

(No Model.)

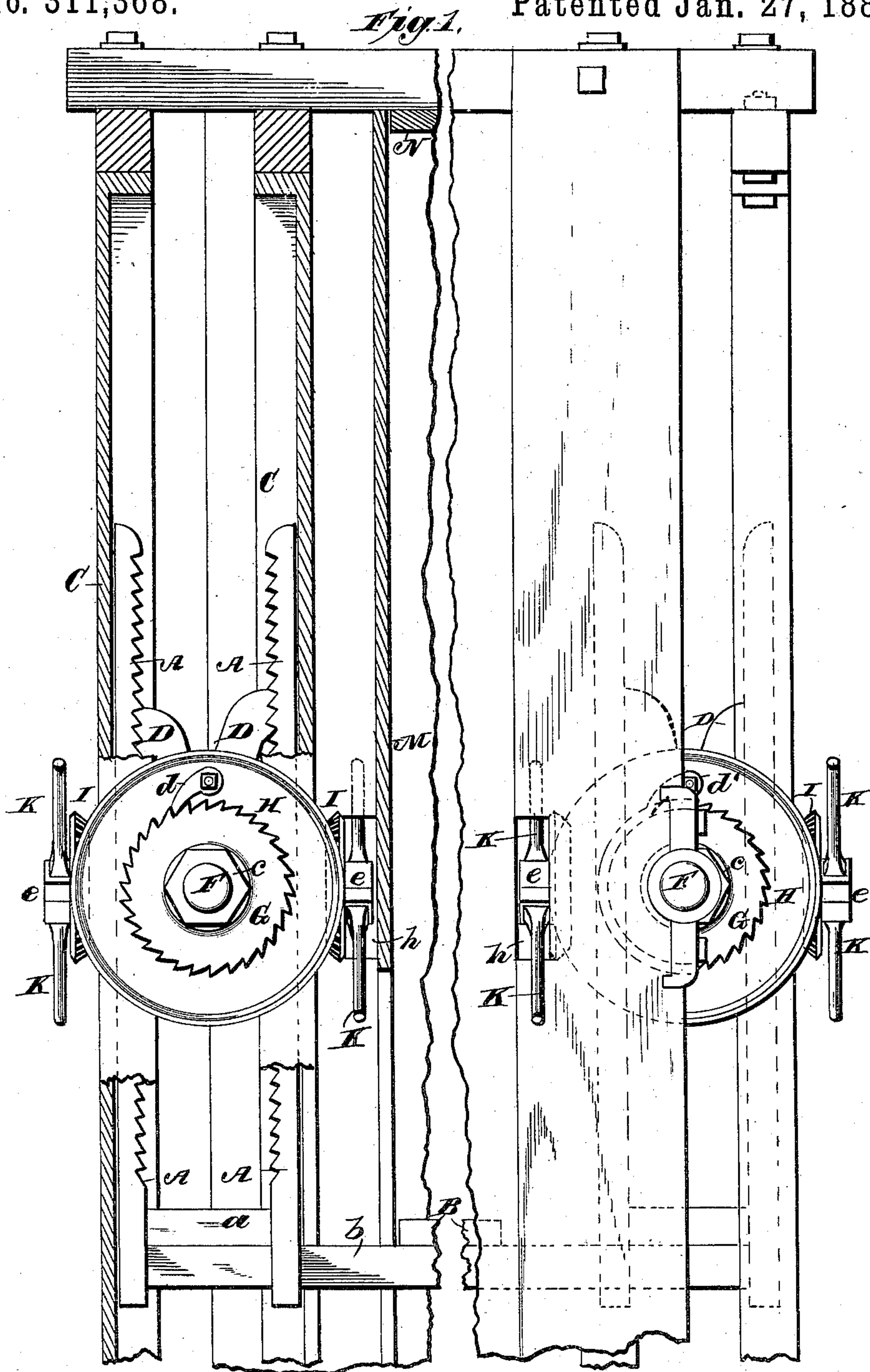
3 Sheets—Sheet 1.

S. T. RICHARDSON.

PRESS.

No. 311,368.

Patented Jan. 27, 1885.



Witnesses.

Robert Everett,

Chas. J. Lyon

Inventor.

Samuel T. Richardson.

By

James L. Norris,

Atty.

(No Model.)

3 Sheets—Sheet 2.

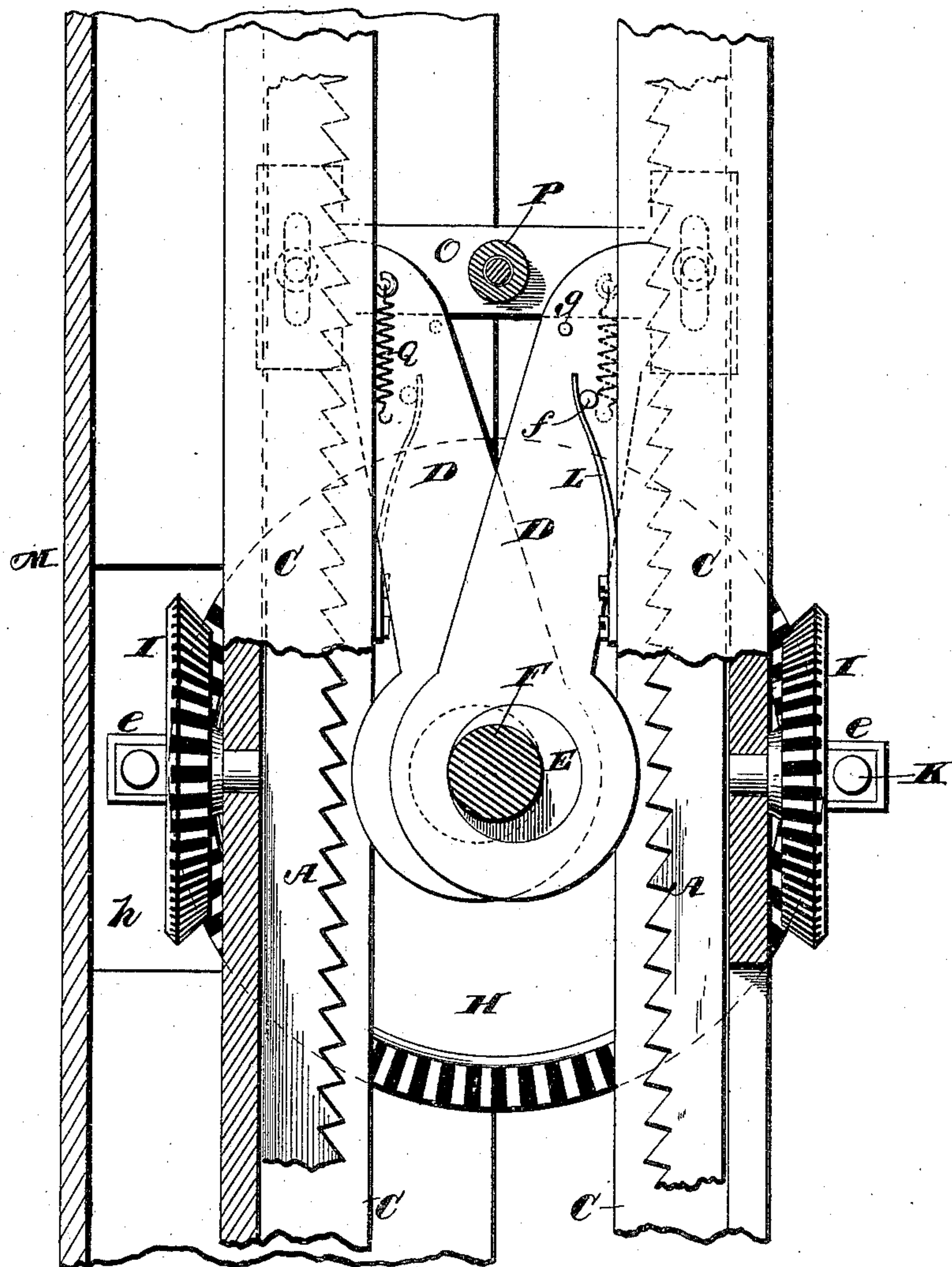
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Fig. 2.



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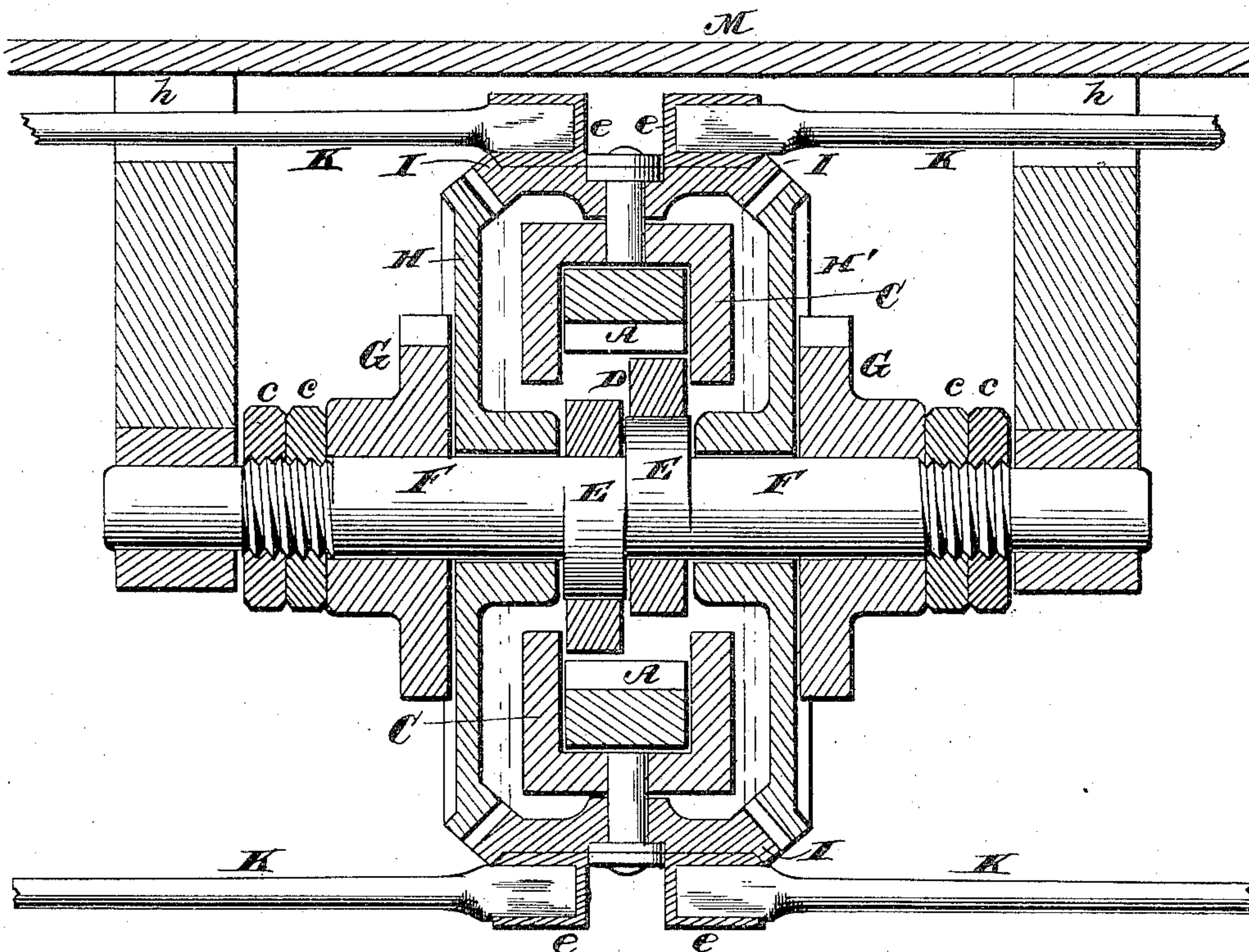
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Fig. 3.



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UNITED STATES PATENT OFFICE,

SAMUEL T. RICHARDSON, OF BALTIMORE, MARYLAND, ASSIGNOR TO THE
RICHARDSON MANUFACTURING COMPANY, OF SAME PLACE.

PRESS.

SPECIFICATION forming part of Letters Patent No. 311,368, dated January 27, 1885.

Application filed June 24, 1884. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL T. RICHARDSON, a citizen of the United States, residing at Baltimore, Maryland, have invented new and useful Improvements in Presses, of which the following is a specification.

This invention relates to lever-power presses for baling hay, cotton, and like material, as well as for analogous purposes requiring a high degree of compression.

The invention is designed particularly for that class of presses in which the movable platen or follower is connected to vertically-moving racks that are actuated by pawls; and the invention consists in the combination, with such follower and its rack-bars, of cam-actuated pawls mounted upon a rotary shaft that also carries a pair of fixed ratchet-wheels and a pair of loosely-mounted gears having gravity-pawls engaging with said ratchet-wheels, one or more intermediate gears being arranged in a plane at right angles with the loose gears, so as to mesh therewith, and being actuated by levers in such a manner as to oscillate the loose gears in opposite directions and cause the pawls to engage alternately with the fixed ratchet-wheels, thereby imparting a continuous rotation to the cam-shaft. This rotary movement of the shaft is converted by the cam-actuated pawls into an upward movement of the rack-bars in raising the follower and closing the press. The invention also consists in the combination, with the cam-actuated pawls, of means for changing their action, so as to cause them to serve as brakes in permitting the follower and its load to be lowered gradually in opening the press, and further in certain peculiarities in the construction and arrangement of the operative mechanism of a lever-power press, as hereinafter more fully set forth.

In the drawings, Figure 1 is a sectional elevation of a portion of a press embodying my invention. Fig. 2 illustrates on a larger scale a portion of the actuating mechanism of the platen or follower on one side only of the press. Fig. 3 is a horizontal section of the same.

Referring to these drawings, A A designate vertical rack-bars that are connected in any suitable manner to the platen or follower B,

Fig. 1, so as to raise and lower the same when actuated by the mechanism, to be hereinafter explained. Two or more of these rack-bars may be employed, according to the dimensions of the press, and the amount of power required to operate the follower and impart the necessary degree of compression. In Fig. 1 the press is illustrated with two pairs of rack-bars, A A, the lower end of each pair being connected by cross-bars *a a*, and the two opposite pairs being connected by cross-bars *b*, on which rests the lower platen or follower, B. The rack-bars A A are arranged to move vertically in grooved or channeled guideways C C, and are actuated by toothed pawls D D, the lower ends of which, as shown in Fig. 2, are journaled or mounted on cams E E, that are formed upon a shaft, F, which is journaled in the stationary frame of the press, as shown in Fig. 3.

To the shaft F, near each end, is rigidly secured a ratchet-wheel, G, by means of nuts *c c*, that are screwed upon a threaded portion of the shaft in proximity to the hubs of said ratchets, or the ratchets G G may be keyed to the shaft or secured in any other convenient manner. The ratchet-wheels G G are alternately actuated by means of pawls *d d* on bevel-gears H H', that are mounted loosely on the shaft F, so as to be capable of receiving an oscillatory movement from the intermediate bevel-gears, I I. These intermediate gears, I I, are journaled or pivoted to the outer sides of the guideways C C or other convenient support, and are provided with sockets *e e* for the reception of detachable levers or handles K K, by which they are operated. It will be seen that the up and down movements of the levers K K, when power is applied thereto, will cause the gears I I and H H' to oscillate reciprocally.

On the outer face of each gear H H' are pivoted one or more pawls or dogs, *d d*, Fig. 1, which rest on the ratchet-wheels G G and drop into engagement therewith by gravity. The pawls *d d* on each gear H H' point or work in the same direction on both sides of the press, and act alternately on their respective ratchet-wheels G G, thereby imparting a continuous motion to the shaft on which said ratchet-wheels are secured.

It will be understood that in oscillating the

gears I I by means of the levers K K power is applied in such a manner as to cause one of said gears to move to the right while the other is being moved to the left, and as both these gears I I are meshed with the gears H H' it is obvious that the latter will be made to oscillate in a corresponding manner, or reciprocally, one moving in one direction while the other moves in the opposite direction. Thus while the gear H moves forward, so as to bring its pawl *d* into engagement with the ratchet-wheel G, thereby causing the latter to turn the shaft F forward, the opposite gear, H', moves back for the purpose of bringing its pawl *d'* into a new position for further action, and vice versa, so that by the reciprocal oscillations of these gears, causing their pawls to act alternately upon their respective ratchet-wheels, a continuous forward motion is imparted to the shaft F that carries the pawls D D for actuating the rack-bars and the follower connected thereto. The large pawls D D receive an oscillating up and down movement from the cams E E on the shaft F, and during their alternate upward movement they are held to their engagement with the rack-bars A A by means of springs L, that are attached to the sides of the guideways C C in such a manner as to bear on pins or studs *f*, that are formed on or secured to said pawls. By the alternate action of the pawls D D on the opposite rack-bars A A, said rack-bars being connected to each other and to the follower B, as before observed, it is obvious that the said follower will be raised with a continuous, steady, and positive movement until the material contained in the press is thoroughly compressed. After the follower B has thus been elevated within the inner walls, M, of the press, in proximity to the head or upper platen, N, thereby compressing the material acted upon, it can be gradually lowered by slightly modifying the action of the pawls D D, the operation of the other mechanism being continued as before.

The operation of lowering the follower B to open the press may be described then as follows: To the opposite guideways C C is adjustably secured a cross-bar, O, Fig. 2, that carries a friction-roller, P, which is thus capable of being lowered into the path of the pawls D D by proper adjustment of the cross-bar. Each pawl D is provided with a pin or stud, *g*, to which can be connected one end of a spiral spring, Q, the other end of which is secured to the opposite or farther guideway C, or other fixed part of the press. When the follower has been raised to the desired point, or when it has reached its extreme lift and is to be lowered, the springs Q Q are stretched across the space between the guideways C C, Fig. 2, and are connected, respectively, to the pins *g g*, on the opposite pawls D D, thereby drawing them away from their engagement with the rack-bars. The roller P is at the same moment adjusted down into the path of

the pawls D D by lowering the cross-bar O, and the action of the levers K K and connected gearing is continued as before. The pawls D D, instead of being made to act as levers to propel the racks A A upward, now serve as brakes to prevent a too rapid descent of the load. It will be seen that as the pawls D D are oscillated by the cams E E they are prevented by the tension of the springs Q Q from coming in contact with the racks until in their upward movement they strike against the roller P, which alternately forces them outward into engagement with their respective racks. Each pawl is thus alternately made to take the strain of the load, and keep engaged with its rack-bar by the action of its cam on the shaft F, and so on, the tension of its spring Q coming into play and drawing it away from the rack as soon as its downward movement relieves it of the pressure of the roller P. The load is thus gradually lowered by a backward step-by-step movement without subjecting the press and its actuating mechanism to undue strain. By disconnecting the springs Q Q and adjusting the cross-bar O and roller P out of the way of the pawls D D the latter may be again caused to elevate the rack-bars A A and follower B by continued action of the gears. It will be seen that the ends of the pawls D D are serrated to correspond with the serrations of the rack-bars A A, each pawl being preferably provided with several teeth for the purpose of enabling it to take a better grip on said rack-bars. The rack-teeth are each formed with a nearly horizontal portion or bearing for the corresponding portions of the pawl-teeth in their upward movement or engagement, and with an inclined portion that also corresponds to a similar construction in the pawl-teeth, the engagement and disengagement of those parts being thus greatly facilitated, while a firm and steady grip is insured.

As the bevel-gears H H and I I are not intended to make a complete revolution, but merely oscillate on their axes, it is obvious that they will be equally efficient whether formed as segments or perfect wheels. It is also apparent that one of the gears I may be dispensed with, though increased power is obtained by employing two such gears in connection with each shaft. The shafts F and their connected gearing are preferably arranged at the sides or ends of the press, and when more than one gear I is employed the levers K K of the inner one may project through openings *h* in the press-frame.

Having thus described my invention, what I claim is—

1. In a press, the combination, with a vertically-movable follower and rack-bars connected thereto, of a rotary shaft carrying cam-actuated pawls adapted to engage with said rack-bars, and the mechanism, substantially as herein described, for converting an oscillatory movement into a continuous rotary

movement of the shaft carrying the cam-actuated pawls, substantially as herein set forth.

2. In a press, the combination, with rack-bars connected to a follower or platen, of
5 toothed pawls mounted upon cams on a rotary shaft, springs for normally holding said pawls away from engagement with the rack-bars, and a roller attached to an adjustable support and capable of being brought into the path of
10 the pawls, so as to exert a pressure thereon sufficient to overcome the tension of the springs, thereby forcing the pawls alternately into engagement with the racks for the purpose of permitting the follower to descend,
15 gradually, substantially as described.

3. In a press, the combination of a follower, rack-bars connected thereto and adapted to move in suitable guideways, a shaft carrying cam-actuated pawls for engaging said rack-
20 bars, a pair of ratchet-wheels rigidly secured to said shaft, a pair of bevel-gears mounted loosely on said shaft and having pawls for engaging with the ratchet-wheels, and an intermediate gearing, gear, or gears arranged in
25 a plane at right angles to the bevel-gears and meshing therewith, and means for actuating

said intermediate gear or gears, substantially as described.

4. In a press, the combination, with the shaft F, having cams E E and pawls D D
30 mounted thereon for actuating the rack-bars A A, connected to a follower, B, of the ratchet-wheels G G, secured to said shaft, the bevel-gears H H', mounted loosely thereon, and having pawls d d' for engaging with the ratchet-
35 wheels, and the intermediate gears, I I, provided with levers K K, substantially as described.

5. In a press, the combination, with the rack-bars A A, of the shaft F, having cam-
40 actuated pawls D D, provided with pins g g, the detachable springs Q Q, and the adjustable roller P, whereby the racks are permitted to descend gradually, substantially as described.

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

SAMUEL T. RICHARDSON.

Witnesses:

A. H. NORRIS,
JOS. L. COOMBS.