

No. 681,063.

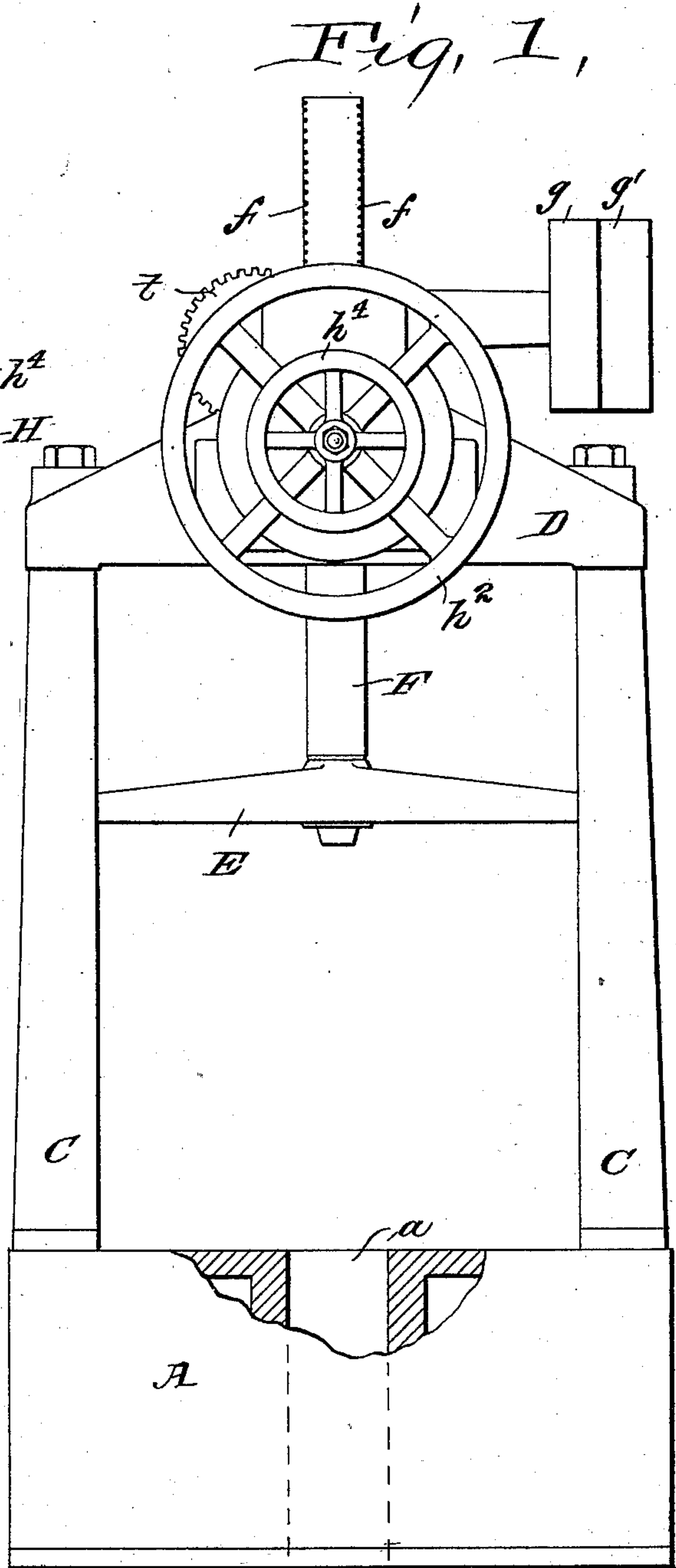
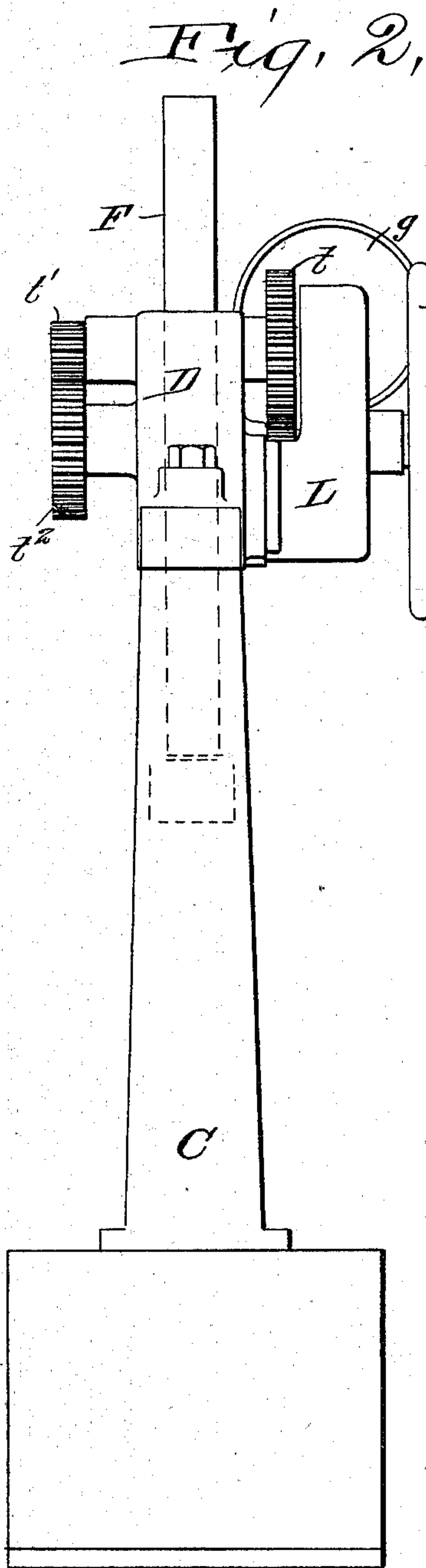
Patented Aug. 20, 1901.

H. M. LUCAS.
POWER PRESS.

(Application filed Feb. 20, 1901.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses.
E. B. Gilchrist
F. D. Ammen

Inventor:
Henry M. Lucas,
By his Attorneys,
Thurston & Bates.

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2 Sheets—Sheet 2.

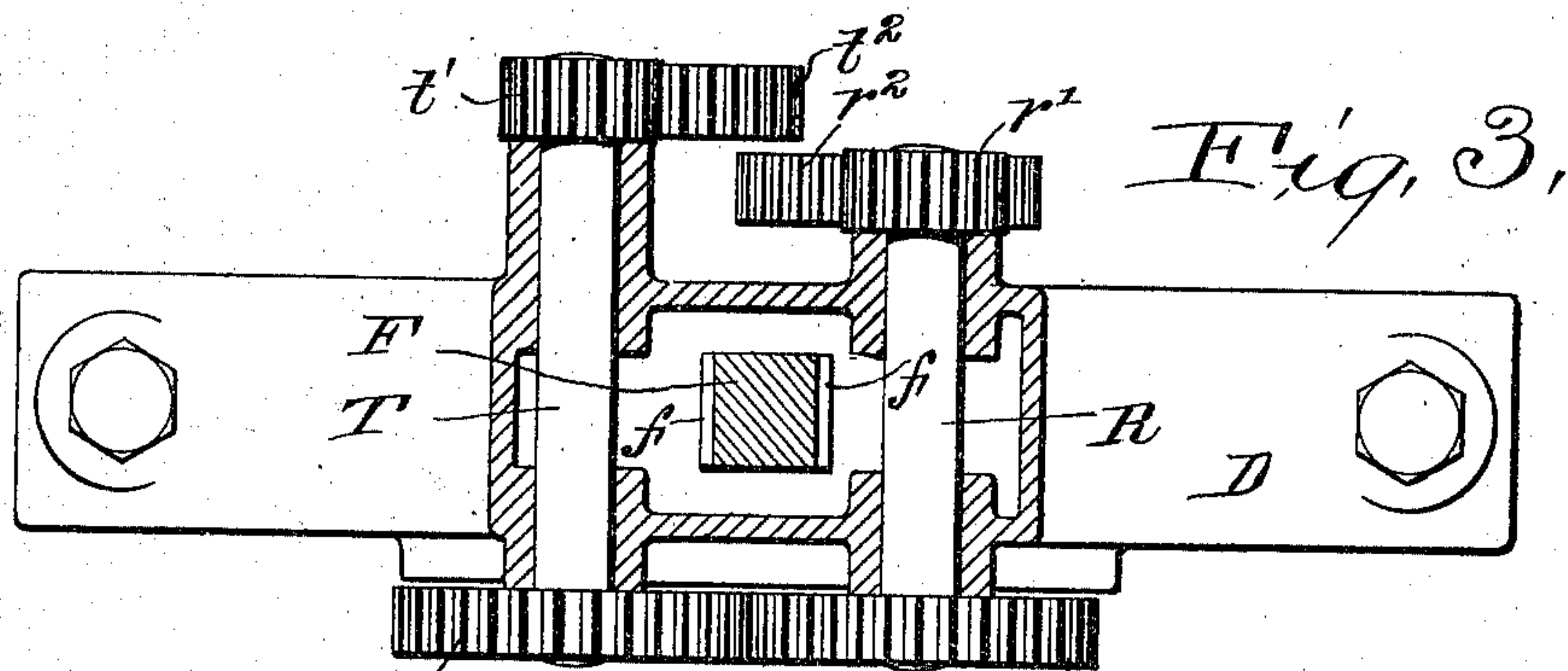


Fig. 3,

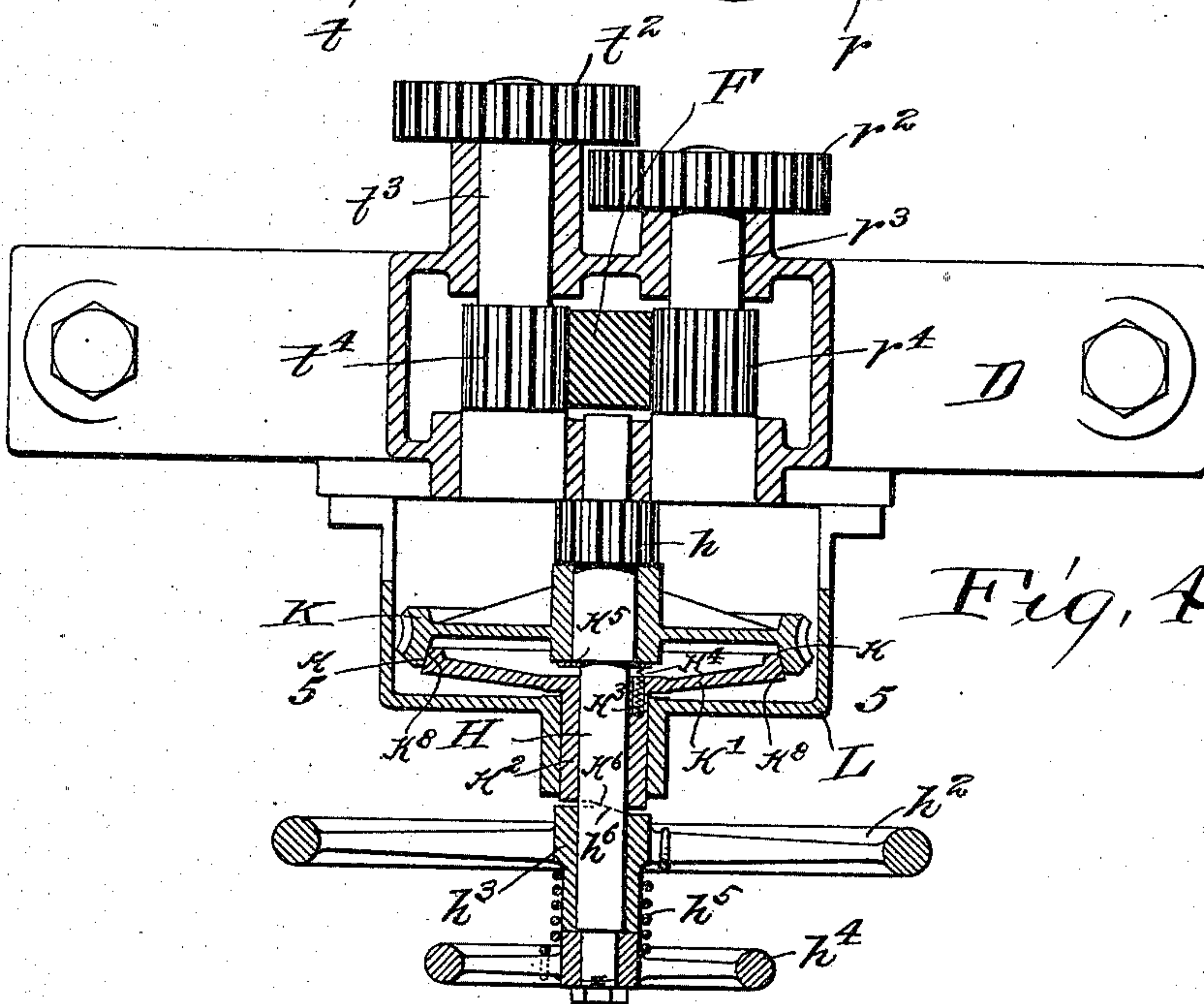


Fig. 4,

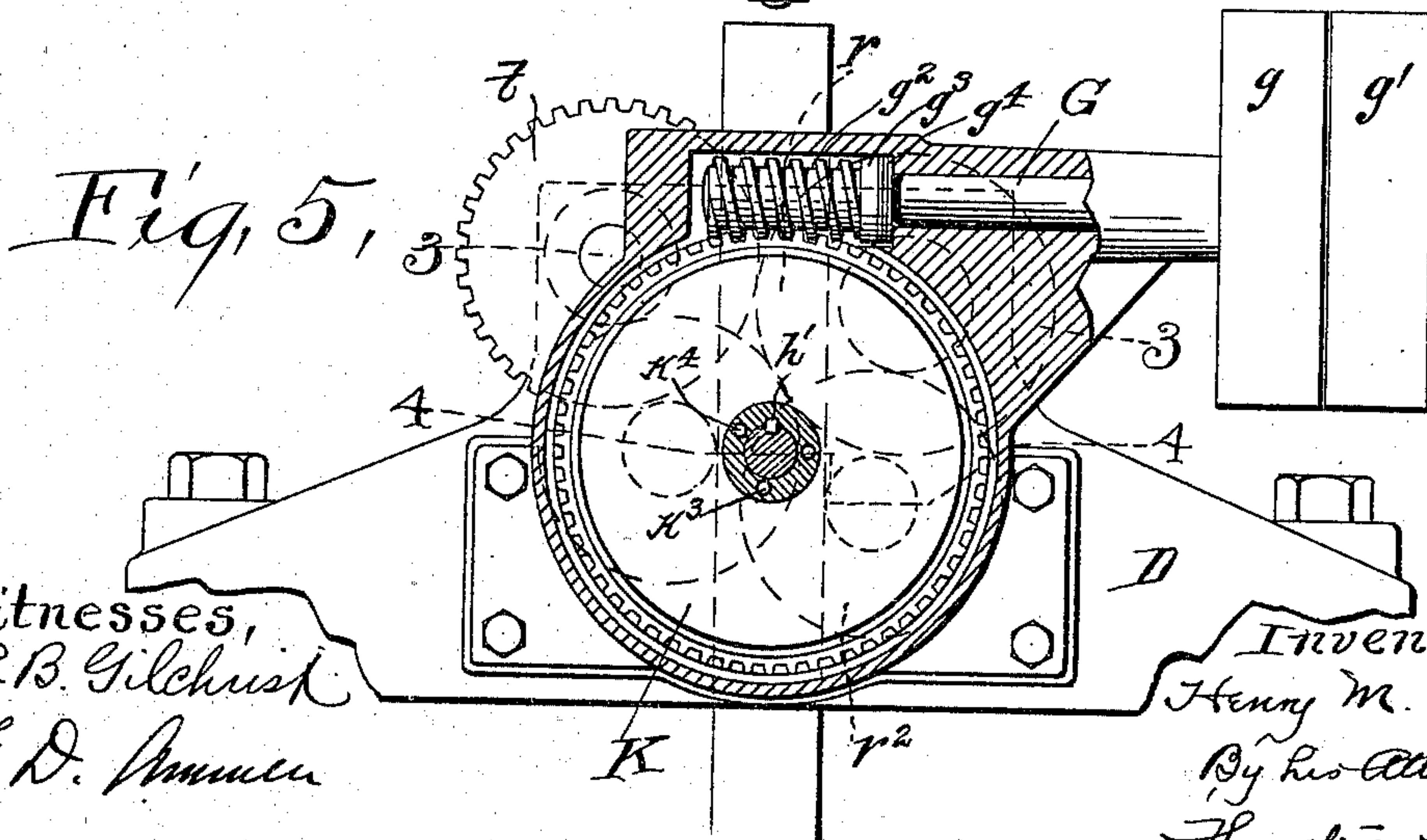


Fig. 5,

Witnesses,
E. B. Gilchrist
F. D. Ammen

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Henry M. Lucas,
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Thurston & Bates.

UNITED STATES PATENT OFFICE.

HENRY M. LUCAS, OF CLEVELAND, OHIO.

POWER-PRESS.

SPECIFICATION forming part of Letters Patent No. 681,063, dated August 20, 1901.

Application filed February 20, 1901. Serial No. 48,144. (No model.)

To all whom it may concern:

Be it known that I, HENRY M. LUCAS, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Power-Presses, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

My invention relates to power-presses generally, but is particularly applicable to those used in machine-shops for such purposes as forcing arbors into wheels and similar operations where tight-fitting parts are to be permanently assembled.

The object of the invention is to provide efficient means for controlling the action of the ram while the press is in the act of operating upon the work.

The invention consists in the means I employ to accomplish this result, comprising, broadly, the adaption of a hand-controlled friction-clutch between the power and the ram. More particularly, it lies in the construction and combination of parts fully described hereinafter, all of which is definitely set forth in the claims.

In the drawings, which fully illustrate my invention, Figure 1 is a front elevation of a press made in accordance therewith, part of the base having been broken away. Fig. 2 is a side elevation of the same. Figs. 3 and 4 are substantially horizontal sections thereof, being taken, respectively, on the lines 3-3 and 4-4 of Fig. 5. Fig. 5 is a vertical section in the plane of the driving-shaft of the machine.

In the preferred construction as shown in the drawings, A represents a base, preferably made of cast-iron. It is provided with a suitable central opening or well *a* to accommodate itself to its work. Columns C C form supports for the housing D and constitute guides for the cross-head E. These may be of any suitable construction and material.

The ram F, which carries as a guide for its lower end the cross-head E, consists, essentially, of a bar of rectangular cross-section provided on two opposite sides with rack-teeth *f*. I will now describe with more particularity the mechanism I employ for driving and controlling this ram.

A driving-shaft G, provided with tight and

loose pulleys *g' g'*, carries a worm *g*², which engages a worm-wheel K. This shaft is further provided with a thrust-collar *g*³ and washers *g*⁴ between it and the housing D. This worm-wheel K is preferably provided with a conically-bored face *k*, and it constitutes one member of a friction-clutch, the other member being preferably a dish-shaped wheel *k'*, having a conically-finished face *k*⁸ coöperating with the face *k*. A spindle H, on which the worm-wheel K turns loosely, is rotatably mounted in the housing D, at its inner end, and carries rigidly a pinion *h*, adapted to drive the ram, as hereinafter explained. The clutch member *k'*, already referred to, has a limited sliding movement upon the spindle H by reason of a spline *h'*, Fig. 5. This clutch member *k'* has a long hub *k*², which is rotatably mounted in the bracket or cover L, which cover may be bolted to the housing D, as shown. This hub is preferably provided with a number of longitudinal recesses *k*³, in which may be mounted light helical compression-springs *k*⁴, which thrust against a loose washer *k*⁵ and normally maintain the member *k'* out of contact with the worm-wheel K. The outer end of the hub *k*² has an inclined face *k*⁶, and beyond it is a loose hand-wheel *h*², whose hub *h*³ has a similarly-inclined end face *h*⁶. Now these two inclined faces coöperate with each other, as shown, wherefore a slight rotation of the hand-wheel *h*² operates to move the member *k'* against the force of the springs *k*⁴, so that it frictionally engages its coöperating clutch member K, as described. Another hand-wheel *h*⁴ is rigidly mounted on the end of the spindle H, and a spring *h*⁵, preferably helical, as shown, and connected at its ends to the two hand-wheels, tends to maintain the hand-wheel *h*² out of engagement with the hub *k*² and operates to return this hand-wheel to its normal position after any rotation relative to the spindle H. The pinion *h*, already referred to, drives the ram through the following mechanism: It meshes with a gear *r*, rigidly mounted on shaft R, which is suitably mounted in the housing D, carrying on its rear end a pinion *r'*, which meshes in turn with a gear *r*². The gear *r*², through the shaft *r*³, drives a pinion *r*⁴, meshing with rack-teeth *f* of the ram F. The gear *r* also drives a gear *t*, similar to itself but upon

the shaft T. Through this shaft T and the gear-wheels t^1 t^2 and shaft t^3 it drives the pinion t^4 similarly as the pinion r^4 is driven. These pinions r^4 t^4 , driven in opposite directions as they are and meshing with the teeth f on opposite sides of the ram, operate to drive the ram longitudinally.

It will be observed that in operation the arrangement of these two pinions r^4 t^4 obviates the necessity for further guides than they themselves afford at this point, whereby wasteful friction is saved and the strain of the pinions distributed.

In operation the ram is brought to the work by the rotation of the hand-wheel h^4 , whereupon the clutch is thrown into engagement by the operator turning the hand-wheel h^2 and is so held by him. The parts are adjusted so that the inclined face h^6 in operation is always in contact with the incline of the hub h^3 , wherefore the amount of power transmitted through the clutch is always under the control of the operator and may be instantly varied by his turning harder on the hand-wheel h^2 or releasing his grasp. Thus the clutch mechanism is not self-locking, but depends on the operator's holding onto the hand-wheel, and this allows him to govern the pressure delivered very accurately, as he can tell from the resistance he encounters in holding the wheel how much pressure he is delivering. In fact, he turns down the hand-wheel as if he were applying the power by hand, and the amount of power delivered is dependent upon the force he so exerts on the hand-wheel.

What I claim is—

1. In a power-press, in combination, a ram, power mechanism adapted to drive the same to its work by a continuous onward pressure, a friction-clutch included within said power mechanism, and non-locking hand mechanism for varying the engagement of the clutch, substantially as described.

2. In a power-press, in combination, a friction-clutch, hand mechanism for accurately controlling the power transmitted thereby, mechanism for delivering power to the friction-clutch, a longitudinally-movable non-rotatable ram adapted to deliver a continuous pressure, and mechanism connecting said clutch with said ram to give it a continuous onward movement, substantially as described.

3. In a power-press, in combination, a friction-clutch, means for transmitting power therethrough, a suitably-guided ram, means for operating the same by such transmitted power in a continuous onward movement, said clutch having an inclined male face and a cooperating female face, a hand-wheel adapted to force said two faces together, and means tending to hold said two faces apart, substantially as described.

4. In a power-press, in combination, a spindle, a ram, connecting mechanism between the two, a wheel adapted to be continuously driven, said wheel carrying a conically-bored

face, a correspondingly-inclined member cooperating with said conically-bored face to form a friction-clutch, said cooperating member being secured to said spindle, a hand-wheel movable on said spindle, there being cooperating inclined faces between said hand-wheel and said cooperating clutch member, substantially as described.

5. In a power-press, in combination, a spindle, a ram, connecting mechanism between the two, a wheel adapted to be continuously driven, said wheel carrying a conically-bored face, a correspondingly-inclined member cooperating with said conically-bored face to form a friction-clutch, said cooperating member being secured to said spindle, a hand-wheel movable on said spindle, there being cooperating inclined faces between said hand-wheel and said clutch member, and a spring connecting said hand-wheel with said spindle to allow limited rotative movement thereof, substantially as described.

6. In a power-press, in combination, a friction-clutch, means for transmitting power therethrough, a ram adapted to be operated by said power and driven to its work in a continuous onward direction, a hand-wheel having a cam or inclined connection with one of the clutch members, said connection being steep enough to prevent the clutch self-locking whereby the hand-wheel not only governs the force of pressure transmitted but keeps the operator apprised thereof, substantially as described.

7. In a power-press, in combination, a friction-clutch, means for transmitting power therethrough, a ram adapted to be operated by said power and driven to its work in a continuous onward direction, a hand-wheel having a cam or inclined connection with one of the clutch members, said connection being steep enough to prevent the clutch self-locking whereby the hand-wheel not only governs the force of pressure transmitted but keeps the operator apprised thereof, and a spring operating to maintain the clutch disengaged unless the operator is holding the hand-wheel, substantially as described.

8. In a power-press, in combination, a rigid open frame, a ram properly carried thereby, means carried near the lower end of the ram and engaging the frame for guiding said lower end, mechanism engaging the ram near its upper end for driving it, said mechanism including a friction-clutch, and hand means for governing the force of contact between the members of said clutch whereby the force of the pressure of the ram may be varied, substantially as described.

9. In a power-press, the combination with a pair of standards, a housing at the upper end thereof, a ram movable through said housing, a cross-head carried by said ram near the lower end and guided by said standards, a spindle journaled in said housing, there being a rack on said ram, gearing connecting said spindle with said rack, a clutch member

- on said spindle rotatable with it, a cooperating clutch member journaled loosely upon the spindle, means for driving continuously said loosely-journaled member, and a hand-wheel capable of a limited movement on the spindle, and means whereby such limited movement of the hand-wheel causes the engagement of said clutch members, substantially as described.
- 10 10. In a power-press, in combination, a spindle, a ram connected therewith so as to be driven thereby, a hand-wheel adapted to rotate said spindle to bring the ram to the work, power mechanism adapted to drive said
- 15 spindle or be free therefrom, and a second hand-wheel adapted to connect the power mechanism with said spindle, substantially as described.
11. In a power-press, in combination, a

spindle, a ram, means for operating said ram 20 connecting with the same, a worm-wheel adapted to be continuously driven, said worm-wheel having a conically-bored face, a disk cooperating therewith to complete a clutch, a hub carried thereby taking around said 25 spindle, said hub having an inclined face at its extremity, a hand-wheel loose on said spindle and having an inclined face cooperating with the first, a second hand-wheel rigid on said spindle, and a spring normally controlling said loose hand-wheel, substantially 30 as described.

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

HENRY M. LUCAS.

Witnesses:

ALBERT H. BATES,
H. M. WISE.