

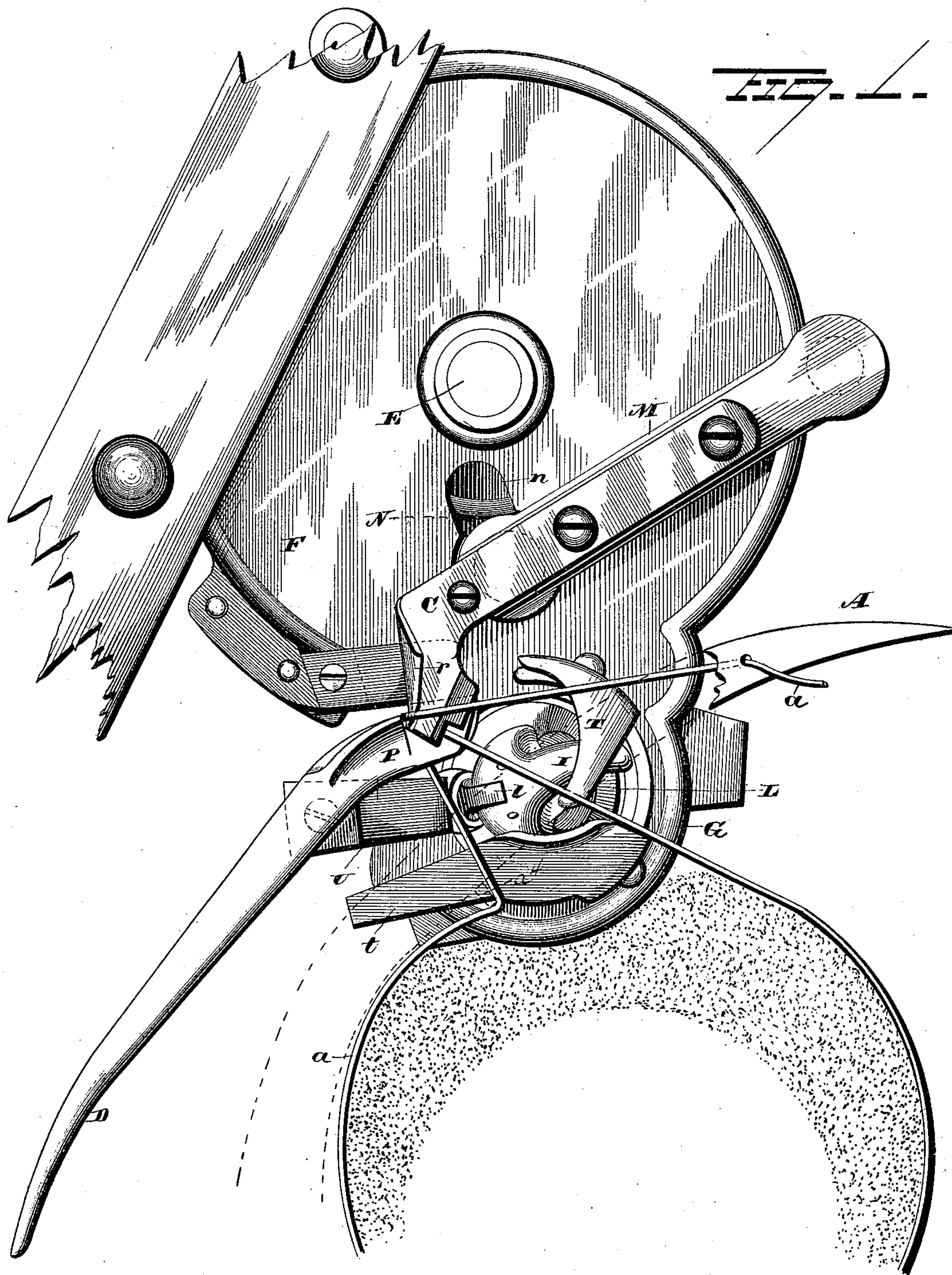
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6 Sheets—Sheet 1.

H. M. WEAVER.
SELF BINDING HARVESTER.

No. 338,808.

Patented Mar. 30, 1886.



WITNESSES

G. D. Nottingham,
Geo. F. Downing.

INVENTOR

Henry M. Weaver,
By H. A. Symonds,
ATTORNEY

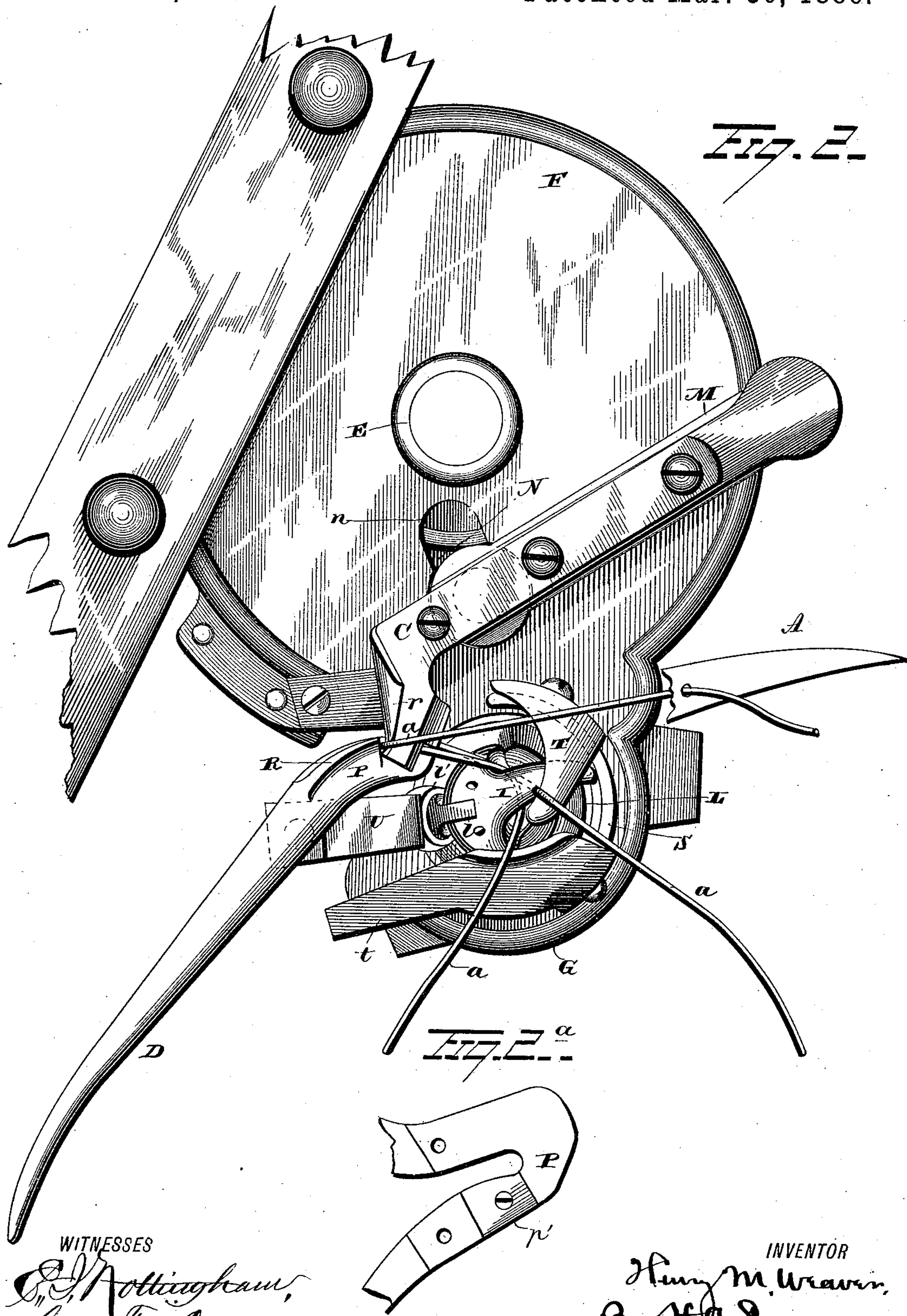
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WITNESSES

C. Nottingham,
Geo. F. Downing.

INVENTOR

Henry M. Weaver,
By H. A. Symons,
ATTORNEY

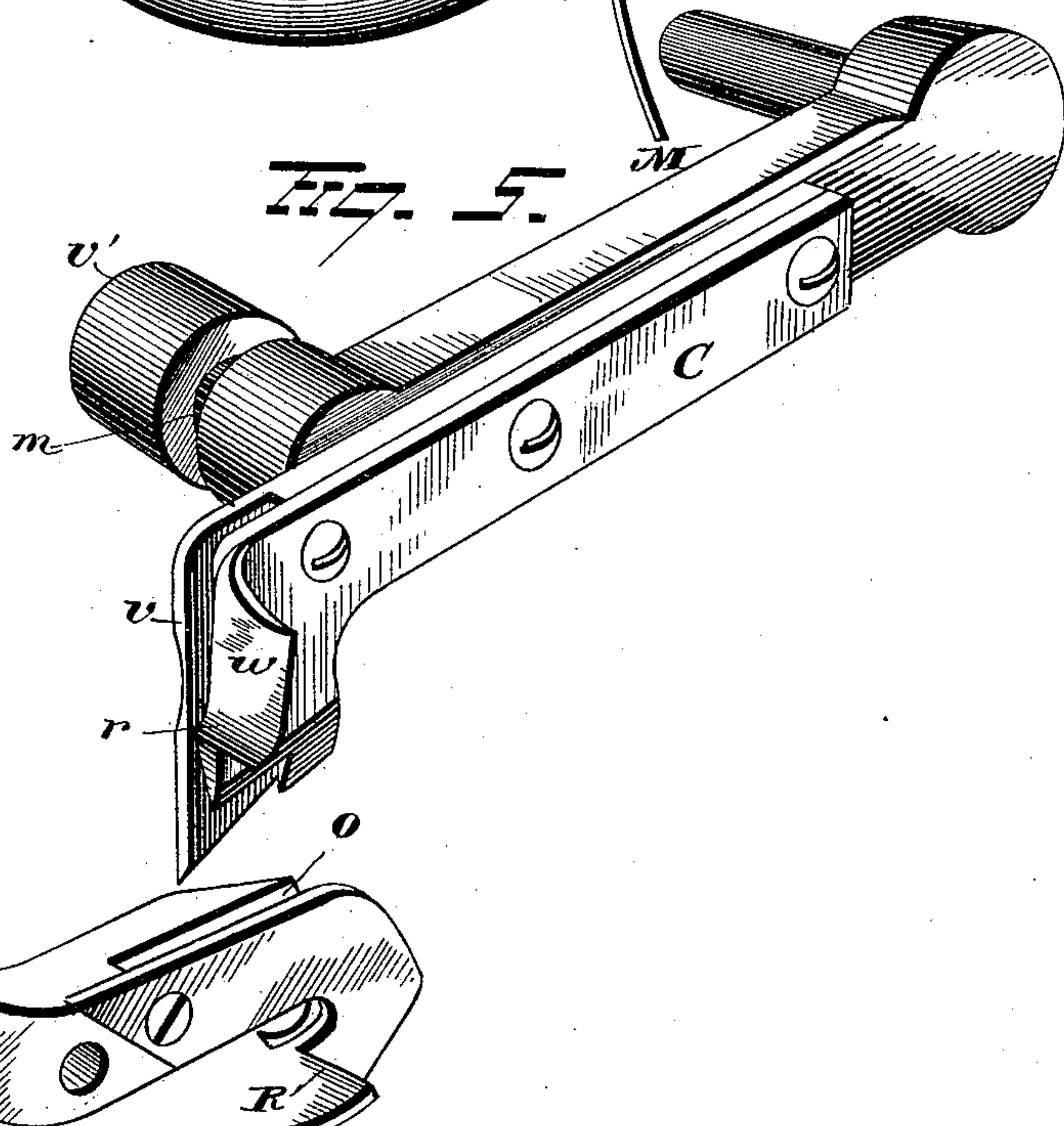
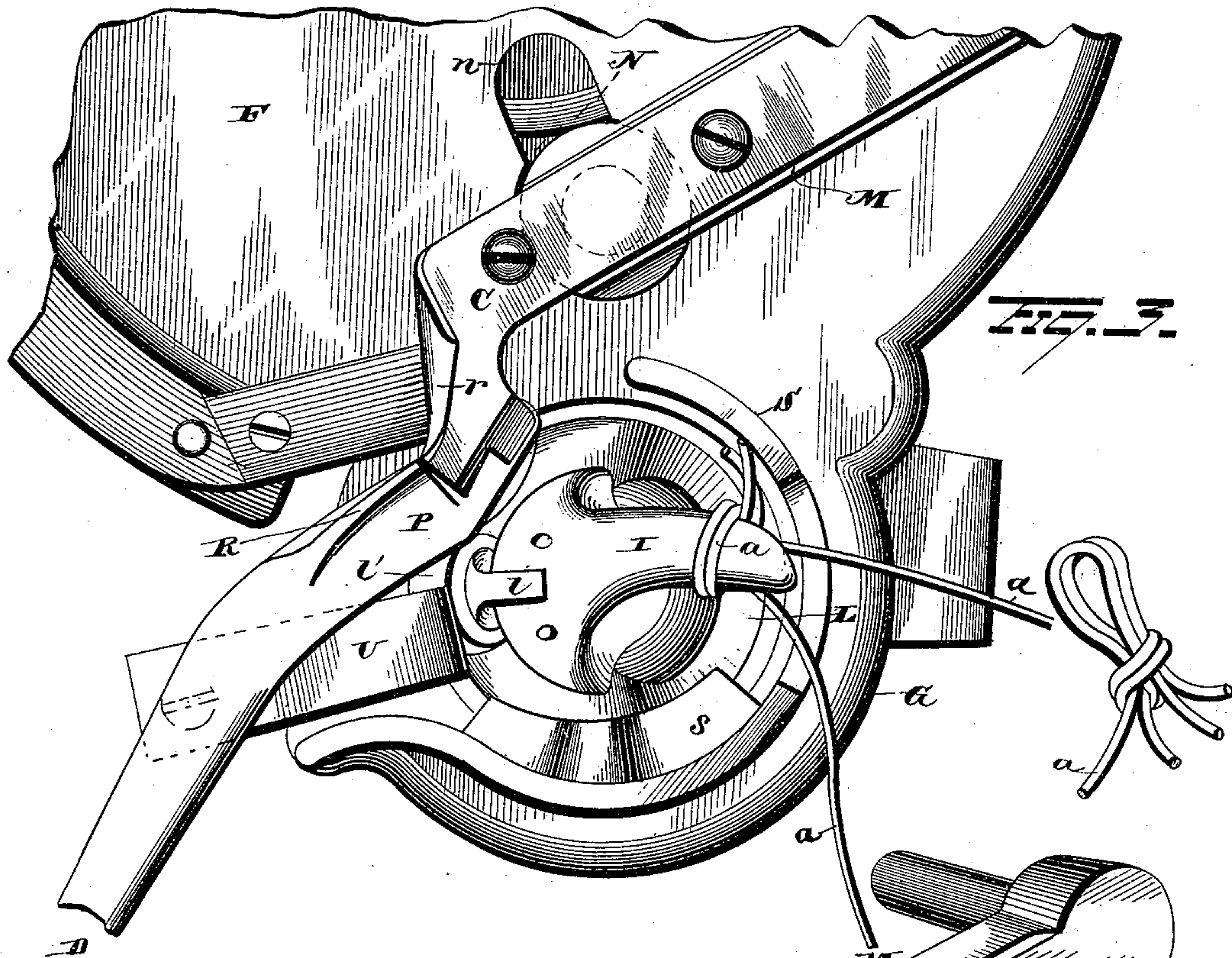
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WITNESSES

W. Nottingham
Geo F. Downing

INVENTOR

Henry M. Weaver
By H. A. Sugmon
ATTORNEY

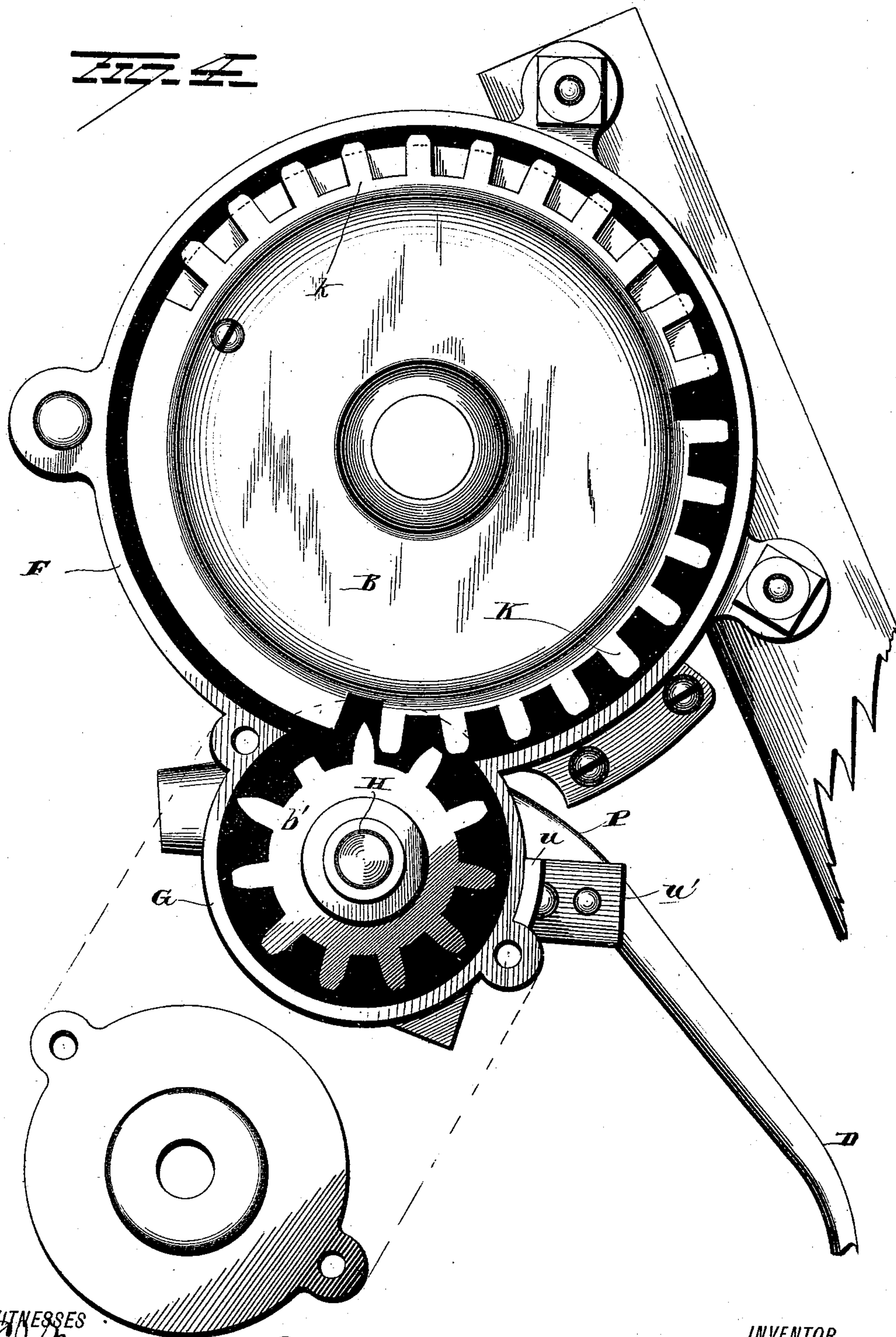
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WITNESSES

Wm. Nottingham,
Wm. F. Downing.

INVENTOR

Henry M. Weaver,
By H. A. Simpson
ATTORNEY

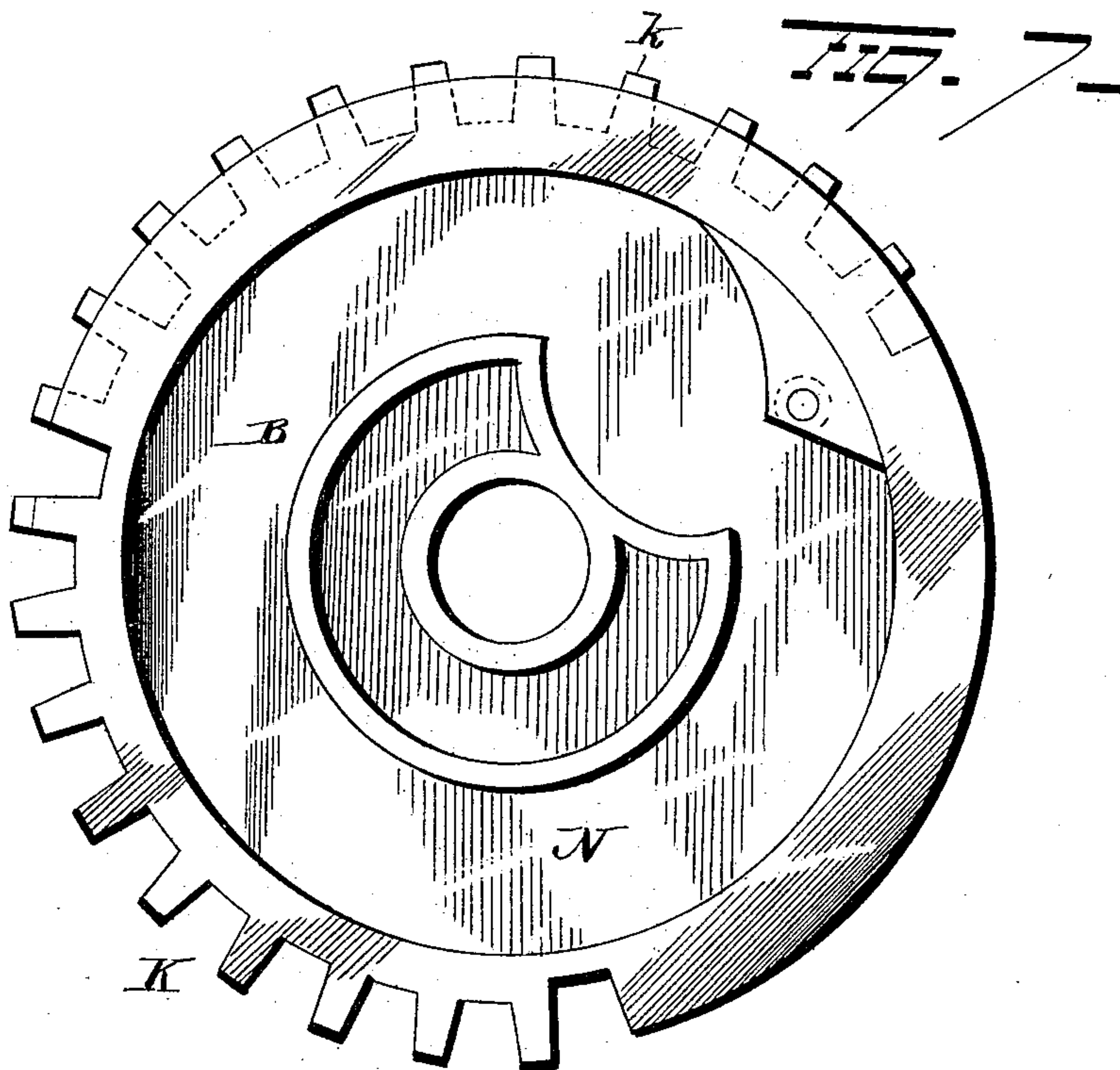
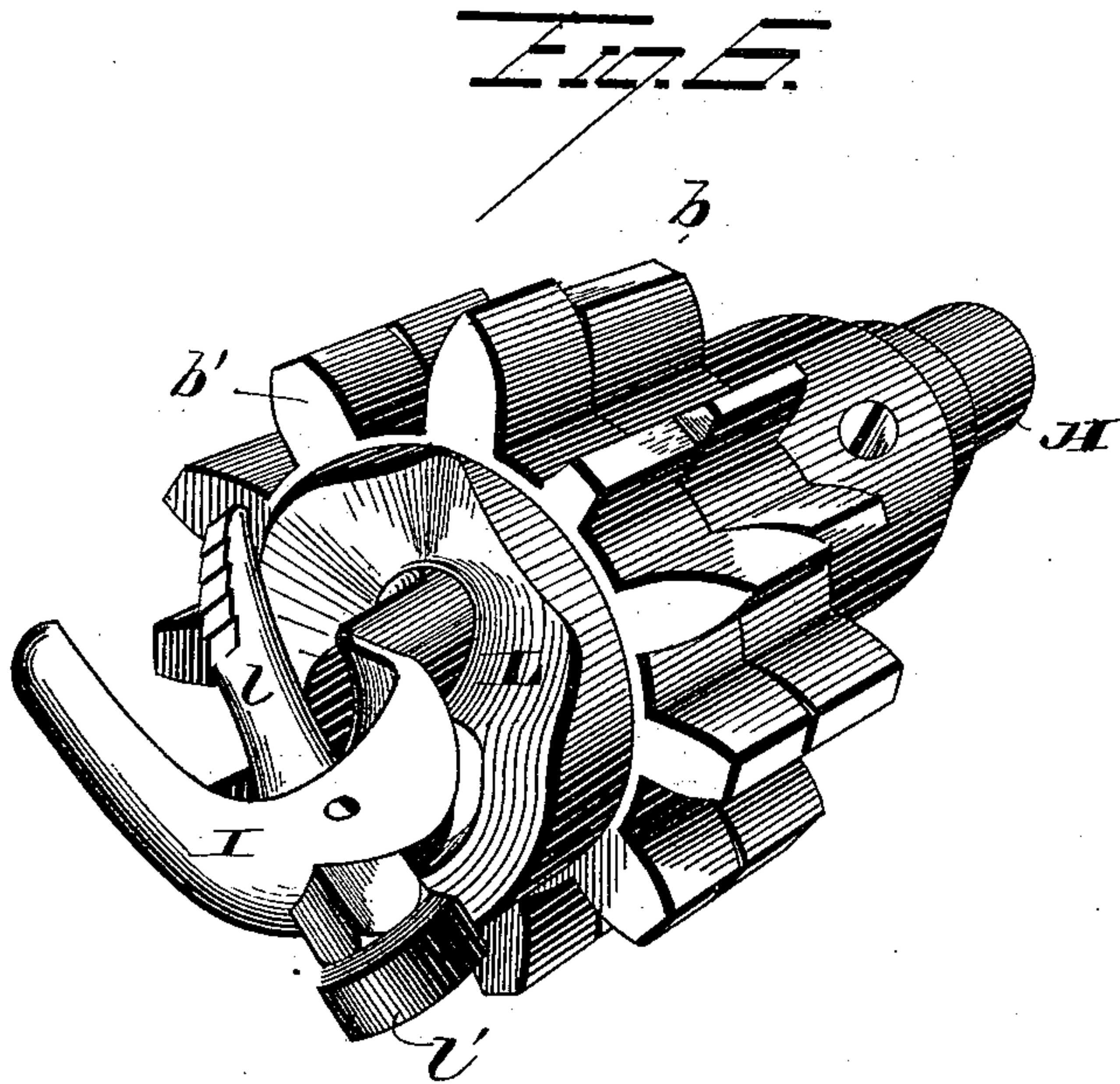
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WITNESSES

Ed. Nottingham,
Geo. A. Downing

INVENTOR

H. M. Weaver
By W. A. Simpson
ATTORNEY

(No Model.)

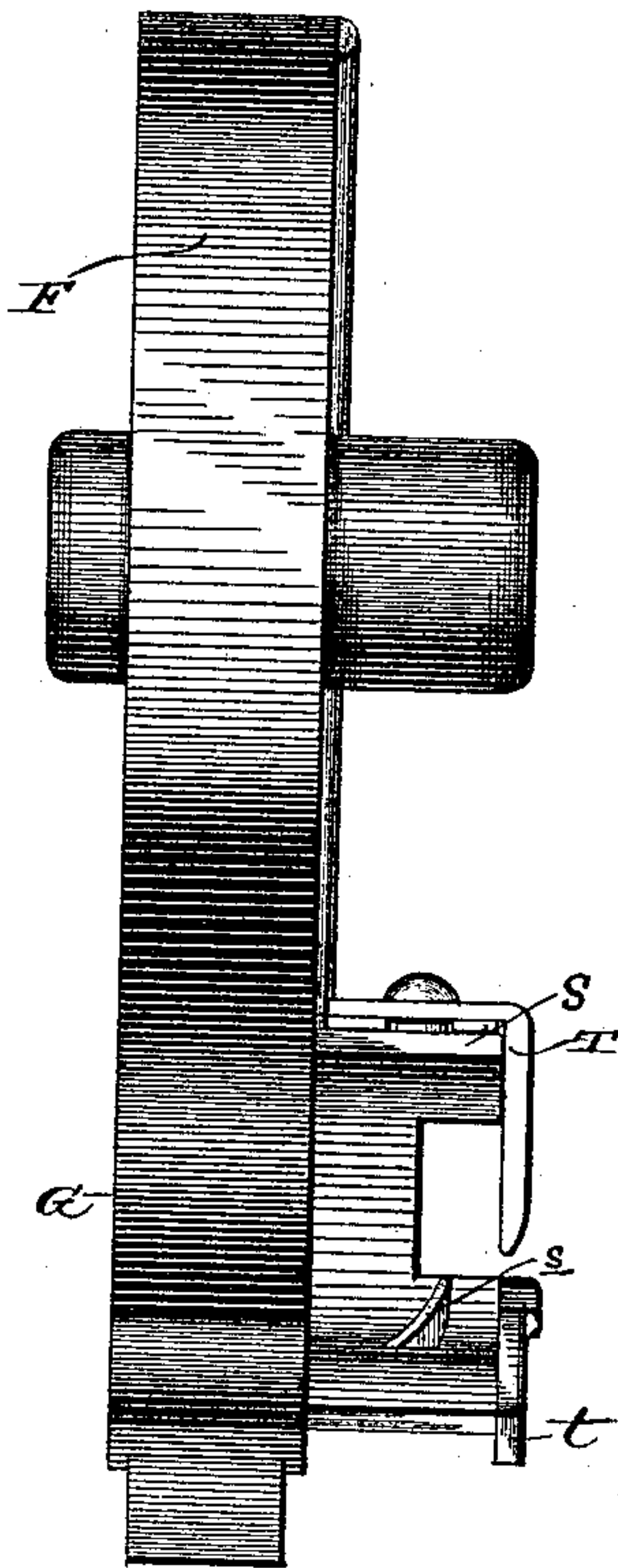
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Fig. 8.



WITNESSES

W. A. Nottingham
Geo. F. Downing

INVENTOR

Henry M. Weaver
By W. A. Cunningham
Attorney

UNITED STATES PATENT OFFICE.

HENRY M. WEAVER, OF MANSFIELD, OHIO.

SELF-BINDING HARVESTER.

SPECIFICATION forming part of Letters Patent No. 338,808, dated March 30, 1886.

Application filed June 23, 1884. Serial No. 135,797. (No model.)

To all whom it may concern:

Be it known that I, HENRY M. WEAVER, of Mansfield, in the county of Richland and State of Ohio, have invented certain new and useful
5 Improvements in Self-Binding Harvesters; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the
10 same.

My invention relates to an improvement in self-binding harvesters, and more particularly to the knot-tying mechanism connected therewith, the object of the same being to provide
15 simple, durable, and effective means for tying the knot and releasing the cord.

With these ends in view my invention consists in certain features of construction and combinations of parts, as will be hereinafter
20 described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view of the knotter in elevation, showing the position of cord and the tying mechanism just as the knotter is about to form the knot.
25 Fig. 2 shows the same after the knotter has completed one revolution. Fig. 2^a shows a modification of the hook P; Fig. 3, the same after the second revolution is about completed and the loop just being slipped over the
30 end of the jaws. Fig. 4 shows the gearing in elevation, the guard-caps or covering-plates being removed. Fig. 5 is a detached perspective view of the combined cord holder and cutter, in connection with the guide-finger.
35 Fig. 6 is a similar detached view of the knotter and cam gear which operates the movable jaw. Fig. 7 is a detached elevation of the knotter driving-gear; and Fig. 8 is a view in side elevation of the boxes F and G, showing
40 the relative arrangement of the guide T and flange t.

My improved knotter is particularly adapted to be used in connection with the hollow shaft and binder-arm for which Letters Patent No. 269,491 were granted me December
45 19, 1882; but may also be used in connection with machines where the well-known reciprocating cord-arm is employed.

A represents the point of the binder-arm, carrying the cord *a*. The binder-arm is secured on a shaft, (not shown,) and makes a

complete revolution for each gavel, carrying the binding-cord about the same and leading it within reach of the knotter and cord-holder, as will appear hereinafter.

The knot-tying mechanism consists, essentially, of a main driving gear-wheel, B, two gear-pinions, *b* and *b'*, on the knotter-shaft and in mesh with and driven by the wheel B and adapted to operate the knotter, a combined cutter and cord-holder, C, operated by a cam-groove on the main gear, and a guide-finger, D, in connection with the cord holder and cutter. The main gear-wheel B is rigidly secured to a shaft, E, journaled in suitable bearings at the center of a circular box, F, the latter being provided conveniently with perforated projections about its periphery, whereby it is rigidly secured to the binder-frame. The box F is further provided with an auxiliary lesser
55 box, G, preferably formed integral therewith, opening for a short distance into the box F, and having the knotter-shaft H journaled in its center, carrying the knotter I and its pinions *b* and *b'*, the knotter being arranged at right angles to the path of the binder-arm. A portion of the periphery, about one-third, of the wheel B is provided with cogs K, extending laterally entirely across the periphery. Another portion, also about one-third, is provided with cogs *k*, of similar pitch, but extending laterally only one half across the periphery, the other half of this third of the periphery being smooth, while the remaining portion of the periphery of the wheel is smooth.
65 The pinions *b* and *b'* are similar in size and construction, *b'*, the pinion nearest to the knotter-jaws, being mounted loosely on the knotter-shaft H, and the pinion *b* rigidly secured thereon. The pinions *b* and *b'* are situated contiguous to each other, and are each about one-half the width of the periphery of the wheel B. The pinion *b'* is provided with a cam sleeve or flange, L, on the side toward the knotter-jaws, and is adapted to engage one end of the movable jaw *l*, pivoted in the head of the knotter, and thereby cause the jaw *l* to open away from the rigid jaw. The heel end of the jaw *l* is conveniently provided with an anti-friction roller, *l'*, which bears against the cam.
75 80 85 90 95 100
Now, when the wheel B is rotated the first one-third revolution, the cogs K on the wheel B,

being at the point of engaging the pinions *b* and *b'*, will revolve the pinions simultaneously, and thereby cause the knotter to complete one revolution. The second one-third revolution, the half-cog portion *k* of the wheel B being now at the point of engaging the wheel *b*, and the rim on the same portion locking the pinion *b'* against rotation, will cause the knotter to make a second revolution, and, the pinion *b'* remaining stationary, will cause the heel end of the pivoted jaw *l* to follow the cam-flange on the side of the pinion *b'*, and thereby open the opposite end of said jaw from the fixed jaw. The final one-third revolution of the wheel B holds the pinions *b* and *b'* in contact with the smooth rim and prevents them from rotating. The latter one-third revolution of the wheel B, however, operates the cord holder and cutter C, as will be shown hereinafter.

An operating-arm, M, is pivoted at one end to the rim of the box F, the other end of the arm being provided with a laterally-extending stud, *m*, carrying an anti-friction roller, *v'*, which engages a cam-groove, N, on the side of the wheel B, the box F being provided with a slot, *n*, to admit the stud *m* and allow it the required play. To the outer or rear side of the arm M the combined cutter and cord-holder C is rigidly secured by screws or other convenient devices. The cutter-blade *v* and cord-holder jaw *w* are similar in general shape, each consisting of a flat bar of metal having a downwardly-projecting portion at the end. These bars are provided with corresponding perforations, through which they are secured to the arm M, and their cutting and grasping ends, respectively, are a short distance apart, thereby allowing the cutter-blade to pass down through a narrow vertical slot, O, in the shank of the guide-hook P, of which the finger D is a continuation, while the cord-holder jaw passes down on the outside of the shank of said hook P. The cutting-edge of the cutter-blade *v* is oblique and beveled, the sharp or extreme lower portion of said cutting-edge being next to the side of the slot O toward the gear-wheel M. Thus as the cutter-blade descends the cord will be severed with a shearing cut by the sharp edge and clamped between the cutter-blade and the edge of the slot.

The parts *v* and *w* may be designated as the movable parts of the cutter and cord-holder, respectively, while the edges of the slot O in the shank of the hook P form the stationary parts of the cutter and holder. The hook P may be cut away at the edge of the slot O to receive a detachable sharp-edged section, *p'*, as shown in Fig. 2^a, which admits of being removed and replaced by a new section in case of wear.

The shank of the hook P is secured to the edge of the box F in the position, as shown, the point of the hook extending obliquely downward and forming the before-mentioned guide-finger D.

The hook P is provided with a flange, R,

shaped as shown, and the cord-holder jaw with a laterally-extending flange, *r*, the former to guide the cord as the latter is carried up in contact with the side of the cord-guiding arm outwardly to the edge of the flange *r*, and the latter to hold the cord out of the course of the knotter until the knot is formed.

The box G is provided with a laterally-extending irregular-shaped flange, S, the lower portion of which is provided with a cam projection, *s*, on its inner or concave surface, upon the outer face of which cam the heel end of the pivoted jaw *l* rides as it makes the last half of its revolution, and causes the jaw *l* to tightly grasp the cord and hold the same until the loop is drawn over the end of the jaws. Just, however, as the pivoted jaw is leaving the cam projection *s*, and just at the time when the pinion *b*, and hence the knotter, has completed its second revolution and the bundle is being ejected, the heel end of the jaw *l* engages under a spring-cam, U, the end of which abuts near the end of the cam projection *s*, and operates to close the jaws with a yielding pressure, which admits of the ends of the cord being released by the weight of the bundle, or by the force of the ejector, or by both combined.

The spring-cam U may be secured to the edge of the box G in any convenient manner—for example, by means of a plate, *u*, fitted transversely to the face of the box and provided with an outwardly-extending lip, *u'*, to the face of which lip the spring-cam U is bolted. To the flange S, in close proximity to and outside of the knotter, are also secured the inwardly-inclined depending prong or arm T and the oppositely-arranged inwardly-extending flange *t*, the former to prevent the cord from slipping off from the point of the jaws during the second revolution of the knotter, and the latter to guide the cord as the latter is carried up by the binder-arm onto the arm T and allow the jaws of the knotter while the latter is making the first half of the first revolution to pass beneath it. By the use of the arm T and flange-guide *t*, I am enabled to construct the jaws much straighter than heretofore, and yet keep the cord from liability to slip off the jaws while the loop is being formed. This is plainly shown in Fig. 2. The cord passing over the arm T and under the jaws, makes a short turn, and renders it next to impossible for the cord to slip from the jaws until it has been grasped.

The operation of the knot-tyer as a whole is as follows: Suppose the end of the cord to be held clamped between the cord-holder jaw *w* and hook P, thence leading through the eye of the binder-arm and through the hollow shaft on which the binder-arm is secured to the cord-box. When a sufficient amount of grain has gathered in the receptacle to form a gavel, the binder-arm carries the cord about the gavel, in the manner fully described in Letters Patent No. 269,491, above referred to, passing sufficiently near the end of the finger D to slip

the cord under the finger. As the end of the binder-arm slips the cord up along the finger D to the fork or juncture of the two arms of the hook a notch or properly-placed hook, a^4 , on the binder-arm (represented in Fig. 1) carries that portion of the cord lying below the finger D up to a position within reach of the knotter, and when the binder-arm has completed its revolution the several parts of the cord will occupy the positions represented in Fig. 1. The main gear-wheel B now revolves the first one-third revolution, and rotates the knotter once, so as to get the cord in behind the jaws, as shown in Fig. 2, preparatory to forming the loop. The second one-third revolution of the wheel B rotates the knotter a second time, forming the loop, and causing the jaw l to open and grasp the two strands of the cord extending to the holder in the manner explained hereinbefore. The final one-third revolution of the wheel B, by means of the cam-groove in contact with the stud on the arm M, lifts the cutter and cord-holder jaws, thus releasing the held end of the cord and allowing the cord around the finger D to slip into the fork of the hook, and causing the arm M to return to its depressed condition, thereby severing the part leading beneath the finger D and thence to the knotter, and holding the end leading over the finger and thence to the eye of the binder-arm. The ejector at this moment throws the bundle outwardly and draws the loop over the end of the knotter-jaws, while ends of the cord are held tightly between the movable and rigid jaws of the knotter, thus forming the knot, and finally withdrawing the ends from the jaws and allowing the bundle to fall. The cord is now held in a position similar to that which was assumed at the beginning of the operation, and the same operation is repeated when sufficient grain has gathered in the receptacle to form another gavel.

It is evident that slight changes may be made in many of the parts above described, both in their form and construction, without departing from the spirit and scope of my invention; hence I do not wish to limit myself strictly to the construction herein set forth; but,

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

1. The combination, with a rotary binder-arm and a knotter arranged at right angles to the path of the binder-arm, of a cord holder and cutter consisting, essentially, of stationary and movable sections or jaws, and a tapering finger forming a continuation of said stationary section or jaw and adapted to catch under the cord as the latter is carried up by the binder-arm and deflect it laterally into the jaws of the holder, substantially as set forth.

2. The combination, with a binder-arm and a knotter, of a cord holder and cutter consisting, essentially, of a stationary guide-hook, slotted as described, and a movable portion,

and a tapering finger forming a continuation of the guide-hook.

3. The combination, with a binder-arm and a cord-knotter arranged at right angles to the path of the binder-arm, of a cord holder and cutter consisting, essentially, of a stationary section, slotted as described, and provided with a cord catching and deflecting hook, a movable cutter-section adapted to enter the slot in the stationary section, and a movable cord-holding jaw adapted to engage the stationary section, the movable cutter and holder jaws or sections being rigidly secured together, substantially as set forth.

4. The combination, with a knotter, of a cord-holder consisting, essentially, of a stationary section having a cord catching and deflecting hook, and a movable portion, the latter provided with a laterally-extending flange adapted to hold the cord leading from the holder to the binder-arm out of the reach of the tying-bill.

5. In a tying mechanism for grain-binders, the combination, with a cord-holder consisting, essentially, of a stationary section having a cord catching and deflecting hook and provided with a laterally-projecting flange, and a movable section having a laterally-projecting flange registering with the flange on the stationary section, of a knotter located adjacent to the cord-holder, substantially as set forth.

6. The combination, with a knotter-shaft, of a cam loosely encircling said shaft, and devices, substantially as described, for first rotating the cam and shaft simultaneously, and, secondly, rotating the shaft and locking the cam.

7. The combination, with a knotter-shaft having a tying-jaw rigidly secured thereto, a movable jaw provided at its inner end with an anti-friction roller, and a cam loosely encircling said shaft, of devices, substantially as described, for first rotating the cam and the shaft, and, secondly, locking the cam, substantially as set forth.

8. The combination, with a knotter-shaft and two pinions of similar construction secured thereon, one rigidly and the other loosely, of the movable jaw of the knotter adapted to engage a cam-flange on the loose pinion, and a gear-wheel for engaging the pinions, thereby rotating the knotter and operating the jaw, substantially as set forth.

9. The combination, with a knotter-shaft provided with two pinions of similar construction, one rigidly and the other loosely mounted thereon, of the movable jaw of the knotter operated by a cam on the loose pinion, and a gear-wheel adapted to first turn both pinions simultaneously, and, secondly, turn the fixed pinion and the knotter-shaft and lock the loose cam-pinion against rotation, substantially as set forth.

10. The combination, with a knotter-shaft provided with two pinions, one rigidly and the

other loosely secured thereon, of the movable jaw of the knotter pivoted thereto and operated by a cam-flange on one of the pinions, and a driving-wheel adapted to first rotate both pinions simultaneously, secondly, to lock the loose one and rotate the fixed one and the knotter-shaft, and, thirdly, to lock both, substantially as set forth.

11. The combination, with a binder-arm and a knotter, of a rigid cord-guide partially overlying the knotter, and an outwardly-extending flange located outside of the knotter and in close relation to the guide, substantially as and for the purpose set forth.

12. The combination, with a rotary knotter adapted to have two revolutions to tie the knot, of a rigid inwardly-inclined cord-guide partially overlying the knotter, and constructed to hold the cord out of the reach of the knotter during the first part of its first revolution, and to prevent the cord from slipping off the ends of the jaws as the latter pass under the guide during the latter part of the first revolution and the commencement of the second revolution, substantially as set forth.

13. In tying mechanism for grain-binders, the combination, with a knotter-shaft carrying a stationary and a pivoted jaw, a sleeve surrounding said shaft and having a cam adapted to be engaged by the inner end of the pivoted jaw, and devices for rotating said cam-sleeve, of a stationary cam-flange for holding the pivoted jaw in a closed position, and the yielding spring-cam for yieldingly holding the pivoted jaw in a closed position, substantially as set forth.

14. The combination, with a knotter-shaft

having a rigid jaw and a pivoted jaw, of the flange S, partially surrounding the knotter and having a cam thereon for holding the jaws in closed adjustment.

15. The combination, with a knotter-shaft having a rigid jaw and a pivoted jaw, of the flange S, partially surrounding the knotter and having a cam thereon for holding the jaws in closed adjustment, and the yielding spring-cam U, forming a continuation of said flange, substantially as set forth.

16. The combination, with a knotter-shaft having a rigid jaw and a pivoted jaw, a sleeve encircling said shaft and provided with a cam, and gearing, substantially as described, for operating said shaft and sleeve, of the flange S, partially surrounding the knotter and having a cam thereon, all of the above parts combined and operating substantially as described.

17. The combination, with a knotter-shaft having a rigid jaw and a pivoted jaw, a sleeve encircling said shaft and provided with a cam, and gearing, substantially as described, for rotating the shaft and sleeve, of the flange S, partially surrounding the knotter and having a cam thereon, and the yielding spring-cam U, forming a continuation of said flange, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

HENRY M. WEAVER.

Witnesses:

E. G. STOKES,
CHAS. KENNEDY.