

No. 843,177.

PATENTED FEB. 5, 1907.

W. A. ROBINSON.  
LAPPET LOOM.  
APPLICATION FILED MAR. 24, 1904.

3 SHEETS—SHEET 1.

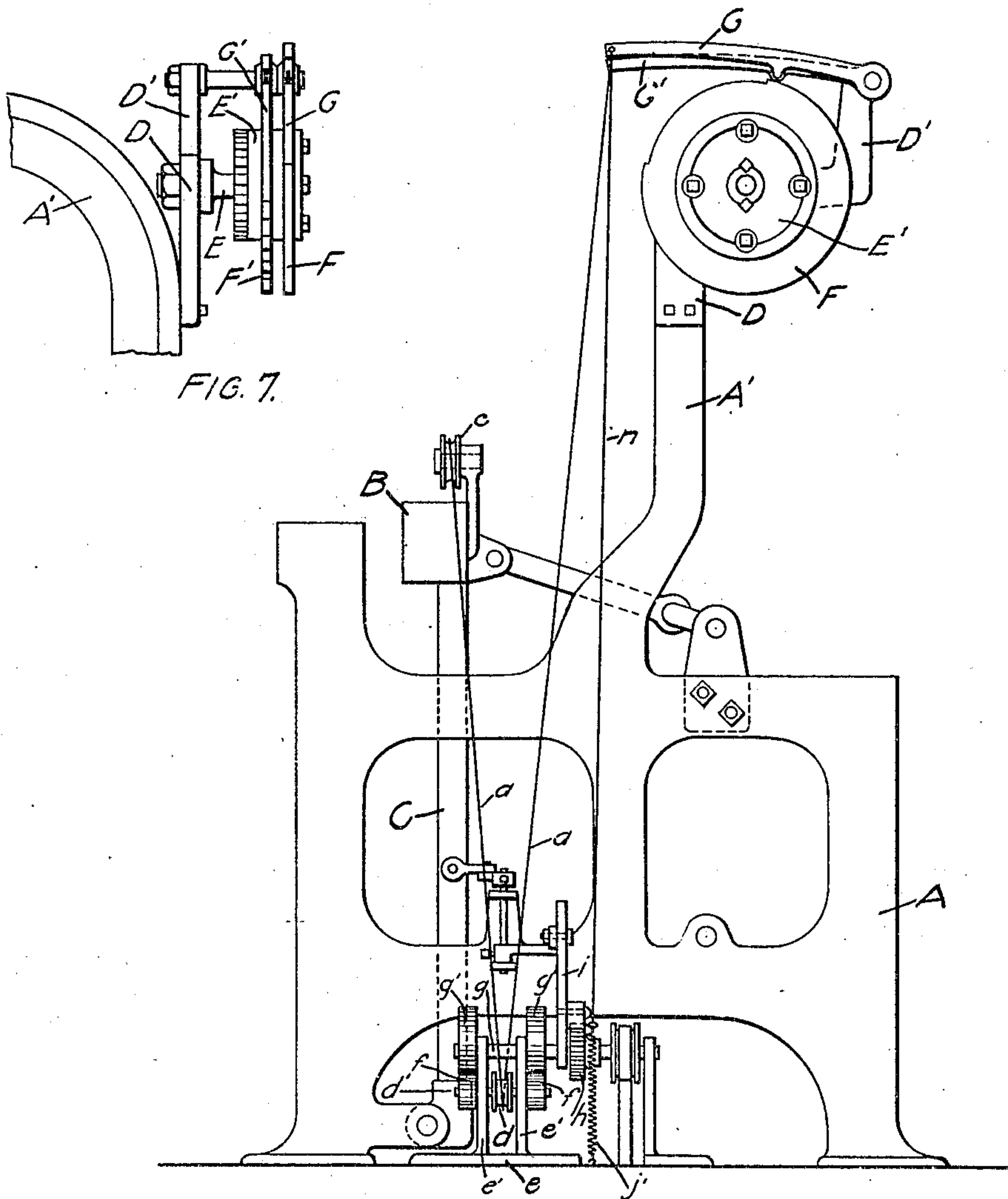


FIG. 1.

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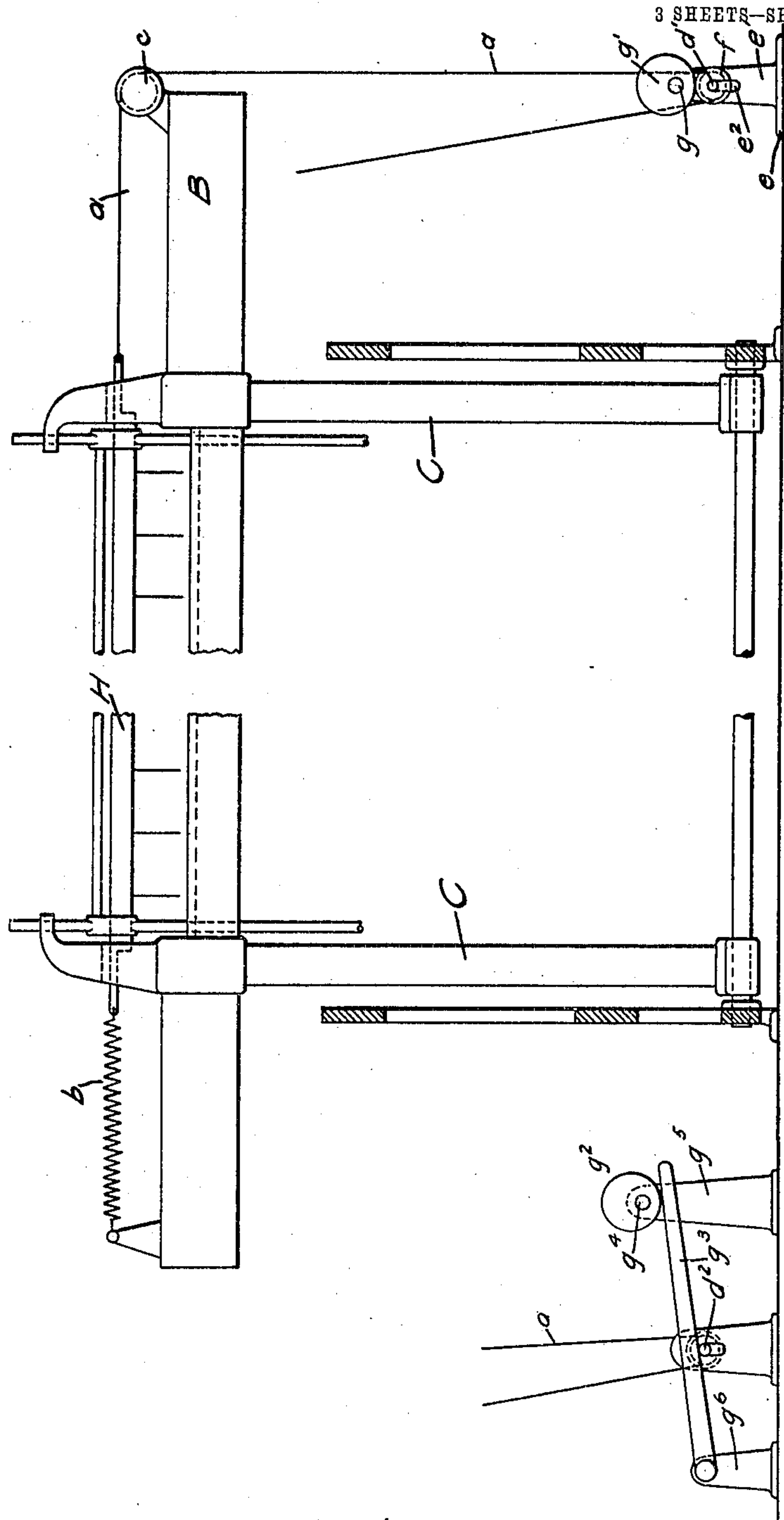
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

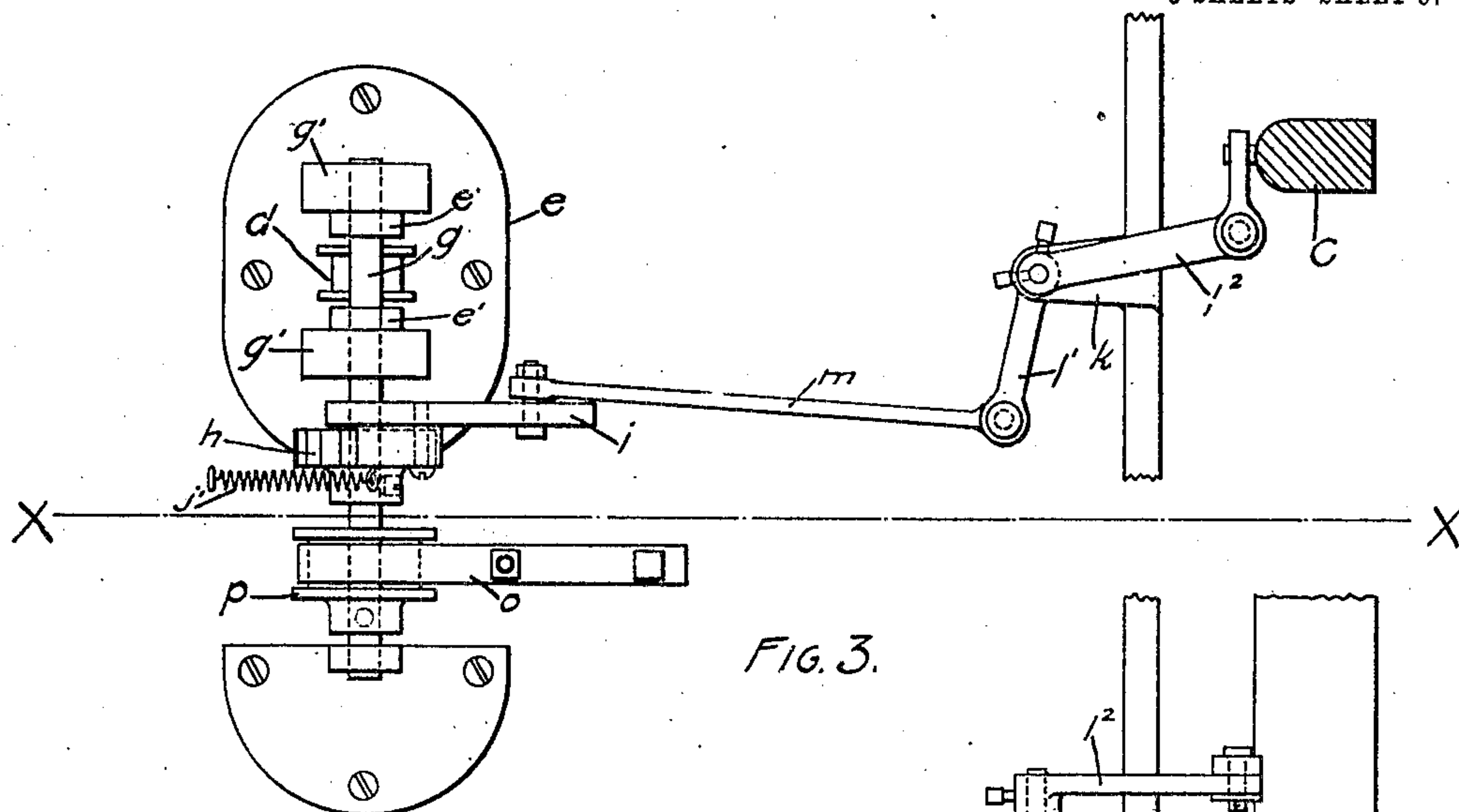


FIG. 3.

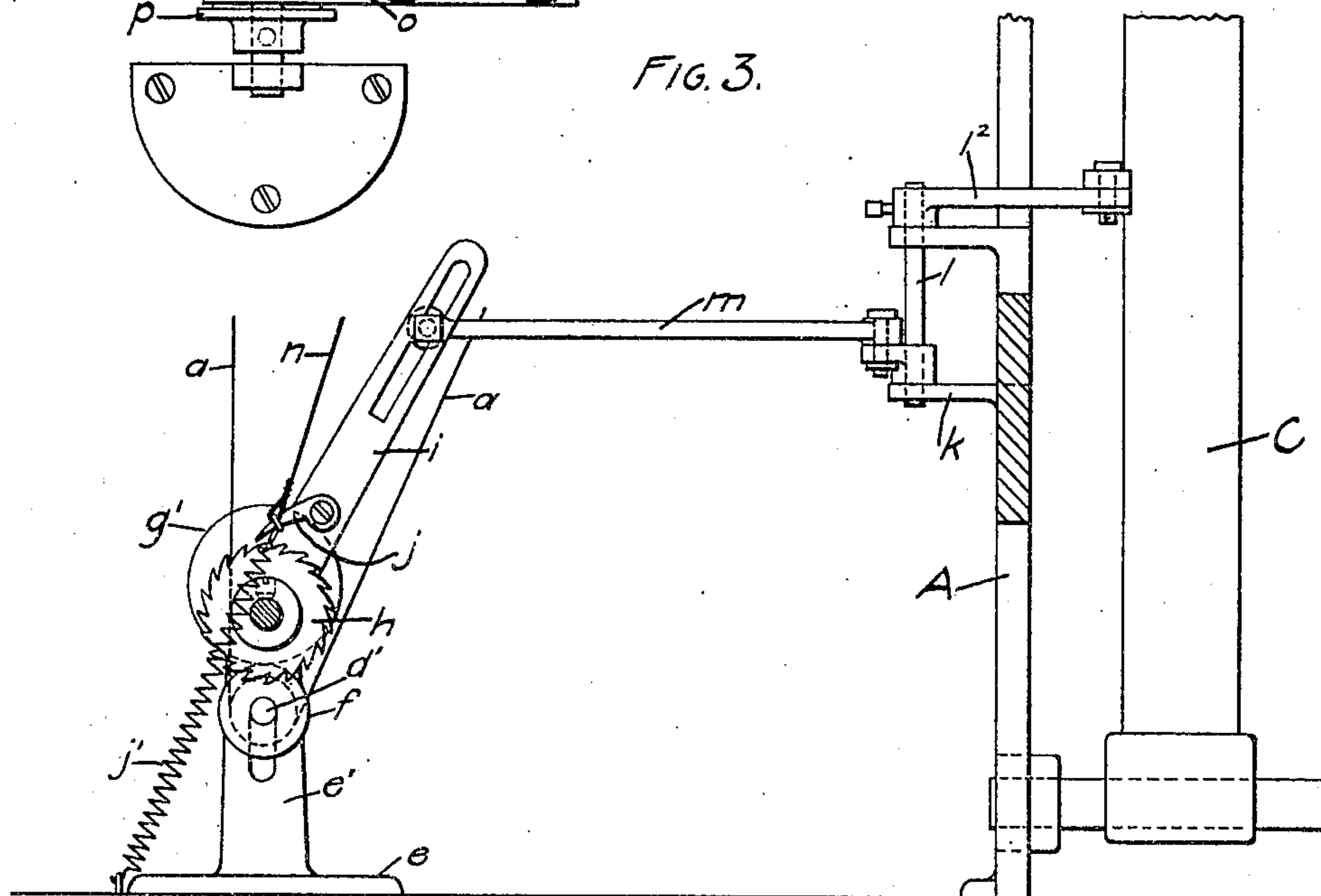


FIG. 4.

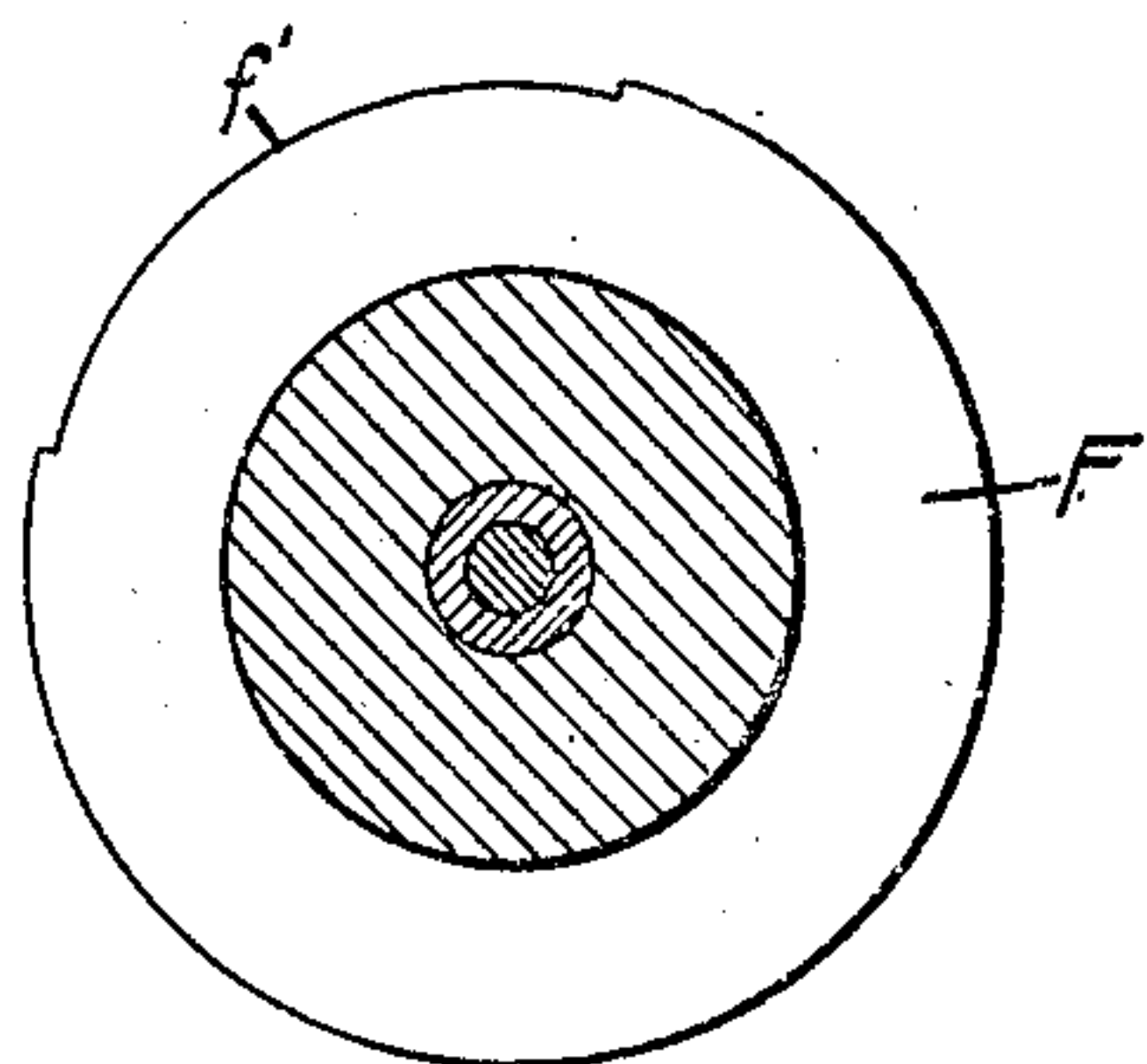


FIG. 5

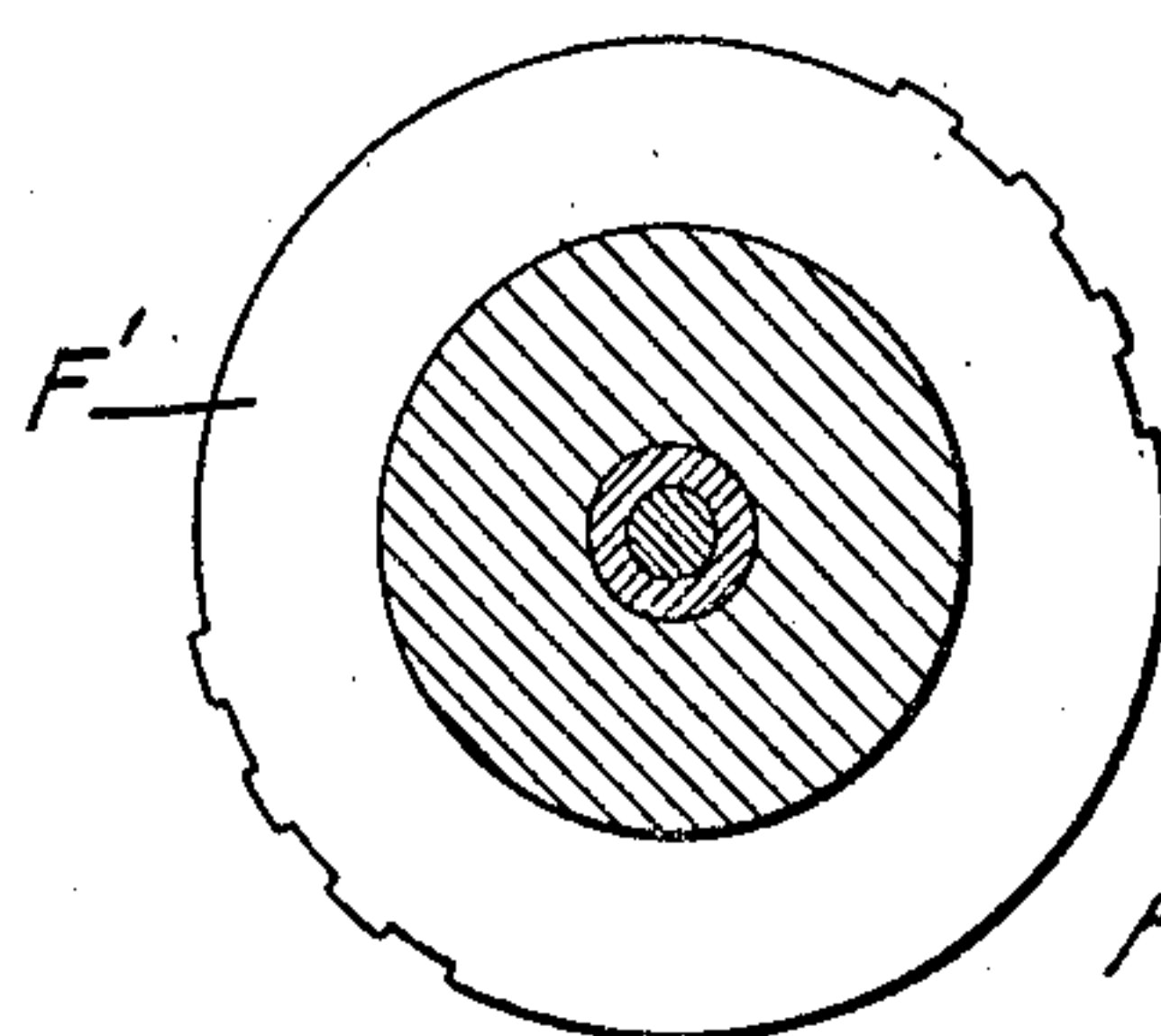


FIG. 6

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# UNITED STATES PATENT OFFICE.

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## LAPPET-LOOM.

No. 843,177.

Specification of Letters Patent.

Patented Feb. 5, 1907.

Application filed March 24, 1904. Serial No. 199,671.

*To all whom it may concern:*

Be it known that I, WILLIAM A. ROBINSON, of the city of Woonsocket, county of Providence, and State of Rhode Island, have  
5 invented certain new and useful Improvements in Lappet-Looms; and I do hereby declare the following specification, taken in connection with the accompanying drawings, forming a part of the same, to be a full,  
10 clear, and exact description thereof.

The present invention relates to improvements in lappet-loom, and more particularly to means for increasing the extent of the lateral movement of the needle-bar.

15 Heretofore the lateral movements of the needle-bar both for locating the position of the lappet-pattern on the fabric and in the weaving of said pattern, have been controlled by pattern-wheels or pattern-chains and  
20 with the result that the amount of lateral movement of the needle-bar was necessarily limited, and it was impossible to space the successive lappet-patterns laterally at any considerable distance apart or to weave a  
25 lappet-pattern which extended any considerable distance crosswise of the fabric.

The present invention consists in providing means whereby increased lateral movement may be given to the needle-bar, either  
30 for the purpose of increasing the distance laterally between successive individual lappet-patterns or for increasing the extent to which an individual lappet-pattern may extend crosswise of the fabric.

35 Referring to the drawings, Figure 1 is an end view of a lappet-loom embodying the invention. Fig. 2 is a front view of the lay and some of its adjuncts with the frame of the loom broken away. Fig. 3 is a plan view  
40 of the mechanism which has been added to the loom as ordinarily constructed. Fig. 4 is a section on the line  $x x$ , Fig. 3. Figs. 5 and 6 are views of pattern-wheels which may be employed. Fig. 7 is a detail, and Fig. 8  
45 shows a modification.

A represents the frame of the loom, B the lay, and C the swords of the lay, all of the usual construction. Secured to the arch A' of the frame is a bracket D, carrying the stud  
50 E. Mounted on this stud E is a drum E', on which the pattern-wheels F F' are in turn mounted and to which the said pattern-wheels are secured. Means (not shown) is

provided for rotating the drum E' and with it the pattern-wheels. A bracket D' is se- 55  
cured to the bracket D, and to said bracket D' the pattern-levers G G' are pivoted, said pattern-levers being arranged to overlie the pattern-wheels F F' and being preferably provided with dolly-rolls to ride on said pat- 60  
tern-wheels.

H represents the needle-bar, which is provided with any desired means for raising and lowering the same to insert and withdraw the lappet-threads at the desired times. As 65  
the present invention has no relation to these up and down movements of the needle-bar, it has not been deemed necessary to show the means for controlling the same in the drawings. The said needle-bar H is adapted to 70  
be moved laterally in one direction by a cord  $a$ , and in the opposite direction by the spring  $b$ , as shown in Fig. 2. The cord  $a$ , which is connected to one end of the needle-bar, passes over the pulley  $c$ , mounted on the lay, thence 75  
down and around the pulley  $d$ , mounted to revolve on the arbor  $d'$ , located near the floor and substantially in line with the axis about which the lay swings, and thence upward and is connected to the free end of the pat- 80  
tern-lever G'. With this construction when the pattern-lever G' is raised by a projection on the pattern-wheel F', it will serve to pull the cord  $a$  and so as to move the needle-bar H to the right in Fig. 2. When the lever G' 85  
is permitted to move downward by a depression in the pattern-wheel F', the spring  $b$  will serve to move the needle-bar H in the opposite direction.

Heretofore the arbor  $d'$ , on which the pul- 90  
ley  $d$  revolves, was fixed, and said pulley  $d$  had no movement except a rotary movement about its axis. In the present arrangement means are provided whereby the arbor  $d'$ , and consequently the pulley  $d$ , may be given 95  
a vertical up-and-down movement. The arbor  $d'$  is mounted in a standard  $e$ , having two vertical arms  $e'$   $e'$ , between which the pulley  $d$  is located. Each of the standards  $e$  is provided with an elongated slot  $e^2$ , whereby the 100  
arbor  $d'$  and the pulley  $d$  may occupy different vertical positions. Mounted upon each end of the arbor  $d'$  is a friction-roll  $f$ .

Arranged above the arbor  $d'$  and parallel therewith is a shaft  $g$ , to which are secured 105  
two cams  $g'$ , one above each of the friction-



rolls *f*. As will be seen by referring to Fig. 2, when the cams *g'* are in the position there shown the arbor *d'* and pulley *d* thereon will be raised to their upper position by the pull of the spring *b*. When, however, the cams *g'* are turned half-around, said cams will serve by acting upon the friction-rolls *f* to depress the arbor *d'* and pulley *d*, thereby producing a pull upon the connecting-cord *a* and a corresponding lateral movement of the needle-bar H.

The mechanism for operating the cam-shaft *g* is best shown in Figs. 3 and 4. Secured to the end of said cam-shaft is a ratchet-wheel *h*, and pivoted loosely on said shaft is a lever *i*, carrying a pawl *j*, adapted to engage the ratchet-teeth on the ratchet *h*. Secured to the frame of the loom is a double-armed bracket *k*, in which is mounted a rock-shaft *l*, provided with arms *l'* *l''*. A link *m* connects the arm *l'* with the lever *i*, while the arm *l''* is connected to the sword of the lay. With this construction the lever *i* will be swung to and fro at each to-and-fro movement of the lay, and consequently if the pawl *j* be in engagement with the ratchet *h* said ratchet will be advanced one tooth at each to-and-fro movement of the lay, and if the ratchet be provided, say, with twenty teeth the cam-shaft *g* and cams *g'* will be given a half-revolution at each ten picks of the loom.

If desired, the pawl *j* may be left in continuous engagement with the ratchet *h*, in which case a lateral movement will be imparted to the needle-bar H under the action or control of the cams *g'* at each pick of the loom, and if there be in addition a pattern-wheel, as *F'*, and a pattern-lever *G'* for controlling the lateral position of the needle-bar, the lateral movement of the needle-bar may be either the sum of the movements due to the action of the cams *g'* and the pattern-wheel *F'* or a movement due to the difference of such movements, or may be a movement equal only to that produced by the cams *g'* alone.

If desired, the cams *g'* may be used solely to locate the position of the successive individual patterns crosswise of the fabric. In such case it will be necessary to provide means for intermittently lifting the pawl *j* out of engagement with the ratchet *h* and so that the cams *g'*, after having been moved from one position to another, will be left in the new position for a given length of time. The means shown in the drawings for controlling the position of the pawl *j* consists of the pattern-wheel *F*, secured to the drum *E'* and the cooperating pattern-lever *G*, to the free end of which lever a connecting-cord *n* is attached, the other end of said cord being connected to the pawl *j*. The pattern-wheel *F*, as shown, has a depression *f'* formed therein. With this construction, as will be obvious, when the roll of the pattern-lever *G* is in

the depression *f'* the pawl *j* will be in engagement with the ratchet *h*; but when the roll of the lever *G* is lifted out of said depression *f'* and is riding upon the raised surface of said pattern-wheel *F* the pawl *j* will be held out of engagement with the ratchet *h*. A spring *j'*, one end of which is connected to the pawl *j* and the other end to the floor or other fixed point, serves to control the movements of said pawl and to return it to operative position when permitted to do so.

As the spring *b* is tending to resist the downward movement of the pulley *d* under the action of the cams *g'*, it is desirable to provide some means to hold the cams *g'* against backward movement when the pawl *j* is moving back, and in the drawings such means are shown, the same consisting of a friction-brake strap *o*, surrounding a pulley *p* on the shaft *g*.

The operation of the mechanism above described is as follows: If desired, the lateral movements of the needle-bar in weaving a lappet-pattern may be controlled solely by the pattern-wheel *F'* and the cams *g'* used solely to locate the successive individual patterns crosswise of the fabric. In such case the pattern-wheel *F* is to be employed and is to be so formed that it will permit the pawl *j* to remain in engagement with the ratchet *h* long enough to enable said pawl to turn the ratchet *h*, and consequently the cams *g'*, half-around. This will result in moving the needle-bar H laterally to locate the next individual lappet-pattern. After the needle-bar has been so moved the pawl *j* is lifted out of engagement with its ratchet under the action of the pattern-wheel *F*, and the weaving of the lappet-pattern is controlled entirely by the pattern-wheel *F'*. If desired, however, the cams *g'* may be employed in connection with the weaving of the lappet-pattern, in which case the lappet-pattern produced instead of being a pattern such as would be produced by the pattern-wheel *F'* alone will be modified by the movement given to the needle-bar under the control of the cams *g'*. In either case it will be noted that the amount of movement given to the needle-bar H by the action of the cams *g'* is a much greater movement than could be given to said needle-bar by a pattern-wheel like that shown, first, because the eccentricity of the cams *g* may be much larger than it would be practicable to make the depressions in a pattern-wheel, and, second, because by reason of the fact that the pulley *d* is in a bight of the connecting-cord *a* the amount of movement given to the needle-bar by the rise or fall of said pulley will be twice the distance said pulley rises or falls. In this connection it is to be noted that the eccentricity of the cams *g'* may of course be varied and so as to produce a greater or less rise and fall of the pulley *d*, according to the



lappet-pattern desired to be produced or according to the distance between successive individual lappet-patterns which may be desired. So, also, the contour of the cams  $g'$  may be varied so as to still further vary the lappet-pattern to be produced, and the contour of said cams may also be such that the pulley  $d$  will be moved from its lowest to its highest position, or vice versa, by less than a half-revolution of said cams.

It will further be noted that the lateral movements of the needle-bar under the control of the cams  $g'$  may either be entirely independent of the lateral movements of the needle-bar under the control of the pattern-wheel  $F'$  or may be in conjunction therewith, and, further, that the lateral movement of the needle-bar when effected by the action of the cams  $g'$  alone will be much greater than has heretofore been possible.

In the arrangement shown in Fig. 8 the cams  $g^2$  (one of which only is shown) instead of acting directly on the pulley-arbor  $d^2$  are arranged to act upon interposed levers  $g^3$ . The cam-shaft  $g^4$  in this case is mounted in a separate standard  $g^5$ , and the levers  $g^3$  are pivoted in another standard  $g^6$ . These levers overlie the arbor  $d^2$ , and their free ends are arranged to underlie the cams  $g^2$  and so as to be acted upon thereby. The operation of the parts in controlling the lateral movements of the needle-bar is the same as in the previous arrangement.

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

1. In a lappet-loom the combination, with a needle-bar, of a pattern-surface for controlling the lateral movements of the needle-bar in weaving the lappet figure, and means for intermittently moving said needle-bar to locate the position of successive lappet figures laterally, substantially as described.

2. In a lappet-loom the combination, with a needle-bar, of a pattern-surface for controlling the lateral movements of the needle-bar in weaving the lappet figure, a second pattern-surface for moving said needle-bar to locate the position of successive lappet figures laterally, and means for intermittently operating said second pattern-surface, substantially as described.

3. In a lappet-loom the combination, with a needle-bar, of a pattern-surface for controlling the lateral movements of the needle-bar in weaving the lappet figure, a second pattern-surface for moving said needle-bar to locate the position of successive lappet-patterns laterally, and a third pattern-surface for controlling the operation of said second pattern-surface, substantially as described.

4. In a lappet-loom the combination, with a needle-bar, of a pattern-surface for controlling the lateral movements of the needle-bar in weaving a lappet figure, a cam for moving said needle-bar to locate the position of suc-

cessive lappet figures laterally, and means for intermittently rotating said cam, substantially as described.

5. In a lappet-loom the combination, with a needle-bar, of a pattern-surface for controlling the lateral movements of the needle-bar in weaving the lappet figure, a connection between said pattern-surface and the needle-bar, a second pattern-surface for moving said needle-bar to locate the position of successive lappet figures laterally, said second pattern-surface being arranged to act on said connection intermediate the first pattern-surface and the needle-bar, and means for intermittently operating said second pattern-surface, substantially as described.

6. In a lappet-loom, the combination, with a needle-bar, of a pattern-surface for controlling the lateral movements of the needle-bar in weaving a lappet figure, a connecting-cord leading from said pattern-surface to said needle-bar, a second pattern-surface arranged to operate upon a bight in said connecting-cord, and means for intermittently operating said second pattern-surface, substantially as described.

7. In a lappet-loom, the combination, with a needle-bar, of a pattern-surface for controlling the lateral movements of the needle-bar in weaving a lappet figure, a connecting-cord leading from said pattern-surface to said needle-bar, a cam arranged to operate upon a bight in said connecting-cord, and means for intermittently operating said cam, substantially as described.

8. In a lappet-loom the combination, with a needle-bar, of a cord connecting with said needle-bar for controlling the lateral movements thereof, a movable pulley around which said cord passes, a cam for moving said pulley to lengthen or shorten the bight formed in the cord by its passing around said pulley, and means for intermittently rotating said cam, substantially as described.

9. In a lappet-loom the combination, with a needle-bar, of a cord connecting with said needle-bar for controlling the lateral movements thereof, a movable pulley around which said cord passes, a cam provided with a ratchet for moving said pulley to lengthen or shorten the bight formed in the cord by its passing around said pulley, a continuously-operating pawl for actuating said ratchet, and a pattern-surface for controlling the operative position of said pawl, substantially as described.

10. In a lappet-loom the combination, with a needle-bar, of a pattern-surface for controlling the lateral movements of the needle-bar, a pulley mounted independent of the lay of the loom but approximately in line with the axis about which said lay swings, a connecting-cord leading from said pattern-surface and around said pulley to the needle-bar, and means for moving said pulley to lengthen or



shorten the bight formed in said cord by its passing around said pulley, substantially as described.

11. In a lappet-loom the combination, with  
5 a needle-bar, of a cord connecting with said needle-bar for controlling the lateral movements thereof, a movable pulley around which said cord passes, said movable pulley being mounted independent of the lay of the  
10 loom but approximately in line with the axis about which said lay swings, and means for moving said pulley to lengthen or shorten the bight formed in the cord by its passing around said pulley, substantially as described.

12. In a lappet-loom the combination, with 15 a needle-bar, of a cord connecting with said needle-bar, a movable pulley around which said cord passes, said movable pulley being mounted independent of the lay of the loom but approximately in line with the axis 20 thereof, and a cam for moving said pulley to lengthen or shorten the bight formed in the cord by its passing around said pulley, substantially as described.

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