(No Model.)

2 Sheets—Sheet 1.

J. W. WEBSTER.

GRAIN BINDER.

No. 278,639. Patented May 29, 1883.

Fig. 1.

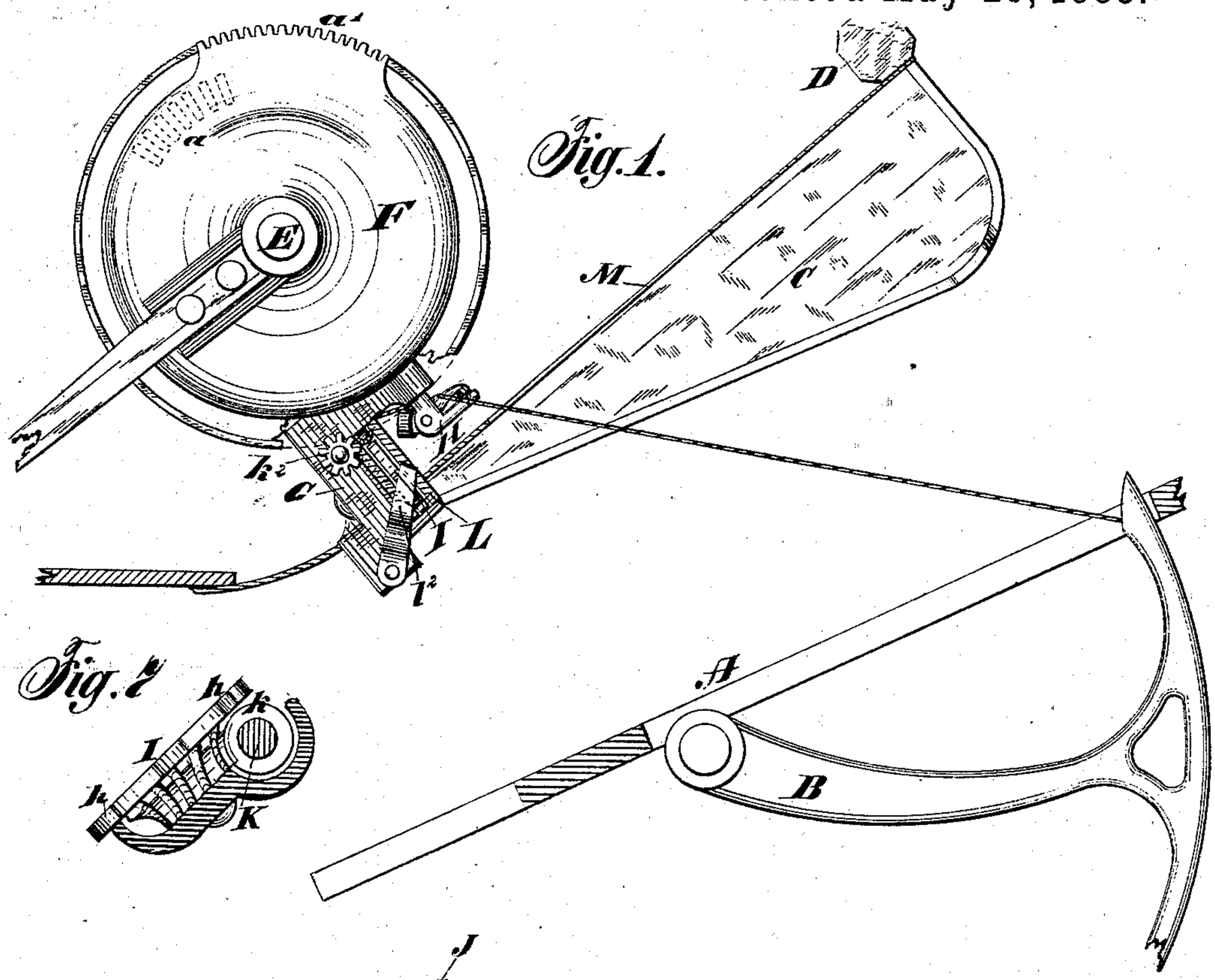

Fig. 2.

Fig. 2.

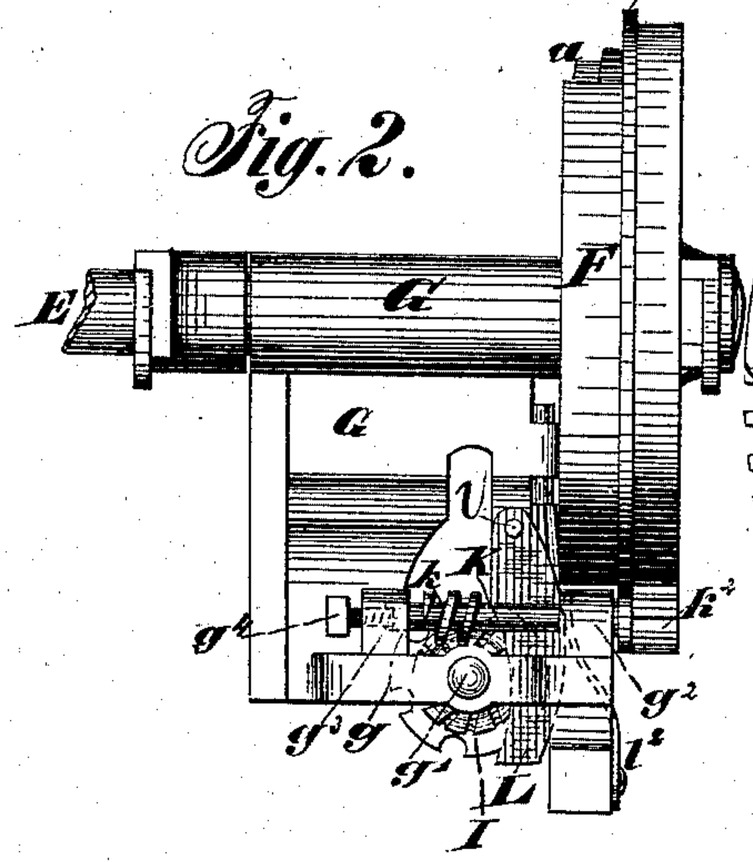

Fig. 3.

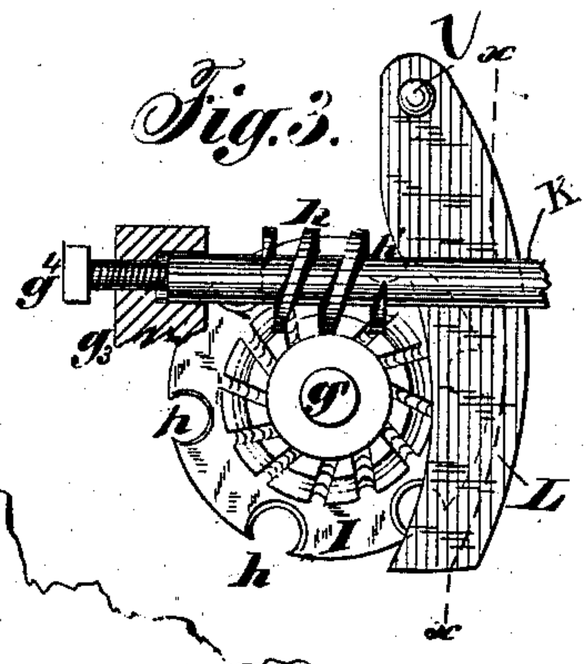

Fig. 4.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 5.

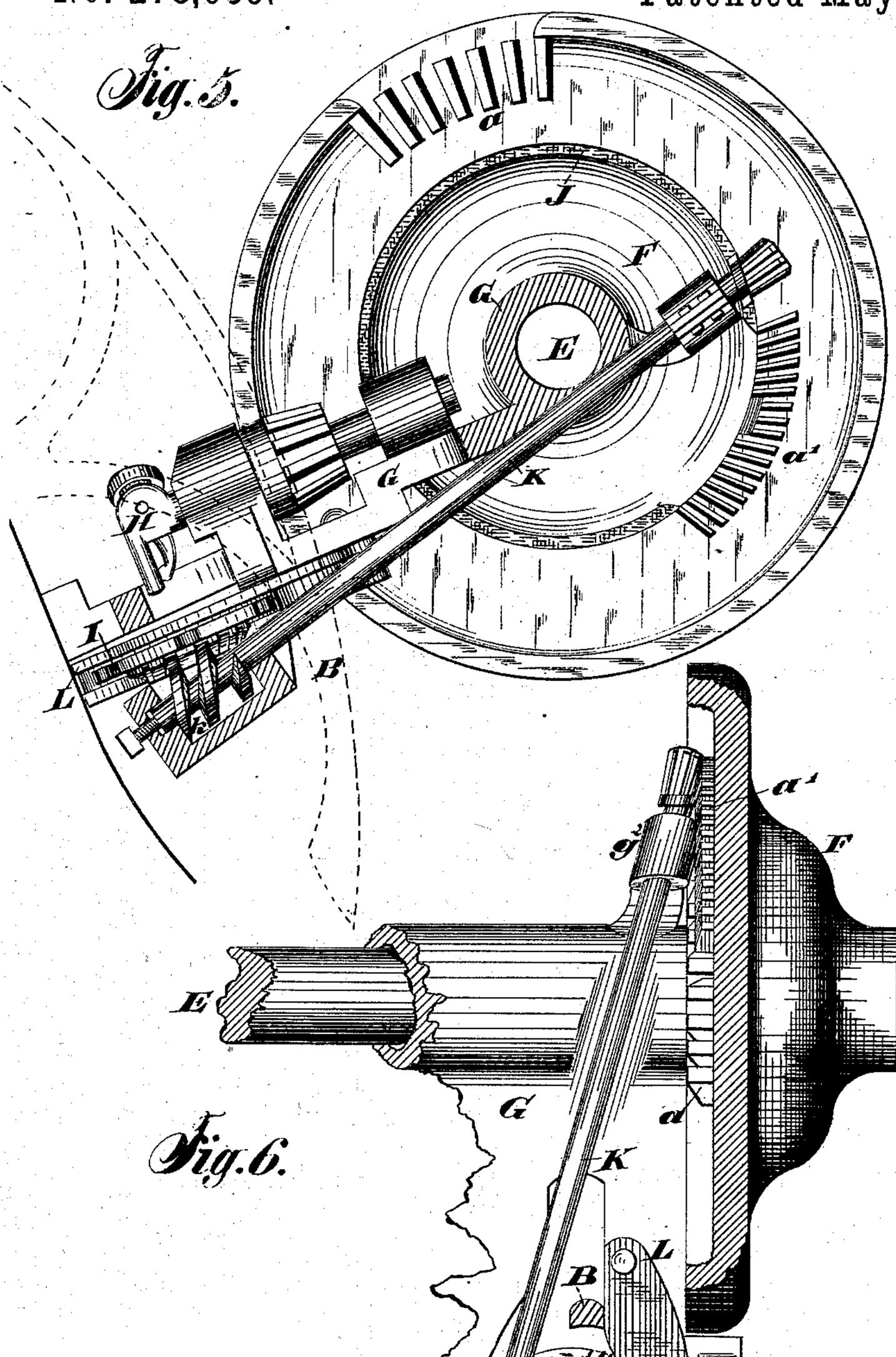

Fig. 6.

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Inventor:
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UNITED STATES PATENT OFFICE.

JOHN W. WEBSTER, OF CHICAGO, ILLINOIS, ASSIGNOR TO WILLIAM DEERING, OF SAME PLACE.

GRAIN-BINDER.

SPECIFICATION forming part of Letters Patent No. 278,639, dated May 29, 1883.

Application filed February 1, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. WEBSTER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Grain-Binders, of which the following is a full description, reference being had to the accompanying drawings.

The object of my invention is to simplify the mechanism for actuating the cord-holder, and at the same time to obviate certain defects in the class of binders to which my invention is applicable; and its nature consists in providing novel means for actuating the intermittently-rotating cord-holder that shall at the same time operate as means for retaining the same in a fixed position of rest during said intermitments.

I have shown my invention as adapted to a form of binder now much used, and the cord-holder moving and retaining device is designed to replace parts for the same purpose shown in Patent No. 257,837, May 16, 1882, in which a rotary cord-holder is shown with six notches in its periphery, and is provided with a ratchet-wheel beneath, into which engages a pawl pivoted to a vibrating lever adapted to carry the holding-disk one notch at a time, at the proper interval, and thus engage the twine laid therein and carry it into what is usually termed the "holder." Another pawl is provided to prevent retrograde movements of the cord-holding disk; but no means is provided for preventing the said disk from being moved too far forward because of the parts getting out of adjustment in relation thereto—a difficulty that in practice is very great, because by too great movement the twine held is not properly presented to the tyer. These objections I have overcome, as will be shown.

Figure 1 of the drawings is a view of the band-carrying, band-uniting, and cord-holding mechanism as viewed from the end of the binder, a part of the knotter-driving gear being broken out to better show the knotter-frame. Fig. 2 shows the rotating holding-disk and its driving-screw and pinion as viewed from below. Fig. 3 is an enlarged view of the worm and gear as viewed from below. Fig. 4 is a fragment of the knotter-driving gear and the delay-pinion for rotating the worm. Figs. 5, 6 are modifications that will be hereinafter explained; and Fig. 7 shows the worm-shaft, worm-wheel, and holding-disk as viewed from a point in line with the axis of the screw-shaft.

A is the usual grain-table of a binder; B, the needle rocking beneath it, its point thrusting through the table to deliver the band to the tyer and holder. C are plates secured to the knotter-frame and to the part of the frame-work D. E is a shaft connected by proper gearing to the source of power. F is the knotter-driving gear-wheel, and it is also the gear-wheel for actuating the holder. G is the knotter-frame; H, the tyer; I, the holding-disk; J, a delay-rim and segment, forming a part of the wheel F for actuating the holding devices. K is the worm-shaft for driving the holder; L, the stationary part of the holder.

The wheel F is the source of power and motion of all parts of the tying, holding, and cutting mechanism, and, in addition to the segment *a* and the delay-rim for rotating and locking the knotter-pinion, it has a segment, *a'*, and delay-rim to operate the holder. These two segments are so located that each shall operate its pinion at the proper instant and in the proper order. The segment *a'* is part of the rim of the wheel F, which is of such size that its radius and that of the pinion shall permit the screw-shaft to be placed properly to the holder-disk and the worm-wheel beneath. To this wheel are to be attached the usual cam for actuating the cord-cutter and the seat for the discharge-arm.

The knotter-frame G is supported on the shaft E and by the frame-work D, the breast-plate M and cheek-pieces C serving as means for connecting the said knotter-frame to the binder frame-work. In the frame G are bearings for the knotter-shaft, in such position that the knotter-pinion may properly mesh into the segment *a*. A slot is provided in the frame, through which the needle passes in delivering the twine to the holder. A bar, *g*, across the frame, below the slot, supports the holder-disk, the pin *g'* forming an axis of rotation.

g^2 and g^3 are bearings in the frame for the

worm-shaft. The bearing g^3 is but a socket into which the shaft steps, and is provided with a set-screw, g^4, threaded through the end wall of the socket, and by means of which the endwise adjustment of the screw is made. All of the wear of the worm and worm-gear will be in but one direction, and hence adjustment in but one direction will be required.

The holding-disk has beneath it a worm-wheel, into which the worm k acts, as shown in Fig. 7. In this last figure the form of the worm-wheel is shown to be such that it engages with the worm only in such a way that by the removal of its axis (the pin g') it may be lifted out; but I do not confine myself to any particular form of worm-wheel. It is preferable to cast the worm-wheel and holding-disk as one piece.

I shape the bar g of the knotter-frame so as to form a cup, into which the worm-wheel may run, which, when filled with oil, forms means for constant lubrication for the worm and worm-wheel. This construction is shown only in Fig. 7, the supporting-bar being plain in the other figures, so as to not obstruct the view of other parts.

L is the holder-plate. It is a grooved shoe, pivoted to the knotter-frame at l in such relation to the holding-disk that the periphery of the latter may pass along through the groove, as shown in Fig. 3 in dotted lines, and Fig. 1, where the shoe is shown as if cut on the line $x\,x$ of Fig. 3. The holding-disk is provided with six notches, h and h'. The notches alternately present themselves to the position of that lettered h, Figs. 3 and 6, and each in turn receives the twine. The shoe is elastically held in position by the spring l^2.

The operation of my device is as follows: The twine is laid into one of the notches h' by the needle, and when so laid the segment a' engages the pinion k^2, and thus gives the worm-shaft k two revolutions, and through the worm and worm-wheel the disk is rotated and carries the twine laid into the notch h' into the shoe L. The wheel F makes one revolution to a single stroke of the needle, and the parts being properly timed, at each stroke the twine is laid in a new notch and is held by being carried as before. Immediately after the engagement of the cord by the holder the segment a acts on the knotter-pinion, and the knot is tied in the usual manner. Should the worm or its wheel become worn, the position of the notches h would vary, and thus become defective, in that they would not carry the twine far enough to permit the jaws of the tyer to properly grasp it, and hence I provide the set-screw g^4. By its use the longitudinal position of the worm-shaft may be adjusted, and through it the holding-disk. Such adjustment will of course change the position of the pinion K relative to the position of the segment a'. To meet this the pinion must be wound on the worm-shaft to a new position. As but one adjustment at most during the life of the machine is all that will be required, means for adjusting the pinion on its shaft are not shown, as any of the usual means of keying pinions to their shafts will permit of such adjustment.

In Figs. 5 and 6 I have shown the worm-shaft as thrown across and below the axis of the wheel F, and provided with a bevel-pinion having a delay-shoe which engages a segment upon the inner face of the wheel F. The changes here suggested are but those of position, and do not affect the principle.

What I claim is—

1. The combination of the wheel F, provided with the knotter-operating segment and delay-rim and the holder-operating segment and delay-rim, with the knotting and holding devices, and the worm-shaft, its worm, and the worm-wheel, whereby the knotter is rotated and the holder is advanced to a new position during each rotation of the wheel F, and there retained, substantially as described.

2. The intermittently-revolving cord-holding device, combined with the worm-shaft and worm-wheel, as means for advancing and retaining the said holding device, substantially as described.

3. The holding-disk and the worm-wheel and worm-shaft, combined with means, substantially such as described, whereby the said parts are given intermittent movement, as set forth.

4. The combination of the wheel F, having the holder-operating segment and delay-rim, with the holding-disk, the worm-wheel, the worm and its shaft, and the worm-shaft pinion, having the delay-surface, substantially as described.

5. The combination of the worm-shaft, the worm-wheel, and the holder-disk and the set-screw, for the purpose described.

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