

(No Model.)

J. BYFIELD.

STOP MOTION MECHANISM FOR KNITTING MACHINES.

No. 328,876.

Patented Oct. 20, 1885.

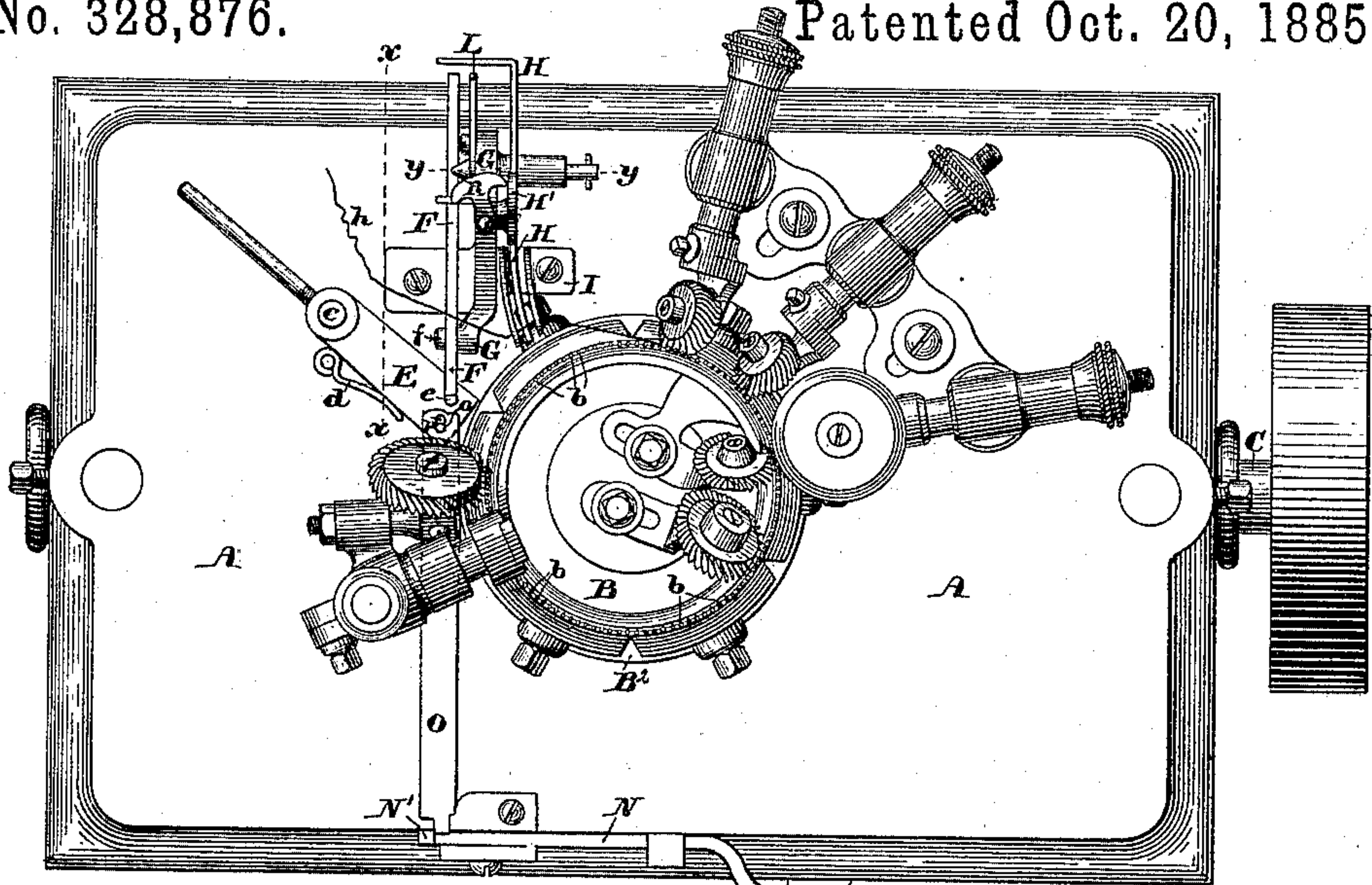


Fig. 1.

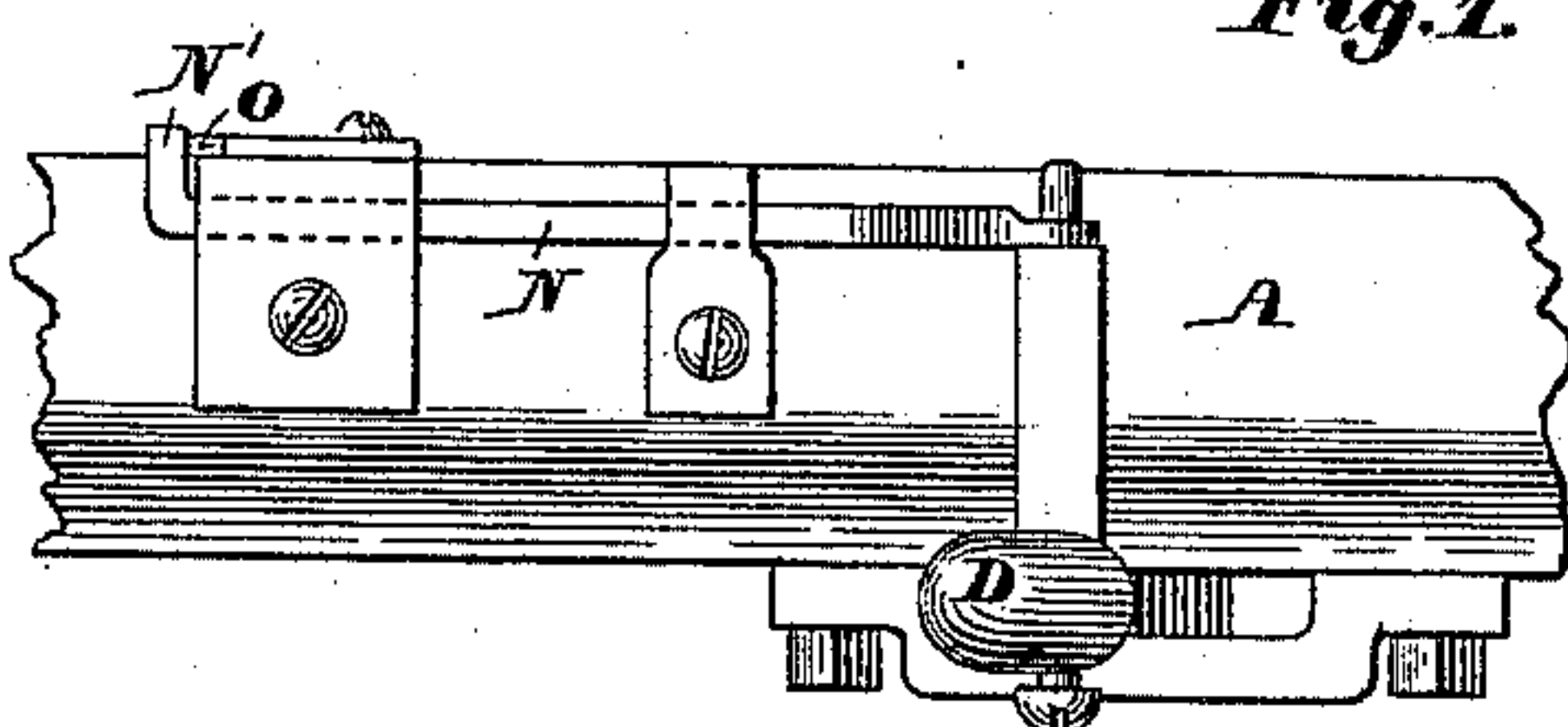


Fig. 2.

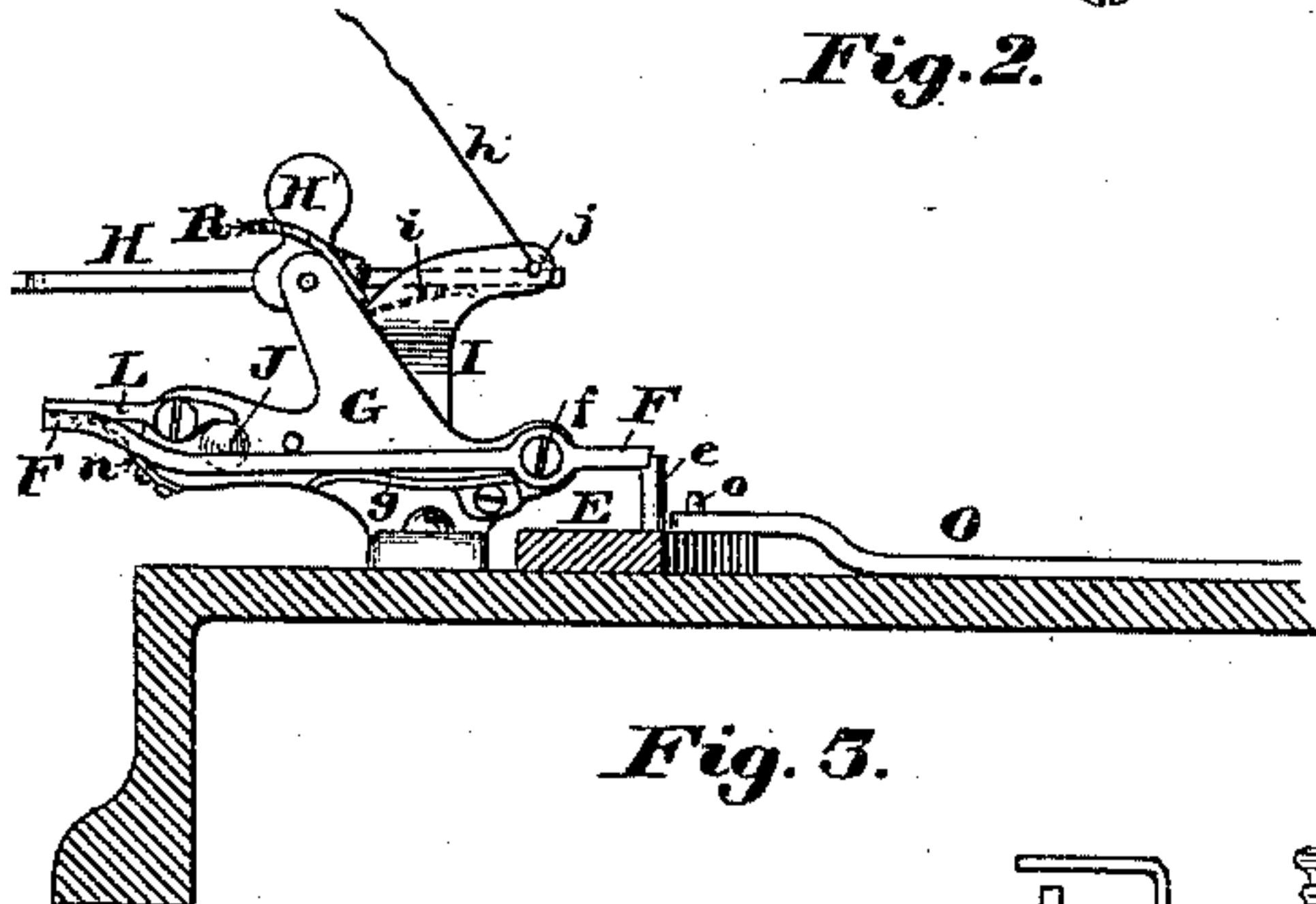


Fig. 3.

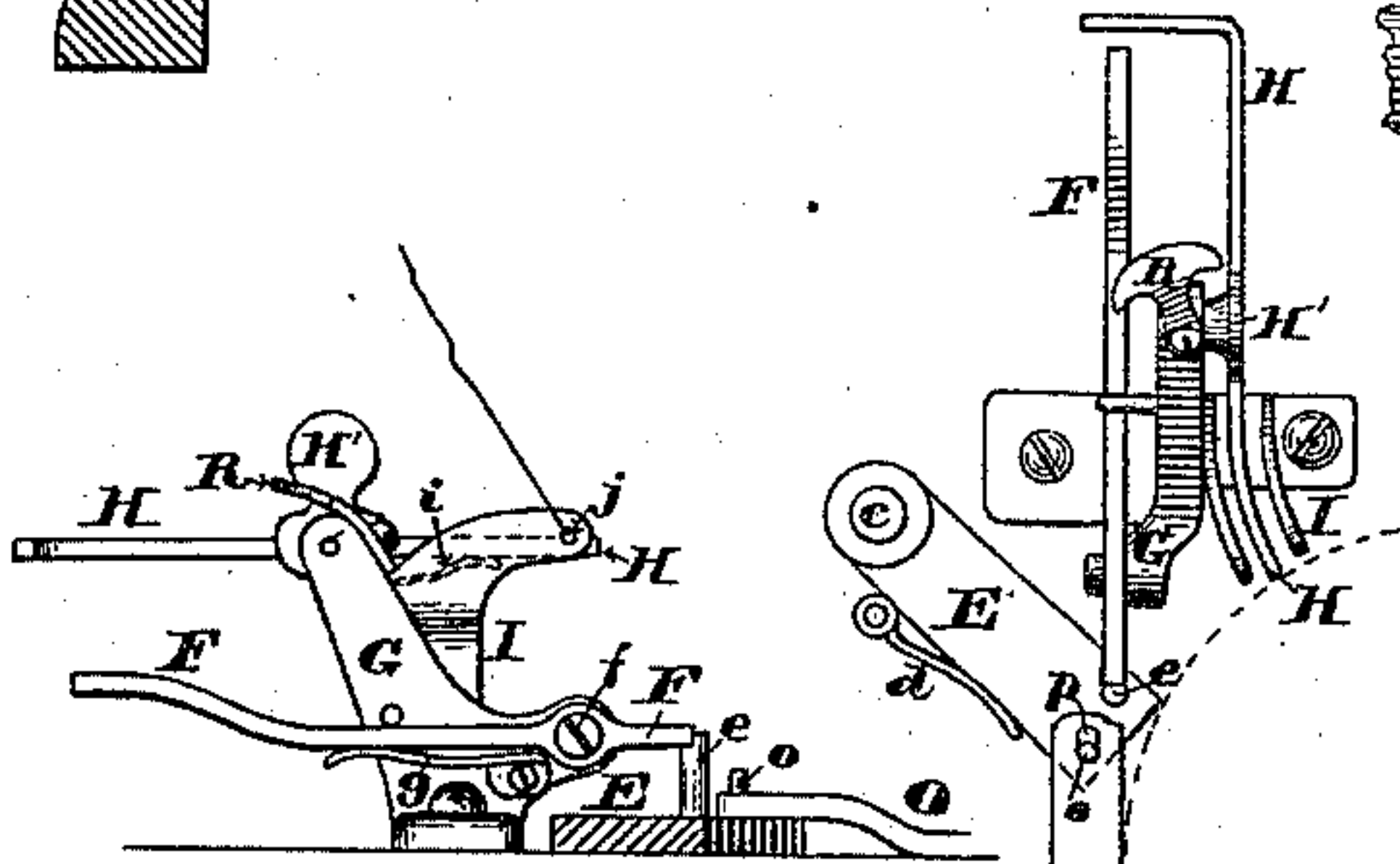


Fig. 4.

Fig. 5.  
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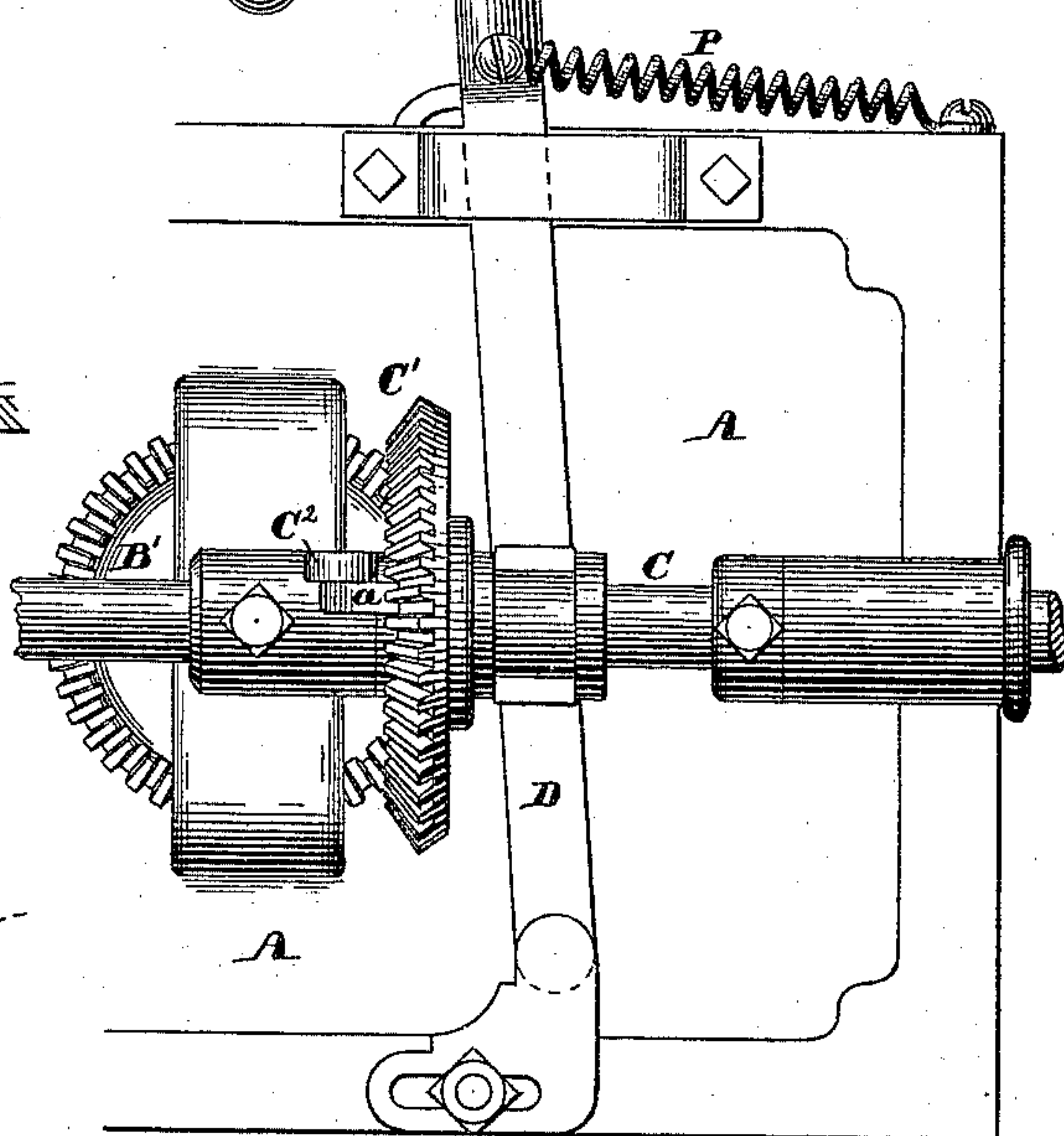


Fig. 6.

Fig. 7.  
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# UNITED STATES PATENT OFFICE.

JOHN BYFIELD, OF LOWELL, MASSACHUSETTS, ASSIGNOR TO THE BYFIELD MANUFACTURING COMPANY, OF SAME PLACE.

## STOP-MOTION MECHANISM FOR KNITTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 328,876, dated October 20, 1885.

Application filed May 12, 1884. Serial No. 131,086. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN BYFIELD, of Lowell, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Stop-Motion Mechanisms for Knitting-Machines, of which the following, taken in connection with the accompanying drawings, is a specification.

My invention relates to stop-motion mechanism for knitting-machines automatically operated by the breaking or exhausting of the yarn; and it consists in certain novel constructions, arrangements, and combinations of devices, which will be best understood by reference to the description of the drawings, and to the claims to be hereinafter given.

Figure 1 of the drawings is a plan of a machine embodying my invention. Fig. 2 is an elevation of a portion of the front side of the machine, illustrating the locking mechanism. Fig. 3 is a transverse section of the bed on line *x x* on Fig. 1, with the driving-shaft and gear removed, and showing the stop mechanism in elevation. Fig. 4 is a partial inverted plan of the bed, driving-shaft, gearing, and shipping mechanism. Fig. 5 is a section on line *y y* on Fig. 1, drawn to an enlarged scale; and Figs. 6 and 7 are respectively a plan and an elevation of the stop mechanism adapted for use when coarse strong yarns only are to be knit.

A is the bed of the machine supported upon suitable legs, (not shown,) and having mounted in suitable bearings therein the needle cylinder or head B and the driving-shaft C, said head B having formed thereon or secured thereto the bevel gear-wheel B', and the shaft C, having mounted loosely thereon the bevel gear-wheel C', arranged to be moved endwise upon said shaft by means of the shipper-lever D, to engage it with or disengage it from the gear B', and also arranged to be connected to said shaft, so as to revolve therewith when in engagement with the gear B' by means of the pin *a* on the gear C', and the dog C<sup>2</sup> firmly secured upon the shaft C, all in a well-known manner.

The usual wheels for forming the stitch in co-operation with the circular series of needles

*b*, and the push-back, all arranged in a well-known manner, are shown in Fig. 1; but as they form no part of my present invention they need not be further described here.

E is a friction-pawl pivoted at *c* to the bed of the machine, with its inner end in close proximity to the periphery of the flange B<sup>2</sup> of the head B without touching it when said friction-pawl is held in its retracted position, as shown in Fig. 1, the rear corner of said pawl, which is nearest to the periphery of the flange B<sup>2</sup>, being slightly in front of a line drawn through the axes of motion of said brake-lever and the needle-head. The pawl E is held in said retracted position against the tension of the spring *d* by the engagement of the forward end of the lever F with the stud *e*, set in the brake-lever E, as shown in Figs. 3 and 7, and is designed to engage with the periphery of the flange B<sup>2</sup> and arrest the revolution of the needle-cylinder whenever the lever F is disengaged from the stud *e*.

The lever F is pivoted at *f* to the stand G, and is held in engagement with the stud *e* by the light spring *g* until its rear end is depressed through the falling of the rear end of the lever H, caused by the breaking of the yarn *h*, by which said lever has its forward end depressed against the tension of the light spring *i*, the forward end of said lever H being arranged between the two arms of the forked stand I, in each of which is formed an eye, *j*, through which the yarn *h* passes to reach the needles and the stitch-wheel, said yarn, in its passage from one of the eyes *j* to the other, passing above the front or short arm of the lever H, as shown in Figs. 1 and 3.

A portion of the rear or long arm of the lever H is bent at right angles, or nearly so, to its main body, and extends over the rear end of the lever F, so that when the rear end of said lever H is depressed by the action of its spring *i*, consequent upon the breaking or giving out of the yarn, said right-angled portion will strike the lever F and cause it to be disengaged from the stud *e*, thereby permitting the spring *d* to move the friction-pawl into engagement with the edge of the flange B<sup>2</sup> of the head B and stop the revolution of said head.



This construction, which answers very well for heavy yarns, is illustrated in Figs. 6 and 7; but for very light yarns a more delicate operation of the lever H is required, and therefore  
 5 on machines for knitting fine lightly-twisted yarns I make the lever H much lighter or more nearly counterbalance it, so that the strength of the finer and weaker yarn will be sufficient to maintain the rear end of the lever  
 10 H in its elevated position, the result of which is that when the yarn breaks or runs out the lever H will not fall with as great force as when made heavier, or not so nearly counterpoised, and hence I use the conical-ended bolt  
 15 J, mounted in a bearing in the stand G in a position for its conical end to act as a wedge or sliding cam upon and depress the lever F when it is moved endwise by the spring L. (Shown in Fig. 5.)

20 The bolt J is provided with the shallow circumferential groove *m*, with which the short arm of the lever L is made to engage to lock said bolt in a retracted position by the tension of the spring *n*, as shown in Fig. 3. The lever L is pivoted to the stand G, and is tripped  
 25 to disengage it from the groove *m* by the falling thereon of the rear or long arm of the lever H, when the yarn breaks or becomes slack, said lever L being so proportioned and mounted  
 30 as to be more easily tripped than the lever F.

N is a rod mounted in bearings on the front side of the bed of the machine, and connected at one end to the shipper D, so as to be moved  
 35 endwise in its bearings thereby, and having formed thereon the upwardly-projecting lug or catch N', with which the end of the locking bolt or latch O engages when the shipper-lever D is moved to the left to cause an engage-  
 40 ment of the gear-wheels C' and B' to lock said shipper in said position. The inner or rear end of the bolt or latch O is connected to the friction-pawl E by means of the pin *o*, set in said friction-pawl and passing through the  
 45 slotted hole *p* in said latch O, as shown in Fig. 1.

P is a spring connected at one end to the shipper-lever D, and at the other end to the bed A, in such a manner that its reaction will  
 50 cause a movement of said shipper-lever D and the gear-wheel C' toward the right whenever the locking bolt or latch O is withdrawn from engagement with the catch N', and thus disengage the needle-head from connection with  
 55 the driving-shaft.

When the lever F is tripped from engagement with the stud *e* by the movement of the lever H, caused by the breaking of the yarn, the pawl E is thrown into engagement with  
 60 the flange B<sup>2</sup>, by the tension of the spring *d*, without moving the locking-bolt O, the pin *o* moving in the slot *p*; but the contact of the flange B<sup>2</sup> with said pawl E causes a continuation of the movement of the pawl sufficient to  
 65 withdraw the bolt or latch O from engagement with the catch N', when the spring P reacts and unships the gearing, and the friction-pawl,

acting upon the flange B<sup>2</sup>, instantly arrests the motion of the needle-head by virtue of the fact that the distance from the axis of motion  
 70 of said pawl to its movable end is greater than the distance from the same axis of motion to the periphery of the flange B<sup>2</sup>.

The lever H is provided with the counterpoise arm or weight H', which, when the forward end of the lever is depressed by the tension of the thread, as shown in the drawings, is perpendicularly, or nearly so, above the axis of said lever; but when the yarn breaks, or becomes slack, and the spring *i* reacts to  
 80 throw the forward end of the lever H upward, the arm or weight H' is thrown to the rear of such perpendicular position, and its weight is added to the weight of the long or rear arm of said lever, and thus assists in tripping the  
 85 lever F or L, as the case may be.

The lever H may be secured in a position with its front end depressed by the T-shaped pivoted latch R, which, when swung to the right, engages by one of its arms as a hook  
 90 with the rear side of the arm H', for the purpose of facilitating the threading of the yarn through the eyes *j* in the stand I, and starting the yarn onto the needles.

It is obvious that this stop mechanism will  
 95 be equally effective when the yarn breaks or is all run off from the bobbin.

The friction-pawl, in combination with suitable devices for rendering it operative when the yarn breaks or gives out, is a very im-  
 100 portant feature in my invention on account of the certainty and promptness with which it acts, and it may be used in connection with a variety of releasing or tripping mechanisms controlled by the tension of the yarn, it only  
 105 being necessary that it should be locked or held in a retracted position by a device that may be operated to release it by the breaking or slackening of the yarn; and therefore I do not wish to be limited to the special construc-  
 110 tion and arrangement of parts shown.

The friction-pawl E may be used to advantage in connection with the spring yarn-guiding arm C, the tripping-shaft D, its weight P, and the locking-latch lever E, of the machine  
 115 described in Letters Patent No. 154,375, August 25, 1874, or in connection with the yarn-supported levers H, the connected levers I and K, the weight L, the rod P, and shipper locking-lever O, of the machine described in  
 120 Letters Patent No. 116,677, of July 4, 1871.

The friction-pawl E and some of the other parts of this invention are shown and described and claimed in other and different combinations in another application of mine,  
 125 filed August 24, 1885, and numbered 175,199.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The combination of a rotary needle cylinder or head, a friction-pawl mounted upon  
 130 an axis outside of said cylinder in a position to operate upon the periphery of the needle-head as a brake or dog, a spring for causing said pawl to engage with the needle-head, a lever



for locking and holding said pawl in a retracted position, and an unbalanced lever held in a passive or inoperative state by the tension of the yarn and which acts upon and trips said locking-lever when the yarn breaks, becomes slack, or runs out, substantially as described.

2. The combination of a needle cylinder or head, a friction-pawl mounted upon an axis outside of said cylinder in a position to operate upon the periphery of the needle-head as a brake or dog, a spring for causing said pawl to engage with the needle-head, a lever for locking and holding said pawl in a retracted position or removed from contact with said head, an unbalanced lever held in a passive or inoperative position by the tension of the yarn and which acts to trip said locking-lever by the descent of its heaviest arm when the yarn breaks, becomes slack, or runs out, and a pair of stationary yarn-guiding eyes, all arranged and adapted to operate substantially as and for the purposes described.

3. The combination of the needle-head B B<sup>2</sup>, the friction-pawl E, the spring *d*, the levers F, H, and L, the stand I, provided with two yarn-guiding eyes, the conical-pointed bolt J, provided with the groove *m* to engage with the lever L, and the spring *l*, all arranged and adapted to operate, substantially as and for the purposes described.

4. The combination of the needle-head B B<sup>2</sup>, the pivoted friction-pawl E, the levers F and H, the spring *d*, the gear-wheels B' and C', the shipper-lever D, the spring P, the catch-rod N N', and the locking-bolt O, all constructed, arranged, and adapted to operate, substantially as and for the purposes described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 9th day of May, A. D. 1884.

JOHN BYFIELD.

Witnesses:

N. C. LOMBARD,

WALTER E. LOMBARD.