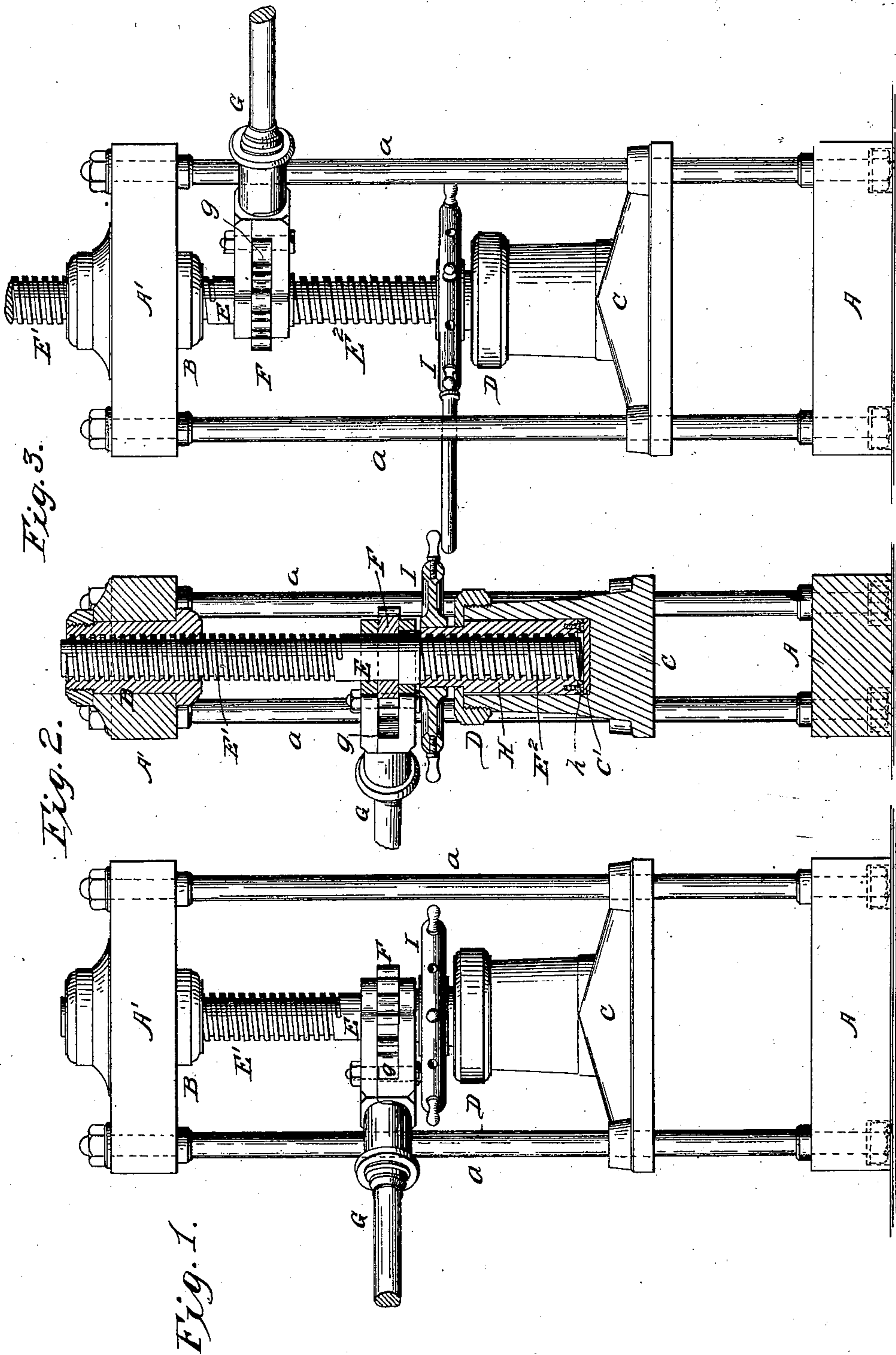


H. C. BOWEN.
SCREW PRESS.

No. 93,167.

Patented Aug. 3, 1869.



Witnesses.
C. C. Livings
W. C. Day

Inventor.
H. C. Bowen
by his attorney
Thomas S. Stetson

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Fig. 4.

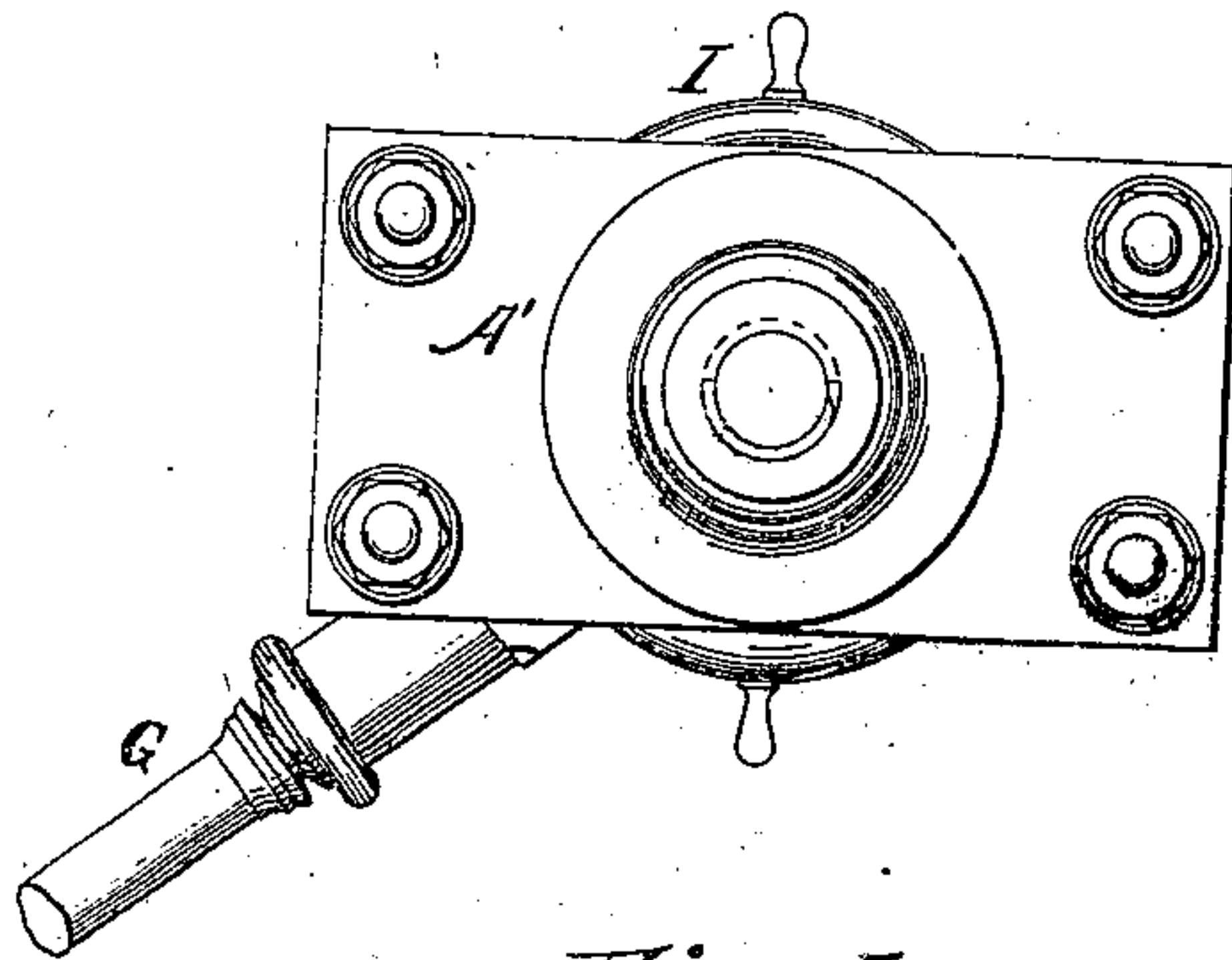
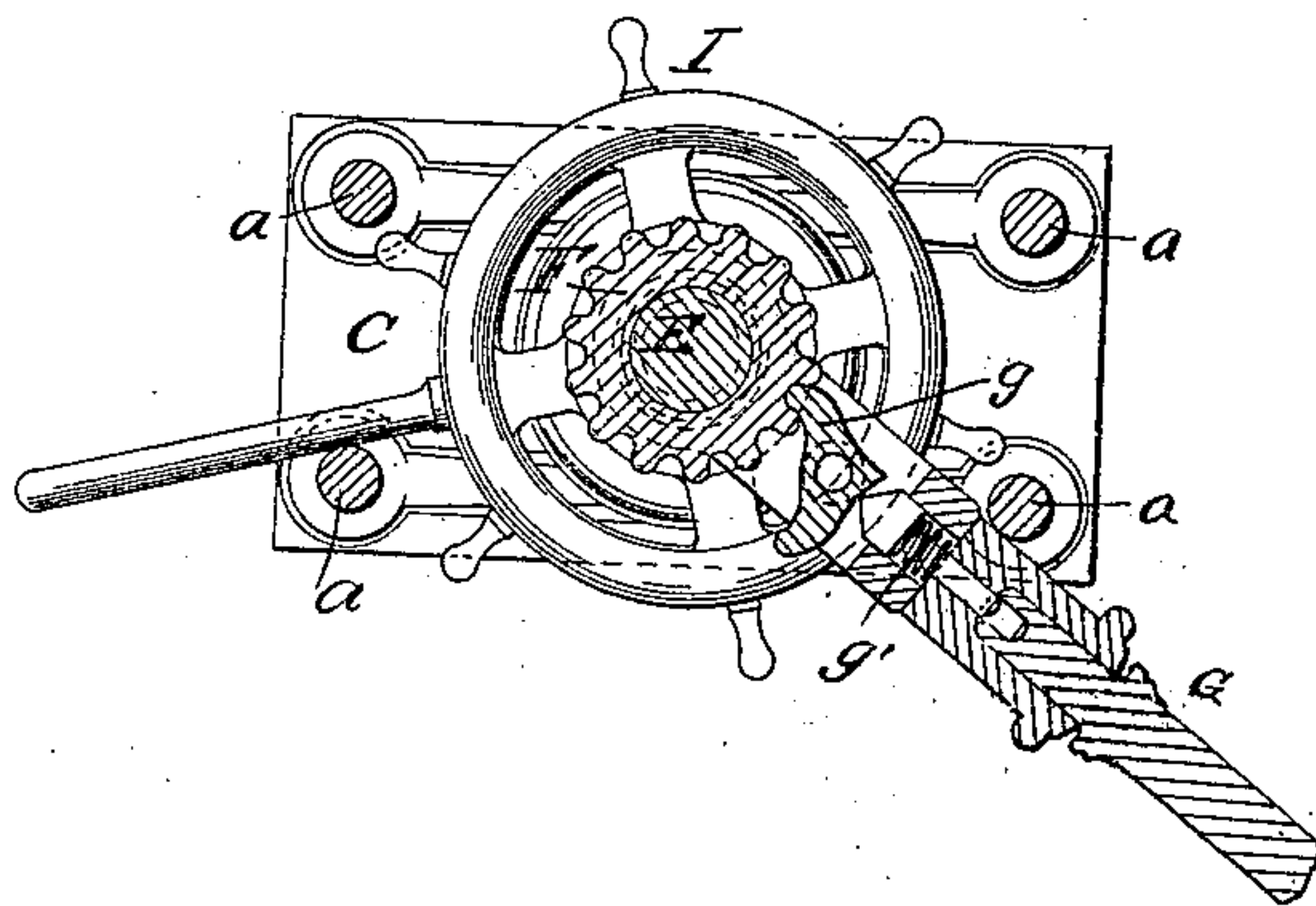


Fig. 5.



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United States Patent Office.

HENRY C. BOWEN, OF NEW YORK, N. Y

Letters Patent No. 93,167; dated August 3, 1869.

IMPROVEMENT IN SCREW-PRESSES.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, HENRY C. BOWEN, of the city and county of New York, in the State of New York, have invented certain new and useful Improvements in Presses adapted for compressing bales of cotton, hay, &c., or for miscellaneous purposes; and I do hereby declare that the following is a full and exact description thereof.

My press is a screw-press, with its parts peculiarly constructed and arranged to allow a very great increase of purchase towards the latter part of the compressing-operation, and to allow a rapid movement in the early stages and in lifting the platen.

The accompanying drawings form a part of this specification.

Figure 1 is a front elevation, and

Figure 2, a vertical section, showing the press in the condition before the maximum power has been applied.

Figure 3 is a front view, showing the press after the maximum power has been applied.

Figure 4 is a top view, corresponding to fig. 1.

Figure 5 is a horizontal section, showing the parts in the condition corresponding to fig. 3.

Similar letters of reference indicate like parts in all the figures.

A is the bed, of cast-iron or other suitable material.

A' is a top, of the same material.

a a, &c., are stout wrought-iron rods, holding the parts A and A' strongly in position by collars and nuts.

B is a heavy fixed nut, supported in the top A'.

C is a stout platen, guided on the rods a.

D is a cap-ring, which fits on a correspondingly-threaded part of the platen.

I denominate, by the general letter E, a stout screw through which the power is applied.

It is operated by a lever, G, having a double pawl, g, and spring g', adapted to act on a toothed wheel or ratchet F, fixed on the plain part of the screw E. near its centre.

The relation of these parts is very clearly shown in the drawing, and will be readily understood.

The screw E is threaded both above and below the plain portion, and both parts are right-handed threads; but the upper part, E¹, is threaded a little finer than the lower part, E².

The part E¹ works in the fixed nut B, and the part E² works in a long nut, H, which is in a boss on the platen C.

The nut H is confined by the screw-cap D, so that it cannot move endwise in the platen; but it is round, and is free to turn around on its axis, being operated and governed in its motion by the hand-wheel I.

The lower edge of this round nut H is provided with a polished steel ring, as indicated by h, bolted to the nut, as represented, which bears upon the disk C' in the platen.

When the press is operated to depress the platen C with its maximum force, the motion is transmitted from the screw through the round nut H; and as the screw E E¹ E² is turned, it tends to depress the nut H, and with it the platen C, at a certain speed, according to the pitch of the coarser part E² of the screw, and it tends to raise the entire screw and its connections at another speed, a little slower, according to the pitch of the part E¹ of the screw, which is a little finer than the part E²; consequently the screw rises bodily at a rate of speed which is very readily appreciated, but the platen is depressed very slowly, and consequently with very great force.

It will be readily seen that the extent of the motion of the platen thus produced with the maximum force must be very little.

The screw E would soon traverse so high as to disconnect itself from the nut H, if this means of inducing motion were carried to a very great extent.

It follows, therefore, that it is desirable to operate the press by depressing the platen as much as possible by other means before this maximum force is applied.

In practice, therefore, after putting any article under the platen C, the press is first operated by reciprocating the lever G with the double pawl g, adjusted to turn so as to turn the screw E E¹ E² in the direction "with the sun;" that is to say, the screw is screwed down into the nut H, until it is quite down, if not already there, and it is then turned further in the same direction, carrying the nut with it.

This operation is continued until the platen bears forcibly upon the article being pressed, and it is further operated to compress the article until it can no longer be thus operated.

In this condition of the press, the screw E E¹ E² will stand as low as it will go in the turning-nut H.

Now, allowing the turning-nut to rest stationary in the boss of the platen, and providing means for locking or otherwise securing it relatively thereto, if such be found necessary, I commence to operate the screw E E¹ E² by turning it "against the sun;" that is to say, I adjust the double pawl g in the opposite position, so that the spring g' shall cause the opposite end of the double pawl to act.

And, now, as the lever G is reciprocated horizontally by the attendants, it raises the screw, causing it to mount upward in the top A.

This operation depresses the platen C at each revolution only by the very small difference between the pitch of the part E² and of the part E¹.

It is practicable, after having thus depressed the platen with the maximum force of the press for a certain distance, so as to begin to lose the proper hold of the screw upon the revolving nut, to block the platen down by stout pieces introduced between the platen and the top piece A', if the goods compressed are elastic, and to run the screw down again by reversing the position of the pawl *g* and appropriately operating the lever *G*, and then, by turning the hand-wheel *I*, to take up the slack or gain thus induced, to again apply the maximum force of the press by again reversing the position of the pawl *g*, and again raising the screw and slightly depressing the platen, as before.

In treating most articles, this duplication of the operation is not necessary. It is sufficient to simply drive down the platen by the simple and ordinary screw-action, as first described, so as to bring out the greatest pressure which this mode of operation will secure, and then to turn the screw up and compress the goods a little more, as before described.

To relax the pressure, the operations above described are reversed, except that it is necessary to work the screw down, and thus to relax the pressure at the very slow rate at which the maximum pressure was obtained only for a very short distance.

Unless the material pressed is very elastic, a slight raising of the platen diminishes the force so that the platen may be raised and the parts all brought to their proper positions by simply turning the nut *H*, by means of the hand-wheel *I*; that is to say, if it is necessary for two or any other number of strong men to reciprocate the lever *G* for a hundred strokes to depress the platen, the same gang reciprocating the lever with the pawl reversed five strokes, will relieve the press so much that the platen may be then raised rapidly by the hand-wheel *I*, which, as will be readily seen, turns the nut *H* upward upon the threads *E*² until it can go no further thereon, and then commences to turn the screw itself, raising the whole by the working of the thread *E*¹.

In this manner the platen is raised as high as may be required to commence next operation.

I do not confine myself to the precise details of the mechanism here represented; many modifications in the form may be made by any good mechanic. For example, the cap *D* may be fastened on by set-screws or various other means, instead of carrying a screw-thread on its interior; or the position of the press may be reversed so that the platen will follow the screw down by its own weight.

The cap *D* will not then be needed.

Bevel-gears may be substituted for the hand-wheel *I* and ratchet *F* on the screw *E*, and hand-wheels or ratchets may be mounted on shafts at right angles to the screw *E*; or various other arrangements may be made for applying power to my several parts besides those here represented.

My press is extremely simple in construction, and may be very cheaply built and easily kept in repair. It affords advantages in the extent of its motion, and the rapidity of its operation, and the intensity of its final pressure, never before realized in a press of analogous character.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The differential screw *E E*¹ *E*², in combination with the movable nut *H*, adapted to be turned at will, with suitable operating-means for turning the screw and the nut so as to operate the press, substantially in the manner and for the purposes herein set forth.

2. The within-described press, in its entire combination and arrangement, having the tie-rods *a* serving as guides for the platen *C*, the hand-wheel *I*, as a means of operating the turning-nut *H*, the latter being mounted in a boss in the platen; as represented, and the differential screw *E E*¹ *E*² being operated by an independent lever and pawl in both directions, obtaining the two degrees of advantage, all substantially as and for the purposes herein represented and described.

HENRY C. BOWEN.

Witnesses:

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C. C. LIVINGS.