

No. 646,819.

Patented Apr. 3, 1900.

G. D. FOSTER.  
WIRE BINDER.

(Application filed Mar. 17, 1899.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

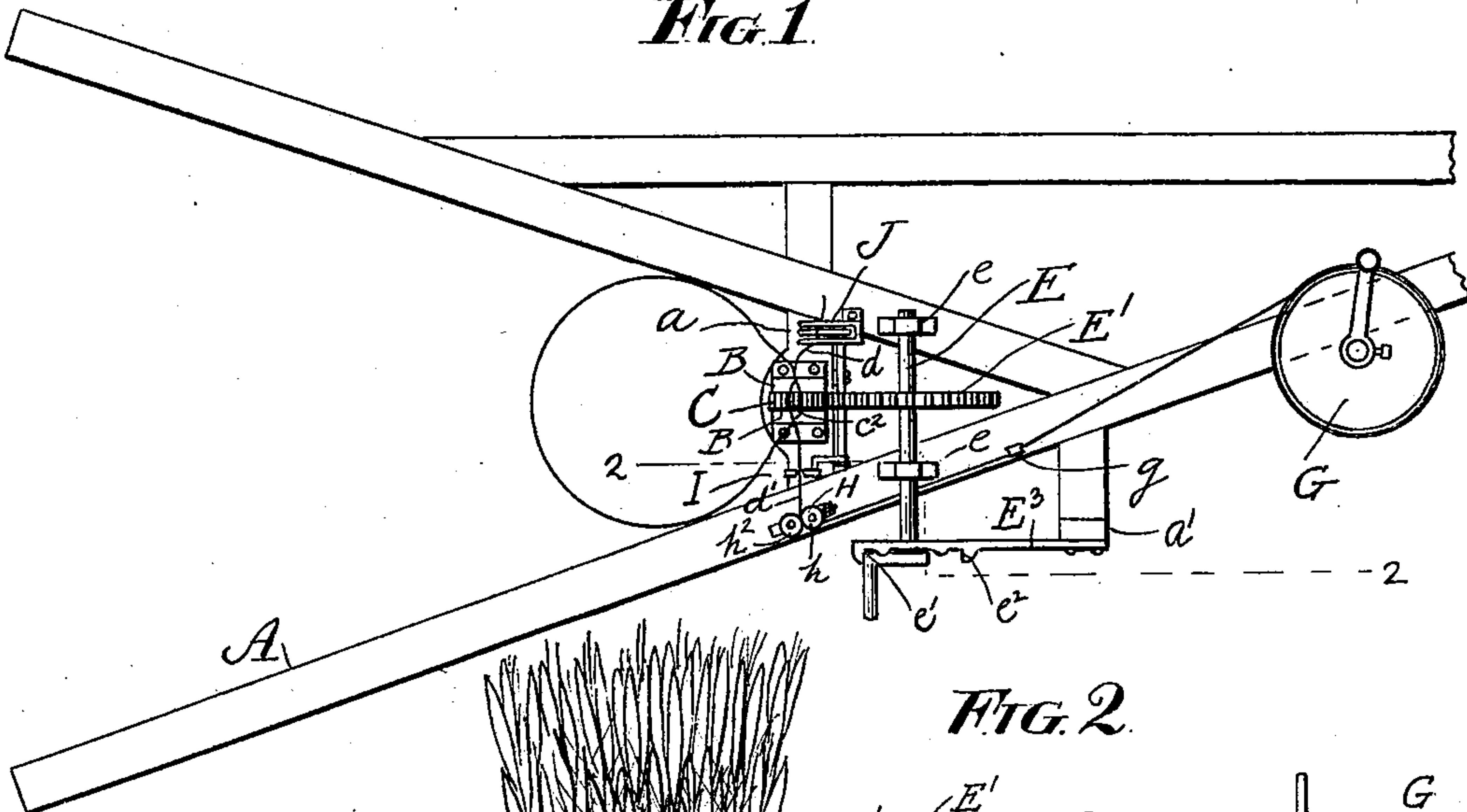


FIG. 2.

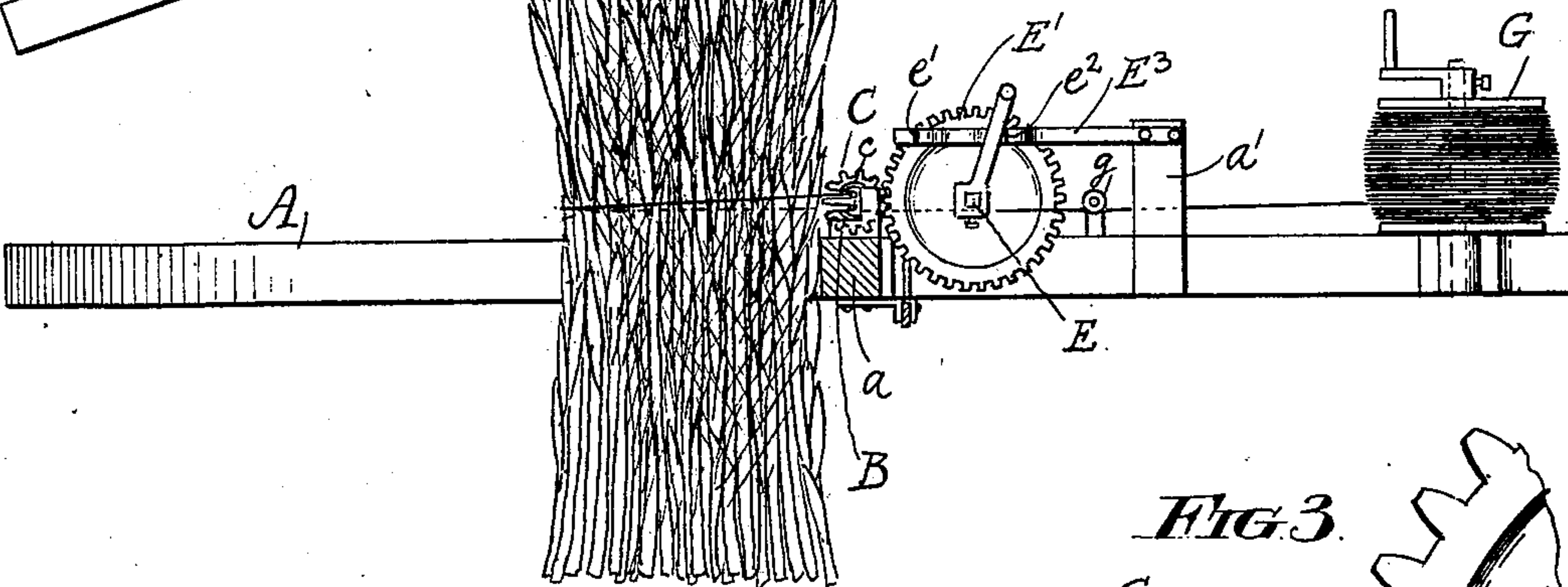


FIG. 4.

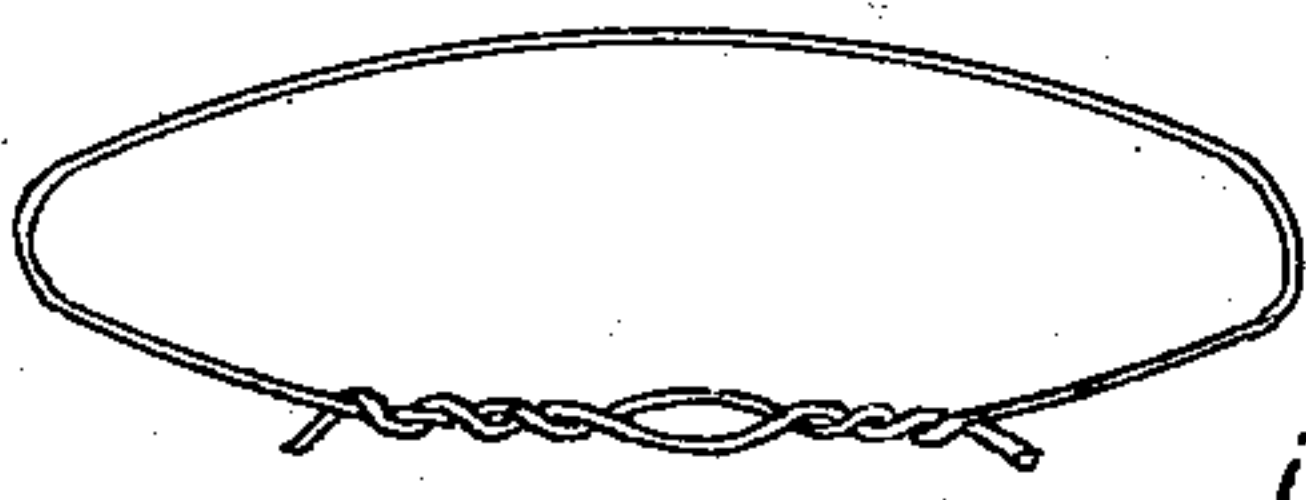


FIG. 5.

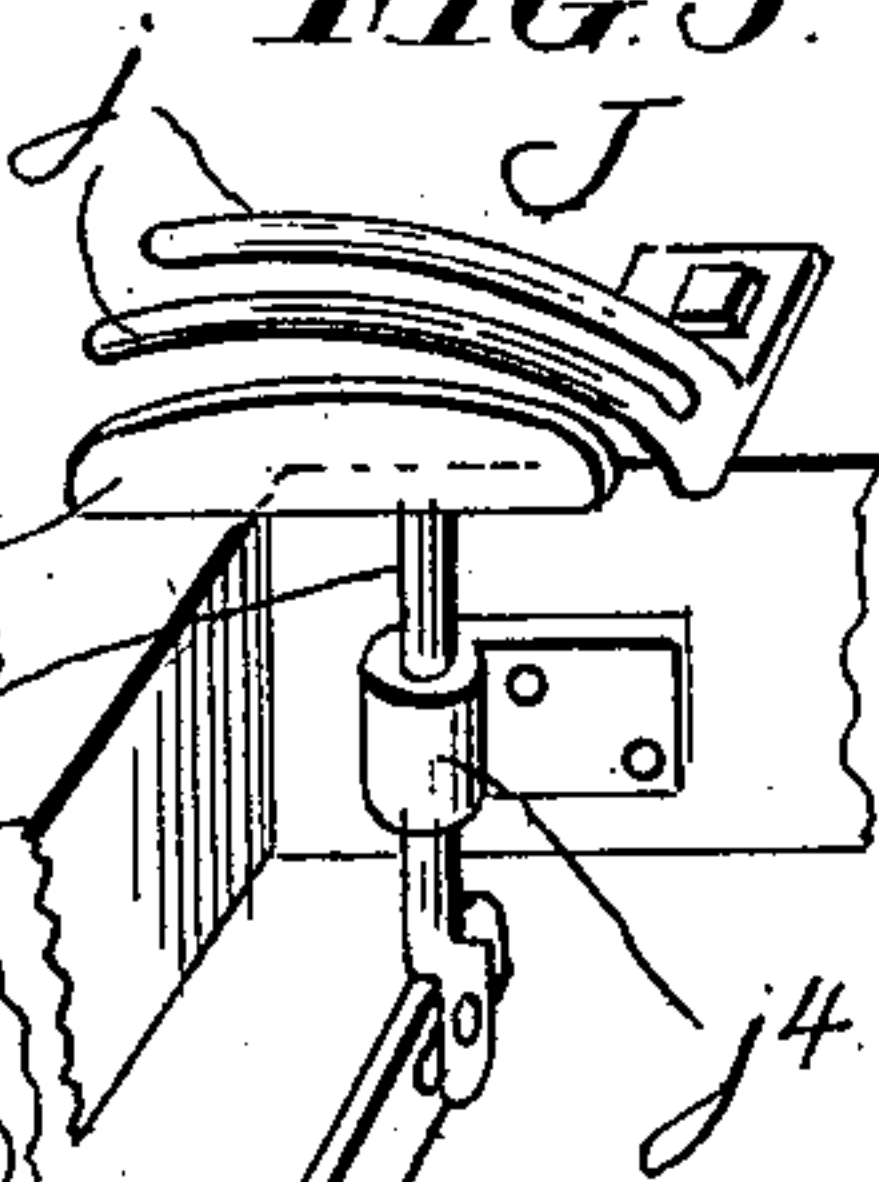
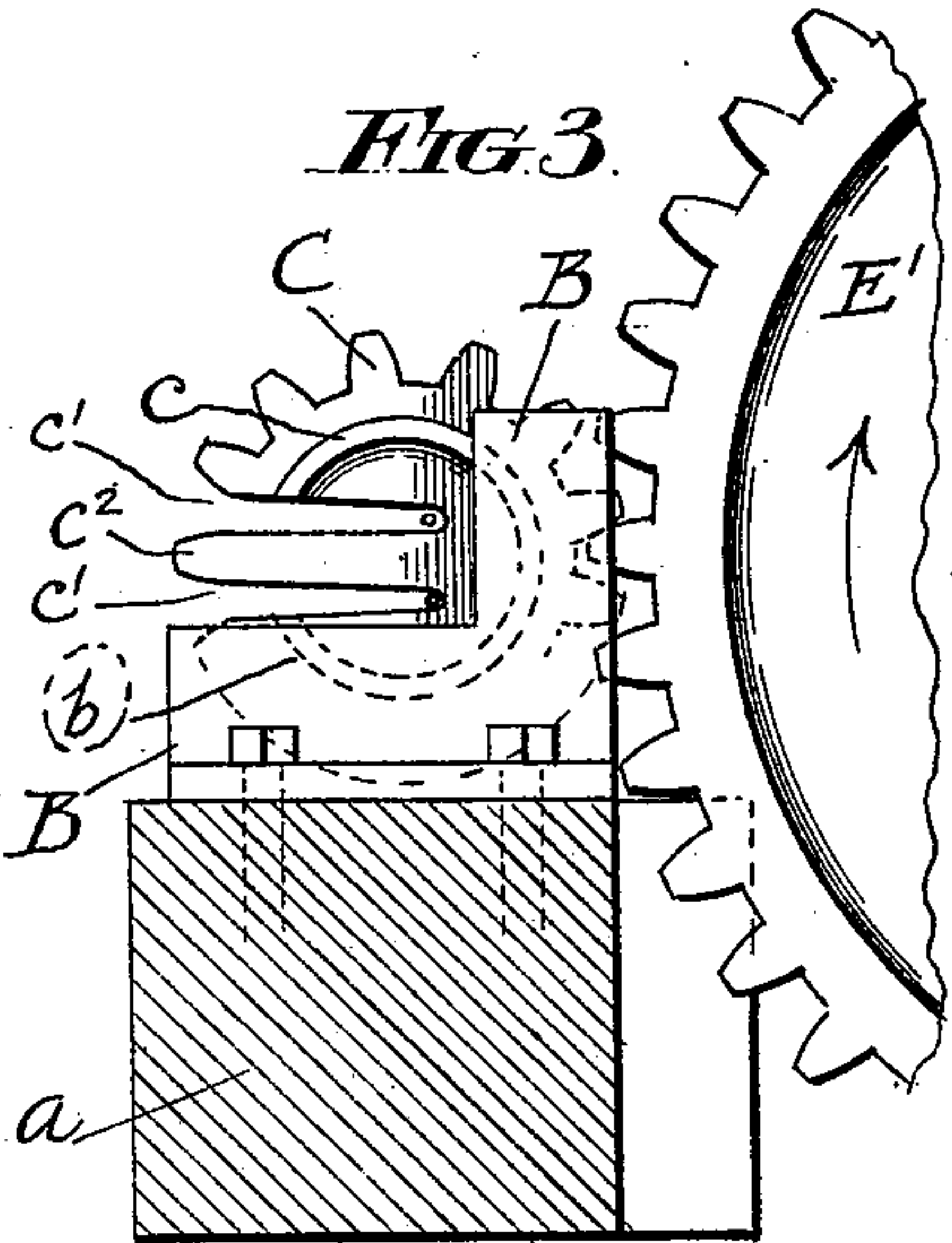


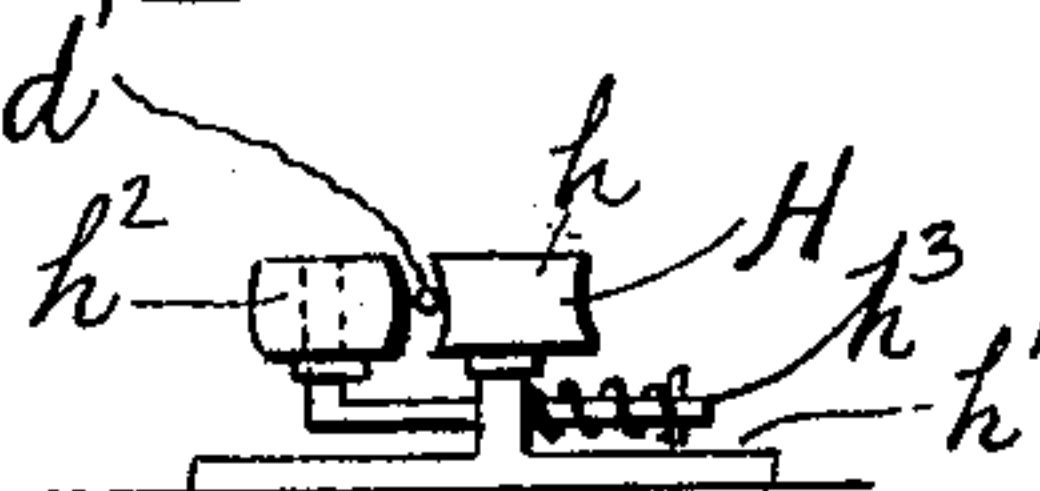
FIG. 3.



Witnesses:

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FIG. 6.



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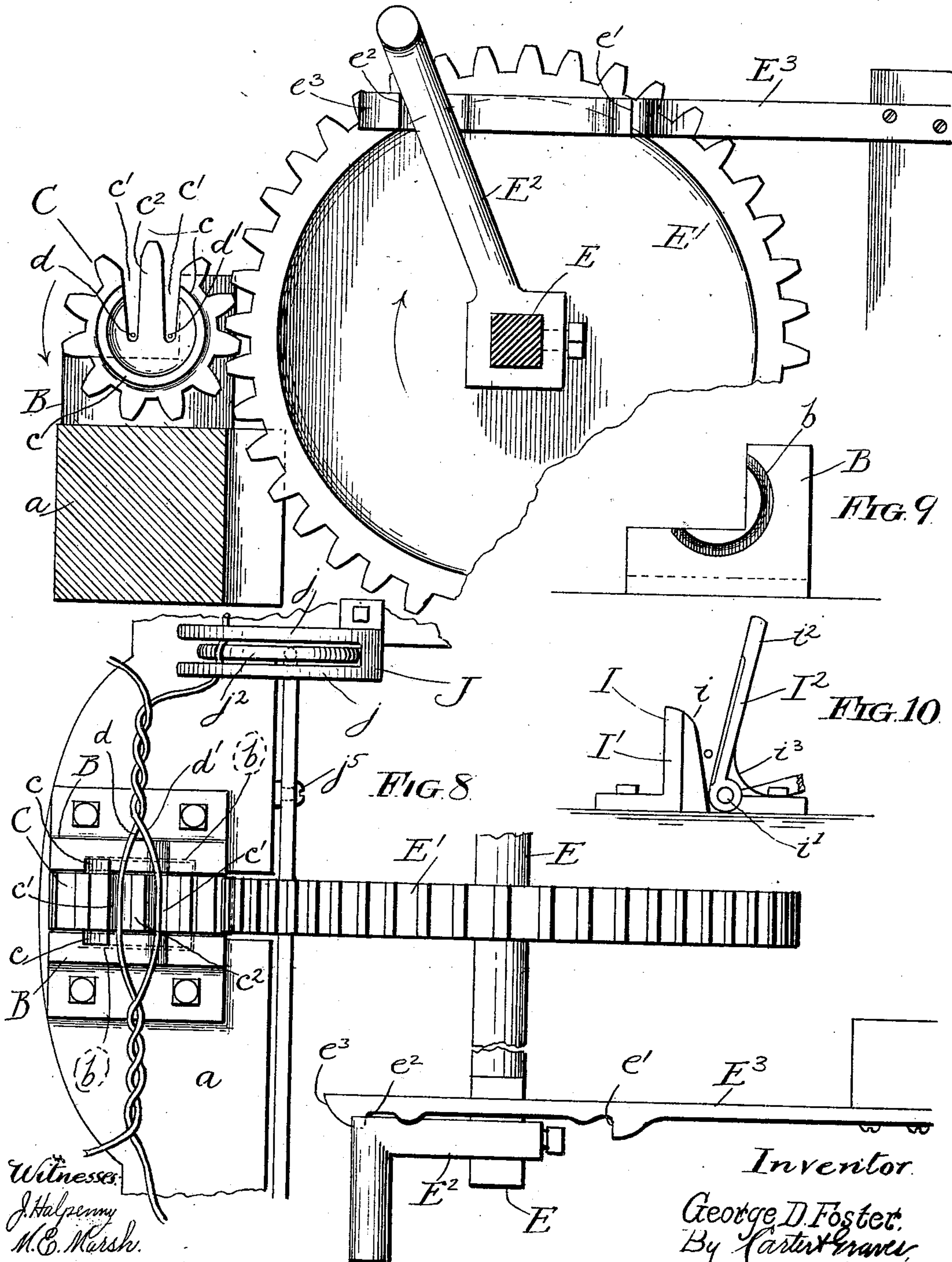
WIRE BINDER.

(Application filed Mar. 17, 1899.)

(No Model.)

2 Sheets—Sheet 2.

Fig. 7





# UNITED STATES PATENT OFFICE.

GEORGE D. FOSTER, OF PRESTON, IOWA.

## WIRE BINDER.

SPECIFICATION forming part of Letters Patent No. 646,819, dated April 3, 1900.

Application filed March 17, 1899. Serial No. 709,484. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE D. FOSTER, of Preston, in the county of Jackson and State of Iowa, have invented certain new and useful Improvements in Wire Binders, of which the following is a specification.

This invention relates to improvements in wire binders, and refers more specifically to a mechanism particularly adapted for binding bales or bundles.

Among the objects of the invention are to provide an apparatus of extremely simple, strong, and durable construction which may be manually operated to form a simple and effective band or bale from a continuous length of wire, an apparatus which may be readily applied to most bundling and baling machines, and to provide improvements in the details of construction of an apparatus embodying my invention especially adapted for binding corn-shocks.

The invention consists in the matters hereinafter described, and more particularly pointed out in the appended claims, and the same will be readily understood, reference being had to the accompanying drawings, in which—

Figure 1 is a plan view of an apparatus embodying my invention mounted upon the yoke of a corn-shock-compressing machine. Fig. 2 is a side elevation, with parts in section, of the same apparatus. Fig. 3 is a fragmentary detail of parts shown in Fig. 2 on an enlarged scale. Fig. 4 shows the form of one of the bands or bales in its finished condition. Fig. 5 is a detail perspective view of the wire clamp whereby the free end of the wire is held during the knotting process. Fig. 6 is a side view of the combined guide-pulley and tension device whereby the end of the wire is held after a finished band has been severed therefrom. Fig. 7 is an enlarged side elevation of the rotary knotter and gear which drives the same, including the crank and spring-latch, whereby the gear is operated and controlled. Fig. 8 is a top plan view of the parts shown in Fig. 7, showing the knotted portion of a band in position in the mechanism by which it is formed. Fig. 9 is a detail side elevation of one of the guide-plates which supports the knotter. Fig. 10 is a detail side elevation of the wire-severing device.

The invention is shown in the present instance as embodied in the form of a corn-shock binder, to which purpose the details shown herein are particularly adapted; but it is to be understood that the general features of the invention are applicable to various other analogous purposes.

Referring to the drawings, A designates as a whole the V-shaped yoke or frame of a shock-compressing apparatus—such, for example, as that shown in Letters Patent granted to me, No. 562,177, dated June 16, 1896. Upon the cross-bar *a* of said yoke, against which the shock or bundle of shocks is compressed, are mounted in parallel relation two upright supporting-plates B, (see detail Fig. 9,) having upon their proximate faces annular grooves *b*. Between the said supporting-plates is mounted a pinion (hereinafter termed the “knotter”) C, having in its side faces annular ribs or flanges *c*, which engage the grooves *b* of the supporting-plates and hold the knotter in position, while permitting it to rotate freely.

The knotter is provided at one side with a radially-arranged slot or opening *c'*, which extends from the periphery inwardly approximately to the center of the knotter. Within this slot and arranged so as to divide the same is a radially-extending lug or finger *c²*, the outer end of which extends flush with the periphery of the knotter and is suitably conformed to serve as one tooth of the series of teeth formed in the periphery of the knotter.

In knotting or twisting the wires together one end of each of the two overlapping portions of the wire which are to be twisted together to form the band is placed in the slot *c'* upon opposite sides of the lug *c²*, as indicated at *d d'*, Figs. 7 and 8, and in order to permit the placing of the wires within the knotter in this manner and in order not to interfere with the wires during the pressing together of the latter the side supporting-plates B are made approximately L-shaped in side elevation, so as to leave the central portion of the knotter and approximately one segmental quarter of it unobstructed.

In order to rotate the knotter to twist the lapped ends of the band together, a shaft E is mounted in suitable bearings *e* upon the frame A, and upon this shaft is fixed a driv-



ing-gear  $E'$ , arranged to intermesh with the teeth of the knotter. Preferably the gear  $E'$  will be of such size as to rotate the knotter a given number of complete revolutions during a single revolution of the gear, (four times in the present instance,) so that the position of the knotter at the end of a complete revolution of the driving-gear will always be the same, for a purpose which will hereinafter appear.

$E^2$  designates a crank secured upon the end of the shaft  $E$ , and  $E^3$  designates a spring-latch mounted upon a suitable support  $a'$ , so as to extend alongside of the path of the crank  $E^2$  and provided with two shoulders  $e' e^2$ , which serve to arrest the movement of the crank in one direction or the other. The free end of the spring-latch is provided with a finger-hold  $e^3$ , whereby the latch may be deflected or bent sufficiently to allow the crank to pass freely in either direction when desired.

$G$  designates a reel or spool of wire rotatably mounted upon the frame  $A$ , the shaft of the reel being provided with a crank-handle, whereby it may be turned to draw the wire taut after adjustment around the bundle and before the knot is formed. From the reel the wire is led underneath a guide-pulley  $g$  and thence through a tension device  $H$ , which also serves as a guide-pulley, and is located upon the frame  $A$  in a position approximately in alinement with the axis of rotation of the knotter. The tension device consists in the present instance of a grooved pulley  $h$ , mounted upon a suitable bearing  $h'$ , and a friction-pulley  $h^2$ , mounted upon a spring-pressed shaft  $h^3$  and arranged to bear yieldingly against the pulley  $h$ , the wire being trained between the two, as shown clearly in detail Fig. 6.

From the tension device the wire passes through a cutter  $I$ , consisting in the present instance of an upright blade  $i$ , mounted in a suitable casting  $I'$ , with which coöperates a pivoted pressure-bar  $I^2$ , pivotally mounted at its lower end, as at  $i'$ , adjacent to the blade  $i$ , and provided at its upper end with a handle  $i^2$ , whereby it may be oscillated to force the wire against the edge of the blade to sever the same. The pressure-bar is desirably held in upright position, so as to serve in connection with the blade to form a guide through which the wire passes, by means of a stop  $i^3$ . After passing through the knotter the free end of the wire is secured in a clamping device  $J$ , which, as herein shown and as conveniently made, consists of a pair of parallel curved fingers  $j$ , rigidly mounted upon the frame  $A$ , and a clamping-jaw  $j^2$ , having its acting face made convex to correspond to the curvature of the fingers and mounted upon a shaft  $j^3$ , working through a bearing  $j^4$ , so as to be capable of being projected between the fingers. The clamping-jaw is conveniently operated by means of a horizontal lever  $K$ , connected at one end with the lower end of the shaft  $j^3$  and pivotally mounted at a point

intermediate of its length, as at  $j^5$ , Fig. 8, upon the frame member  $a$ , the other end of the lever being arranged to project through a loop  $j^6$  upon the end of link  $j^7$ . The link is connected at its opposite end with an arm  $j^8$ , rigidly connected with the presser-bar  $I^2$  in such manner that when the latter is oscillated forwardly to cut the wire the clamp will be opened, and, vice versa, when oscillated in the opposite direction the clamp will be closed.

The operation of the apparatus, constructed as described, is as follows: A shock or bundle of stalks having been brought within the yoke and suitably compressed, the end of the wire is carried from the tension device across over the knotter in rear of the bundle, around the latter, and across over the knotter again and the end secured in the clamp  $J$ . The knotter being in the position shown in Fig. 7, the overlapped ends are adjusted within the knotter at opposite sides of the lug  $c^2$  of the latter, the reel turned so as to draw the wire taut, and the crank  $E^2$  of the driving-gear turned a single revolution to the right or in the direction indicated by the arrow in Fig. 7, permitting the shoulder  $e'$  of the spring-latch to arrest the movement of the crank. This single revolution of the driving-gear will complete the twisting together of the wires in the form shown in Fig. 8, and when the crank-handle  $E^2$  is in position resting against the shoulder  $e'$  the opening and lug  $c^2$  of the knotter will be directed horizontally forward or toward the bundle, so that the latter may be disengaged from the knotter without difficulty. The band is thus completed, and it only remains to sever the wire by means of the cutter  $I$ . As the presser-bar is oscillated to cut the wire the clamp will be opened to release the opposite end and the bundle thus freed ready to be discharged. Before beginning to bind the next shock or bundle the crank of the driving-gear will be shifted back from the shoulder  $e'$  to the shoulder  $e^2$  of the spring-latch, thus restoring the slot of the knotter to a vertical position to more conveniently receive the wire.

While I have herein described and illustrated what I deem to be a preferred embodiment of my invention, yet I do not wish to be understood as limiting myself to the precise details of construction shown except as made the subject of specific claims.

I claim as my invention—

1. A mechanism for twisting wire together comprising a rotatable knotter provided at one side with a radial opening, means for detachably holding the wires separated within said opening, means for rotatably supporting the knotter comprising bearing-plates arranged at opposite sides of the latter, one of which is provided with an annular bearing engaging the knotter, both of said plates being cut away to expose the central portion and a segmental portion of the knotter.

2. A mechanism for twisting wire together comprising a rotatable knotter provided at



one side with a radial opening, means for detachably holding the wires separated within said opening, a gear or segment having driving connections with a part of the knotter radially outside of the point at which the wires are held therein, a stop arranged to arrest the driving-gear at the end of a complete revolution and a second stop arranged to limit the movement of the gear in a reverse direction, whereby two definite positions of the knotter are determined.

3. The combination with a wire-knotting device, of a wire-clamp comprising a pair of rigid curved fingers spaced apart, a jaw mounted and adapted to work between said fingers, and a lever operatively connected with the jaw.

4. The combination with a mechanism for twisting parallel wires together comprising a rotatable knotter provided at one side with a radial opening, means for holding the wire separated within said opening comprising a radially-extending lug extending from the inner end of the opening outwardly to the periphery of the knotter, a series of gear-teeth formed in the periphery of the knotter and of which series the end of the wire-separating lug forms a part, and a gear or segment having connection with the periphery of the knotter, of a wire-reel mounted adjacent to the knotting mechanism and a tension device

through which the wire passes on its way from the reel to the knotter.

5. In a corn-shock-binding apparatus, the combination with a pair of compressing-arms arranged in V-shaped relation, of a wire-twisting apparatus mounted upon said arms adjacent to the point of the V and comprising a cross-support against which the corn-shock is adapted to be compressed, a knotter mounted upon said support consisting of a rotatable wire-holder provided at one side with a radial opening, means for holding the wire separated within said opening and driving connections for rotating the knotter.

6. The combination with a bale-tying mechanism of a wire-clamp located at one side of the knotter and a wire-cutting device at the opposite side thereof, and operative connections between the cutting device and clamp whereby when the clamp is opened to release the wire when the cutter is operated to sever the same.

In testimony that I claim the foregoing as my invention I affix my signature hereto, in the presence of two subscribing witnesses, this 14th day of March, 1899.

GEO. D. FOSTER.

Witnesses:

GEO. PANP,  
C. J. STORM.