

No. 612,392.

Patented Oct. 18, 1898.

G. F. BALLOU.
COPYING PRESS.

(Application filed Dec. 11, 1897.)

(No Model.)

Fig. 1

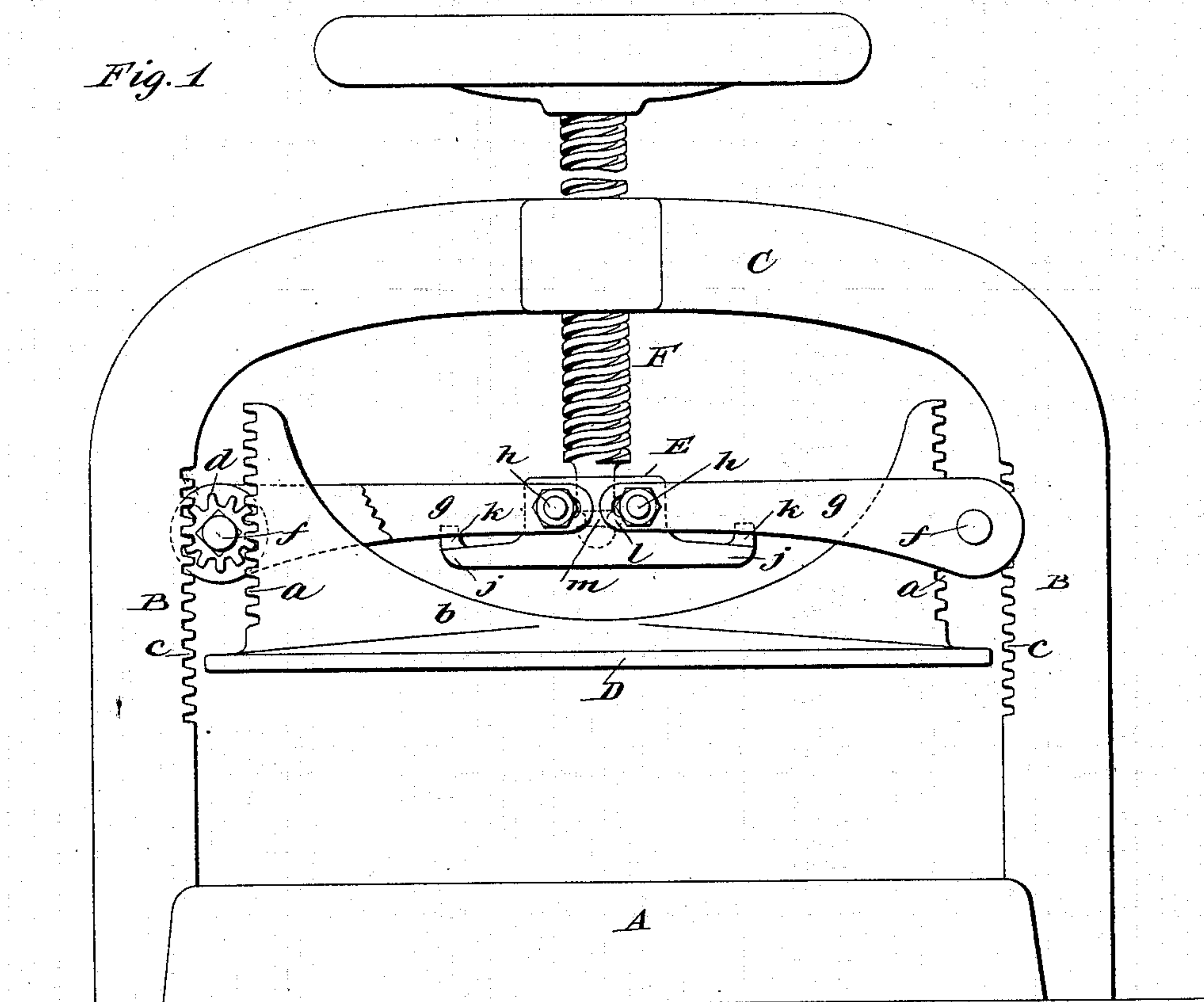
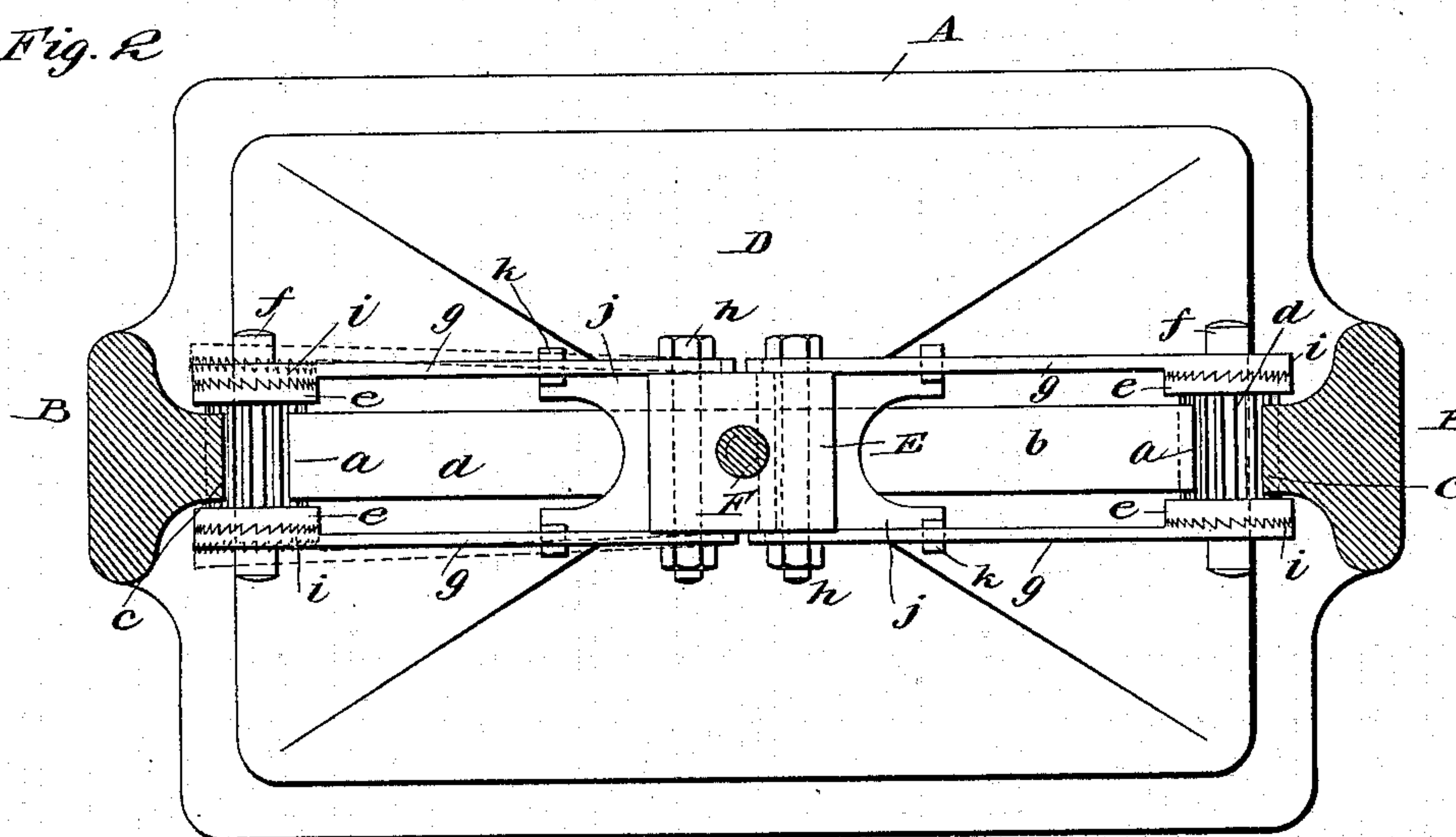


Fig. R



Witnesses:

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COPYING-PRESS.

SPECIFICATION forming part of Letters Patent No. 612,392, dated October 18, 1898.

Application filed December 11, 1897. Serial No. 661,530. (No model.)

To all whom it may concern:

Be it known that I, GEORGE F. BALLOU, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented a certain new and useful Improvement in Copying-Presses, of which the following is a specification.

The object of my invention is to produce a copying-press employing two plates, between which the book or other object is compressed and which are capable of two distinct rates of relative movement, the plates being caused to approach each other at a relatively fast rate of movement until the object to be compressed is firmly engaged between said plates, and the plates being subsequently approached toward each other to compress said object by a relatively slow rate of movement, whereby a very much greater compressive effect may be produced upon said object with the same expenditure of energy, or the same compressive effect may be exerted upon said object with a very much smaller expenditure of energy than is possible in those presses wherein the plates are caused to approach each other always at the same rate of relative movement.

In order that my present invention may be understood, attention is directed to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a side elevation, partly in section, of a copying-press embodying my invention; and Fig. 2, a sectional view of the same.

In both of the above views corresponding parts are represented by the same letters of reference.

A represents the ordinary bed-plate, the upper surface of which constitutes the lower plate, upon which the book or other object to be compressed is placed. Extending up from the said bed-plate are the two standards B B, connected together at their upper ends by a heavy bridge-piece C. Preferably the bed-plate, standards, and bridge-piece are all cast integral.

D represents the upper plate, between which and the bed A the book or object is compressed. This upper plate D is provided near each end with a vertical rack *a*, said racks

being connected by a web *b*, so as to be very rigidly sustained. The standards B B are each provided with a corresponding toothed rack *c*, and between each adjacent toothed rack *a* and *c* is placed a pinion *d*. These pinions not only serve to guide the upper plate D in its correct vertical travel, but they also are employed for the purpose of giving to the plate D a powerful final compression, as will be explained. The pinions *d d* are provided at each side with toothed disks *e*, the teeth of which are made very fine, so as to overcome lost motion in the device. Each pinion is further provided with a short stub-shaft *f*, extending through the same, and mounted upon this shaft at each side is a lever *g*, connected at its rear end to a block E. Each lever *g* is preferably made of spring metal and is connected to said block E by a screw *h*. In order to allow for proper movement, each screw *h* works in a slot in its corresponding lever. The outer end of each lever *g* carries an integral toothed ring *i*, which is adapted to cooperate with the toothed disk *e* of each pinion *d* to constitute a clutch. The block E is provided with outwardly-extending arms *j*, each of which is provided with an upwardly-extending cam portion *k*, which is adapted to engage with the adjacent spring-lever *g* to force the same outward to the position shown in dotted lines, Fig. 2, and to thereby disengage the toothed ring *i* from the disk *e*. The ordinary screw-shaft F of the press enters the block E at its lower end and is prevented from moving relatively to said block by a pin *l* working in a groove *m* in said screw-shaft. If desired, however, the lower end of the screw-shaft may extend entirely through the block E and be provided at its lower end with a nut and above said block with a collar, by which said block will be positively actuated by said screw-shaft.

The operation of the improved copying-press which I have described is as follows: Normally the weight of the upper plate D tends to rotate the pinions *d d*, so as to roll said pinions downward with respect to the racks *c*. This carries the spring-levers *g* into engagement with the cam-surfaces *k*, and said levers at their outer ends are moved outward, so as to disengage the toothed rings from the

disks *e*. The cam-surfaces *k* will therefore act as limiting-stops for further downward movement of the spring-levers and will therefore sustain the upper plate D in its normal position. Upon rotating the screw-shaft F the block E will be lowered, allowing the pinions *d* to roll downward with respect to the racks *c*, and hence actuating the racks *a*, so as to move the upper plate with an increased rate of movement toward the book or other object to be compressed. In other words, the said upper plate D will move toward the book or other object at twice the velocity of the block E, and hence at twice the feeding-speed of the screw-shaft F. As soon as the upper plate D comes into contact with the book or other object further movement downward of the pinions *d* is prevented. The screw-shaft in rotating, however, carries the block E with it and disengages the cam-surfaces *k* from the spring-levers *g*, allowing the toothed rings *i* to engage the disks *e* of the pinions *d*. When this engagement is effected, further movement of the block E downward by reason of the continued rotation of the screw-shaft F swings the spring-levers *g* on the shafts *f* and imparts a partial rotary movement to the pinions *d*, so as to force the upper plate D into contact with the book or other object with a very much increased leverage. Upon the return movement of the shaft F the block E is first elevated, bringing the cam-surfaces *k* into contact with the spring-levers *g* and disengaging the toothed rings *i* from the disks *e*, so that the pinions *d* will be free to rotate in the opposite direction. The continued movement in the reverse direction of the screw-shaft F will therefore elevate the upper plate D through the instrumentality of the spring-levers *g* and the pinions *d*.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is as follows:

1. In a copying-press, the combination of a stationary plate, two standards connected to said plate, a toothed rack on each of said standards, a movable upper plate, toothed racks on said upper plate adjacent to the

toothed racks on the standards, pinions working between the adjacent toothed racks of the upper plate and standards, levers connected to said pinions, means for disconnecting said levers from said pinions, and a screw-shaft connected with said levers, substantially as set forth.

2. In a copying-press, the combination of the stationary plate A, the standards B having the toothed racks *c c*, the movable upper plate D having the toothed racks *a a* thereon, the pinions *d* working between said racks *a* and *c*, the levers *g* adapted to be connected to said pinions, means for positively connecting said levers with said pinions, whereby the latter may be rotated, a block E to which all of said levers are connected, and a screw-shaft for actuating said block, substantially as set forth.

3. In a copying-press, the combination of the stationary plate A, the standards B B having the racks *c* thereon, the movable upper plate D having the racks *a* thereon, the pinions *d* between said racks *a* and *c*, the levers *g*, the clutches *e i* between said levers and pinions, the block E to which said levers are connected, means for connecting and disconnecting said clutches, and the screw-shaft F for actuating said block, substantially as set forth.

4. In a copying-press, the combination of the stationary plate A, the standards B B having the racks *c* thereon, the movable upper plate D having the racks *a* thereon, the pinions *d* between said racks *a* and *c*, the levers *g*, the clutches *e i* between said levers and pinions, the block E to which said levers are connected, cam-surfaces on said block for connecting and disconnecting said clutches, and the screw-shaft F for actuating said block, substantially as set forth.

This specification signed and witnessed this 7th day of December, 1897.

GEO. F. BALLOU.

Witnesses:

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JNO. R. TAYLOR.