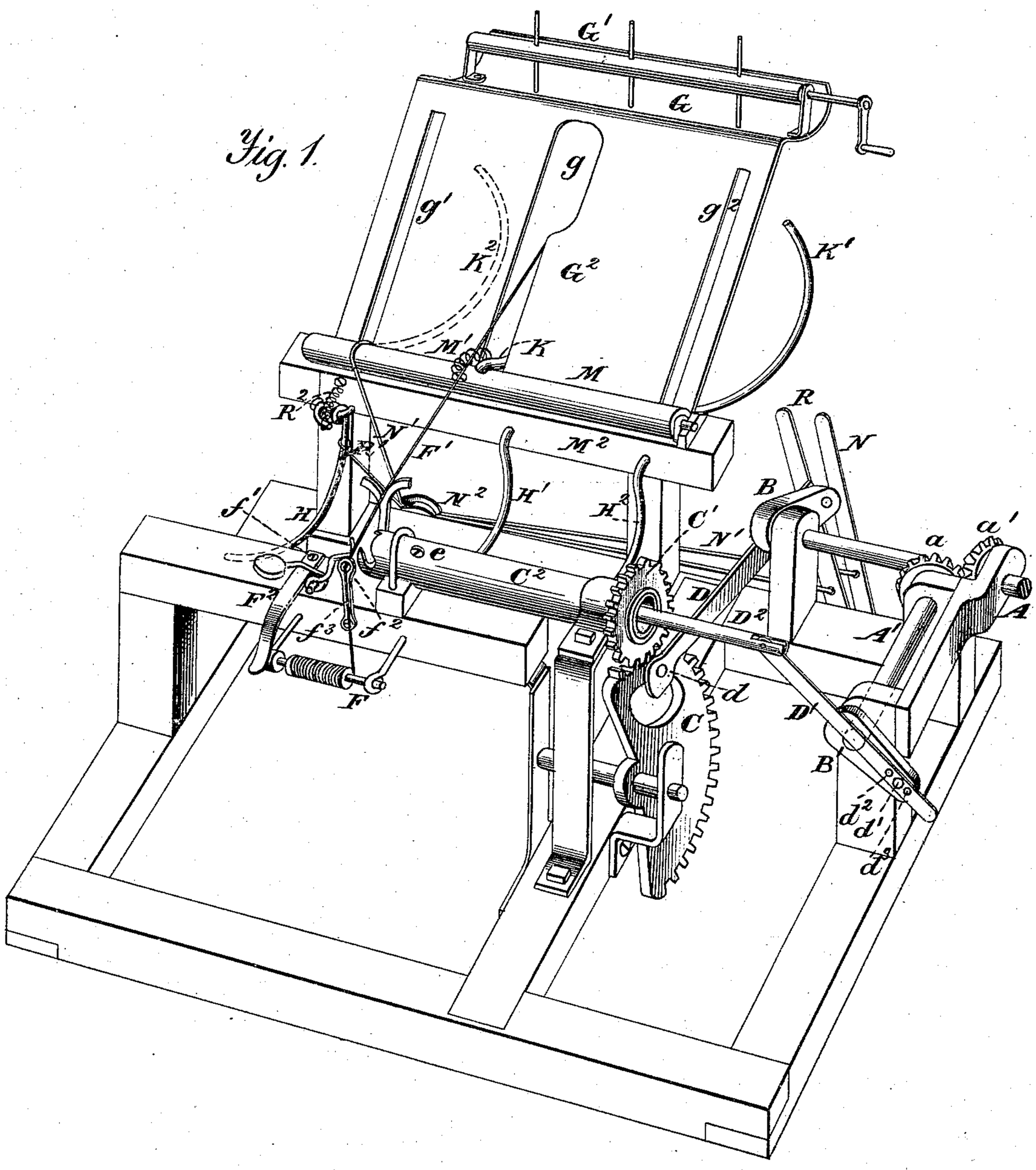
2 Sheets—Sheet 1.

W. M. PIATT.
Grain-Binder.

No. 223,754. Patented Jan. 20, 1880.

Fig. 1.



Witnesses.
A. Ruppert Jr.
D. P. Cowl

W. M. Piatt
Inventor.
D. P. Holloway & Co.
Attys

2 Sheets—Sheet 2.

W. M. PIATT.
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Fig. 2.

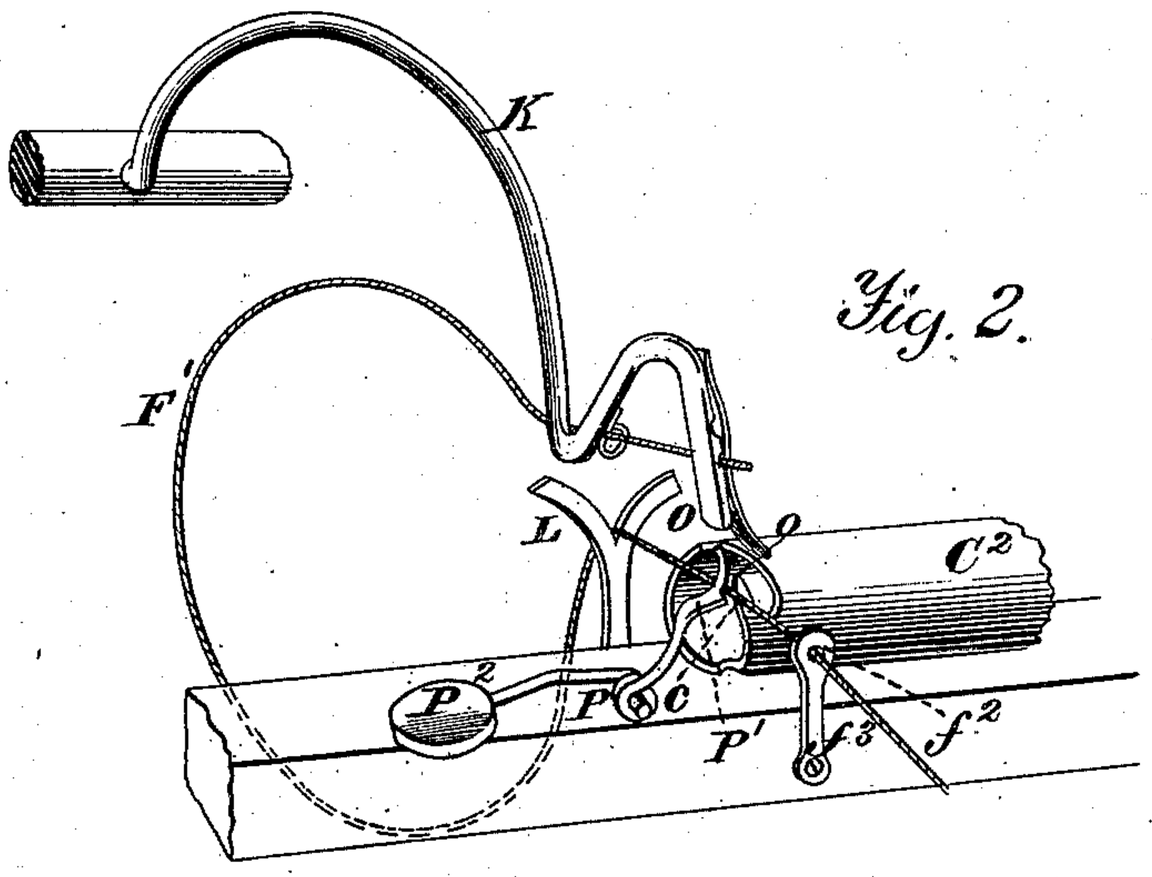


Fig. 3.

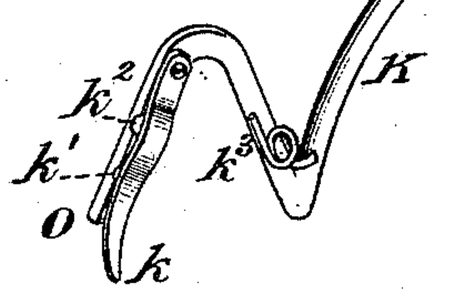


Fig. 5.

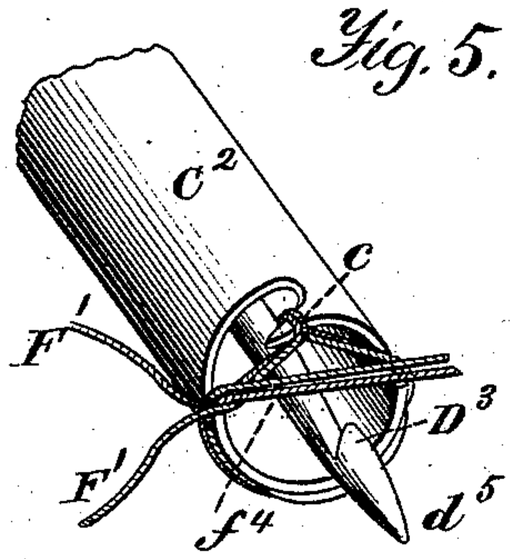


Fig. 4.

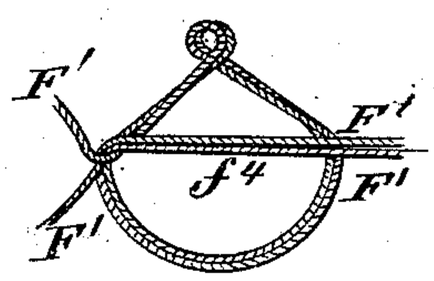


Fig. 6.

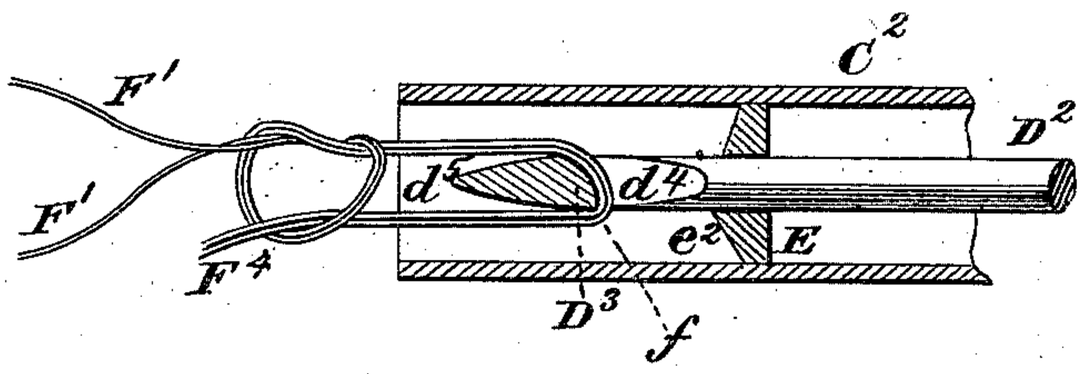
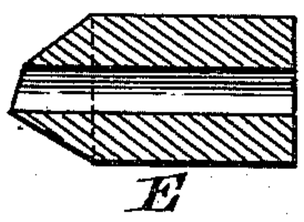


Fig. 7.



Witnesses.
A. Ruppert,
D. P. Lowe

M. M. Piatt
Inventor.
D. P. Holloway & Co
Atty

UNITED STATES PATENT OFFICE.

WILLIAM M. PIATT, OF WEST LIBERTY, OHIO.

GRAIN-BINDER.

SPECIFICATION forming part of Letters Patent No. 223,754, dated January 20, 1880.

Application filed March 21, 1879.

To all whom it may concern:

Be it known that I, WILLIAM M. PIATT, of West Liberty, in the county of Logan and State of Ohio, have invented certain new and useful Improvements in Grain-Binders; and I do hereby declare that the following is a full, clear, and exact description of the invention, which 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 letters of reference marked thereon, which form a part of this specification.

Figure 1 is a perspective view of my invention. Fig. 2 is a perspective view of the mechanism for forming the knot in the binding-cord. Fig. 3 is a perspective view of the cord carrying and holding arm. Fig. 4 is a front elevation of the binding-knot as partially formed. Fig. 5 is a perspective view of the mechanism for completing the knot. Fig. 6 is a section of the knot-forming mechanism, showing the devices for cutting the cord after the knot is formed. Fig. 7 is a longitudinal section of the cone which cuts the string after the knot is completed.

Identical letters are used to refer to identical parts in the drawings.

My invention consists in the hereinafter-designated combinations of mechanism for binding grain, as will more fully appear in the following description.

A is a shaft, to which continuous rotary motion is given by belt or gear attachment to any convenient shaft of the mechanism of the reaper to which my binding mechanism may be attached. B is a crank rigidly attached to this shaft A, and connected with a segment spur-wheel, C, by the rod D. C′ is a pinion operated by the segment spur-wheel C, and C^2 is a tubular shaft, which is rigidly attached to the pinion C′.

The connecting-rod D is attached to the periphery of the segment spur-wheel C by the wrist-pin *d* at such a distance from its center that the revolutions of the crank B will each give the segment spur-wheel C an oscillatory movement of about four-tenths of a circle and return, and the tubular shaft C^2 a movement of about eight-tenths of a circle and return, for each revolution of the shaft A. This oscillatory or forward and backward rotary motion is constant while the operative part of the reaper is in motion.

I do not confine myself to any stated amount of motion to be given to this tubular shaft, as it may be eight-tenths of a revolution, more or less.

A′ is a counter-shaft, driven by the beveled pinions *a* and *a′*. B′ is a crank rigidly attached to this counter-shaft A′, which runs at right angles to the shaft A. D^2 is a piston or plunger, which plays freely in the tubular shaft C^2, and is connected in direct lines with the crank B′ by the connecting-rod D′. The stroke of this piston may be regulated by inserting the wrist-pin *d′* in either of the holes d^2 or d^3.

In the other end of this piston a hook, D^3, is formed by a spiral notch, d^4, being cut in it, the end of the piston terminating in a point, d^5. This piston is in constant movement while the reaper is in operation.

E is a tubular-formed piece of steel inserted in the hollow shaft C^2, through which the piston D^2 freely works. This piece E is held in position adjustably by the set-screw *e*, and its outer edge, e^2, is cut spirally, the reverse of the spiral cut d^4 of the piston D^2, and so constructed and arranged that as the crank B′ returns the piston D^2 the cord F′ will be cut at *f* against e^2. F is a spool upon which the binding-cord F′ is wound, ready for use in binding the grain. F^2 is a tension-spring, bearing upon one head of the spool F, which tension may be regulated by the screw *f′*. To this spool there may be attached by a friction-bearing a clock-spring so constructed and arranged as to allow the paying out of the cord, the embracing part of the spring slipping upon the spool under a regulated friction. The rotation of the spool would coil the spring sufficiently to take up any slack in the cord which might occur in binding the grain.

The binding-cord F′ passes from the spool through the eye f^2 of the standard f^3, and passes nearly at right angles the hooked end of the tubular shaft C^2 and slightly above its center, and, resting in the V-shaped guiding-standard L, passes over the shaft M and through the opening *g* in the apron G^2, and is attached to the curved embracing-arm K by

being slipped under the spring *k* as far as the slight cut-away *k'* in the arm K.

The grain which is to be bound is received from the reaper, as it is cut, in the concave G. When a sufficient amount has been received to form a suitably-sized bundle the operator gives the revolving rake G' a half-turn, which forces the grain out of the concave, and from thence it passes down the inclined apron G^2 and is received by the curved arms H, H', and H^2.

The shaft M works freely in its bearings, and the embracing-arms K, K', and K^2 are rigidly attached to it, and are so arranged as to pass through the openings *g*, *g'*, and g^2.

M' is a suitable spring attached to the shaft M and the frame M^2, and so constructed as to return the shaft and its arms K, K', and K^2 to their position, as indicated in the drawings, in the rear of the apron.

The descending grain depresses the cord F', which draws the arm K forward, expanding the spring M' as the shaft M is turned. The operator then moves the lever N forward, which is connected with the shaft M by the cord N' passing over the sheave N^2. The cord is so attached to the shaft that this forward movement of the lever N causes the shaft M to revolve, carrying the arms K K' K^2 over upon the unbound grain, embracing it, in connection with the receiving-arms H H' H^2, and compressing it, and carrying the cord F' with the arm K, and engaging it with the spring k^3 sufficiently to prevent any sagging of the cord, as shown in Fig. 2. As the operator forces the arm K downward from the position shown in Fig. 2, the cord is placed double, the two strands being in parallel contact with each other, immediately in front of and in close contact with the hook *c*, that part of the cord which is supported by the eye f^2 and the standard L being forced under the springs *k* and k^3. This position of cord, grain, and parts having been reached, the further downward movement of the arm K causes the end O of the arm K to engage the heel P' of the weighted trip-lever P. The continued downward movement of the arm K depresses the trip-lever at P', and the toe or flange *o* causes the cord, as thus doubled, to be deflected toward the rapidly-revolving and returning hook *c*, which, as it revolves, engages the doubled cord as thus deflected, winds the cord around the tubular shaft C^2, taking up, of both ends of the same as passed around the grain, an amount equal to about the circumference of the shaft, thus providing for binding the grain securely.

The crank B' is so located on the shaft A' that as the doubled binding-cord F' has, by having been engaged by the hook *c* and wound by the revolution forward of the shaft C^2, reached the crossed position, as clearly indicated in Fig. 5, the hook D^3 engages the doubled cord as the reverse revolution of shaft C^2 releases it at f^4 from the hook *c*, and, the backward motion of the piston or plunger D^2 continuing, draws the knot, aided by the elasticity of the tightly-bound grain.

When the spirally-cut notch d^4 reaches the reverse spirally-cut tube E the cord is cut and the binding is completed. The bundle is now resting upon the receiving-arms H, H', and H^2.

The operator, by means of the lever R, which is attached to the receiving and supporting arm H by means of the cord R', depresses the arm H, which causes the bundle to be dropped from the machine.

The spring R^2 returns the arm H to and holds it in position.

The tension caused by the drawing of the knot, which is done almost instantly, causes the supply-cord to be forced under the spring *k* as far as the notch *k'*, and the waste end F^4 is forced up into the larger notch k^2, from which it is free to drop out. When the operator releases lever N, the spring *k* having engaged the cord, the spring M' returns the embracing-arms K, K', and K^2, carrying the binding-cord with them by drawing it off of the spool F, and the operation is repeated for the binding of each bundle.

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

1. The combination of the tubular shaft C^2, having a reciprocating rotary movement, and constructed with a hook, *c*, on its open end, and the centrally-placed notched and longitudinally-reciprocating piston D^2, and adjustable and spiral-edged piece E, for forming the knot and cutting the string, substantially as set forth.

2. The combination of the spool F, guides f^2 and L, oscillating arm K, and trip-lever P, substantially as set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

W. M. PIATT.

Witnesses:
I. D. PIATT,
C. S. WILLIAMS.