

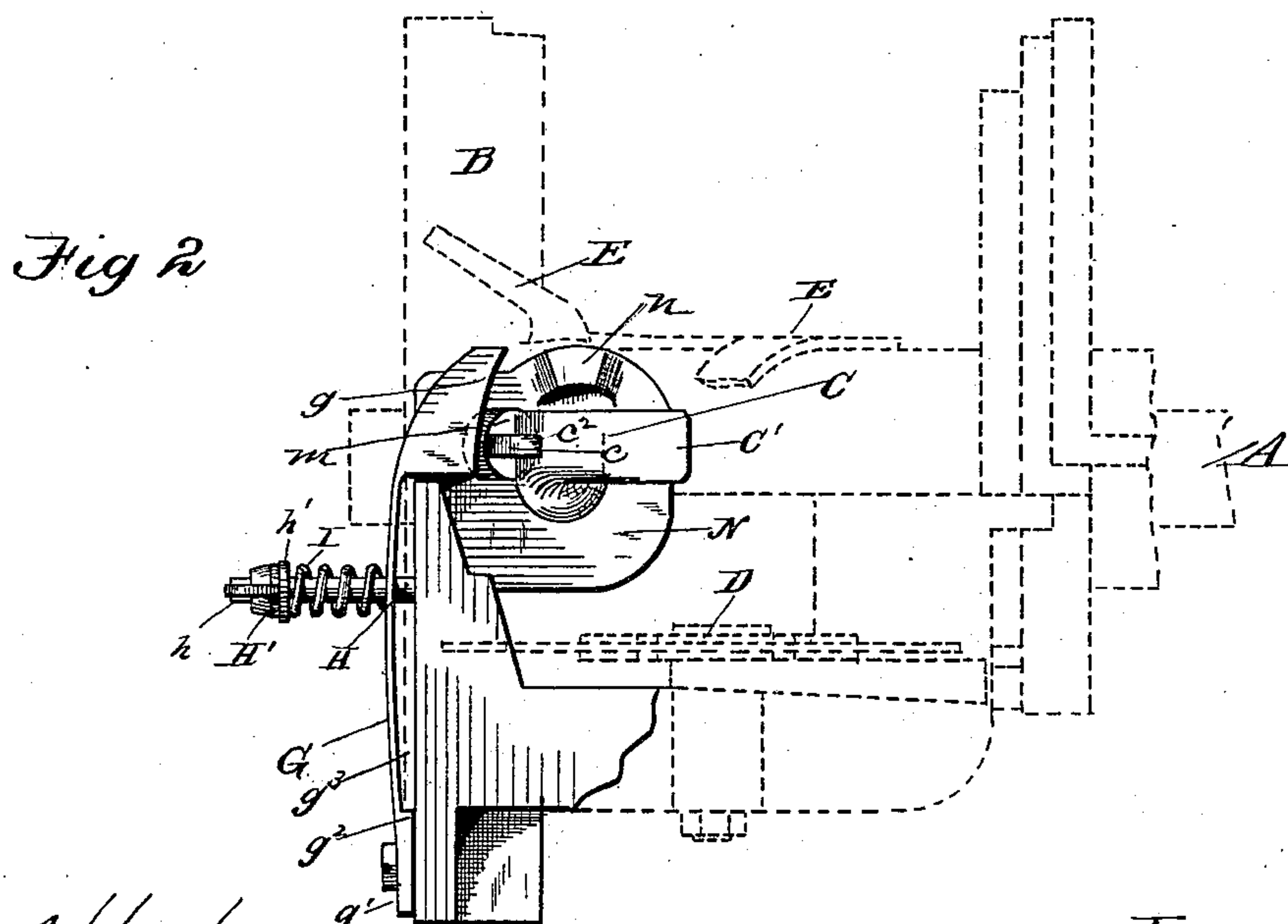
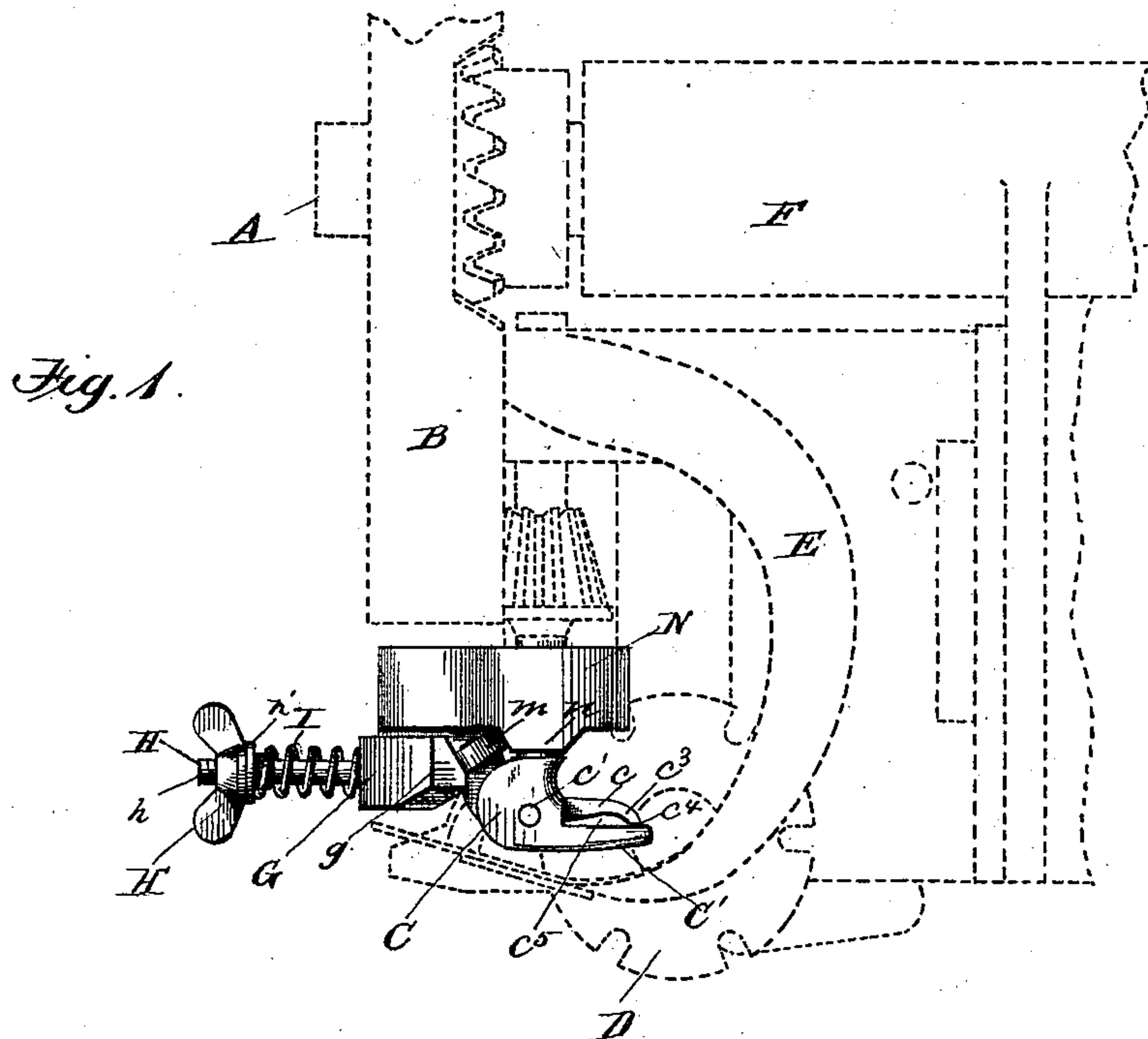
(No Model.)

2 Sheets—Sheet 1.

W. S. DAVEY.
TWINE BINDER.

No. 326;204.

Patented Sept. 15, 1885.



Attest:

W. H. Knight.

M. Bernhard

Inventor:

Windsor J. Davey
per Edwin P. Davis
Attorneys

(No Model.)

2 Sheets—Sheet 2.

W. S. DAVEY.

TWINE BINDER.

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Fig. 6.

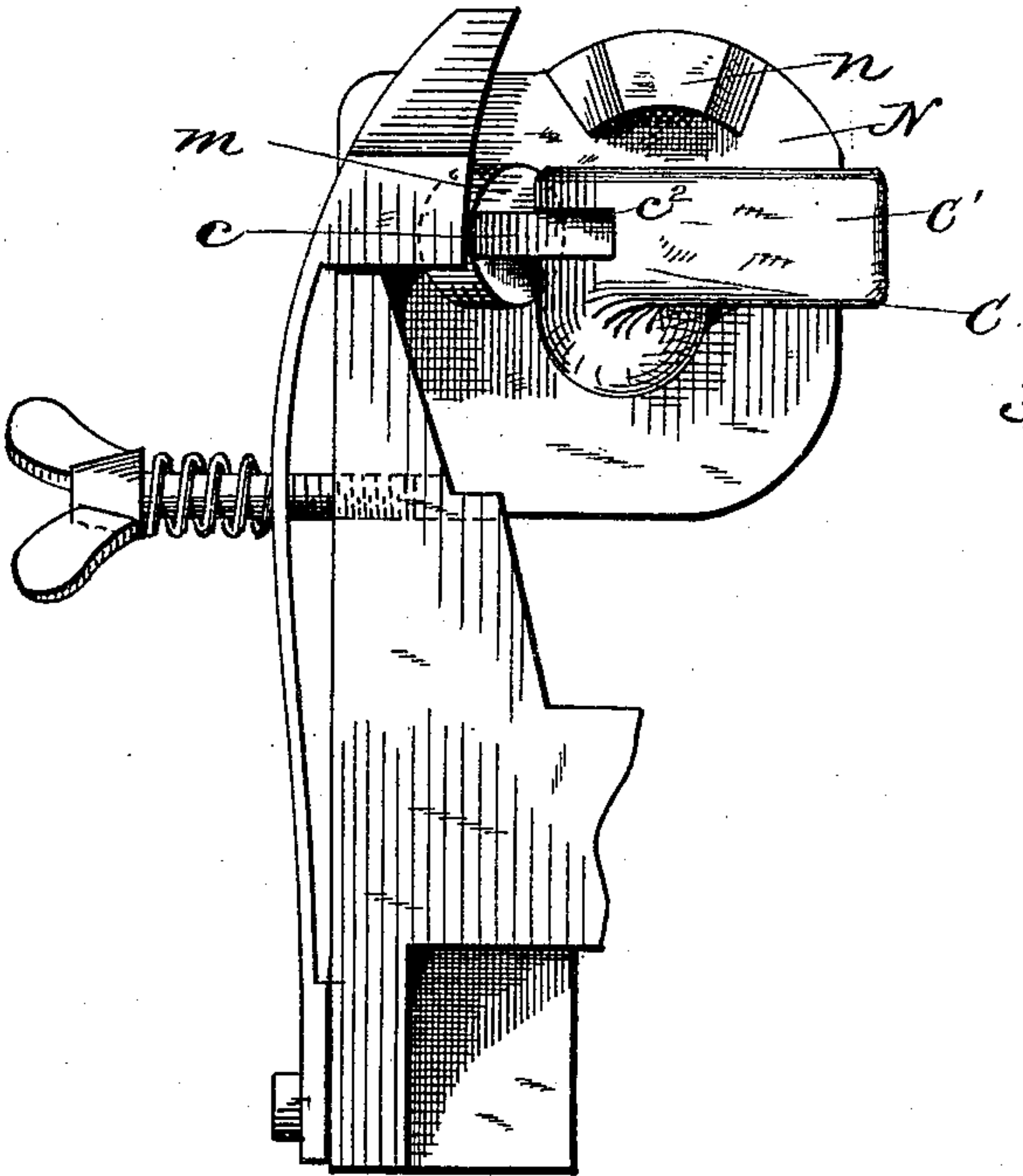
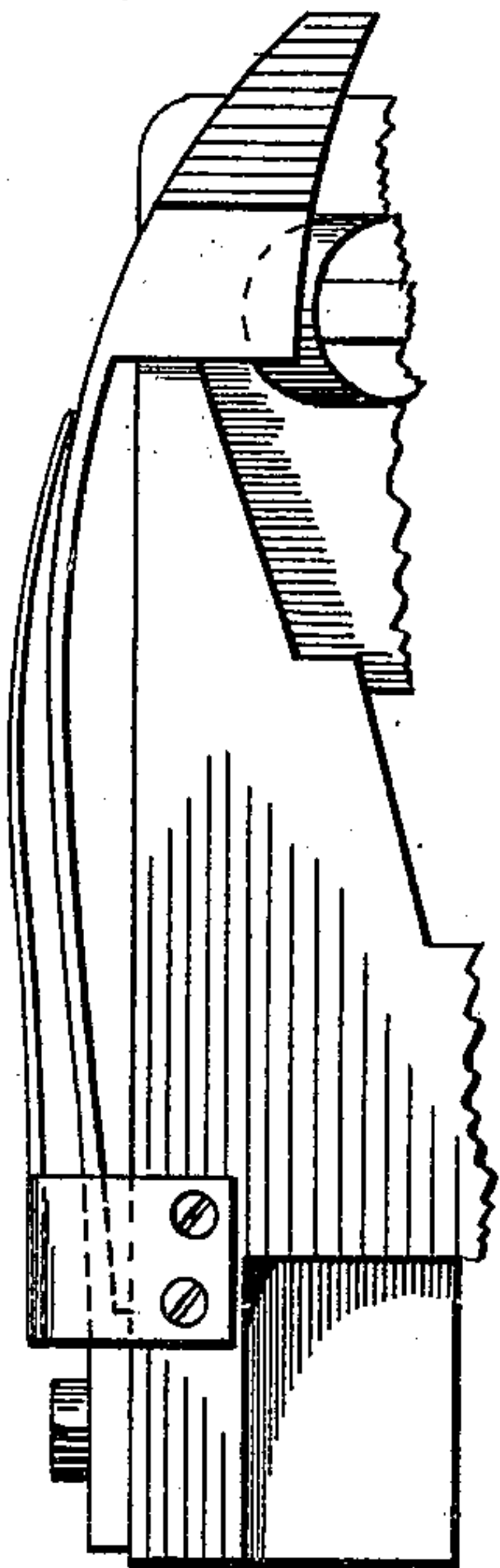


Fig. 5.

Fig. 3.

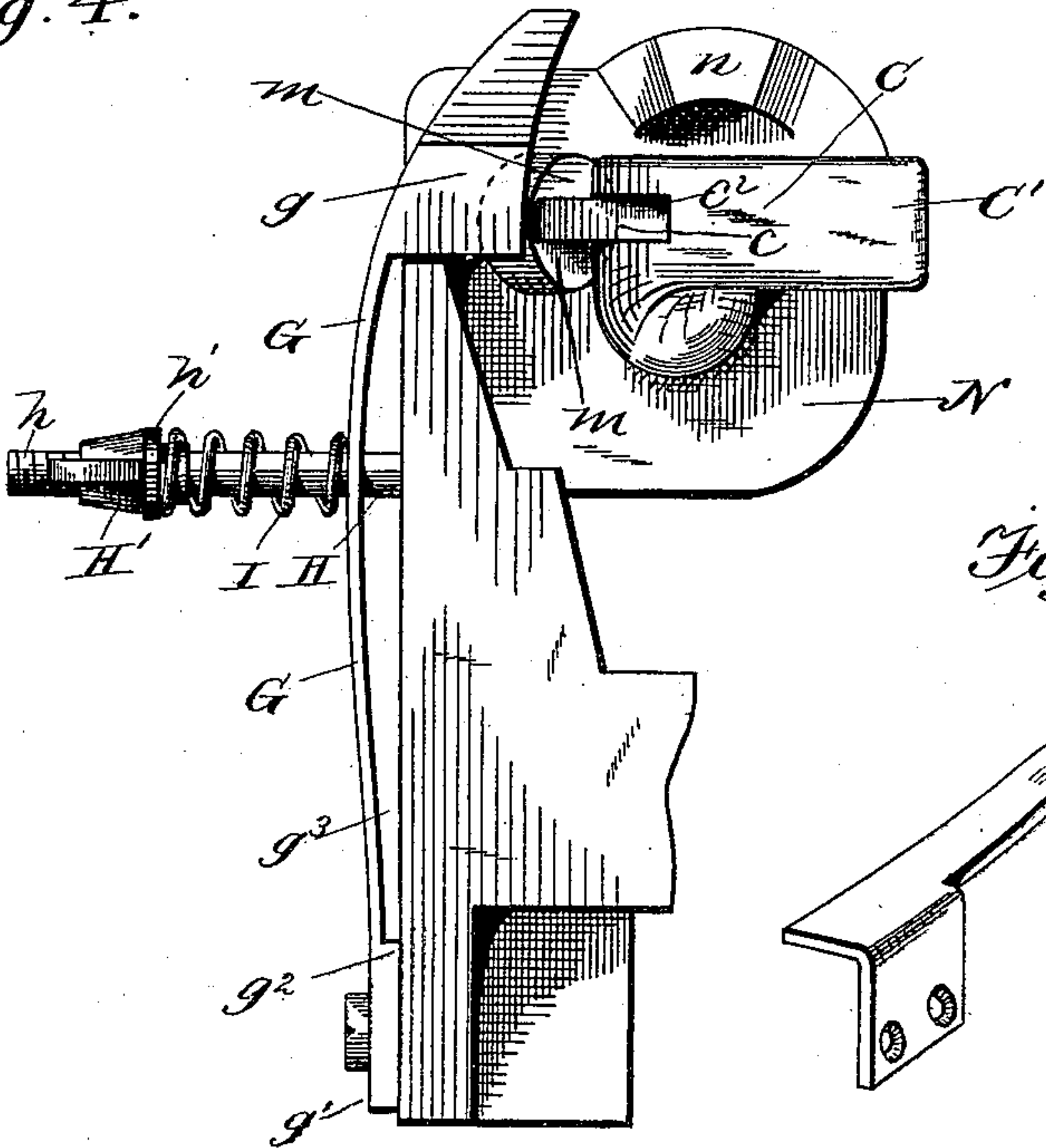
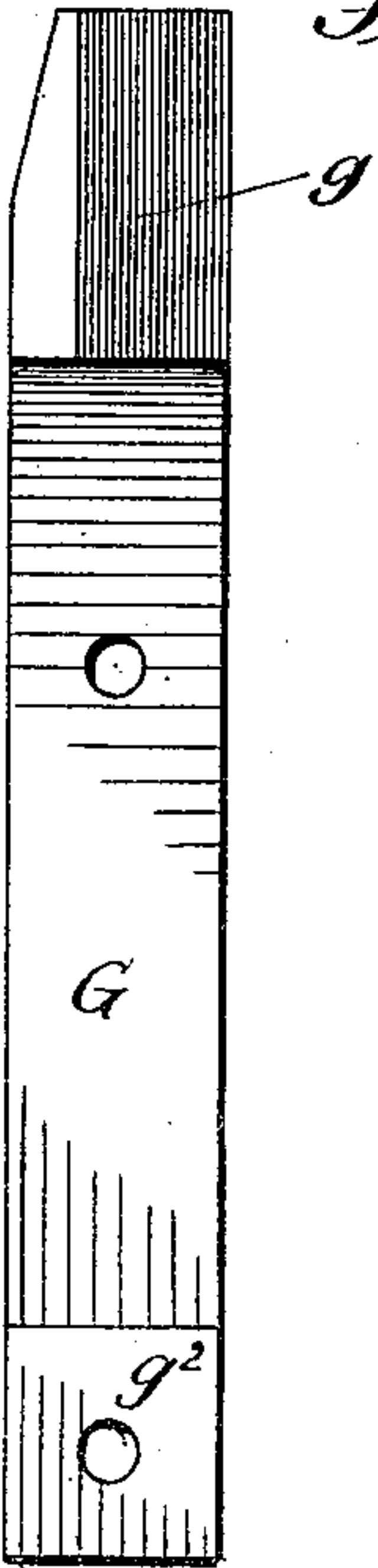
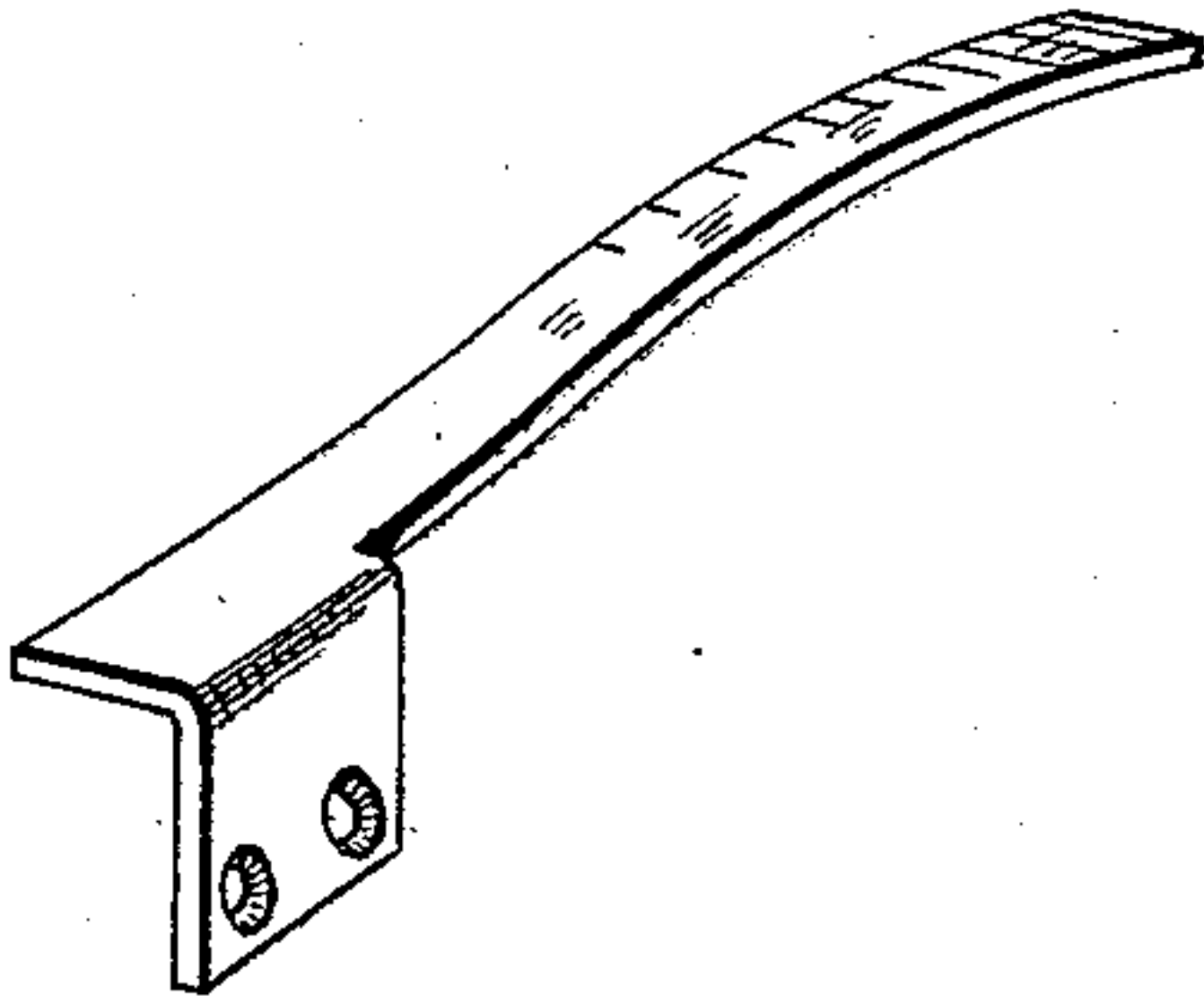


Fig. 7.



Attest.

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UNITED STATES PATENT OFFICE.

WINDSOR S. DAVEY, OF BELOIT, WISCONSIN, ASSIGNOR OF ONE-HALF TO
THE MONITOR WORKS, OF SAME PLACE.

TWINE BINDER.

SPECIFICATION forming part of Letters Patent No. 326,204, dated September 15, 1885.

Application filed December 15, 1883. (No model.)

To all whom it may concern:

Be it known that I, WINDSOR S. DAVEY, a citizen of the United States, residing at Beloit, in the county of Rock and State of Wisconsin, have invented certain new and useful Improvements in Twine-Binders; and I do declare the following to be a full and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being made to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to grain-binding harvesters of that class wherein the gavel of grain is bound by a cord or twine; but it relates more particularly to machines of the class named, wherein the tying of the cord after it has been passed about the gavel of grain is accomplished by a rotating tying bill or hook provided with a pivoted jaw having a friction-roller upon its rear end at the heel of the jaw, which, in conjunction with suitable cams, operates to open and close the jaws, and grasp the double strand of cord below the gavel before it is severed entirely from the cord upon the spool, and to grip and hold the ends of the cord after it has been severed from the cord upon the spool and while the knot is being tied, and to then draw the severed ends through the loop of the knot.

It is well known to those experienced in the art that the tension exerted by the grain in the gavel upon the loop or tying bill or hook is variable, and that it is very difficult to make said tying-hook operate at all times in a uniform manner, owing to such unequal degrees of tension of the cord, inasmuch as when the tension exerted by the gavel is greatest the loop is liable to slip off the hook without a knot being formed or tied, or when the tension is too light the cord is liable to twist and snarl upon said hook.

To obviate the above-named objections is the object of my invention; and to this end it consists in the means whereby the pressure of the cam used to close the pivoted jaw of the tying-hook is increased or lessened, as hereinafter described and claimed.

Like letters of reference denote like parts in the several figures.

Figure 1 represents a top plan view of my invention in place upon a grain-binding harvester. Fig. 2 represents a side elevation thereof. Fig. 3 represents an enlarged detail view of my invention applied to the rotating tying bill or hook of a harvester-binder. Fig. 4 represents a front elevation of the pressure-regulating spring detached from the machine. Figs. 5 and 6 represent views of modified forms of my invention, and Fig. 7 represents a perspective view of the supplemental leaf-spring employed in Fig. 6.

Referring to the drawings, in which, for the purpose of clearly showing the relation of my improvement to a grain-binding machine, I have shown such portions of the binder as are immediately connected with the knot-tying mechanism, such portions being shown in dotted lines to more clearly distinguish them from the portions to which my improvement is directly attached; in such dotted portions A represents the driving-shaft; B, the gear and cam wheel, which gives motion to the rotating tying bill or hook C and cord cutting and holding disk D. E represents the cord guide and stripper, and F the sleeve supporting the outer end of the main driving-shaft. So far as described, with the single exception of the rotating tyer C, the parts shown have no immediate connection with my improvement.

I will now proceed to describe my invention and its connection with the rotating tying bill or hook, together with the operation thereof.

C represents the tying-hook, provided with a jaw or finger, c , pivoted at c' in a slot or aperture, c^2 , formed in the bill or hook C. One end, c^3 , of the jaw c is turned up slightly at its point, said point c^3 bearing against the inner surface, c^4 , of the rigid jaw C' of the hook, as shown in Fig. 1. In the space c^5 between the jaws c and C' the cord is grasped and held while the knot is being tied. The outer end of the jaw c is provided with a small friction-wheel, m , that, when the tying bill or hook is rotated, takes against the stationary cam n , affixed to the face of one of the bearing-blocks N of the shaft of the tying-hook near the top of said block, as shown. The jaw c of the hook is opened by the cam n for the

reception of the cord or twine, and is again closed by a cam-block, *g*, affixed to the upper end of a spring, *G*, attached at its lower end to the frame, the lower end, *g'*, of said spring 5 being provided upon its inner face with a boss, *g''*, whereby a space, *g'''*, is insured between the body of the spring and the frame, to which it is attached. The space *g'''* serves to prevent straw from becoming entangled or 10 massed between the spring *G* and the frame, to which it is attached, thereby pressing said spring outward and its cam *g* away from the roller *m* of the pivoted jaw *c*.

H represents a stud or pin projecting outwardly from the frame through an aperture in the spring *G*, and is provided at its outer end with a screw-threaded portion, *h*, upon which a screw-threaded thumb-nut, *H'*, is placed.

20 *h'* represents a washer placed upon the pin *H* and bearing against the thumb nut *H'*.

I represents a spiral spring placed upon pin *H*, between the washer *h'* and the spring *G*, for the purpose of giving said spring any degree (within certain limits) of stiffness above 25 that imparted by its temper, and, through the cam-block and roller *m*, insure any desired amount of pressure upon the cord held in the space *c'* of the tying-hook while the knot is 30 being formed.

It will be understood by those skilled in the art to which my invention appertains that when the spring-pressed cam-block *g* bears upon the roller *m* the cord held in the 35 jaws of the tying-hook is severed from the cord upon the spool, and that the entire tension of the grain held in the gavel by the cord, whose ends are in the jaws of the tying-hook, operates to draw the ends of the cord from 40 the jaws of said hook, and that, therefore, the pressing of said jaws together must of necessity overcome the tendency of the cord to be drawn from the jaws of the hook by the strain exerted by the grain in the gavel.

45 It will also be observed that the pressure or tension of the grain in the gavel, as before described, is not at all times equal, and therefore the pressure of the jaw *c* should be in proportion to such pressure of the grain. 50 This I accomplish by the use of an auxiliary spring *I* and the thumb-nut *H'*, whereby greater or less tension may be imparted to said spring, as desired.

By employing a small boss, *g''*, upon the inner face of the spring, *I* am enabled to obviate this objection, inasmuch as I have found in practice that the straw will not lodge or become entangled behind a spring having such a boss.

60 In lieu of having a screw-threaded portion, *h*, of the bolt or pin *H* at the outer end thereof, as shown, such screw-threaded portion may be upon the inner end of said bolt or pin and take into a screw-threaded aperture 65 of the frame, in which case the outer end of

the pin may be provided with a thumb-screw head, or such outer end may be provided with a head adapted to be turned by a screw-driver.

The spiral spring *I* may also be dispensed 70 with, and in lieu thereof a leaf-spring attached to one end of the frame, having its free end bearing upon the main spring *G*, in which case the tension of such auxiliary spring would be increased or lessened by 75 means similar to that employed with the spring *I*.

Other changes than those above described may be made in the spring *G* and its auxiliary spring *I* without departing from the spirit 80 of my invention, inasmuch as said invention contemplates the provision of a second or auxiliary spring of any form and connected means, whereby the spring attached to the jaw-closing cam used in connection with ro- 85 tary tying-hooks may receive greater or less tension.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is— 90

1. In a grain-binding harvester, the combination of the friction-roller upon the heel of the movable jaw of the rotating tying-hook, a spring, *G*, secured at one end to the frame and provided at its opposite end with a cam- 95 block normally sustained in the path of said friction-roller, and a spring bearing against and adapted to limit the elasticity of said spring *G*, substantially as described.

2. In a grain-binding harvester, a spring, 100 *G*, attached at one end to the frame of the machine and provided at its opposite ends with a cam-block normally sustained in the track of the friction-roller upon the heel of the movable jaw of the rotating tying-hook, 105 in combination with an adjustable spring normally in contact with said spring *G*, to impart a greater or less degree of elasticity thereto, substantially as described.

3. In a grain-binding harvester, a compound 110 spring comprising a flat leaf-spring and a spiral spring in contact and properly supported, in combination with the friction-roller upon the heel of the movable jaw of the rotating tying-hook, substantially as described. 115

4. In a grain-binding harvester, the combination of the rotating tying-hook provided with a jaw or finger having a friction-roller mounted upon its heel end, a spring, *G*, provided at its lower end with a boss, *g''*, and at 120 its upper end with a cam-block, *g*, screw-threaded stud *H*, thumb-screw *H'*, washer *h'*, and spiral spring *I*, arranged and operating substantially as herein described.

In testimony whereof I affix my signature in 125 presence of two witnesses.

WINDSOR S. DAVEY.

Witnesses:

ALICE HEVENER,
J. E. HEVENER.