

(No Model.)

4 Sheets—Sheet 1.

W. H. GASKILL.  
KNOT TYING MECHANISM FOR HARVESTERS.  
No. 483,914. Patented Oct. 4, 1892.

Fig. 1.

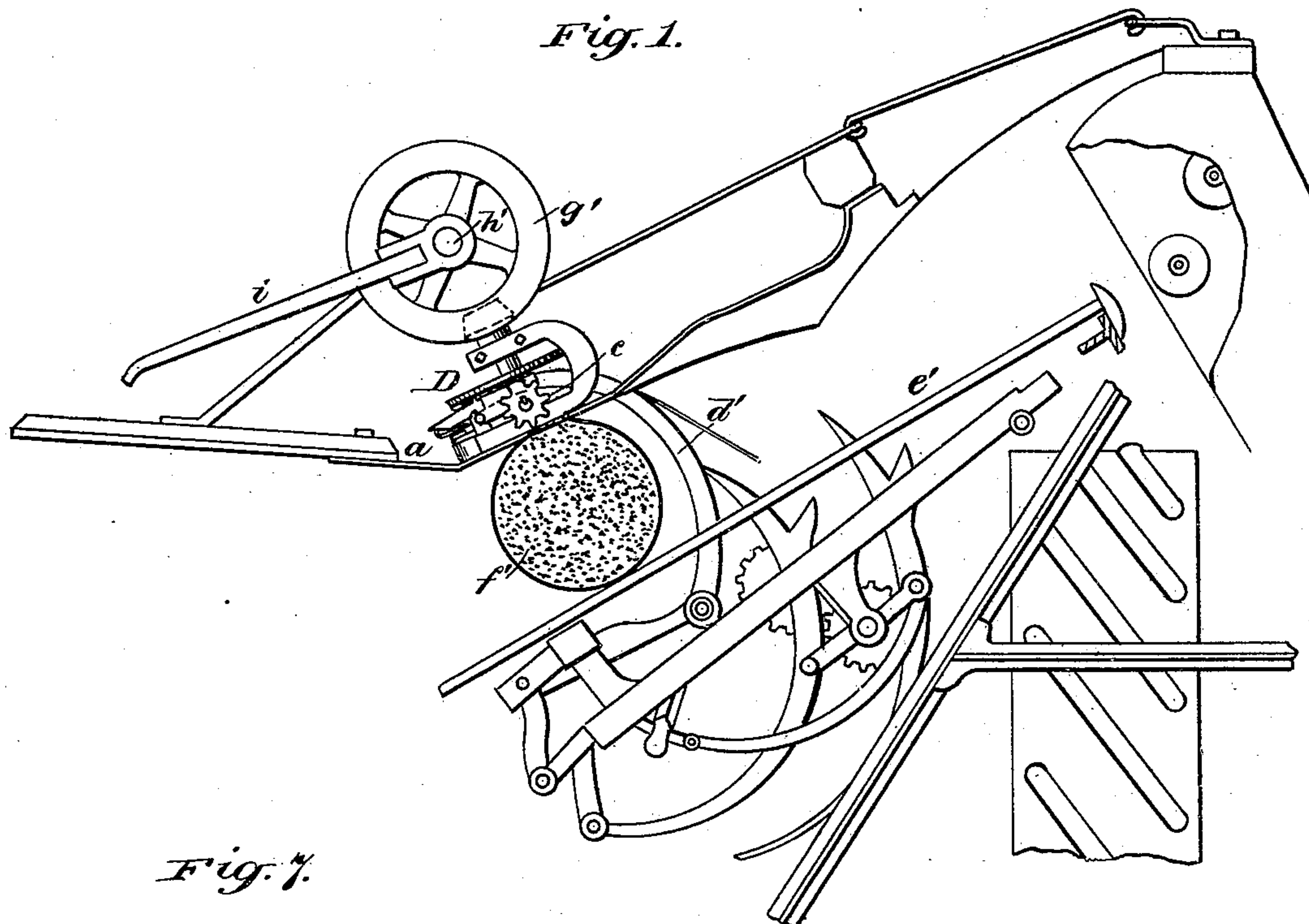


Fig. 7.

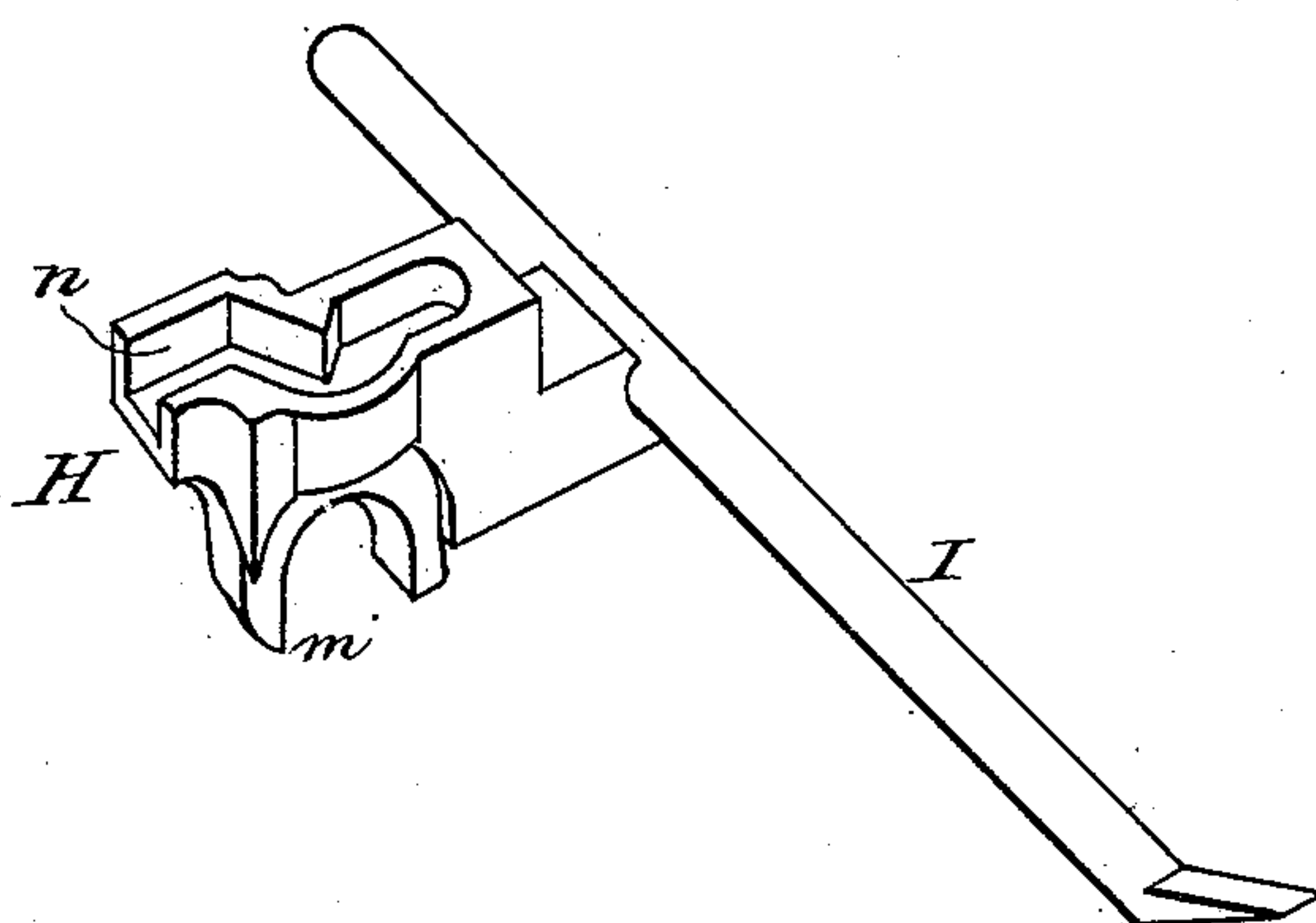


Fig. 8.

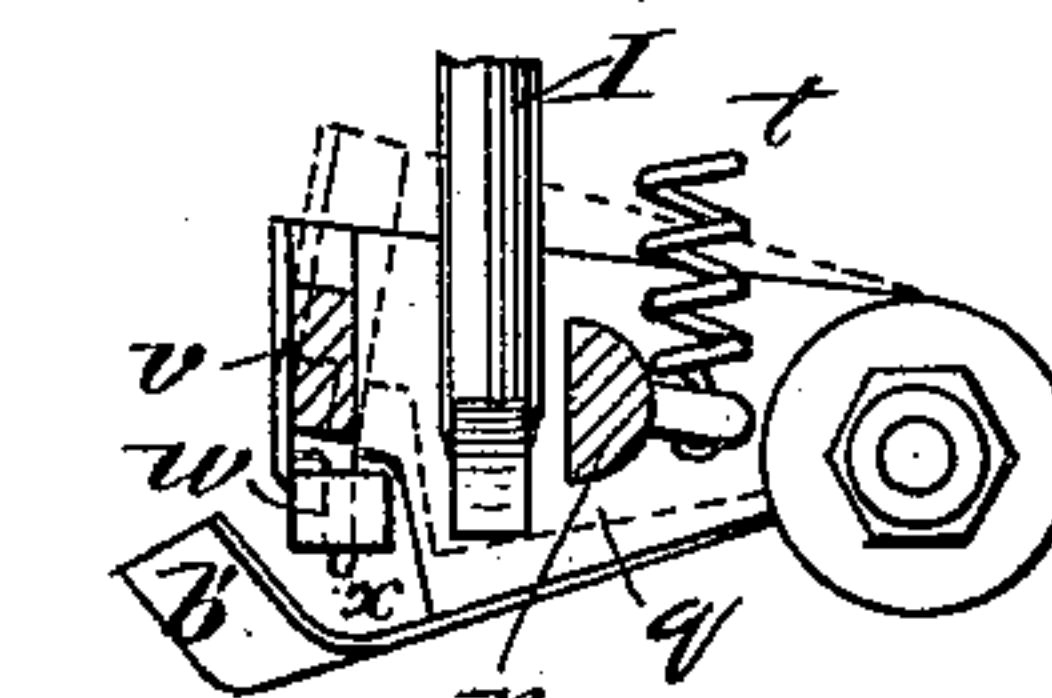
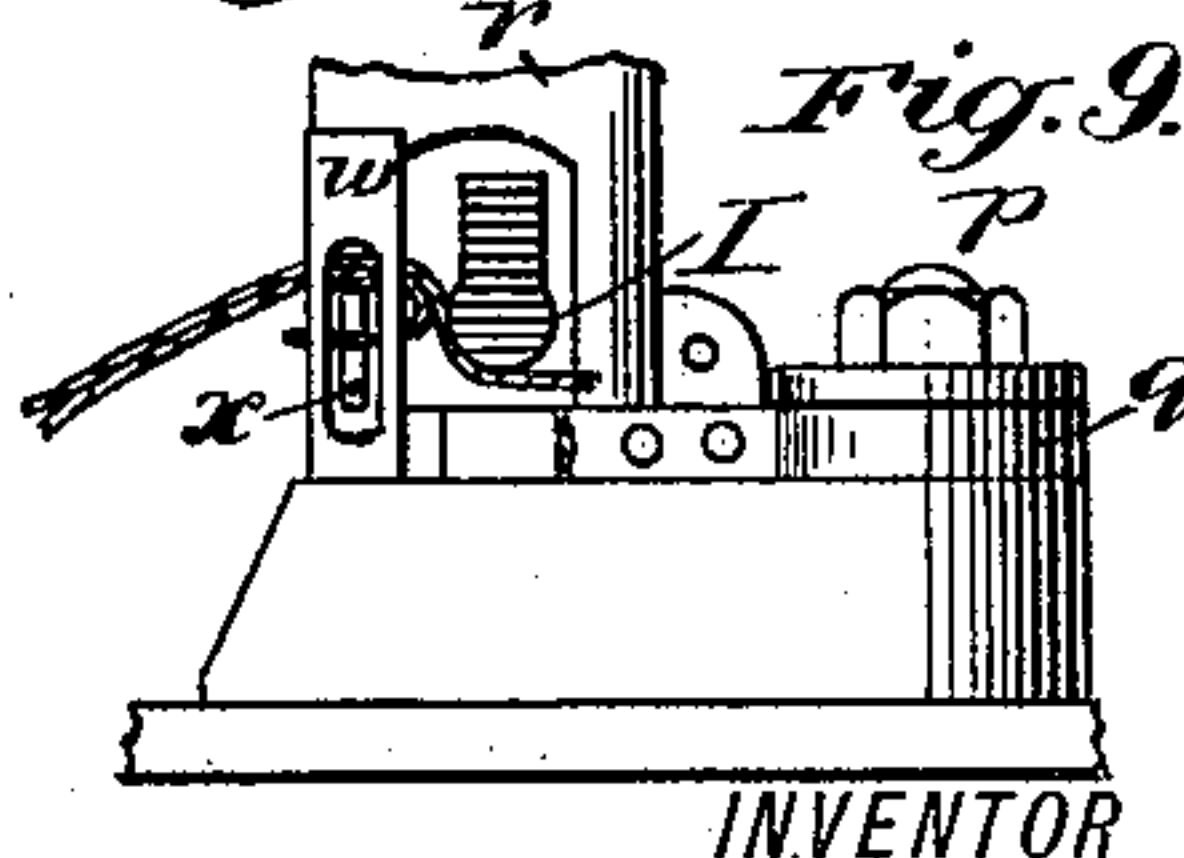


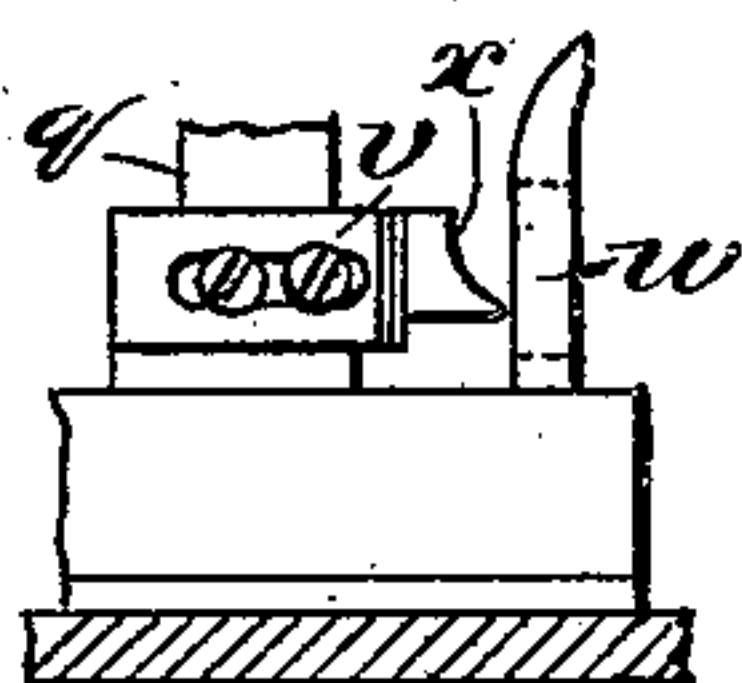
Fig. 9.



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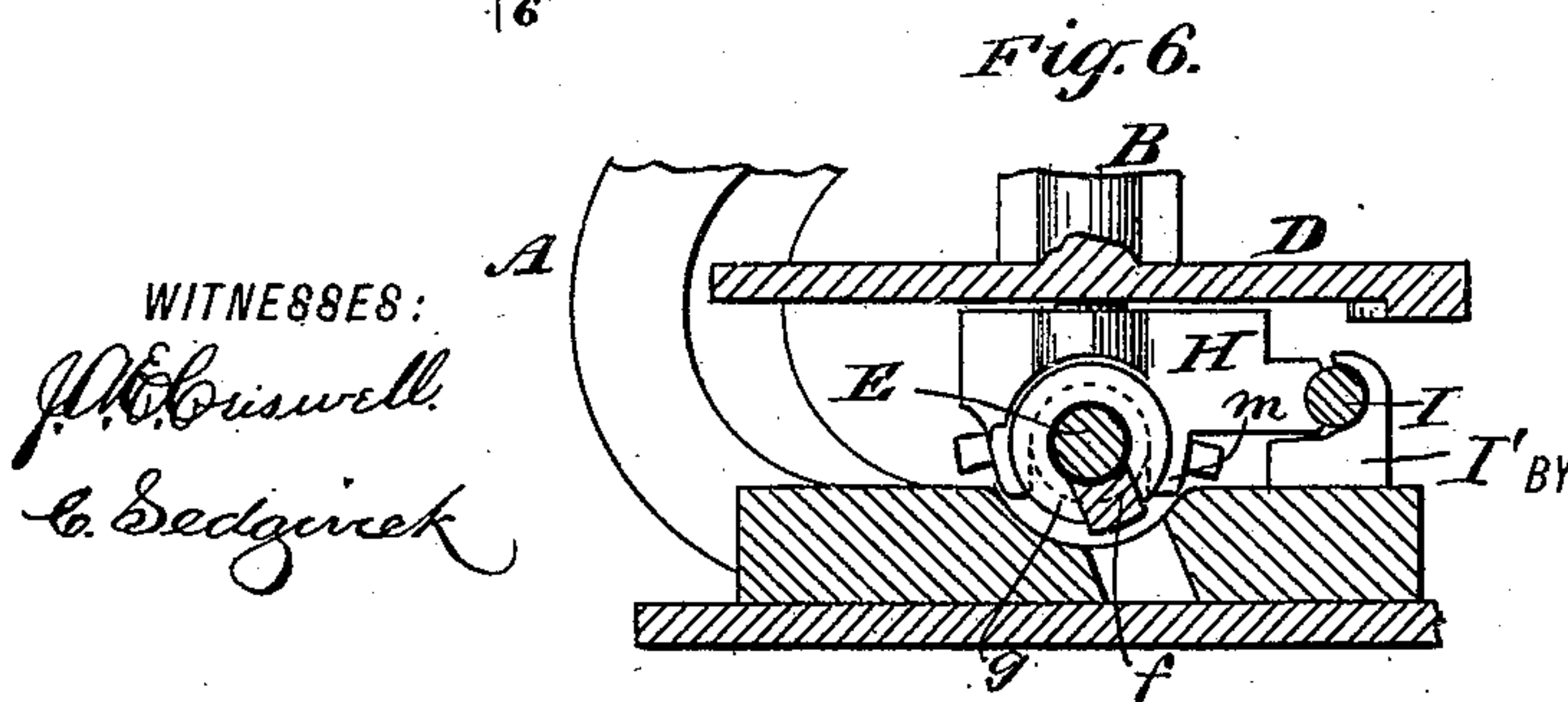
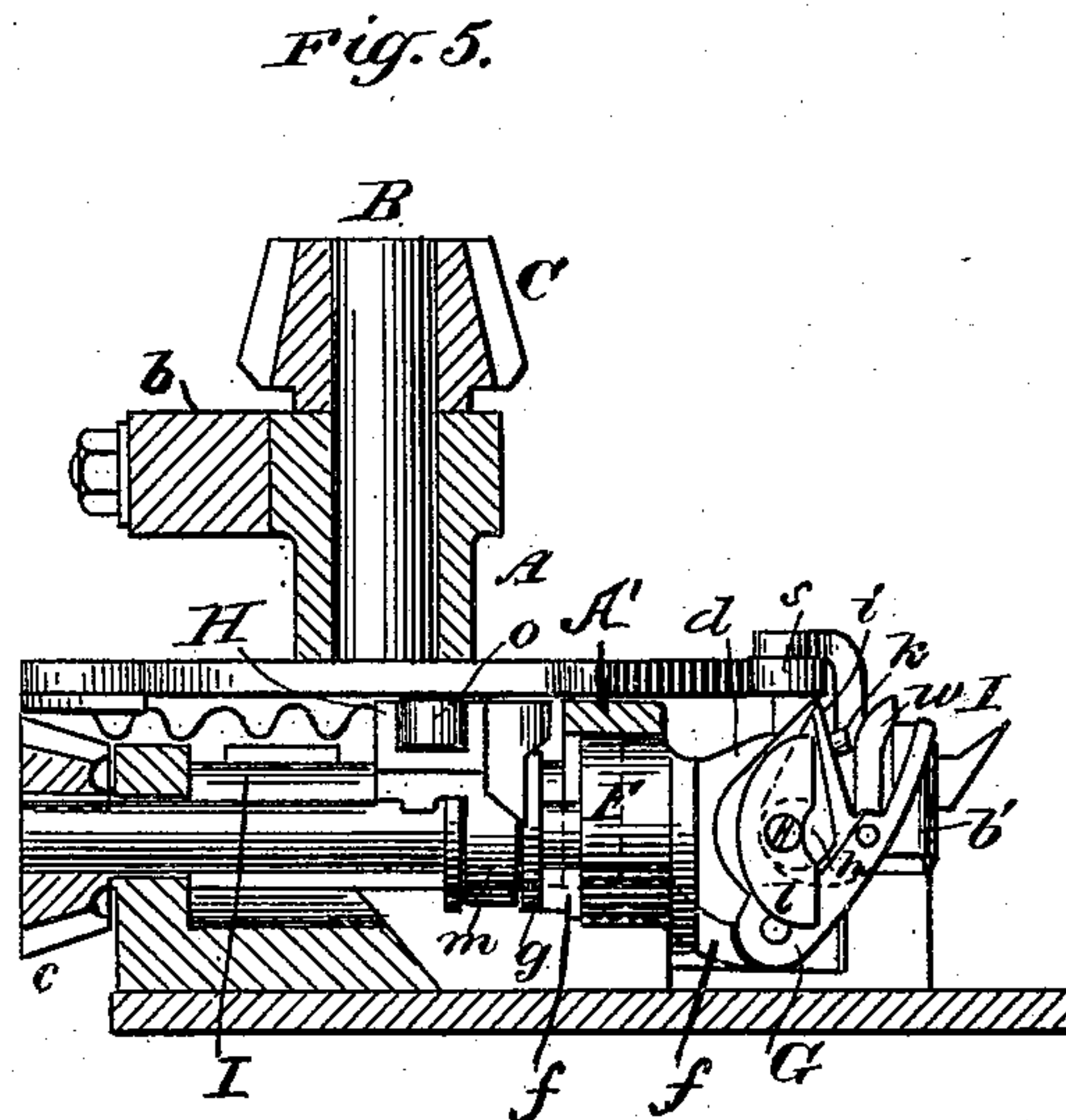
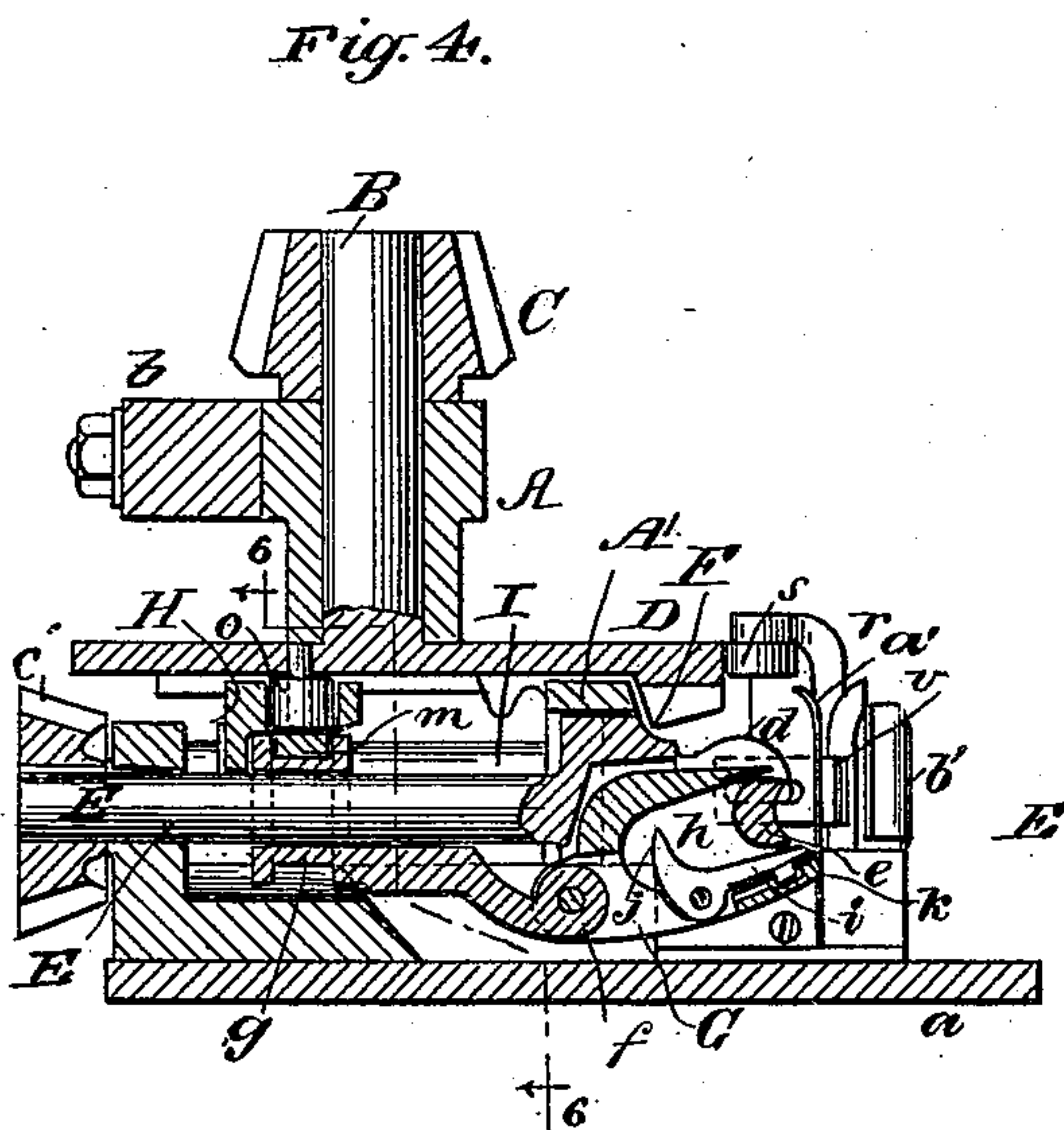
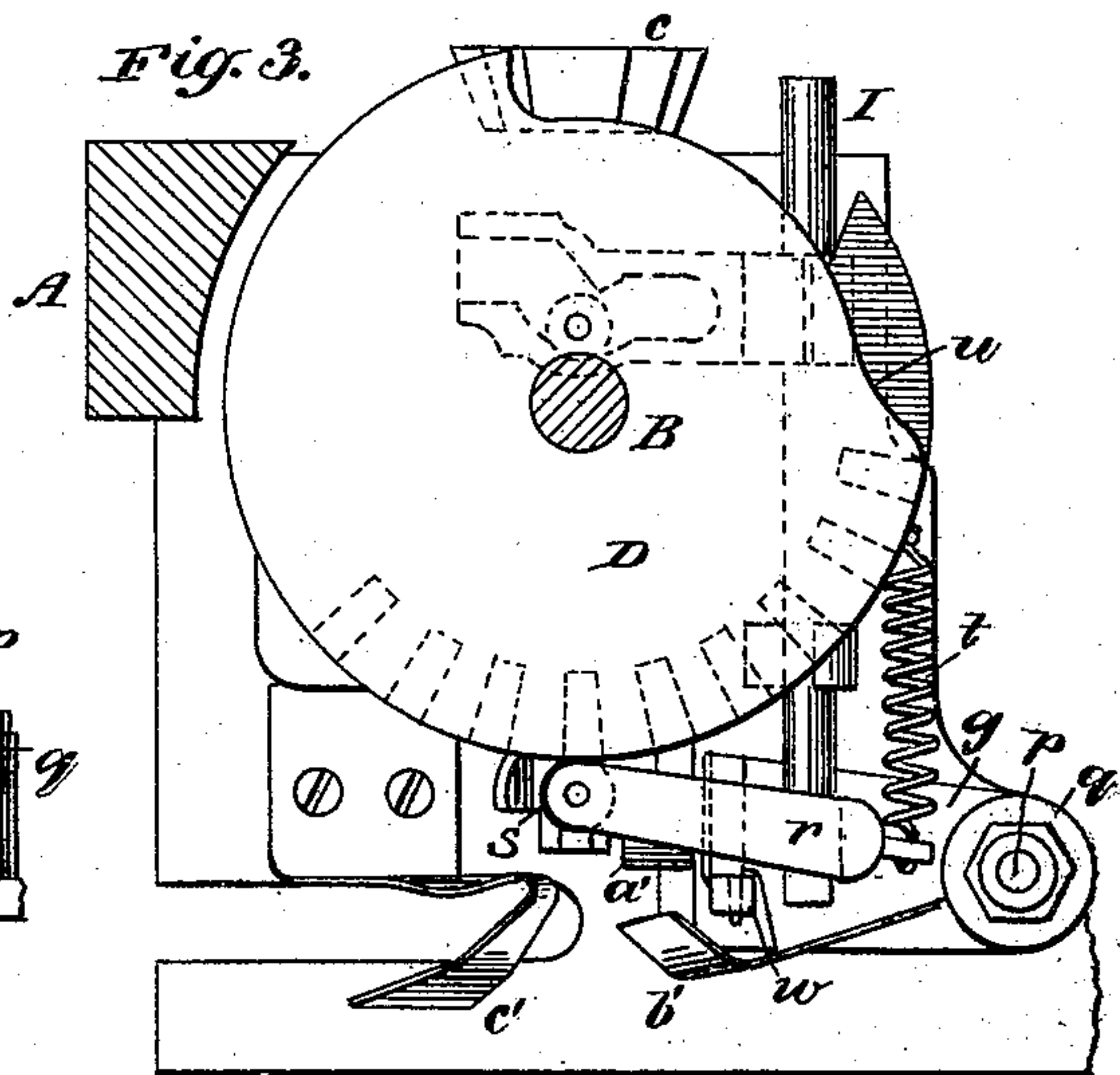
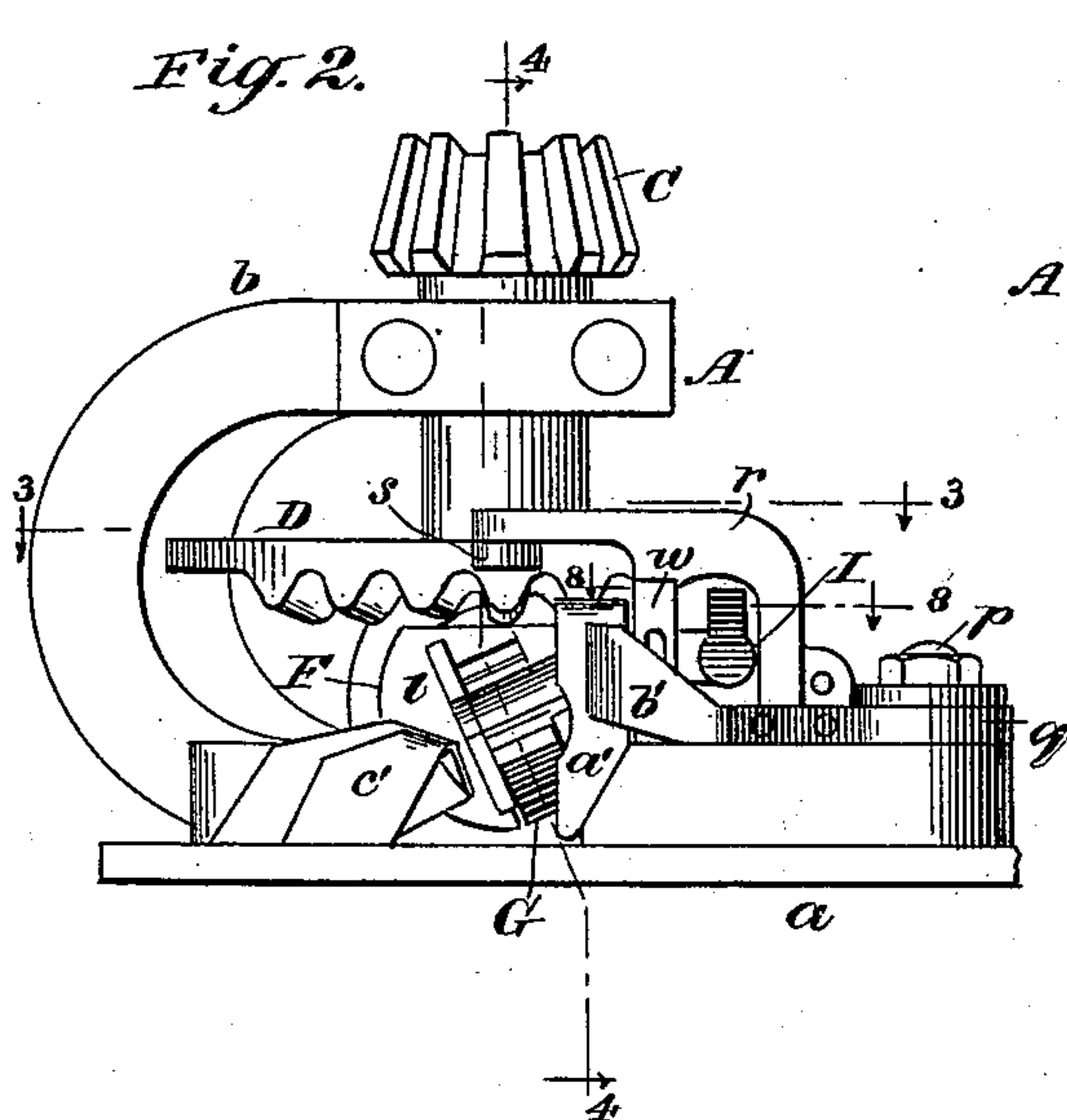
Fig. 10.



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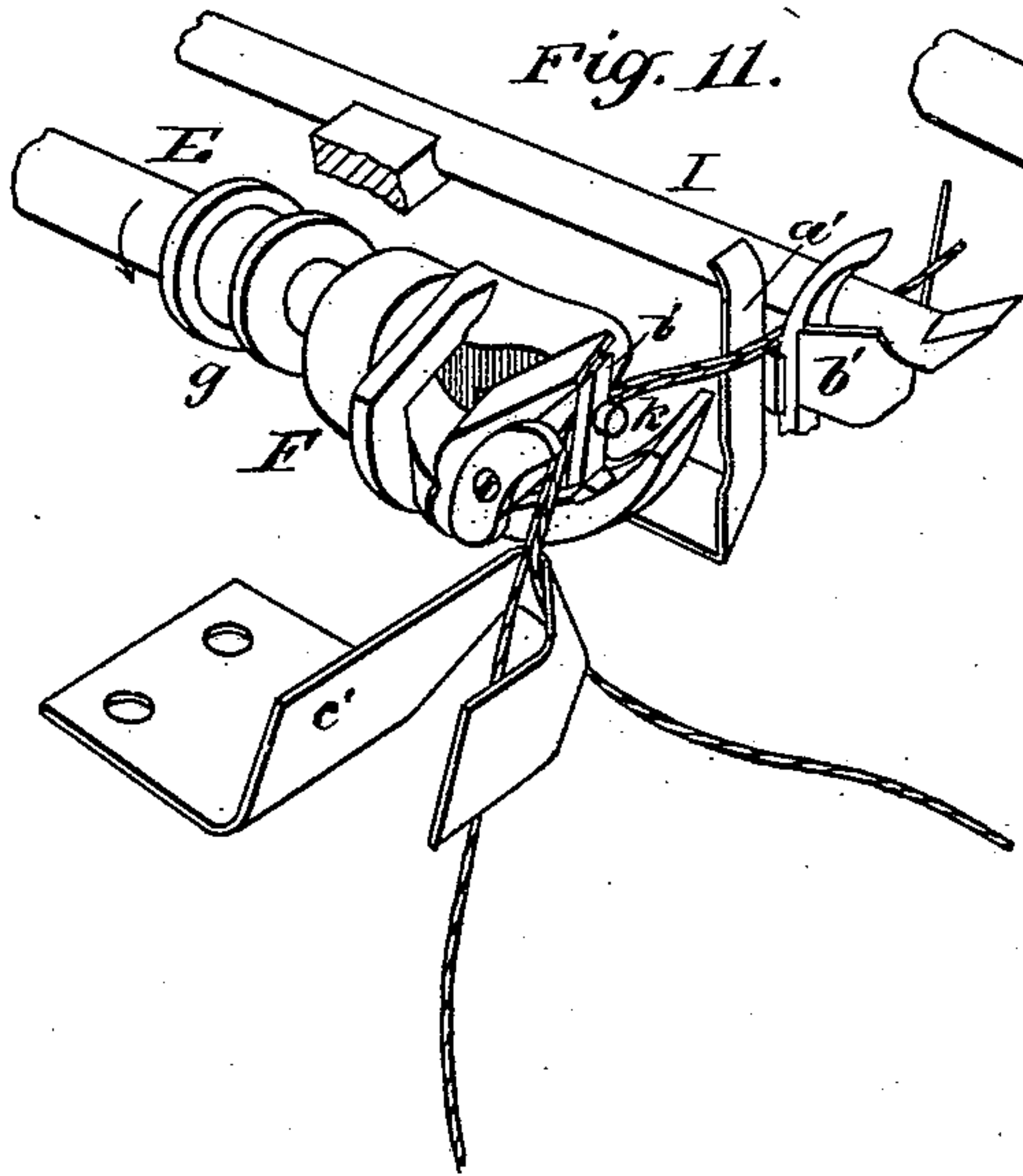


Fig. 11.

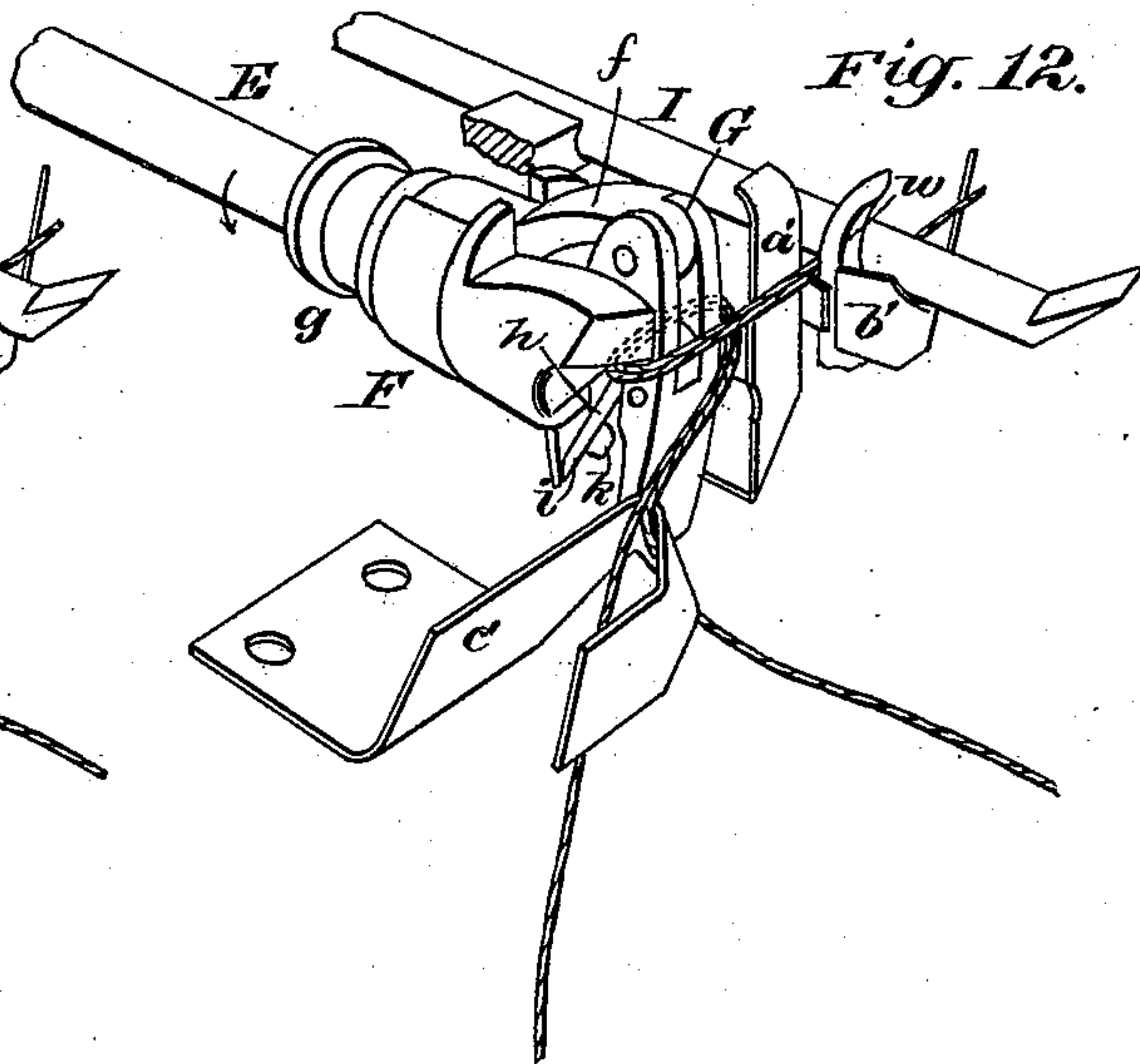


Fig. 12.

Fig. 13.

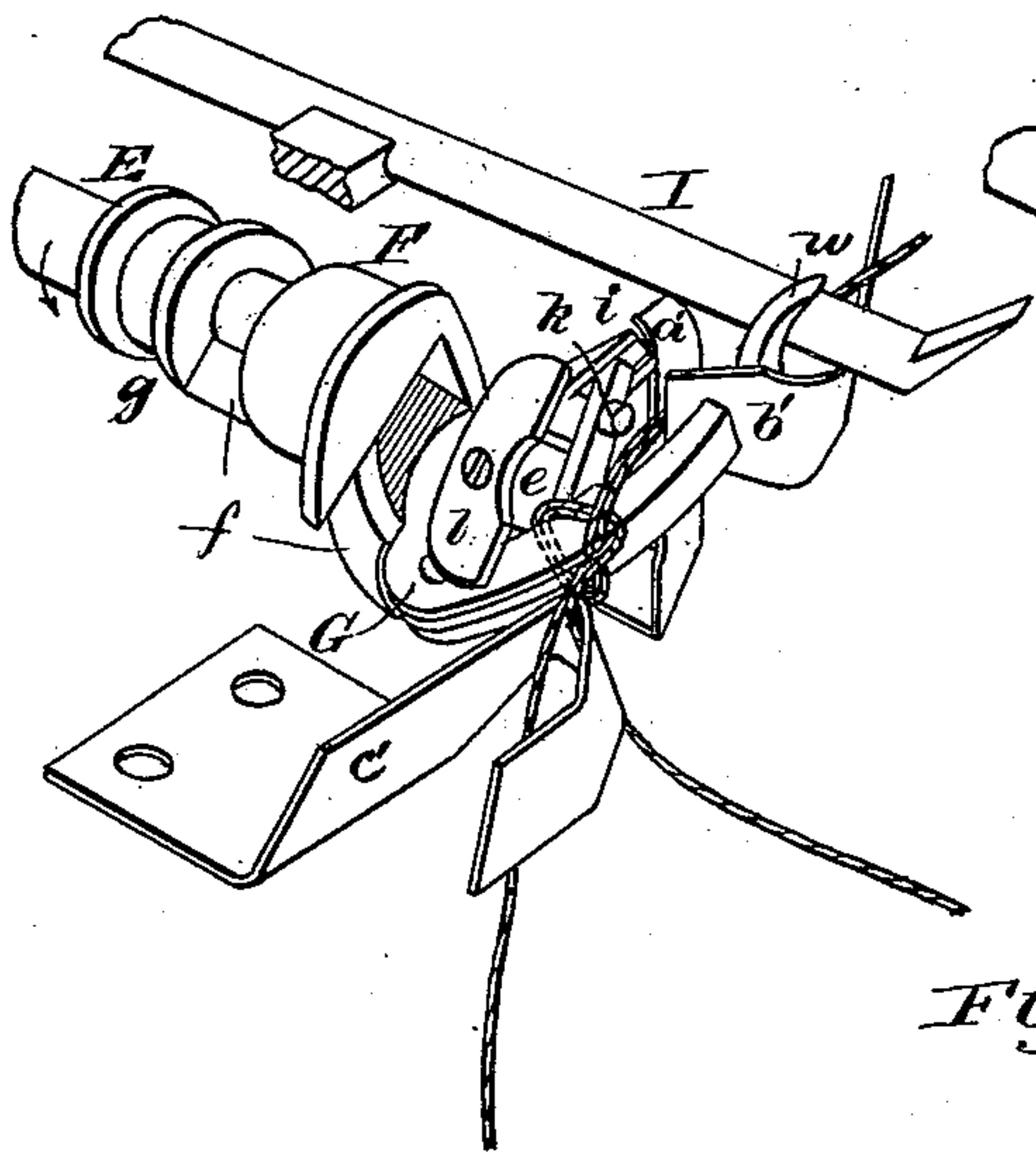


Fig. 14.

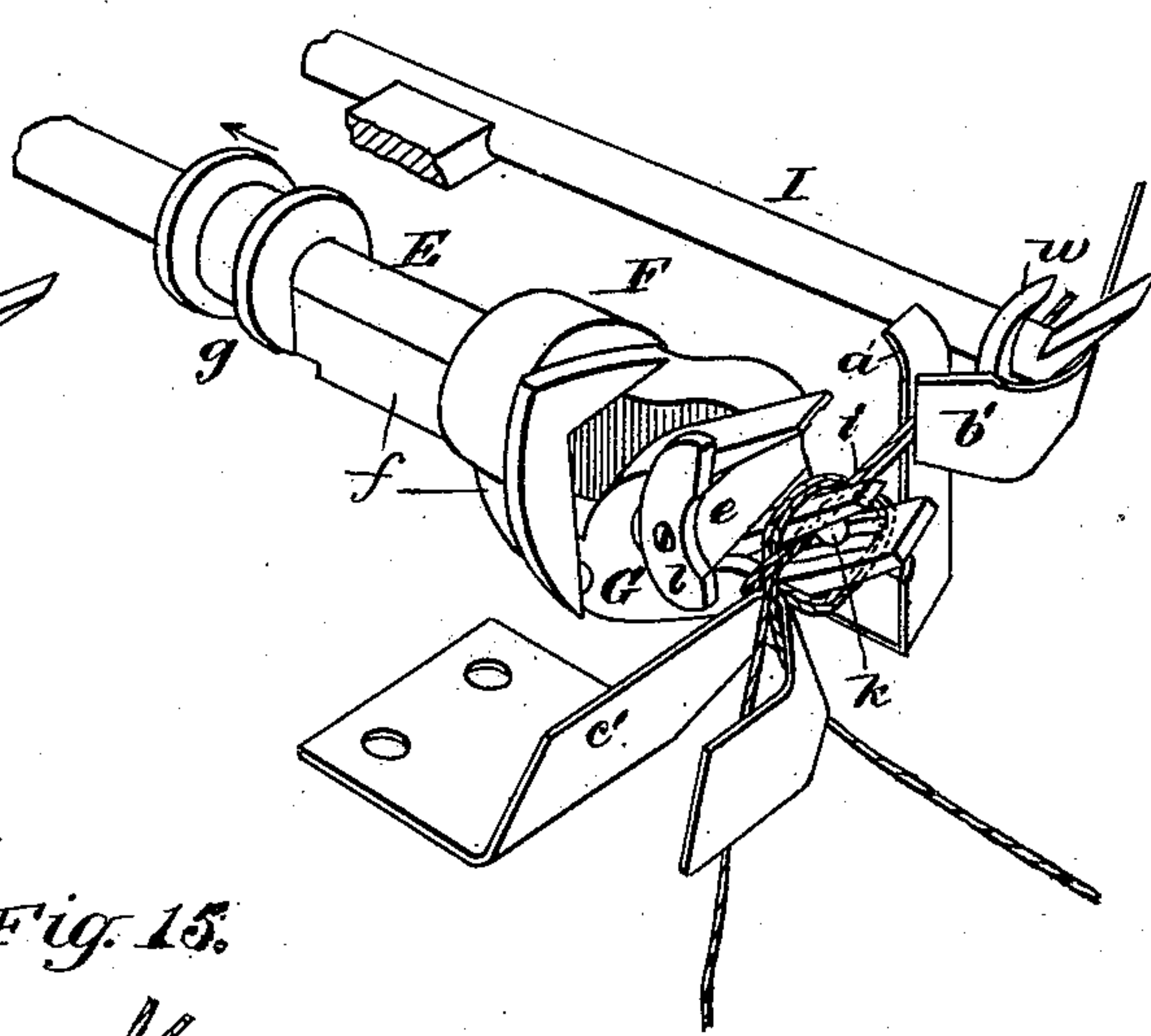
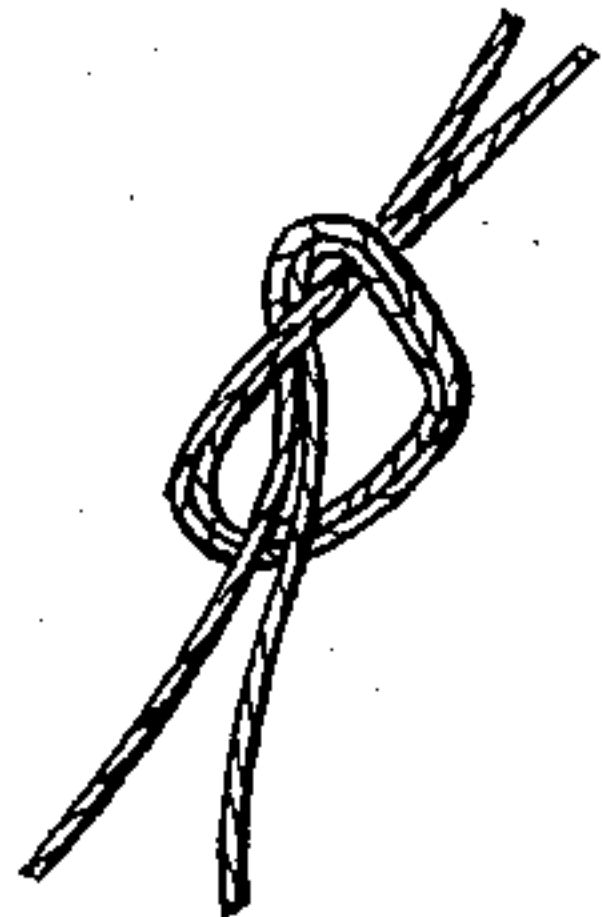


Fig. 15.

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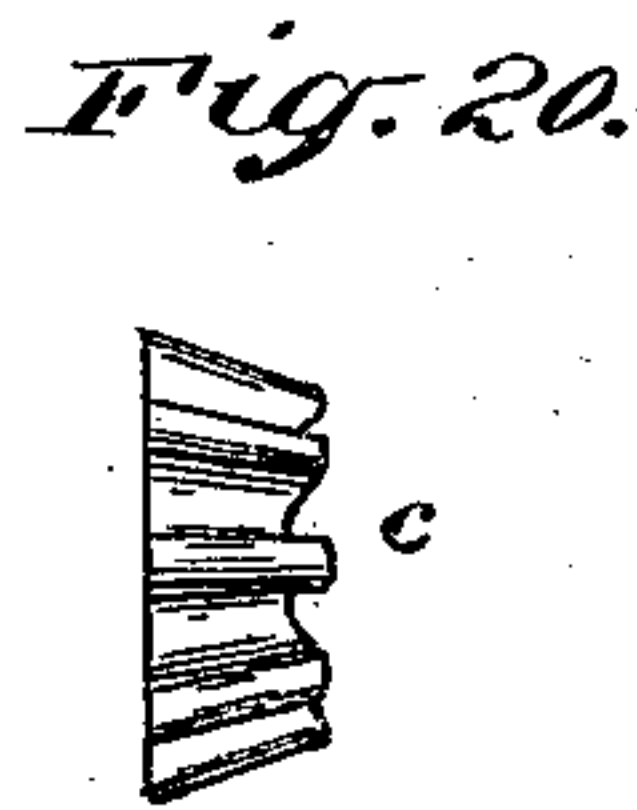
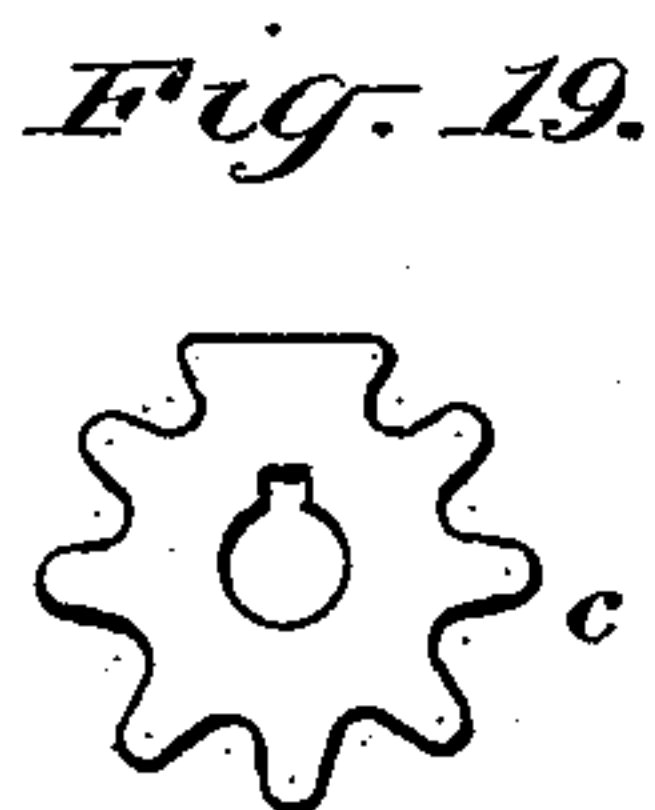
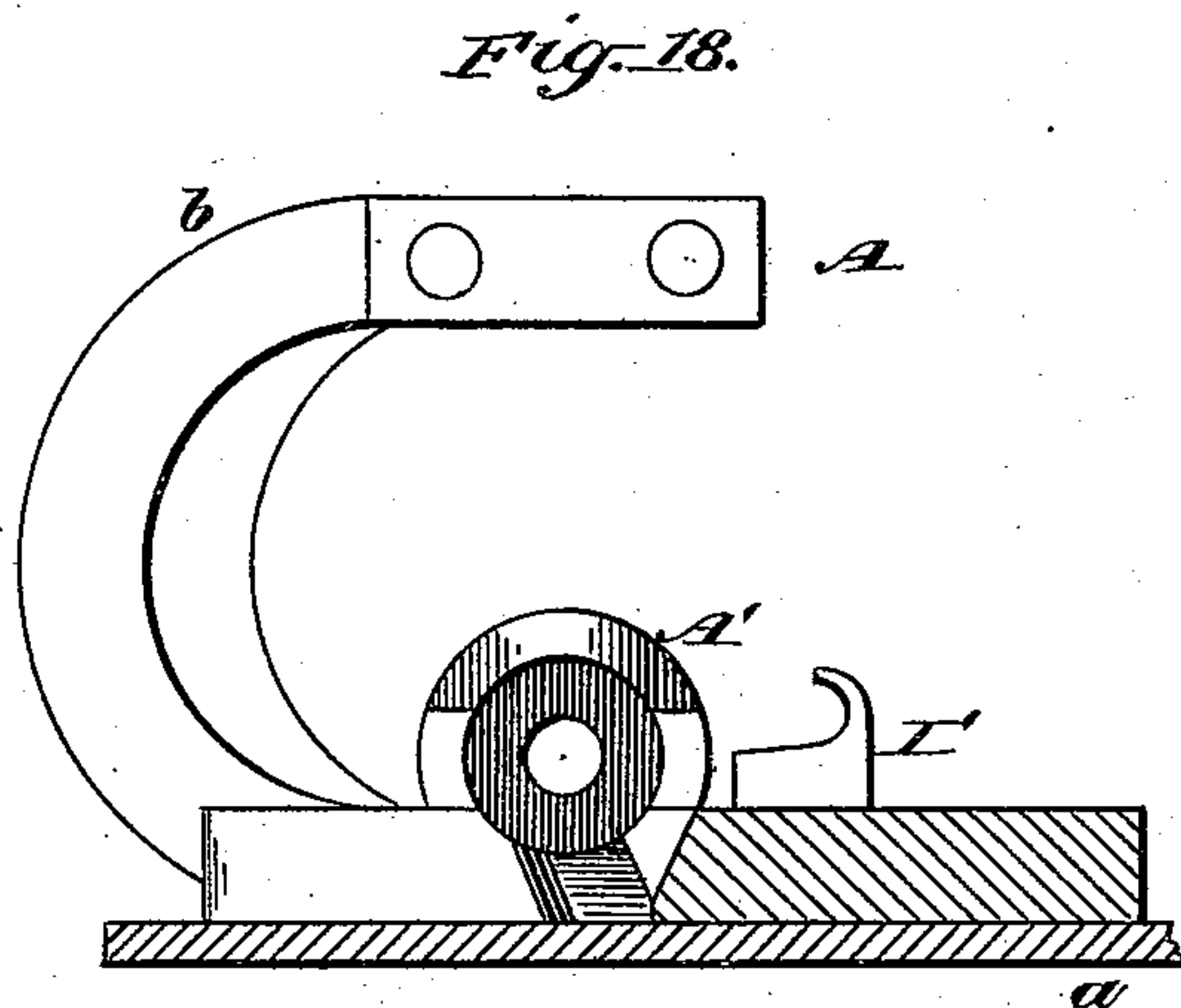
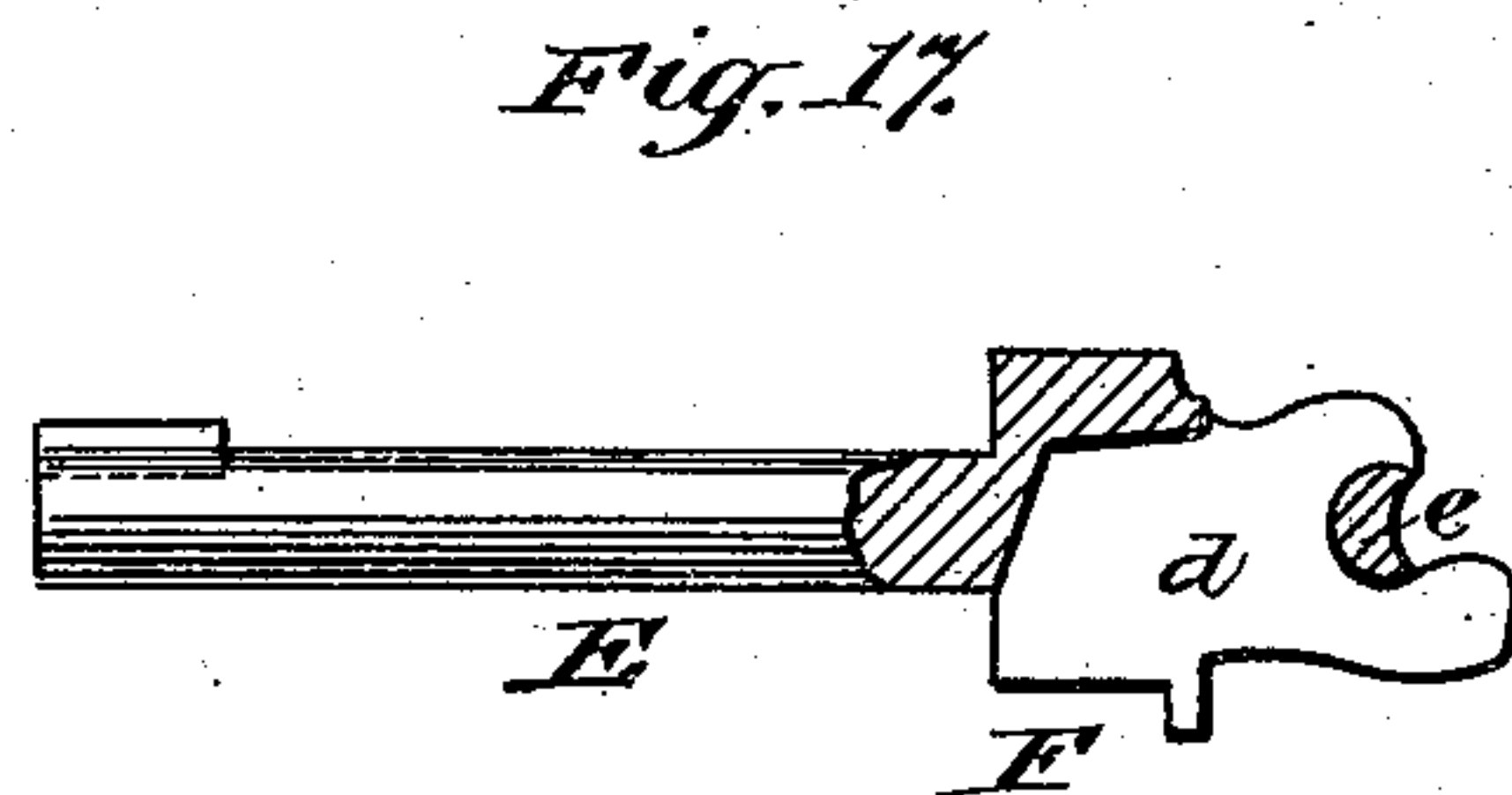
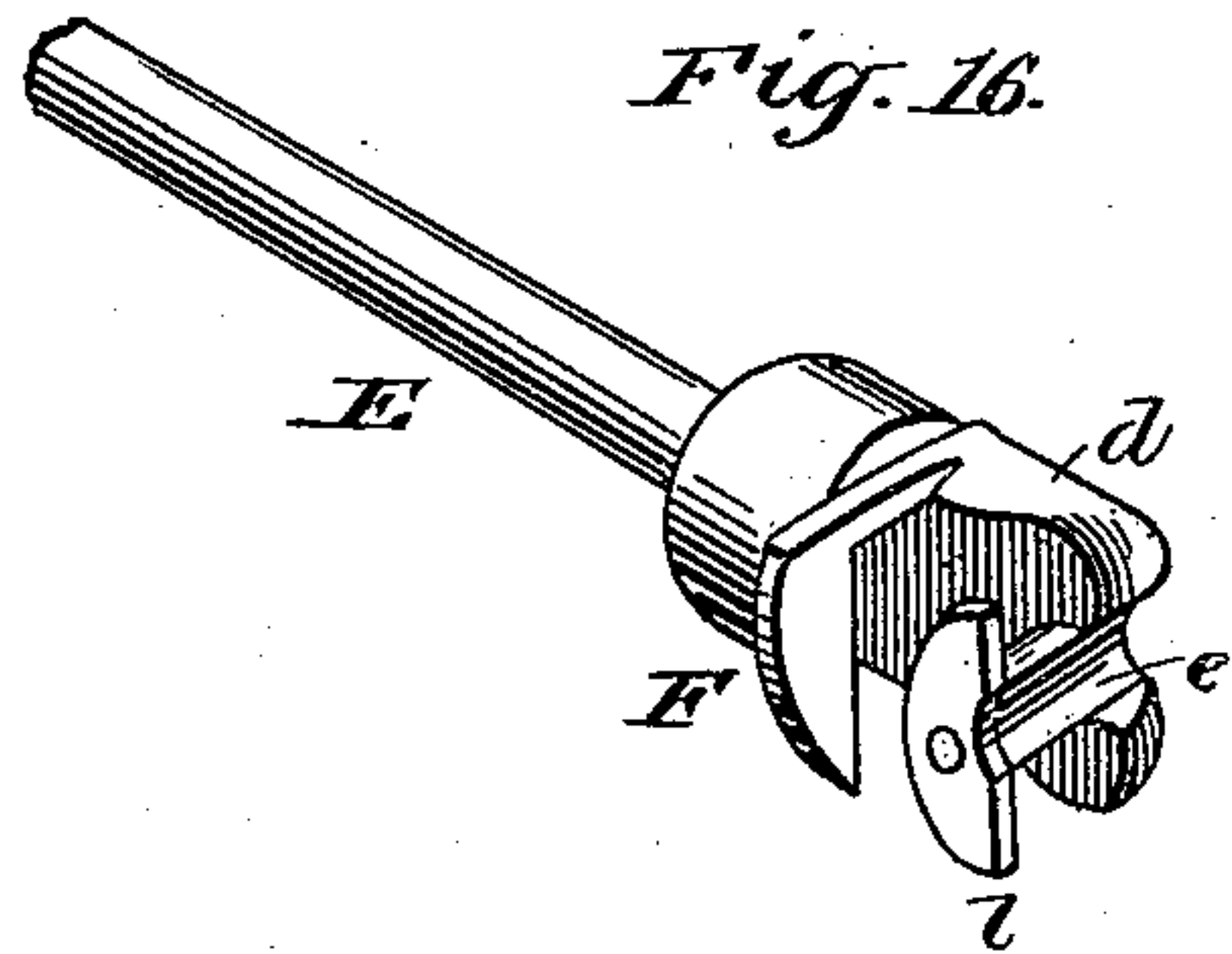


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# UNITED STATES PATENT OFFICE.

WILLIAM HENRY GASKILL, OF WILSON, NEW YORK.

## KNOT-TYING MECHANISM FOR HARVESTERS.

SPECIFICATION forming part of Letters Patent No. 483,914, dated October 4, 1892.

Application filed June 2, 1891. Serial No. 394,823. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM HENRY GASKILL, of Wilson, in the county of Niagara and State of New York, have invented a new and Improved Knot-Tying Mechanism for Harvesters, of which the following is a specification, reference being had to the annexed drawings, forming a part thereof, in which—

Figure 1 is a side elevation of my improved knot-tying mechanism, showing its position on the harvester. Fig. 2 is an enlarged side elevation of the mechanism in detail. Fig. 3 is a horizontal section taken on line 3 3 in Fig. 2. Fig. 4 is an enlarged detail vertical longitudinal section taken on line 4 4 in Fig. 2, showing the tying mechanism in an open position. Fig. 5 is a vertical longitudinal section showing the knot-tying mechanism closed. Fig. 6 is a vertical transverse section taken on line 6 6 in Fig. 4. Fig. 7 is a detail perspective view of the cam and the twine-moving follower. Fig. 8 is a sectional plan view of the twine-moving follower and the twine clasp and cutting mechanism. Fig. 9 is an end elevation of the same. Fig. 10 is a side elevation of the twine-cutter. Fig. 11 is a perspective view of the knot-tying mechanism, showing the first movement in tying the knot. Fig. 12 is a perspective view showing the second movement. Fig. 13 is a perspective view illustrating the third movement. Fig. 14 is a perspective view showing the knot completed and about to be discharged from the knot-tying mechanism. Fig. 15 is a perspective view of the knot before being drawn up. Fig. 16 is a perspective view of the revolving head of the knot-tying mechanism. Fig. 17 is a side elevation of the same, partly in section. Fig. 18 is a perspective view of the main frame, partly in section. Fig. 19 is a side elevation of the irregular pinion, and Fig. 20 is an edge view of the same.

Similar letters of reference indicate corresponding parts in all the views.

The object of my invention is to provide simple and efficient tying mechanism, especially designed for connection with grain-harvesters, but capable of being used on baling or bundling machines for tying the twine employed to bind the bundle or bale.

The frame A of the knot-tying mechanism is secured to the breast-plate *a* of the har-

vester. The frame is provided with an upwardly-curved arm *b*, in which is journaled a shaft B, carrying at its upper end a bevel pinion C or other device for receiving motion from the moving parts of the harvester. The lower end of the shaft B carries a mutilated bevel-wheel D.

In the lower part of the frame A is journaled a shaft E at right angles to the shaft B. To one end of the shaft E is secured an irregular bevel-pinion *c* in position to be engaged by the mutilated bevel-wheel D. The pinion *c* is furnished with a stop-tooth occupying a space equal to two of the ordinary teeth and one of the spaces between the teeth. The opposite end of the shaft E carries a head F, having a projecting arm *d*, to which is attached a stud *e*, projecting laterally at right angles to the axis of the shaft E. The head F is journaled in the standard A' of the frame A, and is slotted at one side to allow the arm *f* to pass through. The arm *f* is carried by a sliding sleeve *g*, placed on the shaft E.

To the arm *f* is pivoted a fork G, which embraces the stud *e*, in one arm of which is pivoted a small angled lever *h*, the longer arm *i* of which extends outwardly parallel with the arm of the fork, the shorter arm *j* of which projects into the space between the arms of the fork and is capable of engaging the stud *e*. The arm *i* of the lever *h* is provided with a lug *k*, which projects into a corresponding recess in the inner face of the arm of the fork G. The outer end of the stud *e* has attached to or formed upon it a head *l*, for keeping the fork G in place in the head F. The sleeve *g* is grooved circumferentially to receive the fork *m*, projecting downwardly from the cam H. The cam H is attached to a sliding bar I, which moves in guides in the frame A. The cam H is provided with a cam-slot *n*, which extends for a short distance at right angles to the bar I, then forward at an angle of about forty-five degrees, then backward at about the same angle, when it is prolonged at right angles to the bar I in a plane parallel with and in front of the open end of the cam-slot. The said cam-slot is engaged by a roller *o*, journaled on a crank-pin projecting downwardly from the lower face of the mutilated bevel-wheel D, the said cam-



slot when engaged by the roller *o* serving to give the bar *I* and the sleeve *g* and parts connected therewith a forward movement, a pause, and a return movement. While the sleeve *g* and parts carried thereby moves out and in, the shaft *E* receives an intermittent rotary motion by the engagement of the pinion *c* with the teeth of the mutilated wheel *D*.

On the stud *p*, projecting from the base of the frame *A*, is pivoted a sector-shaped arm *q*, to which is attached an arm *r*, carrying at its free end a stud, upon which revolves the roller *s*. The arm *r* is drawn forward toward the periphery of the mutilated wheel *D* by a spiral spring *t*, connected with the arm *r* and with a fixed support. The edge of the wheel *D* is cut away, forming a cam *u*, which allows the arms *r* *q* to swing inwardly once during each revolution of the wheel *D*, afterward forcing the arm *r* outwardly. The arm *q* carries a chisel-shaped knife *v*, which, in conjunction with the standard *w*, serves to cut the twine that comes between the said standard and the knife. The arm *q* also carries a follower *x*, which projects beyond the edge of the knife and enters a mortise in the standard *w*, serving to clamp the twine by forcing it into the mortise before it is cut by the knife *v*.

To the base of the machine is attached a standard *a'*, and to the outer edge of the arm *q* is secured a spring-arm *b'*, which is capable of pressing against the standard *a'* as the arm *q* moves backward, thus clamping the twine and holding it with sufficient pressure for the purpose of tying a knot after it is released from the follower *x*. The bar *I* has an upwardly-turned end which extends through an opening in the arm *r* and over the arm *q* behind the standard *w*, the follower *x*, and the knife *v*, the said bar serving to push the twine downward between the follower *x* and the standard *w*.

In front of the twine cutting and clamping mechanism is secured a guide *c'*, which serves to guide the twine carried around the bundle by the needle.

The mechanism for receiving, holding, and separating the grain (shown in Fig. 1) is that belonging to the harvester known as the "Appleby" machine, and as it forms no part of my invention it will be unnecessary to enter into a detailed description of it here. The mechanism referred to is provided with a needle *d'*, which passes up through the grain-receiving apron or table *e'* of the machine and carries the twine from a reel around the bundle *f'* in the regular operation of the machine. The tying mechanism receives its motion from a wheel *g'*, mounted on the shaft *h'*, which is propelled by a suitable connection with the harvester. The wheel *g'* carries an arm *i'*, which in its revolution discharges the bundle from the machine.

The operation of my improved machine is as follows: The end of the twine being held between the follower *x* and the standard *w*, the needle *d'* being below the surface of the

table *e'*, as soon as the bundle of grain has accumulated upon the table the needle *d'* is made to swing upwardly, carrying the twine around the bundle *f'*, as indicated in Fig. 1, over the follower *x* and past the standard *w*, and between the spring-arm *b'* and the standard *a'*, the said arm being at this time removed from the standard. The roller *o* then moves the sleeve *g* forward, projecting the fork *G* beyond the stud *e*, embracing the two strands of twine, afterward bringing the shorter arm *j* of the angled lever *h* into engagement with the stud *e*, thus swinging the longer arm *i* of the said lever away from the arm of the fork *G*, to which it is pivoted, as shown in Fig. 11. Fig. 12 shows the head and fork after they have made a half-revolution. The mutilated wheel *D* continues to turn the fork *G*, while the engagement of the roller *o* with the cam *H* moves the fork forward. Simultaneously the roller *s* of the arm *r* slips off from the cam on the edge of the wheel *D* and withdraws the follower *x* from the standard *w*, and afterward closes the spring-arm *b'* against the standard *a'*, as shown in Fig. 13, thus clamping the two strands of the twine preparatory to their being grasped by the longer arm of the lever *h* within the lug *k* after the fork has made about three-fourths of a revolution and partially formed a knot, as shown in Fig. 13. The cam-roller *o*, by a continued engagement with the cam *H*, withdraws the sleeve *g*, and thus draws the fork *G* into the head *F*, at the same time closing the longer arm *i* of the lever *h* against the arm of the fork in which it is pivoted, and a further turning of the shaft *E* by the engagement of the mutilated wheel *D* with the pinion *c* completes the revolution of the fork *G*, after which the engagement of the roller *o* with the cam, as previously described, withdraws the fork from the knot and pulls the ends of the twine through the loop of the knot, as shown in Fig. 14. The withdrawal of the arm of the fork within the head *F* discharges the knot, and the tied bundle is released from the machine. When the fork has made a half-revolution, as in Fig. 12, the follower releases the end held and the auxiliary holder clamps both strands with a yielding pressure, so that the fingers in completing the revolution can draw the twine necessary to complete the knot from the holder side, which is about three-quarters of an inch. This movement of the twine through the auxiliary holder toward the fingers removes the end clamped by the main holder, so that it is not cut by the knife. It is by this peculiarity of my holder that I am able to save from six to twelve per cent. of twine over other knotters, they cutting both strands and dropping a piece. They use a movable holder to give the necessary slack for making the knot.

This improvement makes a movable holder unnecessary and allows the fingers to tie a knot without any hard strain on the twine.



My improved knot-tying mechanism can be applied to any harvester having a needle for carrying the twine around a bundle or to any machine to which such a needle can be applied.

5 Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In knot-tying mechanism, the combination of the shaft E, the head F, provided with  
10 a transverse stud *e*, the sliding sleeve *g*, the fork G, pivoted to the sliding sleeve and embracing the stud *e*, the angled lever *h*, pivoted to one arm of the fork and provided with the lug *k*, and means for turning the head and  
15 projecting and withdrawing the fork, substantially as specified.

2. In knot-tying mechanism, the combination of the shaft E, having the head F, provided with the stud *e*, furnished with the head  
20 *l*, the sliding sleeve *g*, the fork G, the angled lever *h*, pivoted in the said fork, the irregular pinion *c*, and the mutilated wheel B for imparting to the shaft E, head F, and parts car-

ried thereby an intermittent rotary motion, substantially as specified. 25

3. In knot-tying mechanism, the combination of the shaft E, having the head F, provided with the stud *e*, the sleeve *g*, the fork G, jaw *i*, the cam H, carrying the fork *m*, and the wheel D, furnished with the roller-crank *o*, arranged to engage the cam H, substantially as  
30 specified.

4. In knot-tying mechanism, the combination, with the knot-forming devices, of the spring *b'*, attached to the movable arm *q*, which  
35 carries one jaw of the main cord-holder, and the standard *a'*, arranged in the path of the spring for holding the ends of the twine, the said spring *b'* being adapted to close against the standard *a'* as the main cord-holder opens, 40 substantially as specified.

WILLIAM HENRY GASKILL.

Witnesses:

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HENRY H. FITCH.