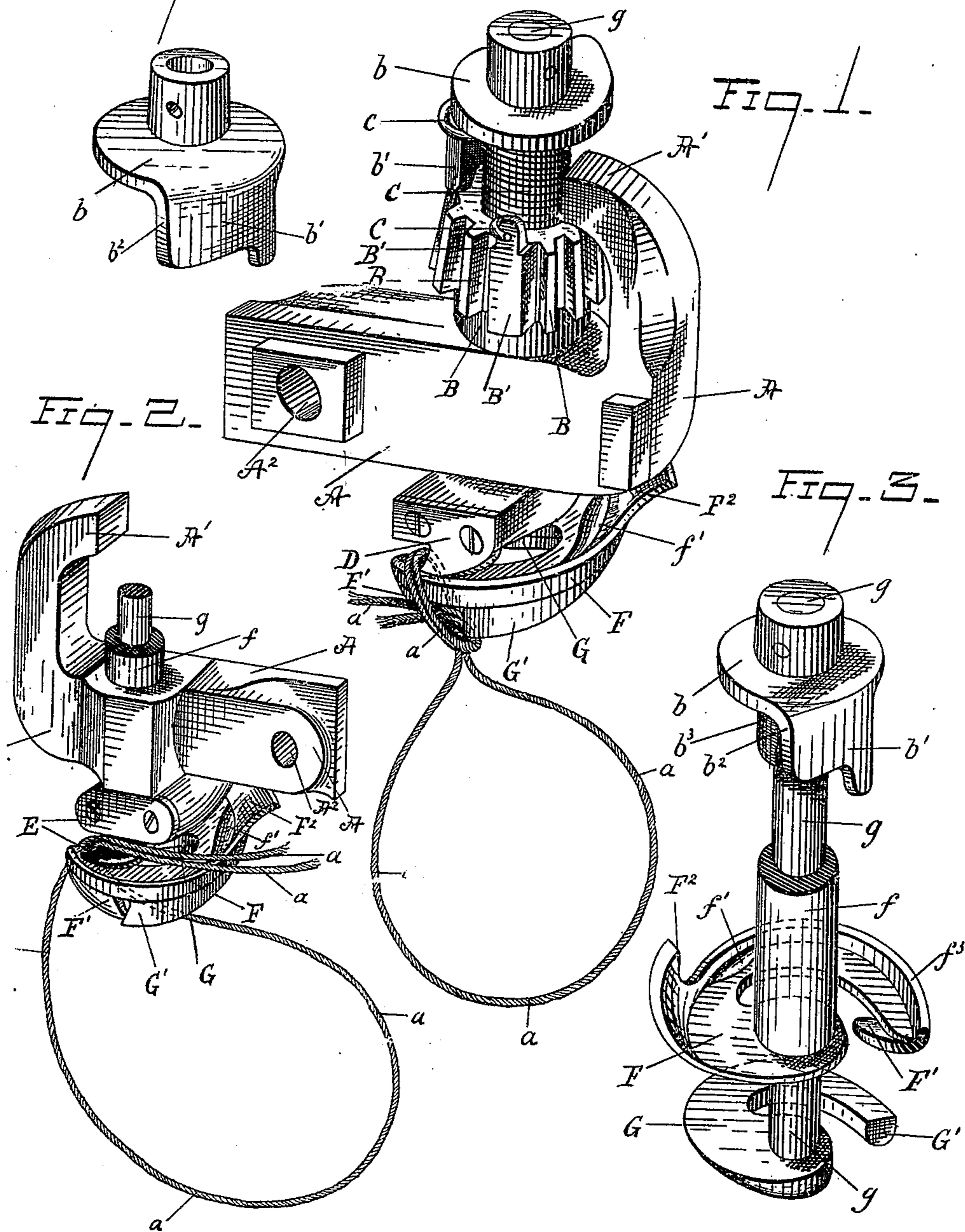


(Model.)

H. A. & W. M. HOLMES.
AUTOMATIC GRAIN BINDER.

No. 329,560.

Patented Nov. 3, 1885.



WITNESSES=

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HECTOR A. HOLMES AND WATSON M. HOLMES, OF HOOSICK FALLS, N. Y.

AUTOMATIC GRAIN-BINDER.

SPECIFICATION forming part of Letters Patent No. 329,560, dated November 3, 1885.

Application filed December 29, 1884. Serial No. 151,445. (Model.) Patented in England May 30, 1884, No. 8,439.

To all whom it may concern:

Be it known that we, HECTOR A. HOLMES and WATSON M. HOLMES, of the village of Hoosick Falls, in the county of Rensselaer and State of New York, have made certain new and useful Improvements in Automatic Grain-Binders, which relate particularly to the mechanism employed in tying the knot in the band where cord is used for the binding material.

Our devices may be employed in any automatic binding-machine whose organization and arrangement are such as to give the proper motion to the several parts and present the binding material in the proper manner to the knot-tying device, which may be done by any of the well-known mechanical means.

In this specification, and drawings which make a part of the same, we have described the device as applied to our binder as heretofore made and as patented to us December 3, 1878, No. 210,533.

In order to enable others skilled in the art to make and use our invention, we will proceed to describe the same with reference to the accompanying drawings, making a part of this specification, in which—

Figure 1 represents in perspective the knot-tyer and the frame which supports it and by which it is attached to the machine. Fig. 2 is a view in perspective of the same, showing the reverse side of Fig. 1 with the driving mechanism omitted. Fig. 3 is a view in perspective of the knotter-shafts, knotter-hooks, and the cap on top of one of the shafts, the knotter-hooks being slid apart to show their construction in detail. Fig. 4 is a view in perspective of the cap on top of one of the knotter-hook shafts.

Similar letters of reference in the several figures represent the same parts.

A is a frame, of metal, which supports the knotting device, and is fastened to the binder-frame by a bolt passing through a bolt-hole, A², in such a way as to present the cogs of the pinion B to be acted upon by cogs in a quadrant or other device to give proper motion to the pinion B, and through it to the several parts, as will be more fully hereinafter described. The shaft *g* passes vertically through the casting or frame A, and to its lower end is fastened the lower knotter jaw or hook, G,

and to its upper end is fastened the collar or cap *b*. This collar *b* has a hub, *b*³, projecting down and around which is coiled the spiral spring C. Around this shaft *g*, and passing through the frame A, is the hollow shaft *f*, on the lower end of which is fastened the upper knotter jaw or hook, F, and on its upper end the pinion B, and through this pinion B is imparted at the proper time all the motions to the knotter-jaws. The upper knotter-jaw, F, has a slight projection or ledge, *f*³, on its upper periphery, extending from its point about two-thirds its length. This slight projection or ledge *f*³ serves the purpose of a guard to the stripper or detaching hook D as the knotter rotates, and also holds up the cord above the horizontal plane of the knotter-jaw, which always insures contact of the edge of the stripper with the cord, and insures its positive action to strip the cord from the knotter-jaws. This projection then rises abruptly upwardly and outwardly, as shown at F², in order to present a carrying-arm to the cord to place the cord in proper position for making the knot, as will be more fully hereinafter described. This projection F² gradually recedes to the level of the plane of the knotter-hook, and its under surface is chamfered or beveled off to meet the beveled-off surface of the under side of the lower knotter-jaw, G, in order to facilitate the movement of the cord upon them, as will more fully appear. A thin piece of metal, E, which we call the "cord" or "twine" rest is fastened by two screws to the frame A. (See Fig. 2.) It extends downward, and has a foot which extends outward and at right angles, or nearly so, to the frame and close to and parallel with the horizontal portion of the upper knotting-jaw. This piece serves as a rest for the cord and keeps it in proper position during the first part of the operation of tying the knot. Upon the side of the frame A, and at its lower end and opposite to the cord-rest, is fastened the detaching hook or stripper D, as shown in Fig. 1.

The frame A is constructed with a horn or projection, which extends upward and is carried outward around the pinion B with its upper end extending inward far enough to arrest the rotary motion of the downwardly-

extending rim or flange b' on cap b . This rim or downwardly-extending flange extends only partially around the outward periphery of the circular flange b , as shown in Fig. 4. The upper end of the coiled spring C is clasped around the vertical edge of the cap, and its lower end is clasped around a projection or pin projecting above the end of the thick tooth B' on pinion B , as shown in Fig. 1. The object of this thick tooth B' is to enable the operator to set the knot-tying device properly in mesh with the teeth on the quadrant or other device which drives it. No quadrant or other device for driving is shown in the drawings.

In Fig. 2 the cord a , which encircles the bundle, is shown with its two branches laid over the cord-rest just above the knot-tying jaws as they commence to tie the knot. The cord is shown broken off, one branch of which is held by the cord-holder, and the other is held by or passes through the eye of the needle-arm, and thence to the ball of cord on the machine. The rest E , over and upon which the cord rests, serves the purpose of holding the cord from falling or being drawn into the open space between the points of the knotter-hooks and the central shaft. Motion is communicated by any well-known means to the pinion B , which turns the hollow shaft f a partial revolution, carrying the point of the upper knotter-jaw, F , toward the cord. The spiral spring C , connected at its upper end to cap b , fast to shaft g , and at its lower end to pinion B , fast to shaft f , draws the two knotter-jaws together, and both knotter-jaws are moved together until the projecting flange b^2 strikes against the horn A' of the frame A . During this movement of the knotter-jaws the upwardly and outwardly projecting arm of the flange F^2 on the upper knotter-jaw, F , strikes against these two branches of the cord, and the knotter-jaw F being beveled or chamfered off on its under side to meet a corresponding chamfer on the lower jaw, G , the two branches of the cord are forced down below both knotter-jaws and under the point of the stripper D , (a depression being formed in the horizontal surface of the upper knotter-jaw, as shown at f' , to allow the twine-space to pass under the stripper,) and cross the two branches of the cord that are around the bundle. Thus both knotter-jaws at this time are encircled by both branches of the cord. When the flange b^2 strikes against the horn A' , as aforesaid, the spring C is overcome, and the upper knotter-jaw moves forward and forms a space between the portions F' and G' of the two knotter-jaws sufficient to receive between them the two branches of the cord which at the commencement of the movement were lying across the cord-rest and on top of the jaws. When this is accomplished, the pinion B is moved in

a reverse direction, and the upper knotter-jaw, F , moves toward the lower knotter-jaw, G , the projection F' strikes against G' on G , and closes the opening with the cord between them. At this time the cord-holder releases its hold on one branch of the cord and takes hold of and cuts off the other branch, which extends to the ball. Both knotting-jaws continue to move together, the upper jaw moving the lower one with the cord encircling them, as before described, until the two upper branches of the cord strike against the detaching hook or stripper D , as shown in Fig. 1. These two branches of the cord will by the further movement be stripped off the jaws F and G and over the two branches of cord held in the opening between F' and G' , thus forming the knot. When the bundle is discharged, the branches held between F' and G' will be drawn out with the bundle. The knotter-jaws will continue to move in the same direction until they take the same position where they started, ready to form another knot.

The device hereinbefore described can be made to tie a knot without the twine-rest E ; but it would require a larger amount of cord, and involve the danger of fouling or breaking it.

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

1. The combination of the knotter-jaw F , having the ledge f^3 , the depression f' , and the abrupt projection F^2 with the stripper D , substantially as described.

2. The combination of the upper jaw, F , having the ledge f^3 and the abrupt projection F^2 , and the lower knotter-jaw with stripper D , substantially as and for the purpose specified.

3. The combination of the upper jaw, F , having the ledge f^3 and the abrupt projection F^2 , and the lower knotter-jaw with the cord-rest E , substantially as and for the purpose described.

4. In combination with the upper jaw, F , having the ledge f^3 and the abrupt projection F^2 , and the lower knotter-jaw, the stripper D , and cord-rest E , substantially as described.

5. In combination with the partially-rotating knotter-jaw F , having the ledge f^3 and the abrupt projection F^2 , the jaw G , the stripper D , and cord-rest E , located above the knotter-jaws and opposite, or nearly so, to each other, substantially as described.

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Witnesses:

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