 is a sectional view of the machine shown in Fig. 1 illustrating a different position. Fig. 3 is a view similar to Figs. 1 and 2 showing a still further working position. Figs. 4, 5 and 6 are plan views of an improved connecting device in different positions. Fig. 7, is a sectional view thereof.

Like numerals of reference designate similar parts throughout the different figures of the drawings.

As shown the device of my invention is supported on side plates or members 2 to which is secured a press frame or table 1 provided with a mold box 3. In the embodiment shown the material is acted upon by companion rams or pressers and the same are disposed above and below the mold box 3, the lower ram or presser being indicated at 5 and the upper one at 7. The material acted upon may conveniently be fed to the mold box by means of a draw hopper 4 which as shown is slidably mounted on the table 1 and may communicate in any desired manner with a source of supply of the material. The hopper 4 is designed to communicate with a

position shown in Fig. 1 and is adapted to be advanced to the positions shown in Figs. 2 and 3 by any suitable mechanism not shown. In the advanced position the material within the hopper is fed to the mold box 3 by gravity and the hopper is provided with an extension as shown for preventing the material from the source of supply from being fed while the hopper is in an advanced position.

As shown the upper ram 7 is connected with means which as shown is in the form of link mechanism and which comprises a guiding member 10 pivoted at 33 to the ram 7, at 34 to a link 9 and at 35 to a supporting member 11 which latter is pivotally connected at 36 in any convenient manner to a suitable stationary part. The link 9 and a link 8 are connected at their free ends with an operated connecting device and said link 8 is supported at its remaining end upon a suitable part 6 of the frame of the machine. Said connecting device which is indicated as a whole by 37 is connected with the means for operating the upper stamp 7 and also with a source of power which as shown consists of a crank shaft 12 adapted to be driven in any suitable manner. Said connecting device comprises as shown two coöperating members movable with respect to each other and adapted to be locked with relation to each other by suitable locking mechanism. As shown the member 13 is connected to the links 8 and 9 and is provided with bearings or guides 15 and 15' in which the other member 14 is slidably mounted. Said member is connected with the crank shaft 12 and is adapted to be operated thereby as shown.

The locking mechanism as shown comprises levers 16 and 16' pivotally mounted at 38 on the member 14 and provided with jointed extensions 18 for effecting synchronous operation of the levers 16 and 16' when one of the same is actuated. Said levers 16 and 16' are notched or otherwise provided with locking portions 39 and 40 adapted for engagement with the bearing 15'. Said lever 16' is provided with an extension 41 adapted for engagement with a lock operating device preferably in the form of finger 17 mounted on the main shaft 12. In order to effect preliminary stamping operations prior to the final power compression preliminary stamp operating mechanism is provided and as shown said mechanism performs its function through the connecting device.

As shown, a lever 23 is pivotally mounted



at 42 and carries on its upper end, on an extension 23<sup>a</sup>, a roller 26 and provided with a quick release portion 28. Said lever 23 is conveniently connected with the member 13 by a link 25 and in the most preferred embodiment said connection is adjustable. As shown the member 13 is provided with a lug 43 to which is pivotally mounted a lever 44 to which latter the link 25 is secured. At the upper end of said lever 44 at 31 is provided a sleeve through which a threaded rod 32 projects and is adapted to be locked with respect to said sleeve by means of nuts 45. Said rod 32 is pivotally mounted at 46 to the member 13. The adjusting means just described serves to limit or vary the relative movement of the member 13 with respect to the member 14, *i. e.*, if the nuts are adjusted to bring the end 31 of the lever toward the pivot mounting 46 the longitudinal movement of the connecting member would be increased and such movement would be correspondingly decreased if a reverse adjustment were made as will hereinafter more fully appear. In the preferred construction there is imparted to the stamp 7 two preliminary stamping movements and the preliminary stamp operating mechanism as shown comprises two members for effecting such movement but I do not wish to be limited to two such preliminary movements as the same are not essential to the full realization of the advantages of my invention. As shown one of said preliminary operating members comprises a cam 19 mounted on the main shaft 12 and conveniently provided with a releasing portion 30 and serving to perform its function by engaging the roller 26.

In constructions where a second preliminary movement of the stamp 7 is desired the lever 23 is provided with an arm 22 carrying a roller 24 and conveniently a releasing portion 27. A cam 20, conveniently provided with a releasing portion 29, is mounted upon a shaft 47 adapted to be driven from the main shaft 12 by power transmission means such as a chain diagrammatically indicated at 21.

Any suitable means not shown may be provided for actuating the member 5.

The operation is as follows:—In Fig. 1 the machine is shown in the position which the parts assume when a final compression stroke has been effected, the locking mechanism being closed and locking the members 13 and 14 from longitudinal movement with respect to each other. As the crank shaft 12 rotates in the direction of the arrow the finger 17 first engages the extension 41 of the lever 16' and throws the locking mechanism out of locking relation with the bearing 15'. The active portion of cam 20 next engages the roller 24 and acts through the arm 22, lever 23 and link 25 and the adjusting

device connecting the link 25 with the member 13 to shift the latter to the left as shown in Fig. 2 thereby acting through the link mechanism to raise the stamp 7. It will be noted that the member 14 also travels in the same direction but at a slower rate of speed therefore the notches of the locking levers 16 will occupy the position shown and will be prevented from engaging the bearing portion 15'. It will be understood that in order to obtain an effective preliminary stamping movement of the part 7, in the construction shown wherein the preliminary stamping movement is effected by gravity, it will be necessary to quickly release the mechanism sustaining the stamp 7 so that the latter will drop with full force. It is to effect such sudden release that the releasing portions 27 and 29 are provided and it will be noted that the portion 27 will engage the cam 20 at 29 after the roller 24 is out of engagement with the cam and that when the parts 27 and 29 reach the position shown in Fig. 2 the arm 22 will be abruptly released and the stamp 7 will drop with full force upon the material in the draw hopper 4 forcing the same into the mold box 3 as shown in Fig. 3. In view of the fact that the crank 12 at this point in the operation has not reached a dead center or in other words has not rotated 180° from its starting point the bearing 15' will still be in such a position that the locking mechanism cannot lock the members 13 and 14 with respect to each other as will be seen by reference to Fig. 3. At this point in the operation the cam 19 has approached the roller 26 and the latter, by reason of the release of arm 22 by cam 20 has approached the cam 19 and the said cam 19 and roller 26 occupy the position shown in Fig. 3. Upon further rotation of the cam 19 the same will act through the roller 26, lever 23, link 25 and member 13 to again raise the stamp 7 and hold it in a raised position while the active portion of the cam 19 is in engagement with the roller 26. The releasing portions 28 and 30 will maintain engagement until the cam 30 has passed beyond the roller 26 whereupon the arm 23 will be suddenly released, in the same manner as hereinbefore described in connection with releasing portion 27 and 29, to allow the stamp 7 to drop by gravity and compress the contents of the mold box 3 with a second preliminary stamping movement. After the stamp 7 has been released to effect such secondary preliminary compression the crank 12 will have passed the 180° mark in its rotation and will be approaching its initial position as shown in Fig. 1 while the return movement of the member 13 due to the release of the lever 23 by the cam 19 will be of such extent as to force the bearing member 15' beyond the locking portions 39 and 40 and the levers 16



and 16', by means of a suitable spring, not shown, will be forced into locking relation with the bearing member 15' and the parts 13 and 14 will be locked to prevent further relative movement of one with respect to the other. Thus the crank 12 in approaching its initial position will exert a pull on the member 14 and the latter through its locking device will cause a corresponding movement of the member 13 by reason of the fact that said members are rigidly locked for the final compression stroke of the stamp 7. It will be understood that the preliminary compression strokes will not compress the material in the mold box 3 a sufficient extent to permit the links 8 and 9 to occupy the position shown in Fig. 1 and that said links will occupy substantially the position shown in Fig. 3. Now it will be obvious that as the crank 12 straightens the links 8 and 9 from the position shown in Fig. 3 to that illustrated in Fig. 1 that the stamp 7 will be forced into the mold box 3 by a power compression due to the crank 12 approaching its initial position thereby serving to complete the formation of the product.

It will be understood that prior to the second preliminary stroke of the stamp 7 the draw hopper 4 will be withdrawn to the position shown in Fig. 1 to receive the next charge and that the withdrawal of the hopper 4 will be preferably effected when the stamp 7 has been raised the second time.

I claim:—

1. In combination, a mold box, a stamp, link mechanism connected with said stamp, a crank shaft, a connecting device associated with said crank shaft and link mechanism whereby a power compression of the stamp is effected, and means associated with said connecting device to effect a preliminary compression by said stamp.

2. In combination, a mold box, a stamp, link mechanism connected with said stamp, a crank shaft, a connecting device associated with said crank shaft and link mechanism whereby a power compression of said stamp is effected, and means associated with said connecting device for effecting preliminary compressions of said stamp.

3. In combination, a mold box, a stamp, mechanism connected with said stamp, a crank shaft, a connecting device associated with said mechanism and crank shaft whereby a power compression of said stamp is ef-

fectured, and means associated with said connecting device for effecting a preliminary gravity compression stroke of said stamp.

4. In combination, a mold box, a stamp, mechanism connected with said stamp, a crank shaft, a connecting device associated with said mechanism and crank shaft whereby a power compression of said stamp is effected, and means associated with said connecting device for effecting a plurality of gravity compression strokes of said stamp.

5. In combination, a mold box, a stamp, a connecting device operatively associated with said stamp and comprising relatively movable members and a locking device for preventing and permitting relative movement of said members with respect to each other, means for operating said connecting device to effect power compression of said stamp, and means associated with said connecting device for effecting preliminary compression strokes of said stamp.

6. In combination, a mold box, a stamp, a connecting device operatively associated with said stamp and comprising members relatively movable with respect to each other and a locking device for preventing and permitting such relative movement, means for operating said connecting device to effect power compression of said stamp, means for effecting a preliminary compression stroke of said stamp, and an adjustable connection for said preliminary means and said connecting device.

7. In combination, a mold box, a stamp, a connecting device operatively associated with said stamp and comprising members relatively movable with respect to each other and a locking device for preventing and permitting such relative movement of said members, means for operating said connecting device to effect compressive movement of said stamp, and means associated with said connecting device and comprising mechanism and two actuating members progressively operating said mechanism for effecting preliminary compressive movements of said stamp.

In testimony whereof I have hereunto set my hand in presence of two witnesses.

JOHANN SCHÜRING, JUR.

Witnesses:

M. NAUMANN,  
GUSTAV MÜLLER.