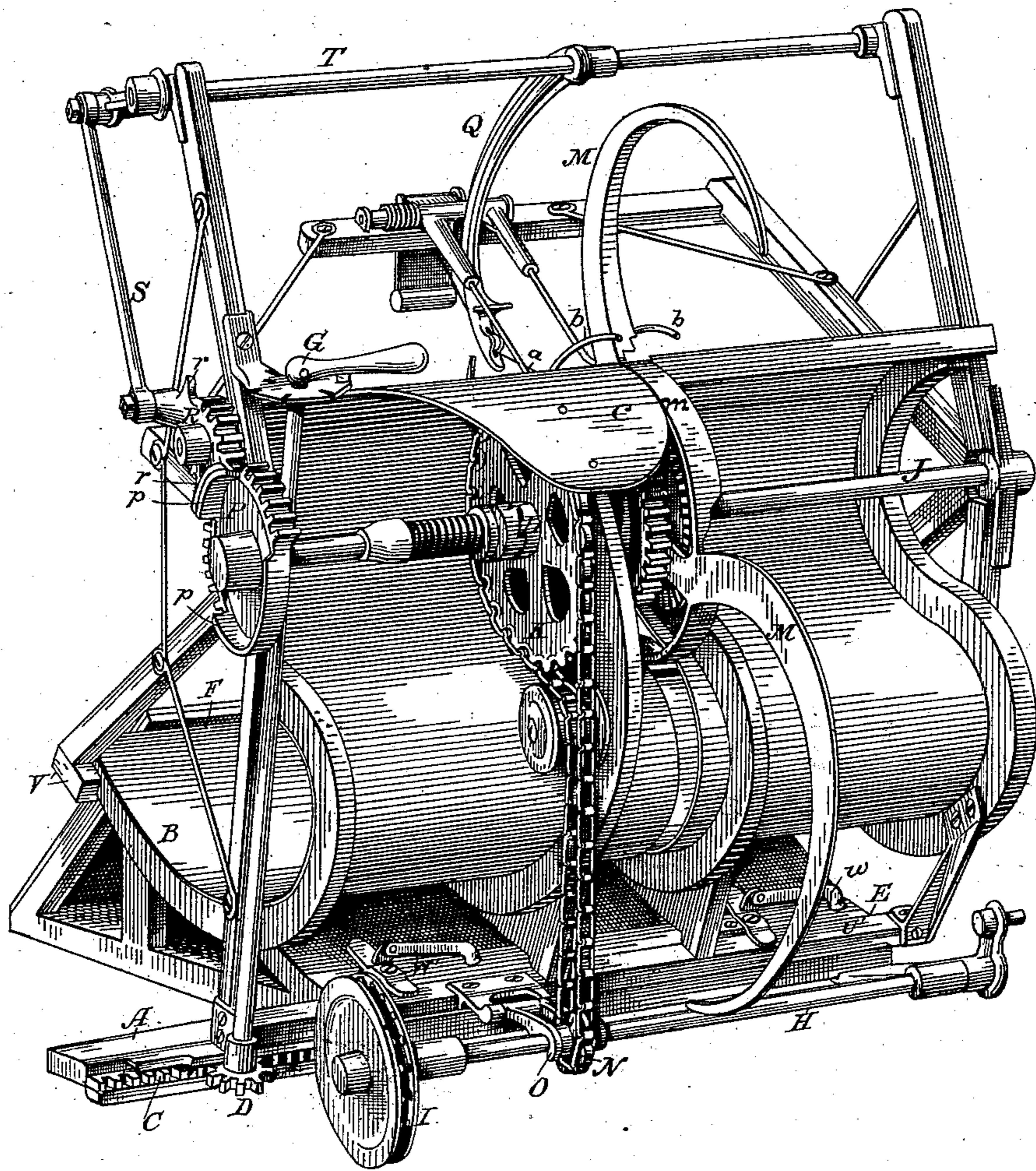


S. D. LOCKE.
Grain-Binder.

No. 222,060.

Patented Nov. 25, 1879.

Fig. 1.



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Fig. 2.

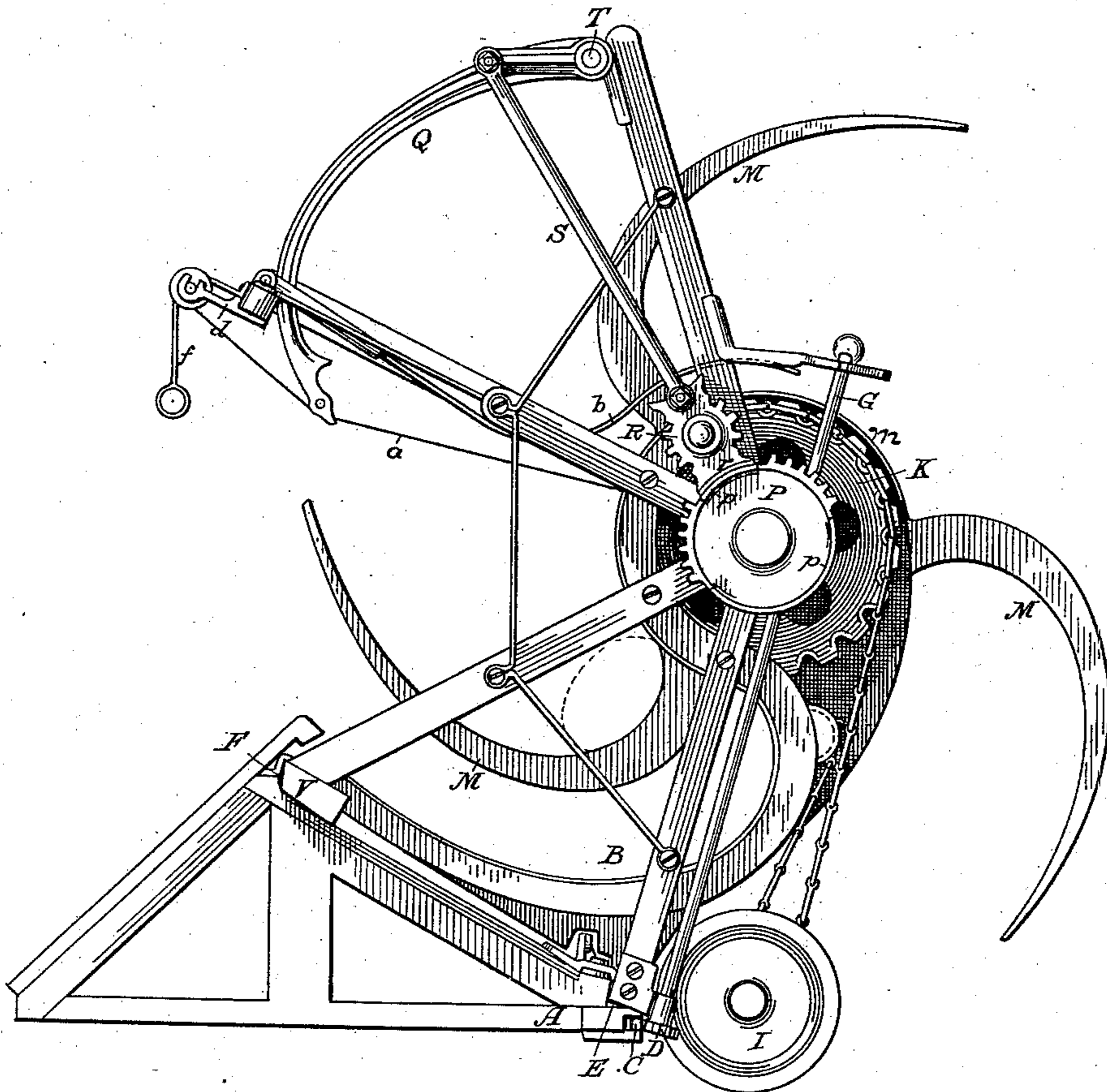
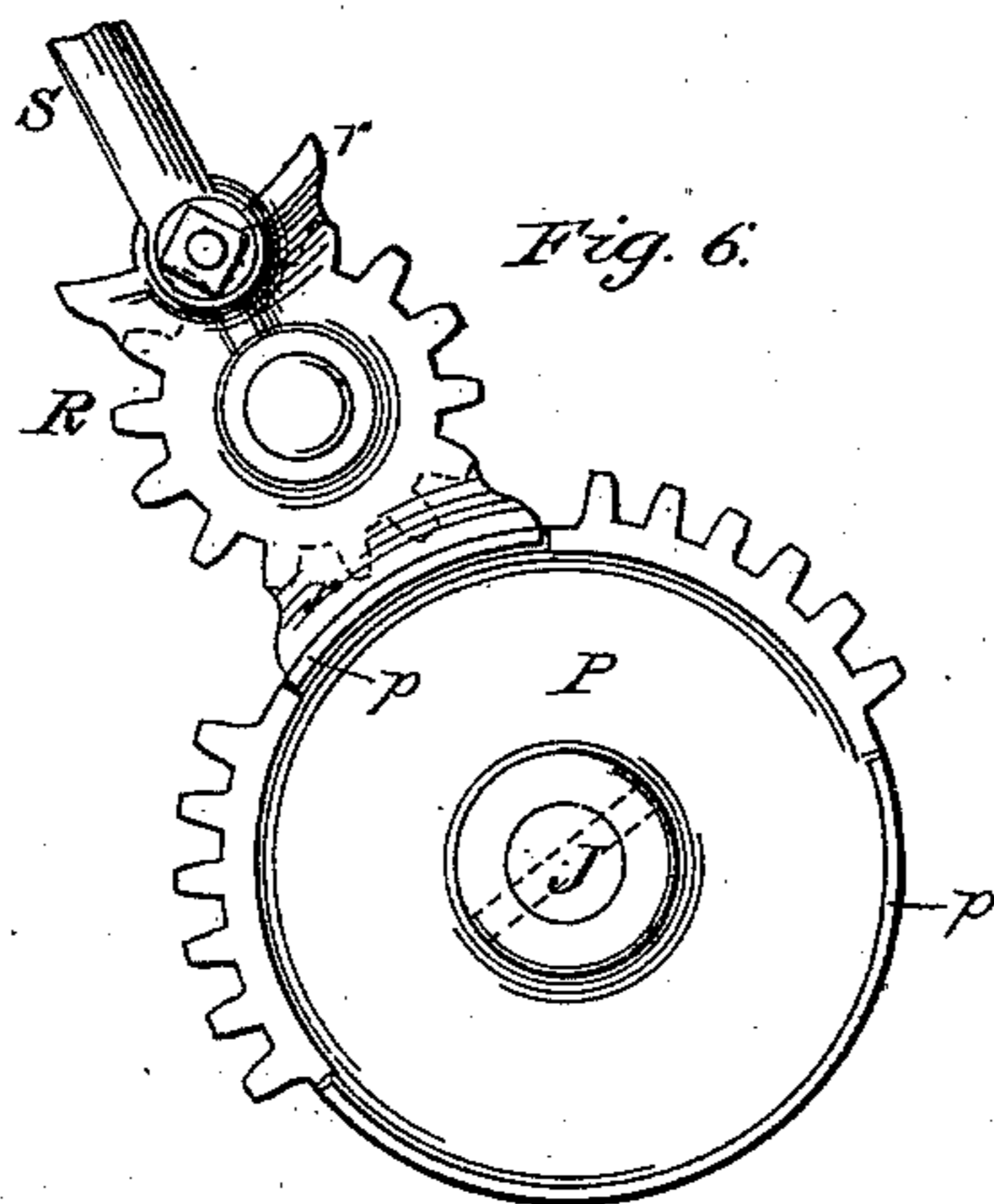


Fig. 6.



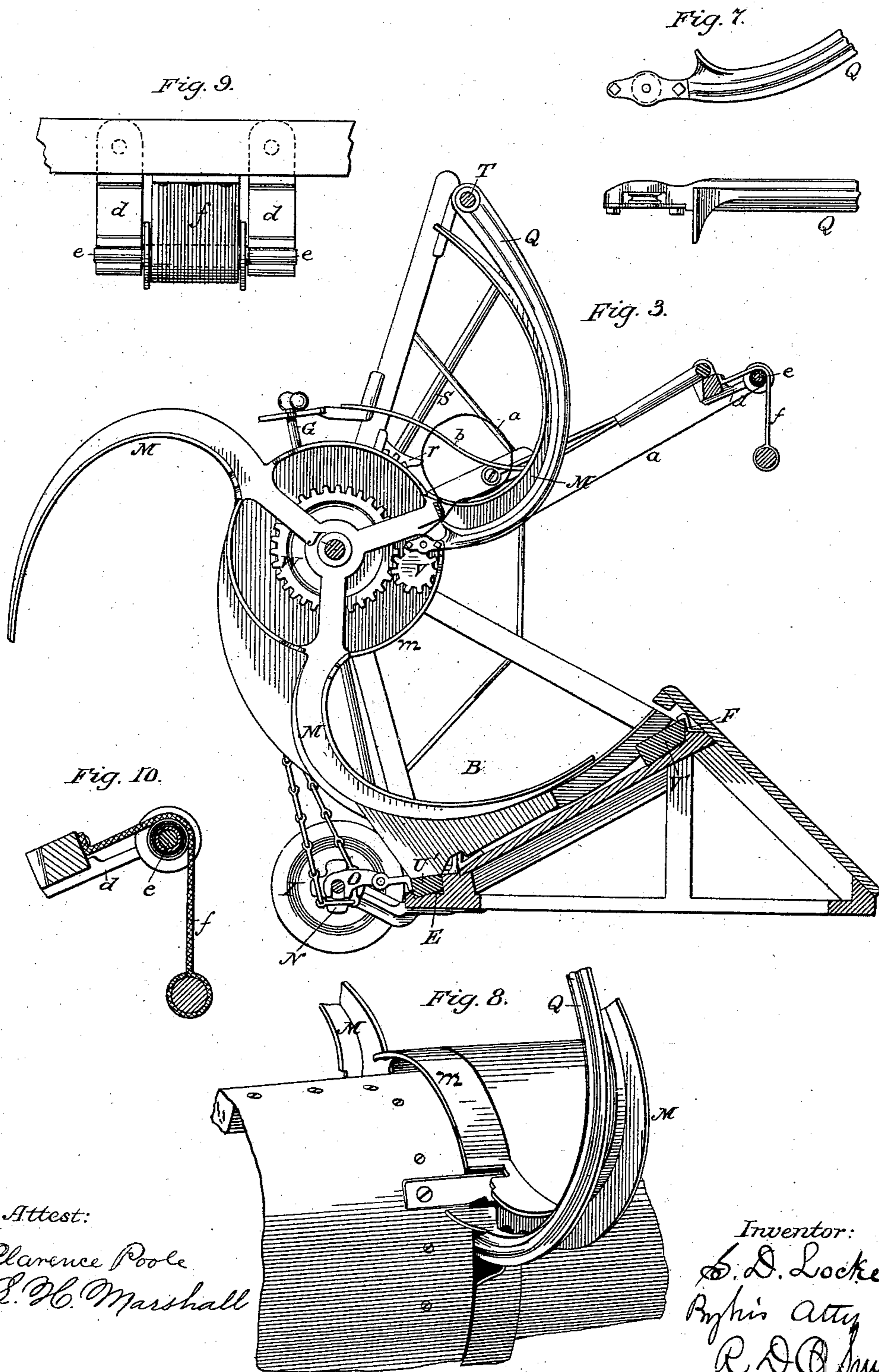
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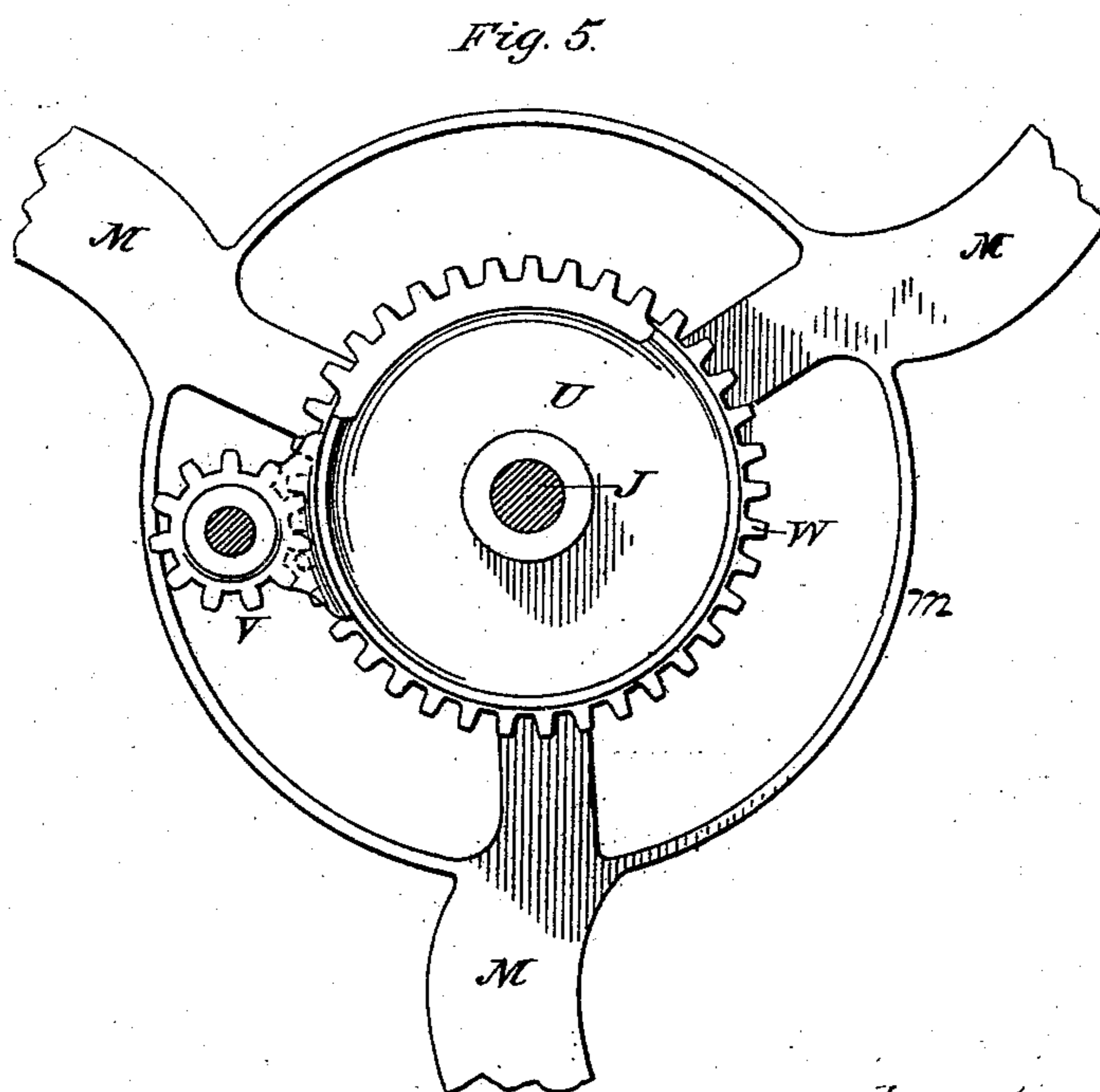
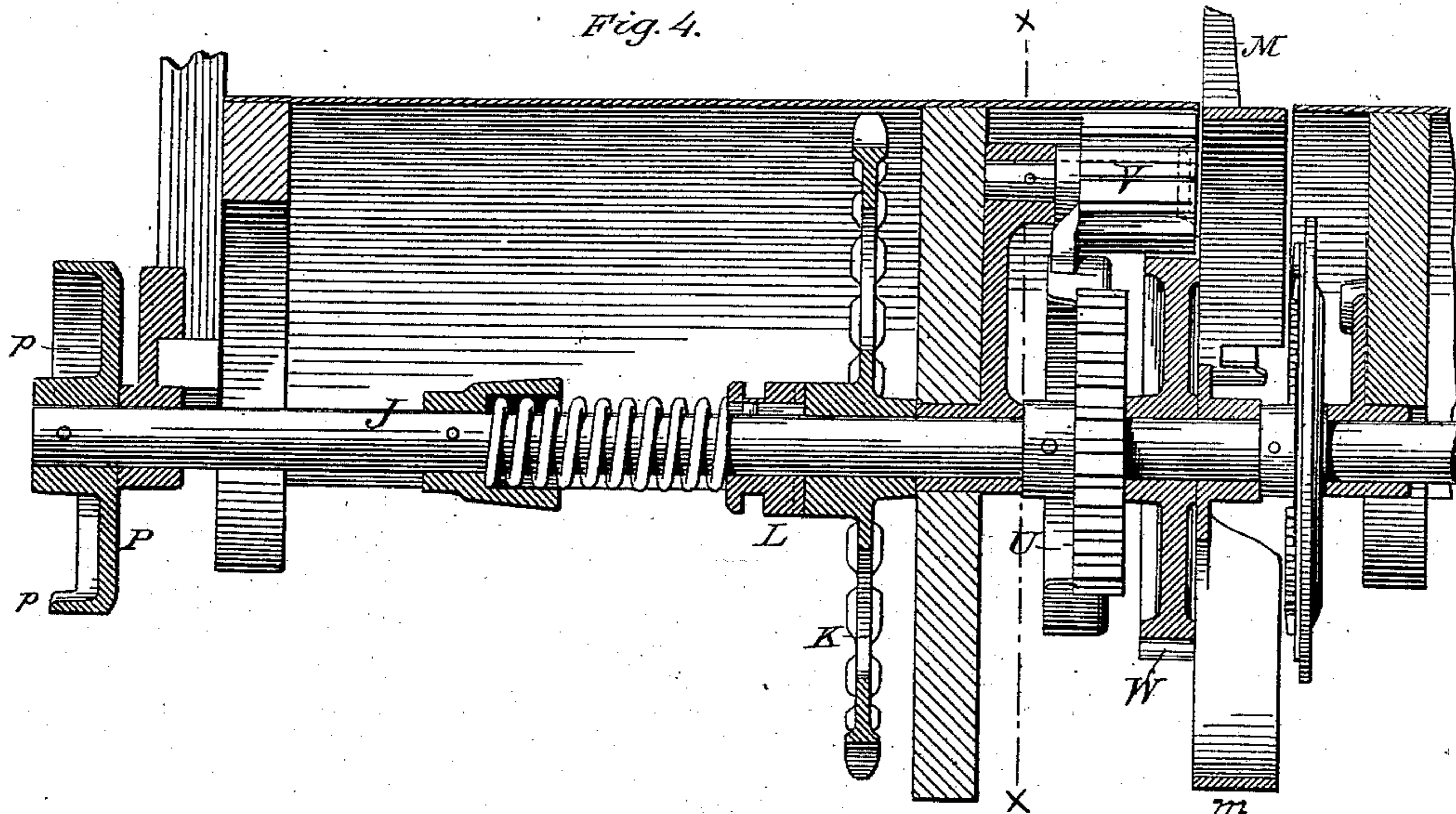
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Fig. 12.

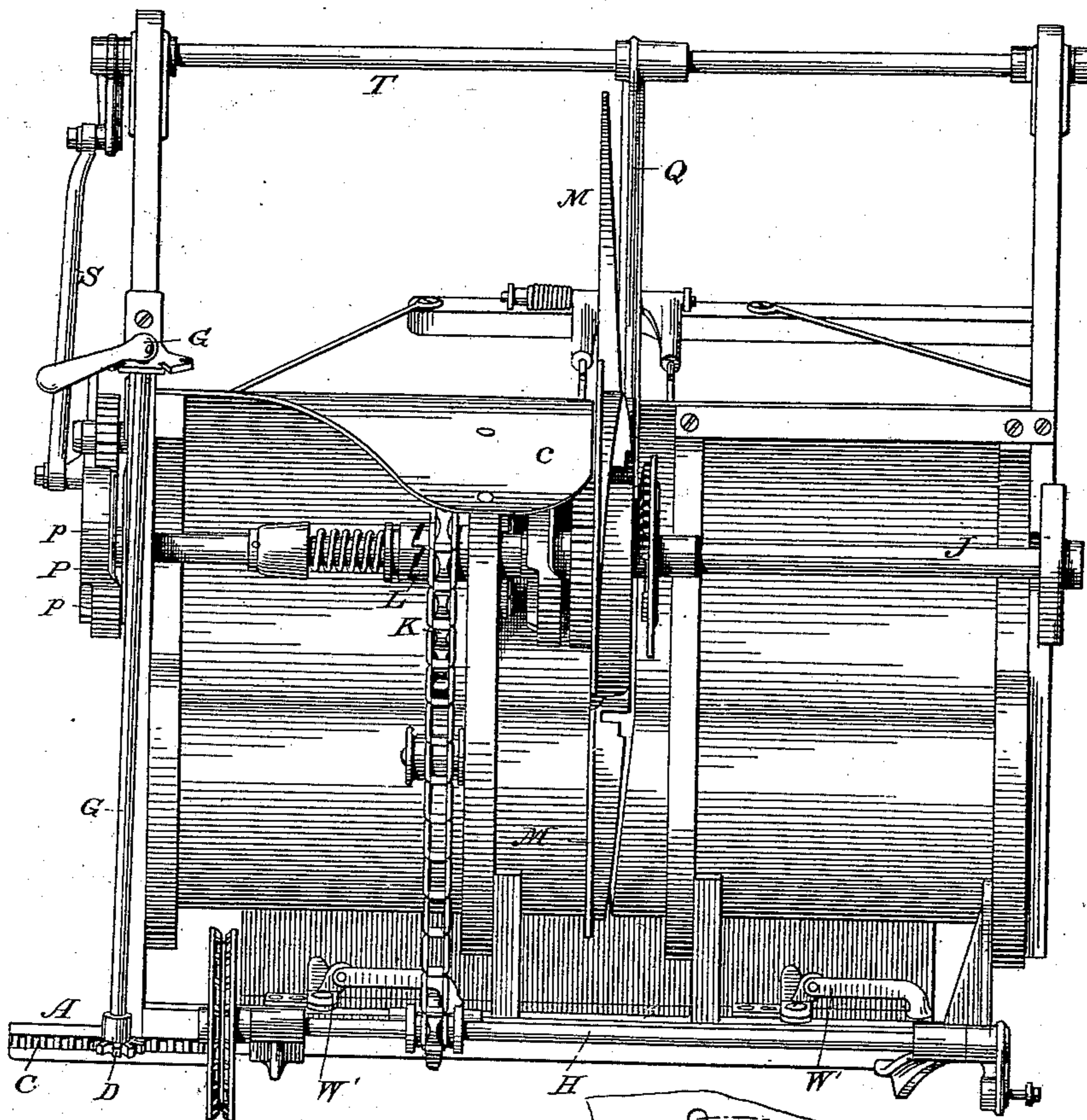
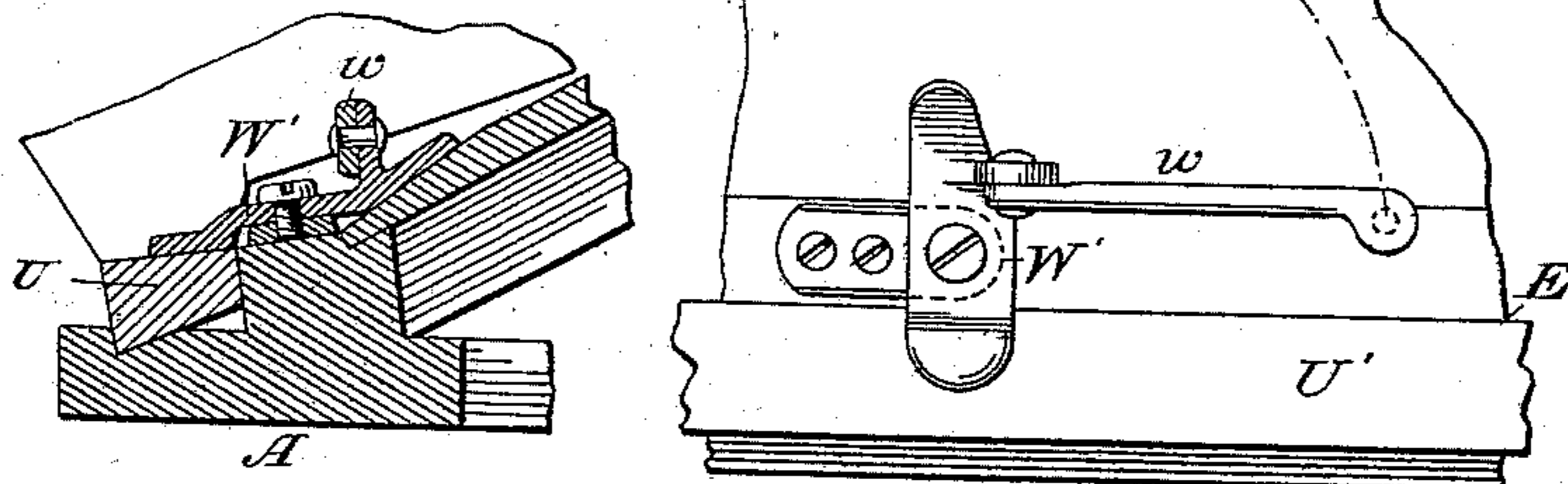


Fig. 11.



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UNITED STATES PATENT OFFICE.

SYLVANUS D. LOCKE, OF HOOSICK FALLS, NEW YORK.

IMPROVEMENT IN GRAIN-BINDERS.

Specification forming part of Letters Patent No. **222,060**, dated November 25, 1879; application filed March 3, 1879.

To all whom it may concern:

Be it known that I, SYLVANUS D. LOCKE, of Hoosick Falls, in the county of Rensselaer and State of New York, have invented new and useful Improvements in Automatic Binders, of which the following is a specification.

This invention relates to that class of automatic binders wherein the gavel is taken from a receptacle and separated from the stream of grain flowing into the same and bound with successive intermittent movements of the parts.

The gavel is gathered, separated, bound, and discharged by positive movements dependent upon the rotation of a single shaft.

This binder is adjustable longitudinally, as to the delivery apparatus of the harvester, by means of a rack and pinion operated by a hand-lever and secured by a lock upon the same, as heretofore shown in my patents. The grain is cut and delivered to the receptacle of the binder by suitable mechanism. (Not shown herein.)

That others may fully understand my invention, I will particularly describe it, having reference to the accompanying drawings, wherein—

Figure 1 is a perspective view of my machine. Fig. 2 is an end elevation of the same. Fig. 3 is a sectional elevation of the same. Fig. 4 is a longitudinal section. Fig. 5 is a section on line *xx* of Fig. 4; Fig. 6, detail of binder-arm driving-gear. Fig. 7 is a detail of the binder-head. Fig. 8 is a perspective of the gathering-arm and stop-plate. Fig. 9 is a perspective of spool for binding material. Fig. 10 is a section of the same. Fig. 11 is the binder-slide lock. Fig. 12 is a rear elevation of my machine.

A is a part of the harvester-frame, and B is the receptacle of the binder. C D is the rack and pinion whereby the binder with its receptacle is secured longitudinally on the ways E F, to adapt it to straw of different lengths, and G is the hand-lever whereby said pinion is rotated.

H is the operative shaft, turning in stationary boxes mounted upon the permanent frame of the harvester. At or near one end of said shaft there is a sprocket or other suitable wheel, I, whereby motion from the prime mover is received.

The binder mechanism is supported by a suitable frame-work, (shown in the drawings,) but to which I do not propose to confine myself.

J is the main shaft of the binder, mounted in suitable bearings. The shaft J is provided with a sprocket-wheel, K, which is mounted upon said shaft, and brought into operative engagement therewith by means of a clutch, L, which is controlled by an ordinary shifting-lever.

Upon the shaft J, about the center of the binder, there is a loose hub with one or more curved arms, M, in a plane perpendicular to the axis of said shaft. The curvature of these arms corresponds to the curvature of the receptacle B, and in their revolution they approach the under side of said receptacle, and pass upward through a median slit therein, thereby separating the flowing stream of grain and raising the gavel out of the receptacle to be bound. There are also mounted upon said shaft, and adjacent to said hub, a spur-gear and two segment-gears, which at the proper times actuate the twisting and cutting mechanism.

The devices described herein and designed to be covered by this patent may operate with any suitable device for securing the band material. Many such devices are known, and I therefore do not propose in this patent to restrict myself either as to the material to be employed for the bands, nor as to the devices whereby said band may be secured.

The special devices for securing the band-wire and severing it at the proper moment which I have devised with reference to this particular machine I propose to make the subject of a separate patent, and therefore make no illustration thereof in this patent.

Upon the shaft H there is a sprocket-wheel, N, which slides upon said shaft, and is prevented from turning thereon by a spline and feather, or other proper device for the same purpose.

A chain passes from the sprocket-wheel N over the wheel K, to communicate motion, and they are kept properly in line with each other when the binder is moved upon its ways by means of a traveler, O, which is hinged to the binder-frame, so that it may be turned back

out of engagement with said pinion, if desired.

At one end of the shaft J there is a segment-gear, P, of peculiar construction. It has two sets of gear-teeth, equal in number, but not placed opposite each other on the periphery of said wheel. Intermediate between said sets of gear-teeth there are laterally-projecting flanges *p*, the outer surfaces of which are coincident with the curved line upon which the teeth are set. The wheel P is the driver for the wire-carrying arm Q.

A pinion, R, having the same number of teeth as the wheel P, is mounted upon a stud above said wheel, and so as to mesh therewith. On the face of said pinion, and projecting radially beyond its periphery, there are two plates, *r*, having the outer edges concave upon arcs of equal radius with the flanges of the wheel P, so that in certain positions said concave will engage with said flanges, and while the wheel P may continue to rotate the pinion R will be restrained. The effect of this device is to give to the pinion R an intermittent semi-rotation with unequal intervals of rest.

When the teeth of wheel P engage with the teeth of pinion R the flange *p* and plate *r*, referred to, go out of engagement, and, the teeth of the segment on P being equal to half the number of teeth on R, the latter moves half a rotation, when the plate and flange again engage and restrain the pinion until again engaged.

An eccentric stud upon the pinion R serves as an attachment for a connecting-rod, S, which actuates the rock-shaft T, whereon the wire-carrying arm Q is mounted, and the unequal intervals between the segments on the wheel P operate to give a longer rest to said arm Q while thrown forward, and while the band-securing devices are operating, than while thrown back to permit the advance of a new bundle.

The intermittent movement of the arms M is produced by means of a segment-gear, U, which is fast upon the shaft J, and a pinion, V, with which it intermittently engages, and thereby transmits motion to a spur-gear, W, attached to the hub of the arms M.

The upper part of the receptacle B is a semi-cylinder divided at its middle to permit the passage of the arms M; but the opening through which they pass is permanently closed by a cylindric flange upon the arms M, so that straw, &c., is excluded.

The wire-carrying arm Q has simply a friction-roller at its end, over which the wire travels. The end of the wire is gripped in the twisting mechanism, and is drawn from a spool conveniently located; but no more than the exact quantity to encircle the bundle then being bound is under any circumstances withdrawn, so that no slack-take-up device is required.

As the arms M rotate the lowermost one separates the stream of grain, and carries the bundle so gathered upward against the binding-wire *a* and the spring-arms *b b*, by which

it is supported, and, in a measure, compressed. The arms M having come to rest, the wire-carrier Q advances, carrying the wire *a* around the sheaf and into the twister, where it is twisted and severed, and said arm then retreats. The next forward movement of the arms M carries the bound bundle over the apron *c* and discharges it while a new bundle is being elevated to be bound.

The convenient location and arrangement of the wire-spool is of considerable importance with machines of this kind, and the tension applied to the same should also be of the simplest kind. Heretofore springs have generally been employed in one way or another; but they are always objectionable because of their liability to break, and thereby temporarily disable the machine.

I have therefore mounted my spool upon a stand, *d*, projecting from the frame of the binder directly in front of the twist-ers, so that the wire draws straight from the spool to the wire carrier and twist-ers. This is a great advantage, because when its direction is changed by passing over guide-pulleys, &c., it is not only more liable to derangement and breakage, but additional power is absorbed in overcoming resistance due to additional bearing-surfaces and change of direction. The spool stand or bracket *d* has two bearings to receive the spindle *e*, upon which the spool is mounted; or said spindle may be hinged at one end, or other arrangements may be made so that a part may be conveniently displaced for the placing or displacement of the spool.

The tension consists of a broad strap, *f*, of leather or other flexible material, one end of which may be secured to the frame, and the other end may hang free over the spool and resting upon it. The friction between the binding material upon the rotating spool and the surface of the fixed strap produces the required resistance to the rotation, known as "tension," and, as is apparent, the friction may be very readily increased or diminished by weights attached to the free end of said strap.

When the spool is full and the leverage of draft is longest, because removed to the farthest point from the center, the point of frictional resistance will be equally removed from the center, and as the binding material is discharged these conditions of leverage will simultaneously and equally recede toward the center, so that with an equal weight upon the strap *f* the tension will be practically uniform from the full spool down to the time of entire discharge.

It is desirable that the binder shall be bodily removable from the reaping-machine, and I therefore make it as a complete structure and arrange suitable fastenings, whereby it may be readily attached or detached from the reaping-machine.

Behind the piece A, which is a part of the frame of the reaping-machine, there is a groove or way in which the front sill, U', of the binding-machine is fitted, so that it may slide back

and forth therein when the binder is moved endwise, for the purpose of adapting the machine to the length of straw being bound. The rear sill, *V'*, of the binder is adapted to a similar way at the opposite side of the machine; but it is confined in this latter way by an overhanging part, which, while it permits the sill to slide, does not permit it to be lifted out.

The pivoted latches *W'* are attached to the frame of the reaper and confine the sill *U'* when they are in position, but permit it to be lifted out of its groove when the binder is to be removed, and when so lifted out the binder is detached and separate from the reaper. The pivoted arm *w* serves to retain the latch *W'* in position by locking into holes prepared for them.

Having described my invention, what I claim as new is—

1. The driving-shaft *H*, provided with the wheel *N*, mounted thereon with a spline and feather, combined with the hinged traveler *O*, attached to the sliding binder-frame, to carry

said wheel with said frame into change of adjustment or be disengaged therefrom, as set forth.

2. The receptacle *B*, the upper part of which is a semi-cylinder divided transversely at the middle, combined with arms *M*, provided with a cylindric flange-ring, *m*, to permanently close the opening between said cylindrical parts of the receptacle.

3. The shaft *J*, provided with the fixed segment-wheel *U*, and the long pinion *V*, in mesh therewith periodically, combined with the spur-gear *W*, constantly in mesh with said pinion and rigidly attached to the hub of arms *M*, whereby they are intermittently rotated.

4. The latches *W'*, pivoted to the permanent frame and swinging over the sill *V'*, to keep the same from accidental displacement, combined with the hinged locking-arms *w*, as set forth.

SYLVANUS D. LOCKE.

Witnesses:

E. R. ESTABROOK,
WM. M. ARCHIBALD.