

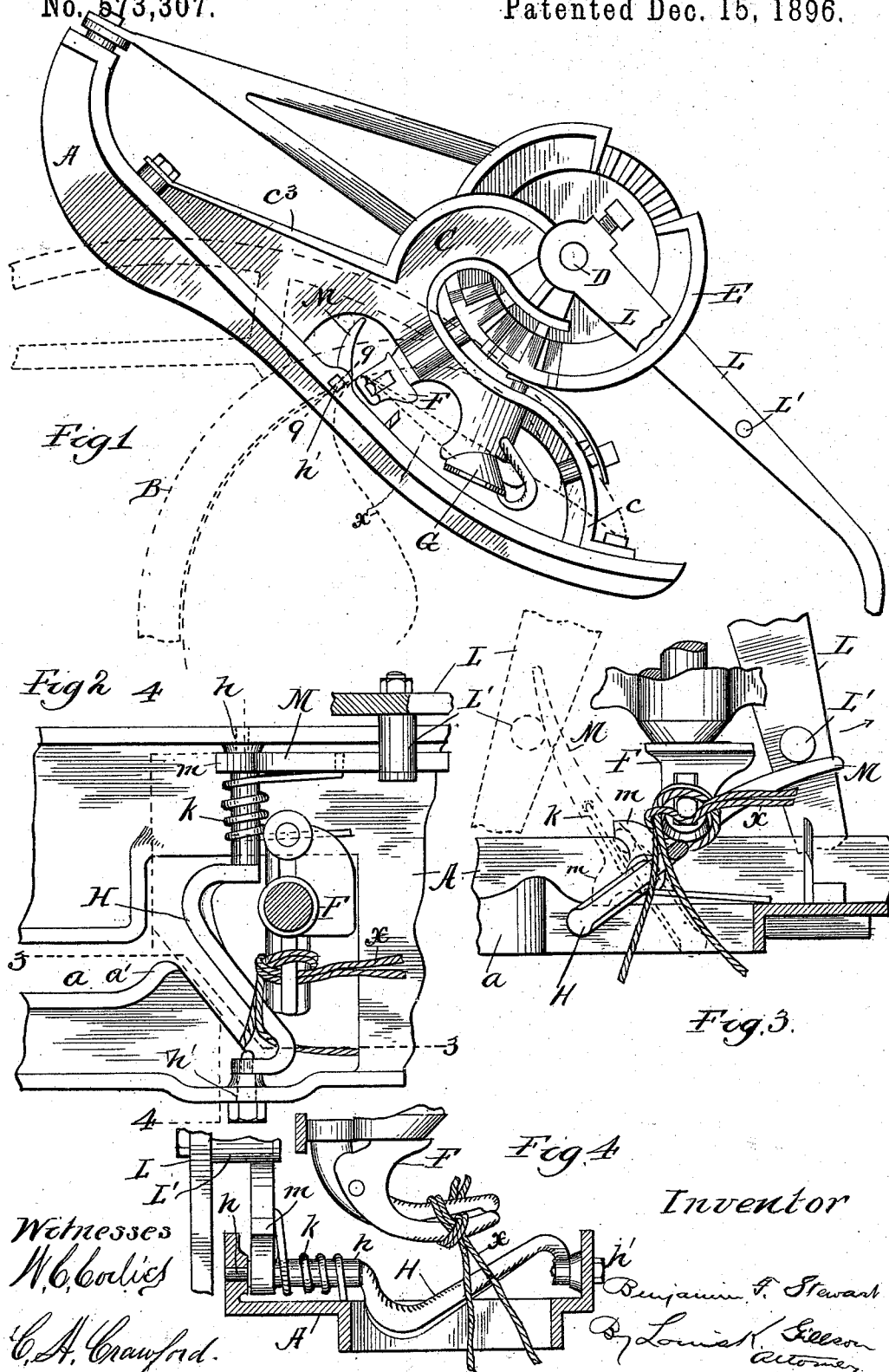
(No Model.)

2 Sheets—Sheet 1.

B. F. STEWART.
TYING MECHANISM FOR GRAIN BINDERS.

No. 573,307.

Patented Dec. 15, 1896.



(No Model.)

2 Sheets—Sheet 2.

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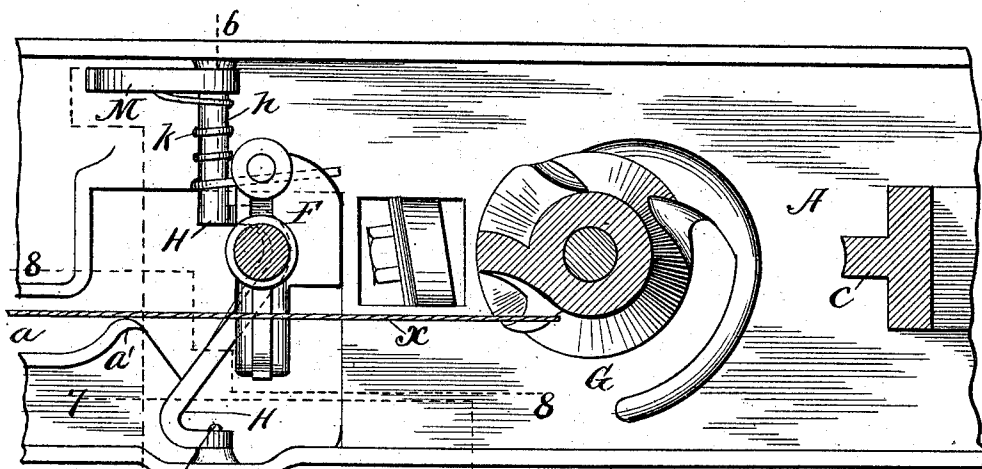


Fig. 5.

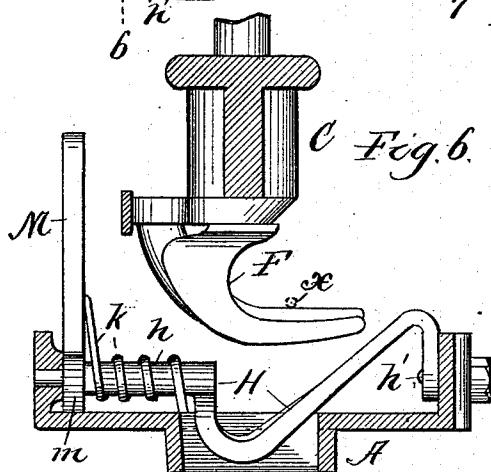


Fig. 6.

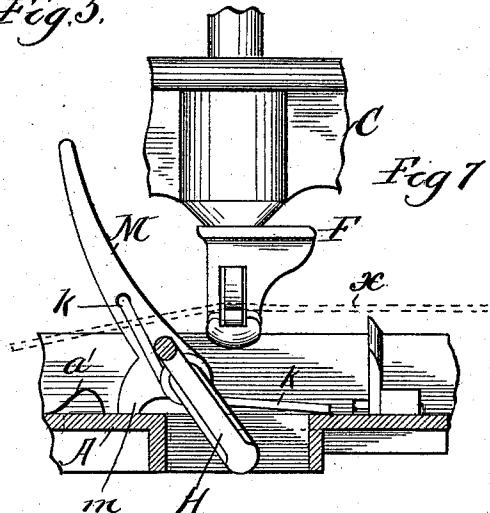


Fig. 7.

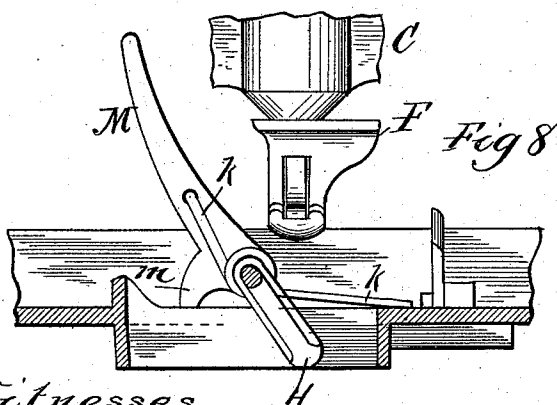


Fig. 8.

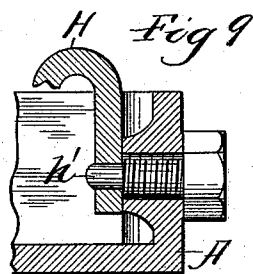


Fig. 9.

Witnesses
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UNITED STATES PATENT OFFICE.

BENJAMIN F. STEWART, OF CHICAGO, ILLINOIS.

TYING MECHANISM FOR GRAIN-BINDERS.

SPECIFICATION forming part of Letters Patent No. 573,307, dated December 15, 1896.

Application filed July 13, 1896. Serial No. 599,051. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN F. STEWART, 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 Tying Mechanism for Grain-Binders; and I do 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 same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

The object of the invention is to provide improved means for bringing the cord into proper relation with the knotter and to strip the knot from the latter; and it consists of a reversible cord-guide and stripping-bar, as hereinafter described, extending obliquely across the slot of the breastplate and before the knotter, so as to intercept the cord, and of means for shifting the position of this bar, the position of the bar before the knot is tied being such that the strain of the gavel slides the cord over its surface toward the heel of the knotter, and its position after the formation of the knot being such that the strain of the discharging bundle slides the cord toward the tip of the knotter and strips the knot therefrom.

In the accompanying drawings, Figure 1 is a side elevation of the breastplate of a grain-binder and of the tying mechanism mounted thereupon. Fig. 2 is a detail plan of the breastplate, certain parts of the tying mechanism being shown in section, the parts being in the position assumed in the last stages of the formation of the knot. Fig. 3 is a sectional view on the line 3 3 of Fig. 2. Fig. 4 is a sectional view on the line 4 4 of Fig. 2. Fig. 5 is a detail plan of the breastplate, showing the parts in the positions assumed before the formation of the knot is commenced. Fig. 6 is a sectional view on the line 6 6 of Fig. 5. Fig. 7 is a sectional view on the line 7 7 of Fig. 5. Fig. 8 is a sectional view on the line 8 8 of Fig. 5. Fig. 9 is a detail section on the line 9 9 of Fig. 1.

The device is intended especially for use in connection with the knotter mechanism for which Letters Patent No. 512,762 were issued

to me January 16, 1894, and in the drawings I have followed the construction therein shown, so far as it is applicable.

The breastplate A carries the knotter-frame, whose main portion is substantially S-shaped and is secured to the breastplate by the foot-piece *c* and tailpiece *c'*. The binder-shaft D is journaled in the frame C and carries the segmental gear-wheel E, which actuates the shafts of the knotter F and cord-holder G, both of which are journaled in the same frame. All of these parts are the same as shown in said former patent. The binder-shaft D carries the two discharge-arms LL, which travel in planes, lying one upon each side of the breastplate, so as to discharge the bundle after the knot is tied. The slot *a* in the breastplate, through which the binder-arm B passes to bring the cord to the knotter, may be straight so far as the placing of the cord is concerned, being provided only with a stop-shoulder *a'* for limiting the sweep of the binder-arm B, and its lower end, that is, the end adjacent to the knotter F, is widened, and across this enlarged portion is mounted a Z-shaped guide and discharge bar H. This bar H is pivoted in the upturned flanges flanking the breastplate A, as shown at *h h'*, the pivot-pins extending laterally from its end members, so that its body portion is at all times oblique to the axis of rotation, and the latter is transverse, as shown, exactly perpendicular to the plane in which the binder-arm B oscillates.

The bar H is directly in front of the knotter F, that is, it intercepts the cord as brought over by the binder-arm before it reaches the knotter, and it is as close to the knotter as may be without interference therewith. The pivot-pin *h* of the bar H, lying back of the normal position of the heel of the knotter F, is of sufficient length to carry a coiled spring *k*, one end of which is attached to a trip-arm M, fixed upon the pivot *h*, the other end reacting against the breastplate A, so as to hold the bar H in one of its positions, which may be called "normal," the arm M having a heel *m*, which contacts with the surface of the breastplate to stop the arm when thrown back by the spring. While I regard the spring as the most satisfactory means for restoring the bar to its normal position, any other means will

come within the scope of the invention. A stud L' , projecting laterally from one of the discharge-arms L and provided with an anti-friction-roller, contacts with the trip-arm M as the discharge-arms swing around to discharge the bundle, and moves it and the bar II through about ninety degrees, the bar being immediately restored to its normal position by the spring k when the stud L' passes off from the arm M .

The Z -bar II and the trip-arm M are so disposed relatively that when in its normal position the end member of the former at the front side of the slot projects upwardly and backwardly toward the direction of approach of the binder-arm, the body portion trending from the tip of the knotter obliquely downwardly and forwardly under the heel thereof. The Z -bar assumes its normal position just before the recession of the binder-arm, and remains in that position until after the rotation of the knotter-hook F . While in its normal position, therefore, the cord leading from the cord-holder to the eye of the binder-arm is laid across it, and as the strain of the forming gavel carries this portion of the cord back under the breastplate it is bent over the oblique member of the bar II and drawn downwardly toward the lower end thereof and thereby carried well toward the shank of the knotter-hook. As the other bight of the cord is laid over the knotter-hook by the needle-arm it is drawn taut over this oblique member of the bar II and in like manner carried toward the shank of the knotter, so that both strands are placed in the best position for the successful operation of the knotter. The knotter having rotated, the discharge-arms L move through their orbits to discharge the bundle. As they come into contact with the bundle the stud L' strikes the trip-arm M , as indicated by dotted lines, Fig. 3, and rocks the Z -bar II , bringing it to the position shown by solid lines in the same figure, so that its oblique body portion trends toward the tip of the knotter and in the direction of the discharge of the bundle. The strain of the discharging bundle upon the cord x will therefore slide it along the oblique member of the bar II toward and beyond the tip of the knotter-hook, stripping the knot from the bill of the knotter over the two ends of the cord held between its mandibles, and thereby completing the tying operation. By this construction I secure a reversible guide-bar for the cord which first brings it to its proper position with reference to the knotter-hook and then discharges it therefrom. I am able to bring the bill of the knotter to rest in a position transverse to the cord as laid by the binder-arm, so that it better receives the cord, and to still provide for the stripping of the knot from the bill by the strain of the bundle under the pressure of the discharge-arms. It is obvious that the guide-bar would perform its function equally well if in its normal position it trended through a plane parallel with the

breastplate and had a greater angular movement, the essential condition being that as the cord slides over its face under the strain of the forming gavel it be carried toward the shank of the knotter, while the movement of the cord over its face under the strain of the discharging bundle carries it toward the toe of the knotter.

While I have shown and described the guide and stripping bar II as having the form of the letter Z , this form may be departed from, it being essential only that the bar be capable of two positions, in one of which it receives the cord upon a face which inclines from the side of the slot a , toward which the knotter-bill is pointed, in the direction of strain of the cord, and in the other it carries the cord upon a face which inclines from the opposite side of the slot toward the direction of strain. Any mechanism, however shaped, mounted, or operated, which meets these conditions comes within the scope of this invention.

I have not deemed it necessary to particularly describe the knotter, the cord-holder, or the mechanism for driving these parts, or to fully show or describe the binder-arm, as all of these parts are clearly shown in my earlier patent, are not changed in the construction now shown, and are well understood by those skilled in the art.

I claim—

1. The combination with the binding mechanism of a grain-binder, of a guide-bar for intercepting the cord between the knotter and the gavel and being oblique to the plane in which the cord is delivered, whereby the cord is guided laterally, and means for reversing the inclination of the bar with reference to such plane so that it will guide the cord laterally in the opposite direction.

2. The combination with a slotted breastplate, of a guide-bar pivotally mounted so that its axis of rotation extends across the slot of the plate and being oblique to the axis of its rotation, and means for oscillating such guide-bar.

3. The combination with a slotted breastplate and with the binder mechanism, of a guide-bar pivotally mounted so that its axis of rotation extends across the slot of the plate and being oblique to the axis of its rotation, a spring for holding the guide-bar in one of its positions, and mechanism for turning such guide-bar on its pivots in opposition to the spring.

4. The combination with a slotted breastplate and with the binder mechanism, of a guide-bar pivotally mounted so that its axis of rotation extends across the slot of the plate and being oblique to the axis of its rotation, a trip-arm connected with the guide-bar, a spring for holding the guide-bar in one of its positions, and mechanism for turning such guide-bar on its pivots in opposition to the spring.

5. The combination with a breastplate, having a slot through which the binding-cord is

brought to the knoter, and a rotative knoter-hook adapted to rest in a position transverse to said slot, of a **Z**-shaped guide and stripping bar pivotally mounted upon the breastplate so that its axis of rotation extends across said slot and having its diagonal member oblique to its axis of rotation, a spring for holding such guide-bar normally in such position that its oblique portion recedes from the tip of the knoter away from the direction of approach of the cord, and means for turning such bar to a reverse position.

6. The combination with a breastplate, having a slot through which the binding-cord is brought to the knoter, and a rotative knoter-hook adapted to rest in a position transverse to said slot, of a **Z**-shaped guide and stripping bar pivotally mounted upon the breastplate so that its axis of rotation extends across said slot and having its diagonal mem-

ber oblique to its axis of rotation, a spring for holding such guide-bar normally in such position that its oblique portion recedes from the tip of the knoter away from the direction of approach of the cord, an orbitally-moving discharge-arm, and a trip-arm projecting from the guide-bar and intercepting the orbit of the discharge-arm.

7. The combination with an orbitally-moving discharge-arm, of a reversible cord-guide and stripping-bar, and a trip-arm connected with the bar and intercepting the orbit of the discharge-arm.

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

BENJAMIN F. STEWART.

Witnesses:

SAKE D. THOMPSON,
LOUIS K. GILLSON.