J. H. WHITNEY.

Grain-Binder.

No. 163,830. Patented May 25, 1875.

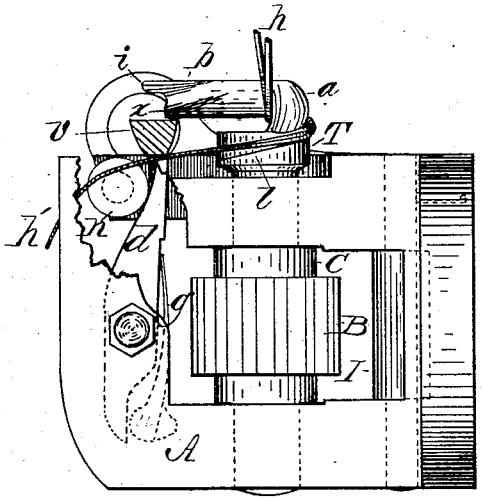

Fig. 3.

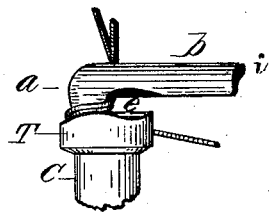

Fig. 4.

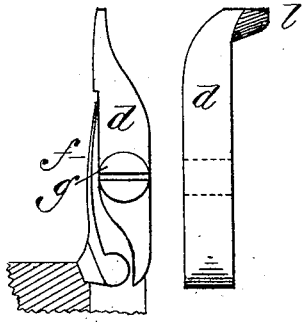

Fig. 5.

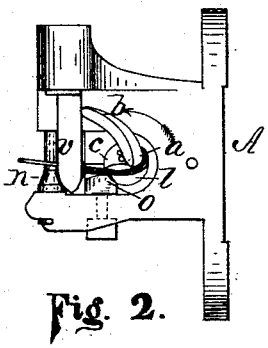

Fig. 2.

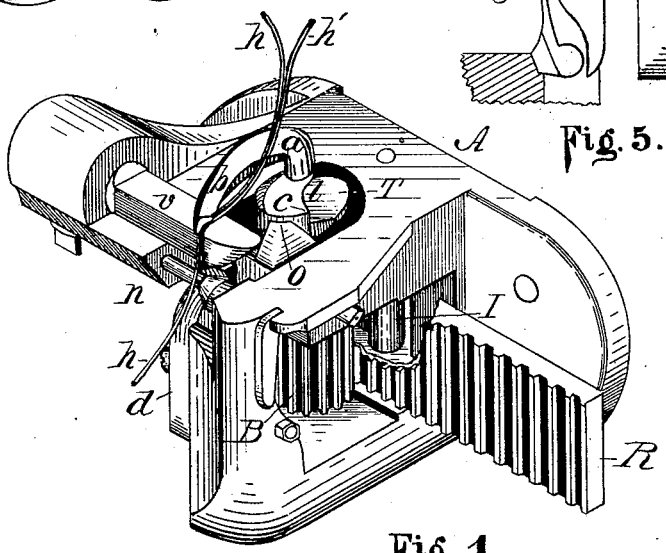

Fig. 1.

Witnesses:

Thos. Houghton.

Will. H. Dodge

Inventor:

John H. Whitney

by Dodger & Son

Attys.

THE GRAPHIC CO. PHOTO-LITH. 39 & 41 PARK PLACE, N.Y.

UNITED STATES PATENT OFFICE.

JOHN H. WHITNEY, OF ST. LOUIS, MISSOURI, ASSIGNOR TO SUMNER & WHITNEY MANUFACTURING COMPANY, OF SAME PLACE.

IMPROVEMENT IN GRAIN-BINDERS.

Specification forming part of Letters Patent No. **163,830**, dated May 25, 1875; application filed November 18, 1874.

To all whom it may concern:

Be it known that I, JOHN H. WHITNEY, of St. Louis, in the county of St. Louis and State of Missouri, have invented certain Improvements in Grain-Binders, of which the following is a specification:

My invention relates to automatic binders for binding grain; and the invention consists of a rotating shaft having an eccentric spindle, around which the wire is bent and held while being twisted, together with devices for holding and bringing the wire into proper position, and for cutting off the wire, as hereinafter more specifically described.

Figure 1 is a perspective view; Fig. 2, a top-plan view; Fig. 3, a side elevation; and Figs. 4 and 5 are views of portions shown detached.

The object of this invention is to produce a device for twisting and cutting off the wire used for binding the bundles of grain in a grain-binding machine or attachment to harvesters, which devices are usually denominated twisters.

In constructing my twister, I provide a strong metallic frame, which is best made by casting it in a solid block of the required size and form, or nearly so, and then finishing it to receive and support the operating parts, this frame being represented by A, Figs. 1, 2, and 3, it being provided with ears or flanges, by which it is bolted securely and rigidly to the frame of the machine. Centrally within this frame I locate the twisting device, which is mounted on a vertical shaft, C, on which is secured a pinion, B, as represented in Fig. 3, so that it may be rotated by a toothed rack, R, which is made to play back and forth through an opening in the frame A, there being a friction-roller, I, at the back of the rack, to hold it in gear with the pinion and prevent friction. At its upper end this shaft C is provided with a head or enlargement, T, as shown in Figs. 3 and 4, from the top of which there projects vertically a short spindle, *a*, which is located eccentrically thereon, as shown in Figs. 3 and 4, and from which a curved finger, *b*, projects horizontally, as shown. This finger *b*, at its outer end, is made concave on its inner face, as shown in Figs. 1 and 5, the concavity being inclined upward from the outer end toward the spindle, thus corresponding with the angle at which the wire is held, as shown in Fig. 1, the lip *i* on the top of the finger preventing the wire from slipping off, while the rounded lip *x* below helps to support the wire, and prevents it from being cut by being drawn tight over the edge of pin *v* as it is swept off by the finger.

The head T has one side cut away, so as to form an incline, *l*, as shown in Figs. 1 and 3, and close alongside of this incline there is formed a cutting-lip, *c*, as shown in Fig. 1. Close by the side of this head T I secure a lug or projection, *o*, the side of which next to the head is hollowed out so as to be concentric with the cutting-lip *c*, and fit close up against the outer face or periphery of the latter, as represented in Figs. 1 and 2.

A flat-faced pin, *v*, is secured in a horizontal position on a line with the top face of head T, and its upper face is of such a height that the finger *b* will just sweep over it, as the latter is rotated with the shaft C, the relative position of pin *v* and finger *b* being shown in Figs. 1 and 3. As shown in Fig. 1, the free or projecting end of this pin *v* is rounded and beveled under, as shown; and just under and outside of this pin *v* is located a friction-roller, *n*, which has a beveled or conical head at the end under the free end of the pin *v*, as represented in Figs. 1 and 2.

A clamping-lever, *d*, shown detached in Fig. 5, is pivoted to the frame A in such a position that its upper end (which has a laterally-projecting lip, *l*, on it, as shown in the right-hand view of Fig. 5) will come just under the outer or free end of pin *v*, as shown in Figs. 1 and 3.

It will be observed that this lever *d* is so pivoted in relation to the pin *v* that as its upper end is drawn or pressed outward it will tend to press tightly against the under side of the pin, it being pivoted eccentrically thereto. A spring, *g*, is arranged to bear against the upper portion of this lever *d*, for the purpose of keeping it pressed against the pin with sufficient force to clamp the wire *h* when inserted between them, as represented

in Fig. 3, and thus hold it securely in place. To prevent the upper end of the lever *d* from being moved so far as to cut the wire by pressing it too hard against the pin, I provide a stop, *u*, against which the lower end of the lever *d* strikes, when it has moved the proper distance, as shown in Figs. 3 and 5.

As represented in Fig. 4, the head T and finger *b* are slightly beveled or cut away on their rear side, as indicated at *e*, for more readily permitting the wire to be disengaged after the twisting has been completed.

The above devices, when thus constructed and arranged, constitute my improved twister and cutter; and the manner in which they operate is as follows: The frame A being securely bolted in position, and the rack R being suitably connected to the mechanism of the machine, which is arranged to operate intermittently, the wire *h* is carried by a needle (not shown in the drawings) down close alongside of the pin *v*, resting across the outer edge thereof, as shown in Fig. 1, a single strand only being thus presented at the first descent of the needle. The finger *b* then sweeps over the face of the pin *v*, forcing the wire off the end of the pin, at the same time causing it to engage with, and be twisted around, the spindle *a* as the shaft C rotates, thereby pulling the wire from the needle under the rounded end of the pin *v*, against the conical head of roller *n*, which, with the spindle *a*, forces it between the clamping-lever *d* and the under side of pin *v*. At this instant the wire will lie along on the incline *l*, as shown in Fig. 3, which will draw it down in front of the lip or projection *o*, when, as the twisting continues the cutting-lip *c* of head T will sweep past the stationary lip *o*, thereby severing the wire and leaving its end next the needle held fast between the lever *d* and pin *v*, as represented in Fig. 3, where *h'* represents the portion of the wire which leads to the needle.

So far the result has been simply to secure the free end of the wire extending from the needle, and clamp it fast between the finger and the lever *d*. After this is done the needle rises, leaving the free end of the wire thus held fast, and the needle remains elevated while the bundle of grain is being accumulated on the platform above, the bundle as it is thus being formed pressing against the wire *h'* which is thus pressed over the outer and upper corner of pin *v*, as shown in Fig. 1.

After the bundle has been formed, the needle descends again, bringing the wire *h* down alongside of the strand *h'*, across the outer edge of pin *v*, as represented in Fig. 1, when the finger *b*, coming around, sweeps both strands off the end of the pin, and causes them to engage around the spindle *a*, as the latter rotates, which draws them down on the incline *l*, so that the strand *h* is forced by the conical head of *n* under the stationary pin *v* and in front of lip *o*, when it is severed by the advancing cutting-lip *c*, the strand *h'* being drawn out of the clamp at the same time by the rotation of the spindle *a*, and leaving the end of the wire from the needle clamped fast as before, ready for another operation.

It will be observed that by the time the wire has been cut both strands have been wound once around the eccentric spindle *a*, which is sufficient to hold the free ends thereon, and at which time the two strands will extend upward through a hole above (not shown) in a line directly over the center of the shaft C, as shown in Figs. 3 and 4. While thus held upon the spindle, the latter is caused to make three or more rotations in the same direction as before, which gives to the two strands a corresponding number of twists, which fasten their ends securely together. When this has been done, the reverse movement of the rack R causes the shaft C to rotate in the reverse direction, whereby the free ends of the strands are unwound from around the spindle *a*, when the bundle, being moved, draws them up out of the way.

It will be observed that the ends of the strands are wound around the spindle *a* in an oblique or spiral position, as shown in Figs. 3 and 4, and the spindle being eccentric, in effect, backs out of the wire, as it were, where it is wound around it, the free ends passing out through the space *e*, between the head T and finger *b*, at the point where they are cut away for that purpose, as seen in Fig. 4.

By this construction, I am enabled to produce an exceedingly simple, strong, and efficient twisting and cutting device, and which I find by practical tests to operate in a most satisfactory manner, and which does not become disarranged or out of order.

As any suitable reciprocating needle may be used to carry the wire to the twister, and as such a device is shown in my patent of May 26, 1874, No. 151,459, I have not deemed it necessary to show any in this connection. An improved construction of needle intended to be used with this twister will, however, be described in connection with the mechanism for operating the same, in another application to be filed hereafter.

I am aware that various forms of rotating hooks have been used, some having a narrow slit, into which the wire is forced and held by friction, and others having hinged or sliding jaws or clamps for holding the wire, and I do not claim such. My twister differs from all such, in that it has no hinged or sliding clamping devices, and does not hold the wire by friction arising from its being forced or drawn into any narrow slit; but simply by its being wound or wrapped loosely around a spindle, *a*, its operation in this respect being similar to that of a spindle used for spinning or twisting yarn.

Having thus described my invention, what I claim is—

1. A twister for grain-binders, consisting of the rotating shaft C, having attached rig-