(No Model.)

# C. FARNER & G. LINDER.

## KNOTTER FOR GRAIN BINDERS.

No. 384,245. Patented June 12, 1888.

Fig. 1

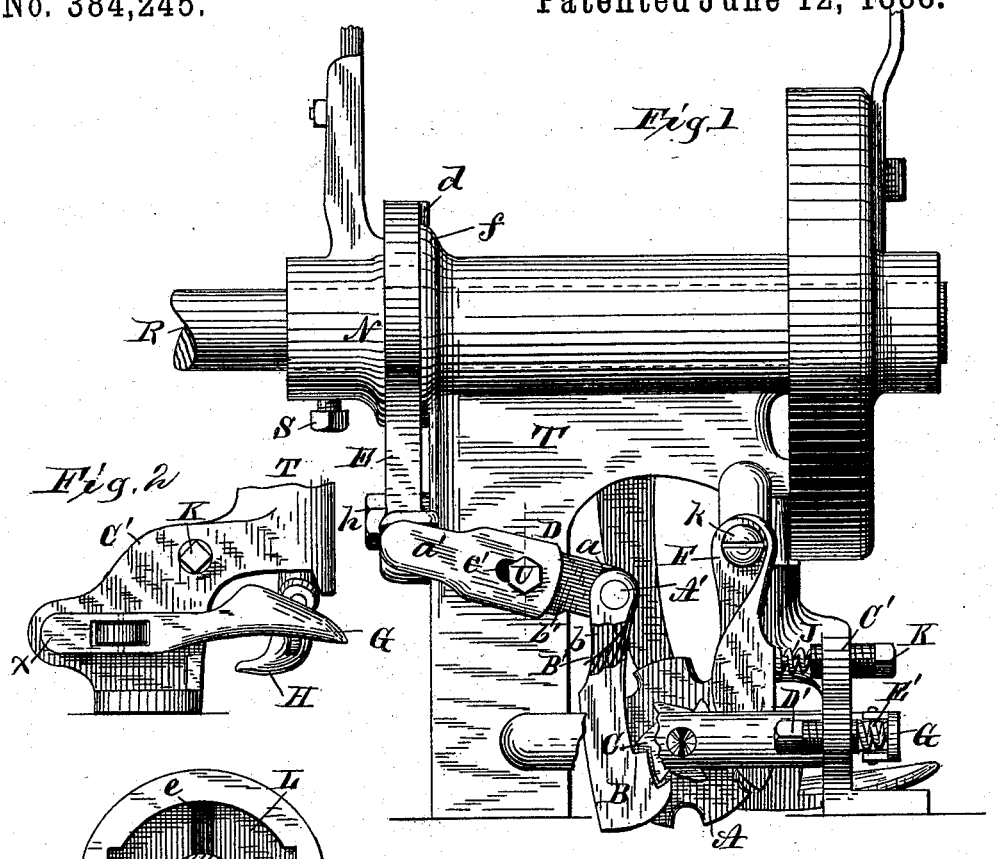



Fig. 2

Fig. 3

Fig. 5

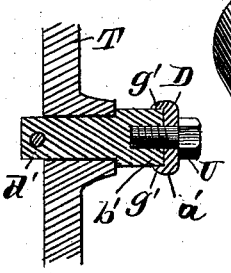
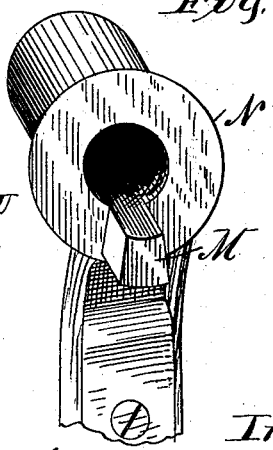



Fig. 4

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# UNITED STATES PATENT OFFICE.

CONRAD FARNER AND GEORGE LINDER, OF MILWAUKEE, WISCONSIN.

## KNOTTER FOR GRAIN-BINDERS.

SPECIFICATION forming part of Letters Patent No. 384,245, dated June 12, 1888.

Application filed March 1, 1886. Serial No. 193,646. (No model.)

*To all whom it may concern:*

Be it known that we, CONRAD FARNER and GEORGE LINDER, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented new and useful Improvements in Knotters for Grain-Binders; and we do hereby declare the following to be a full, clear, and exact description of said invention, reference being had to the accompanying drawings, and to the letters or figures of reference marked thereon, which form a part of this specification.

Our invention relates to improvements in knotters for grain-binders; and it consists in certain improvements in devices and certain combinations and arrangement of devices, hereinafter set forth.

In the drawings, Figure 1 represents a rear view of the device embodying our invention. Figs. 2, 3, 4, and 5 are details.

Like parts are represented by the same reference-letters throughout the several views.

The device for holding the end of the cord, consisting of the disk A and grooved arm F, the device for carrying the cord around the bundle, the jaws H, for tying the knot, and the device for cutting the cord are all constructed in the ordinary manner.

Our improvements relate more especially to the construction and arrangement of the devices for rotating the cord-holding disk or wheel A, consisting of the pawl B, ratchet C, lever D, and vertically-moving slide E, the device for holding and regulating the pressure of the cord-holding lever F against the periphery of the wheel A consisting of the spiral spring J and adjusting-screw K, and the device for holding and regulating the pressure of the lever G against the jaws H.

The slide E is provided with an elliptically-shaped aperture, L, for the reception of the lug M, which lug projects therein from the face of the collar N. Each end of the recess L is provided with an angular recess, O and P, in which the lug M engages as it moves with the shaft R. The collar N is secured to the shaft R by a set-screw, S. Thus when the lug M moves above and below the shaft R it moves the slide slowly; but when said lug M enters the recess P it carries the slide E up with a quick positive movement until the lug escapes from said recess above the shaft. The lug then passes over the shaft communicating but little movement to the slide until it descends into the recess O, when it carries the slide down with a quick movement until it escapes from said recess below the shaft. Thus the required movement is communicated to said slide E at the proper moment for operating the cord-holding disk A, and such movement is communicated from said slide to the disk A through the lever D, pawl B, and ratchet-wheel C. The lever D is pivoted to the side of the frame T by the shaft $d'$, to which it is secured by the bolt $u$, and to the slide E by pin W, which pin W operates in the recess or slot $y$. The opposite end of the lever D is pivoted to the pawl B by a pin, A'. The pawl B is retained in contact with the ratchet-wheel C by the plate spring B', which spring B' is held at its upper end within a recess at $a$, formed in the lever D, and the lower end of said spring is secured in a recess, $b$, formed in the upper end of the pawl B, and the tension of said spring is such as to throw the lower end of the pawl against said ratchet C. The slide E is provided with a vertical flange, $d$, which operates in a corresponding groove at $e$, formed in the face of the shoulder $f$. The lower end of said slide is provided with a slot, $g$, for the reception of the bolt $h$, which bolt is affixed to the stationary frame T. Thus the slide E is retained in place against the end of the frame T and guided in its vertical movement by the flange $d$ and bolt $h$. The grooved cord-holding lever F is pivoted at its upper end to the frame T upon the bolt $k$, and its lower end is retained in contact with and pressed firmly against the disk A by the spiral spring J and adjusting and retaining screw K. The screw K is held in place by the flange C', through which it passes, and in which it is adjusted toward or from said arm F. The inner end of said adjusting-screw K is provided with a recess for holding the end of said spring J, by which said spring is held in position against said arm. A similar screw and tension spring to that last described, indicated by D' and E', are employed to hold and regulate the pressure of the lever G against the knotter-jaws H. The screw D' is held in place by said flange C', in which it is adjusted, and one end of said spring E' is

held in place within a recess formed in the end of said screw, while the opposite end of said spring bears against the short arm of said lever G at *x*. (Shown in Fig. 2.) The pressure of the lever G against said jaws H may be increased by turning said screw D′ inward, and diminished by turning it outward. Thus it is obvious that the screws K and D′ are adapted by their construction to perform their twofold function of holding the tension-springs in place and regulating their tension, and, owing to the limited space they occupy, they are especially adapted to be used in the combination shown.

The lever D is formed in two separate pieces, *a′* and *b′*, which overlap each other at the retaining-bolt *u*. The part *a′* is provided with an elongated hole or slot, *c′*, through which the retaining-bolt *u* passes, which slot permits of said part *a′* being extended or contracted. The part *b′* is rigidly attached to the shaft *d′* and turns with it. The part *a′* is provided with flanges *g′ g′*, which overlap the edges of the part *b′* in such a manner that when the retaining-bolt *u* is inserted and turned firmly down the two parts of the lever are held rigidly in place.

We are aware that similar spiral springs, E′ and J, have heretofore been held in place against a shoulder upon and around the exterior surface of adjusting-screws, while such springs are by our improvements held in place within a recess formed in the interior of the adjusting-screws D and K.

Owing to the limited space for the springs E and J between the spring supporting shoulder C′ and the bearing-surface of the cord-holding arm F and the lever G it has heretofore been common to employ flat plate springs instead of spiral springs, it being difficult to insert a spiral spring of sufficient length in the limited spaces allowed when such springs were placed against the end of the adjusting-screws, while it is obvious that by using recessed adjusting-screws G′ and K the length of the spiral springs may be greatly increased, so as to extend within the screws through the screw-supporting shoulder C′, to or near their outer ends, and we are enabled to insert a much longer spiral spring than we could otherwise, which will produce the required movements, while it is obvious that when supporting the springs upon the outside of or against the ends of the screws the length of the spring is limited by the space between the end of the screw and its opposing bearings.

Having thus described our improvements, what we claim as new, and desire to secure by Letters Patent, is—

1. In twine binders for harvesters, the combination of the shaft R, collar N, provided with lug M, slide E, provided with elliptically-shaped recess L and angular recesses O and P, said slide being adapted to be moved upward and downward by the circular movement of said lug M within said recess, lever D, centrally pivoted to the supporting-frame T, pawl B, and ratchet-wheel C, affixed to the side of the cord-holding disk A, substantially as and for the purpose set forth.

2. In a cord-knotter for grain-binders, the combination of the shaft R, collar N, provided with lug M, slide E, having recesses L, O, and P, said slide E being guided in its reciprocating movement by the bolt *h*, operating in slot *g* and connecting at its lower end by a movable joint with the pawl-lever D, lever D, formed in two parts adjustably secured together and pivoted to the frame T upon the shaft or trunnion *d′*, pawl B, and ratchet-wheel C, said wheel C being affixed to the side of the cord-holding disk A, substantially as shown and described.

In testimony whereof we affix our signatures in presence of two witnesses.

CONRAD FARNER.
GEORGE LINDER.

Witnesses:
JAS. B. ERWIN,
E. R. INMAN.