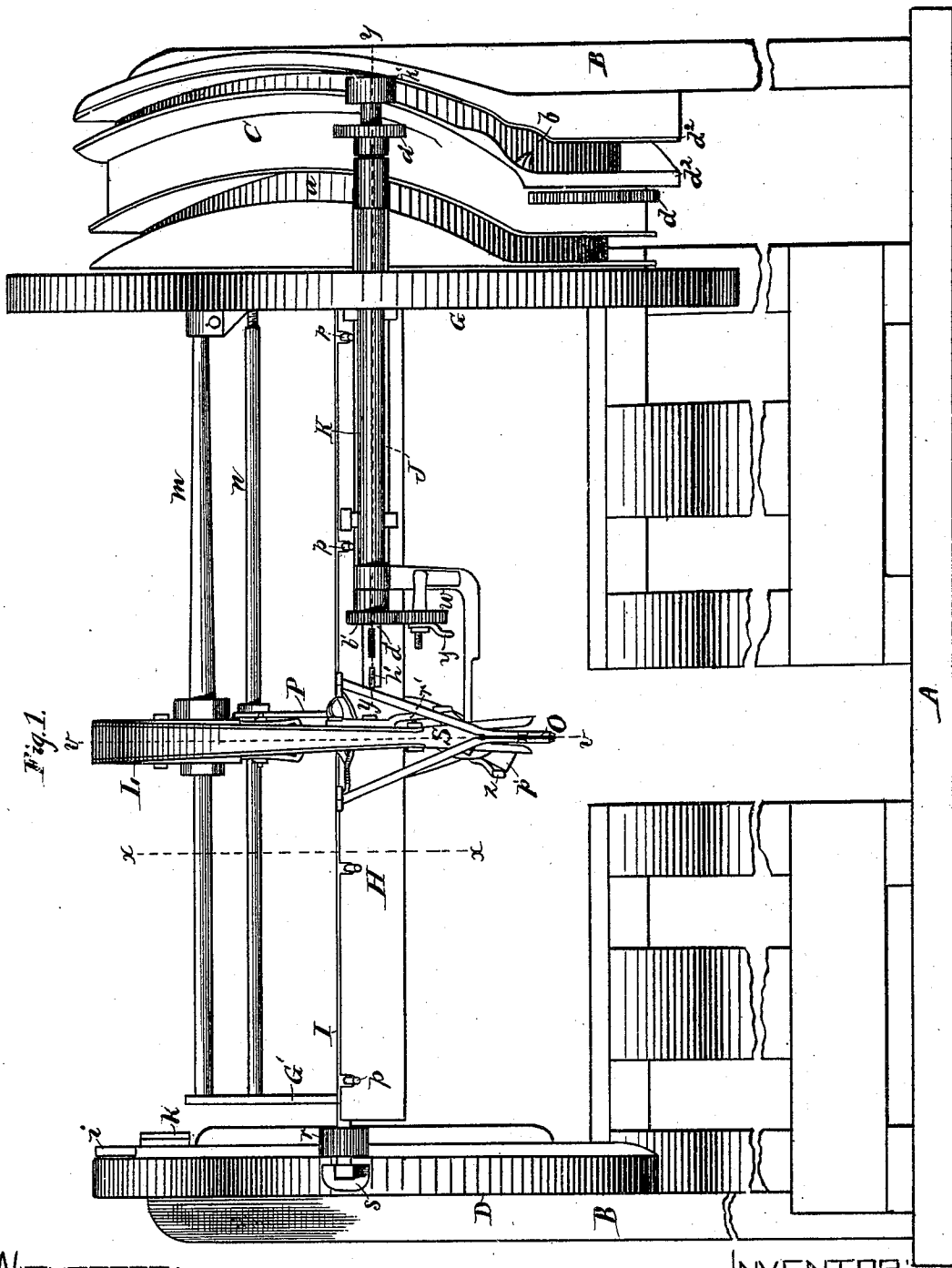


C. G. CROSSE.
GRAIN-BINDER.

No. 171,652.

Patented Jan. 4, 1876.



WITNESSES:

Jas. F. Duhamel
 Thomas. Byrne.

INVENTOR

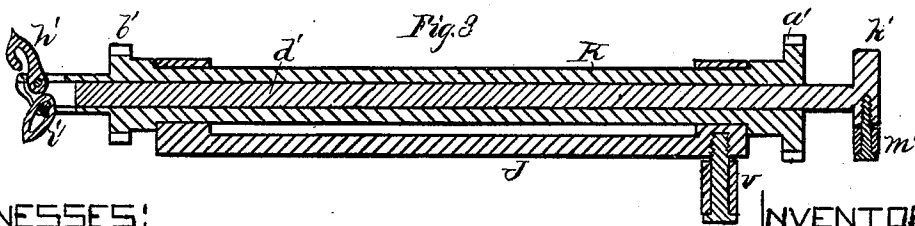
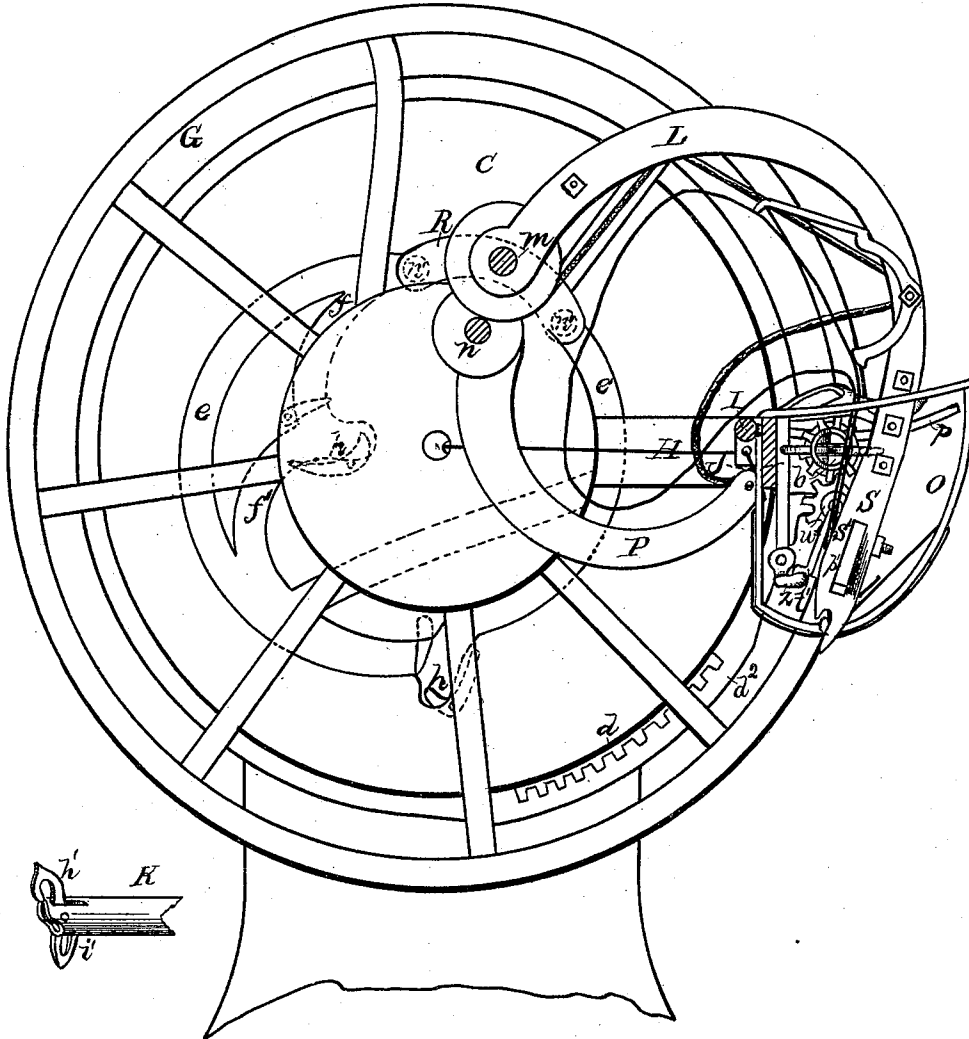
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Fig. 2.



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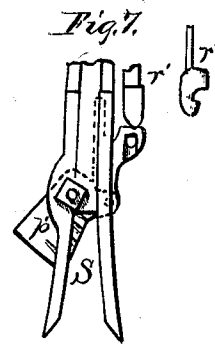
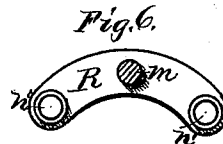
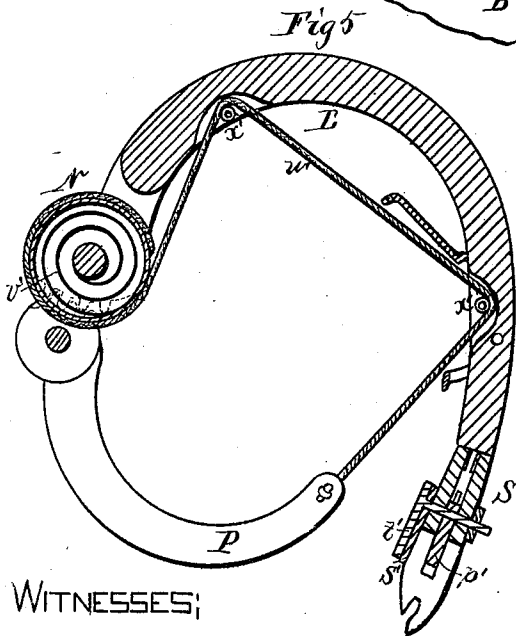
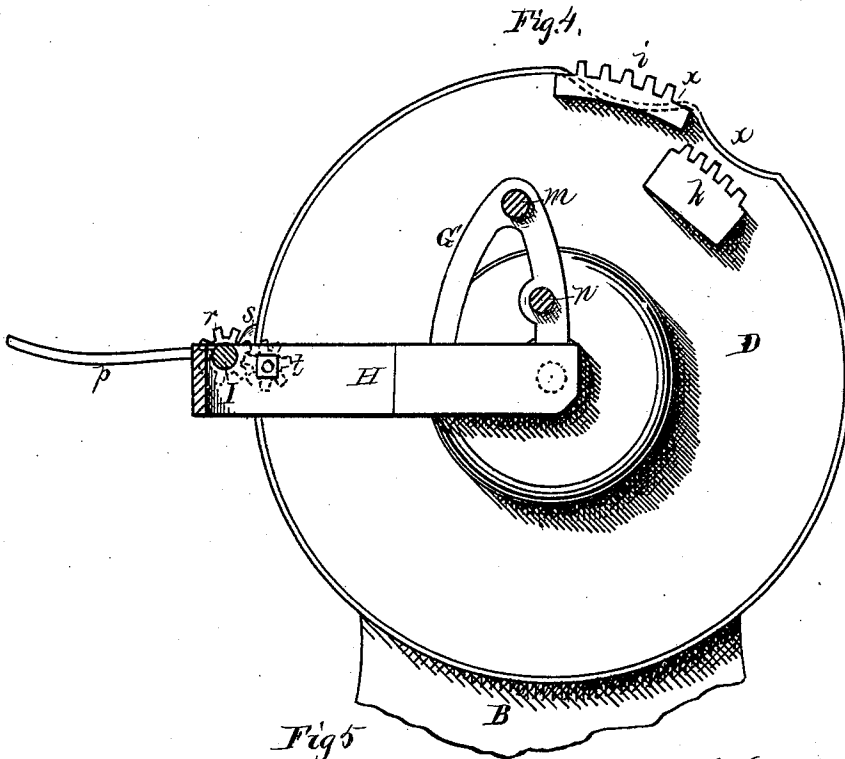
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C. G. CROSSE.
GRAIN-BINDER.

No. 171,652.

Patented Jan. 4, 1876.



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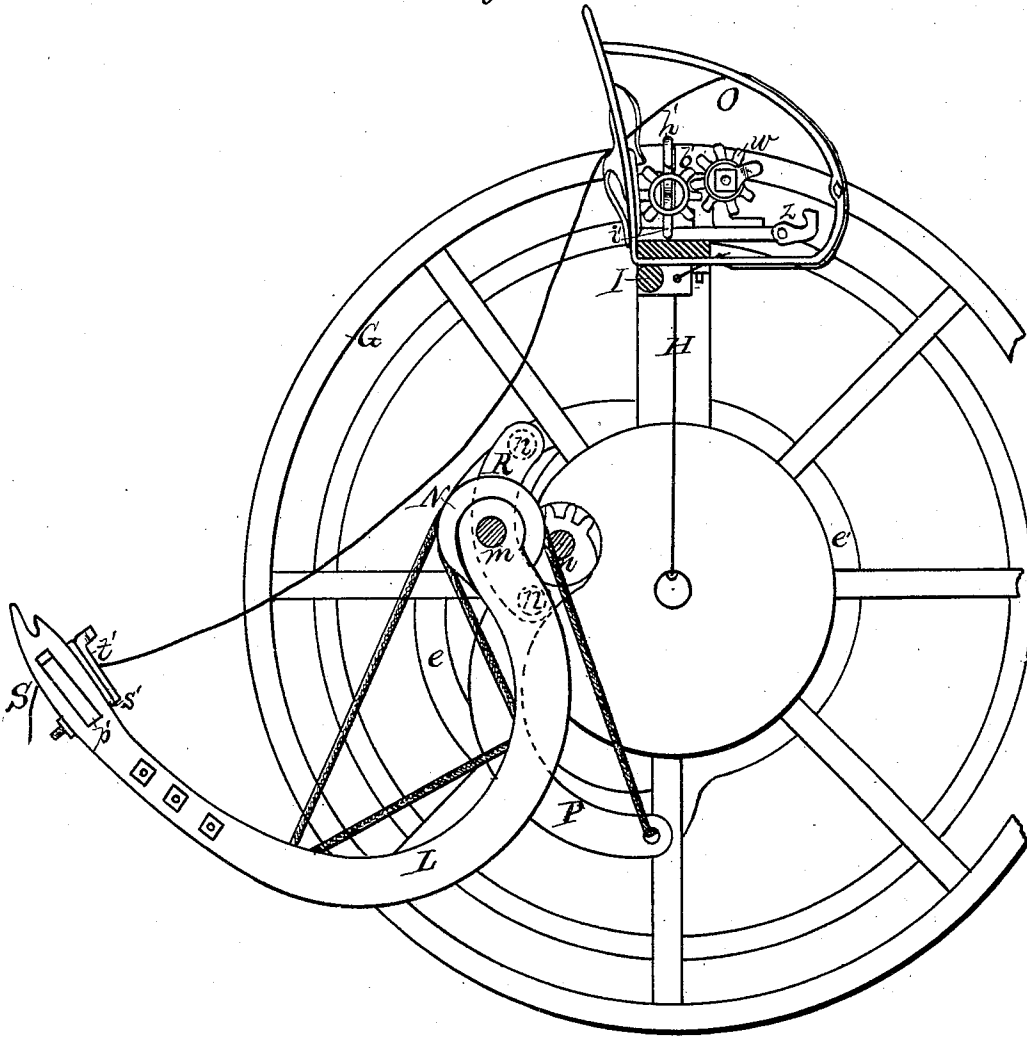
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Fig. 8.



WITNESSES;

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UNITED STATES PATENT OFFICE.

CHARLES G. CROSSE, OF SUN PRAIRIE, WISCONSIN.

IMPROVEMENT IN GRAIN-BINDERS.

Specification forming part of Letters Patent No. **171,652**, dated January 4, 1876; application filed June 21, 1875.

To all whom it may concern:

Be it known that I, CHARLES G. CROSSE, of Sun Prairie, county of Dane and State of Wisconsin, have invented certain new and useful Improvements in Grain-Binder, of which the following is a specification:

The nature of my invention consists in the construction and arrangement of a grain-binder, as will be hereinafter more fully set forth.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawings, which form a part of this specification, and in which—

Figure 1 is a side view of my invention with the arms opened. Fig. 2 is a sectional view taken upon the line *xx*, Fig. 1. Fig. 3 is a longitudinal section of shaft *K*. Fig. 4 shows inner side of wheel *D*. Fig. 5 is a longitudinal section of the rope-carrying arm *L*. Figs. 6 and 7 show detached parts. Fig. 8 is a view of my invention with the arms opened.

A represents an oblong frame, of any suitable dimensions, at each end of which is an upright standard, *B*. One of these standards supports a stationary cam, *C*, which is provided on its circumference with two eccentric grooves, *a* and *b*, and a cogged segment, *d*, a little in front of a vertical line drawn from the center of the cam. On the inner face of the cam *C* is an eccentric groove, divided into two parts, *e e'*, and formed with eccentric cross-grooves *f f'*, as shown, all arranged in such a manner as to guide two friction-rollers at the ends of the cross-bar on the shaft that supports the main arm, in such a manner as to produce alternately a forward and backward half-revolution of the shaft, and, consequently, of the arm. In the groove *f* are a self-adjusting bridge, *h*, and a lever, *h'*, and a similar bridge and lever are located at the lower junction of the grooves *e e'*. The outer face of the cam *C* is hollow, to make space for the spool *E*, which holds the twine for binding the grain. To the opposite standard *B* is secured a disk, *D*, having a smooth surface or periphery, which is traversed by a shoe at the end of the rake-shaft. Near the top of the disk *D* is a short cogged segment, *i*, project-

ing even with or slightly beyond the smooth circumference of the disk. On the inner face of the disk is another cogged segment, *k*, concentric with the former, and making, as it were, a broken continuation of the same. These two cogged segments are for the purpose of giving a forward and backward half-revolution of the rake-head, which throws the bundle out of the machine. Upon the inner face of the cam *C* revolves a large wheel, *G*, to which power is to be communicated by cog-gearing, chain and sprocket, or other suitable means. To this wheel is attached one end of a bent bar, *H*, to which the rake and tying machinery are affixed. This bar extends entirely across the machine, a short distance inward from the rim of the wheel *G*, and its ends are bent at right angles parallel with each other, and one of these bent ends of the bar is secured to the wheel. The wheel *G* also, at a suitable point, supports one end of the shafts *m n*, which bear the rope-carrying and compressing arms. The opposite ends of these shafts, as well as the other bent end of the bar *H*, are supported by corresponding portions of a wheel, *G'*, having its journal-bearing in the center of the stationary disk *D*. *I* is the rake-shaft, provided with teeth or fingers *p p*, and placed in suitable bearings on the under side of the bar *H*, along the front edge. The rake-shaft *I* is, at the end near the stationary disk *D*, provided with an elongated pinion, *r*, and outside thereof with a shoe, *s*. The pinion *r* meshes with an idle-pinion, *t*, mounted on a stud on the side of the bar *H*. The shoe *s* slides on the smooth surface of the wheel *D* as the wheel *G*, with the machinery attached thereto, is revolved, and when the pinion *r* reaches the cogged segment *i*, and traverses the same, the rake makes a half-revolution forward. As soon as the pinion *r* has passed the segment *i* the idle-pinion *t* gears with the segment *k*, and causes the rake to make a half-revolution backward to its former position. In the surface of the wheel *D*, directly opposite the segments *i k*, are recesses or depressions *xx*, to allow the shoe *s* to turn with the rake-shaft, and when the rake has been returned to its position the shoe slides over the smooth surface of the wheel, holding the rake and pinion in position. Upon

the upper surface of the bar H is a slide, J, moving in suitable guides thereon. This slide has at its outer end a stud with friction-roller *v*, which occupies the inner groove *a* in the convex surface of the cam C, and which thereby gives to the slide a forward and backward motion. At its inner end the slide supports a pinion, *w*, which is armed with a finger, *y*, as shown. This finger is intended, by its revolution at the proper moment, to lift a spring and open the jaw that holds the twine at the extremity of the rope-carrying arm. At the extreme inner end of the slide J is a hook, *z*, which, as the slide is drawn backward, is intended to come in contact with a projection upon the lower surface of the said jaw, closing the same, causing it to bite off the twine and hold on to the end. The tier is supported upon the upper surface of the slide J, and consists of a hollow shaft, K, upon the outer end of which is a pinion, *a'*, to work in the cog-segment *d* upon the convex surface of the cam C, thereby giving a revolution to the tier. Near the inner end, on the hollow shaft K, is another pinion, *b'*, which meshes with and revolves the pinion *w* on the inner end of the slide, when the shaft is revolved by the pinion *a'* working in the cog-segment *d*.

In the inner end of the hollow shaft K are elongated mortises or slots, through which the fingers *h'* and *i'* of the internal shaft *d'* are moved. The shaft or rod *d'* passes through the hollow shaft or cylinder K, and its outer end is provided with a semicircular disk or shoe, *k'*, which revolves between two plates, *d²* *d²*, opposite the cog-segment *d* of the cam C, thus holding the rod *d'* pressed into the hollow shaft K. The concave surface of the shoe *k'* is provided with a stud and friction-roller, *m'*, which occupies the outer groove *b* of the convex surface of the cam C, except while the tier is being revolved by the pinion *a'*, working in the cog-segment *d*. In the inner end of the rod *d'* are pivoted the fingers *h'* *i'*, which occupy the mortises in the hollow shaft K, and manipulate the twine in the act of tying the band. The superior finger *h'*, at its external end, is formed with a double crescent-shaped hook. The upper crescent of this hook, when the rod is pushed forward, catches the twine, and draws it backward, permitting the lower crescent of the hook to pass around it during the revolution. The inferior finger *i'*, coming in contact with the twine, throws it forward again; and when the revolution is completed, the rod being drawn back, the lower crescent of the hook seizes the twine, while the loop, pushed forward by the inferior finger, slips over the part thus held by the hook. The slide being then drawn back, the knot formed as just described is tightened, the twine cut off, and the end held by the jaw. L is the rope-carrying arm, secured in the center of the shaft *m*; and P is the arm for compressing the bundle, secured in the center of the shaft *n*, and the inner ends of said arms are connected by means of cog-segments. On the end of the shaft *m* which is

supported in the wheel G is a cross-bar, R, having at each end a stud with friction-roller *n'*, which rollers work in the eccentric grooves in the inner face of the cam C in the following manner: The two rollers *n'* *n'* work in the groove *e'*, and when in that place the arms L P are closed. The first roller then enters the groove *f*, and, just at the time when the second roller would enter said groove, the first roller comes in contact with, and is guided by, the bridge *h h*, into a pocket formed therein. The cross-bar R then turns upon the first roller as a fulcrum, the second roller passing into the groove *e'*, and through the same until it gets past the lower end of the groove *f'*, when the first roller, which is now behind, clears the bridges, and follows out of the groove *f'*. By this movement the arms L P are opened to receive the grain. In like manner the arms are closed again by the second roller, which is now in front, being stopped by the lower bridge, and, the first roller passing through the groove *f'*, causing the cross-bar R to turn back again until both rollers enter the groove *e'* in their original order. The rope-carrying arm L is curved, as shown, and its outer end formed or provided with a beak, S, in which is pivoted a horizontal jaw, *p'*. The inner end of this jaw projects on the side of the beak, and is held by a spring, *r'*, when the jaw is closed. On the pivot of the jaw *p'*, on the underside of the beak, is secured an arm, *t'*, carrying the knife or shear-blade *s'*.

The twine for the bands passes from the spool E through the axis of the large wheel G; thence up on its inner face to the lower surface of the bar H; thence along said bar to a point opposite the standard O, upon which the beak S impinges; thence up the posterior surface of said standard through the forked end thereof to the beak. The standard O is secured to the bar H, as shown.

At the inner end of the rope-carrying arm L is a drum, N, containing a spring, *v'*, to which the band *w'* is attached. This band passes through pulleys *x'* on the arm L to the end of the compressing-arm P.

The operation of the machine is substantially as follows: Power being applied to the large wheel G, the arms L P are thrown open by the action of the double friction-rollers *n'* in the face of the cam. The fingers *p* of the rake, coming in contact with the grain, press it forward until the reversed action of the arms causes the band *w'* to compress the grain against the rake, and the arm L carrying the twine around it. The beak S bestrides the twine previous to impinging upon the standard O, the two ends of the band thus lying across the upper crescent of the hook of the tier, when the tier revolves and ties the knot, as before described. When the tying is completed the arms are again thrown open, and the rake performs its half-revolution forward, discharging the bundle from the machine—then backward again to position.

Having thus fully described my invention,

what I claim as new, and desire to secure by Letters Patent, is—

1. The eccentric grooves *e e'*, with eccentric cross-grooves *f f'*, and the self-adjusting bridges *h h'*, all arranged in the inner face of the cam C, in combination with the rope-arm shaft *m*, cross-bar R, and friction-rollers *n' n'*, substantially as and for the purposes herein set forth.

2. The combination of the rake I *p*, pinion *r*, shoe *s*, idle-pinion *t*, and the stationary disk D, having cog-segments *i k* and recesses *x x*, substantially as and for the purposes herein set forth.

3. The slide J, provided with the friction-roller *v*, pinion *w*, finger *y*, and hook *z*, in combination with the hollow shaft K and pinion *b'*, substantially as described.

4. The hollow tier-shaft K, provided with the pinions *a' b'*, in combination with the cog-segment *d* on the cam C, and the pinion *w* on the slide J, substantially as and for the purposes herein set forth.

5. The combination of the slide J, hollow shaft K, slotted at its inner end, and the mov-

able internal shaft *d'*, with the pivoted fingers *h' i'*, substantially as and for the purposes herein set forth.

6. The combination of the shaft or rod *d'* with the pivoted fingers *h' i'*, the shoe *k'*, roller *m'*, and groove *b* and plates *d'* in the cam C, substantially as and for the purposes herein set forth.

7. The rope-carrying arm L, beak S, jaw *p'*, spring *r'*, and arm *t'*, with blade *s'*, all combined and arranged substantially as and for the purposes herein set forth.

8. The combination of the arms L and P, geared together at their inner ends, the drum N, with spring *v'*, and compressing-band *w'*, all substantially as and for the purposes herein set forth.

In testimony that I claim the foregoing as my invention, I hereunto affix my signature this 7th day of June, 1875.

CHARLES GILES CROSSE.

Witnesses:

C. C. LABORE,
L. V. LEWIS.