2 Sheets—Sheet 1.

W. A. SUTPHIN.

Grain-Binders.

No. 196,949. Patented Nov. 6, 1877.

Fig. 1

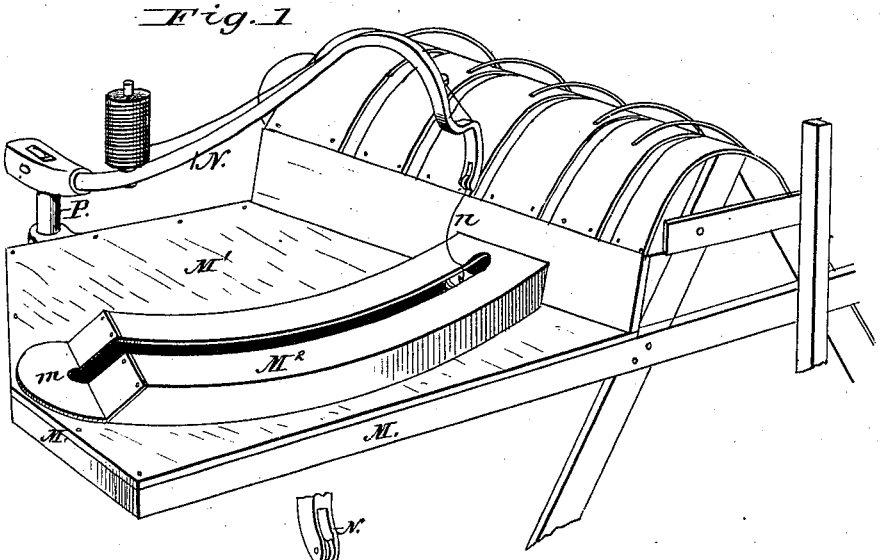


Fig. 2.

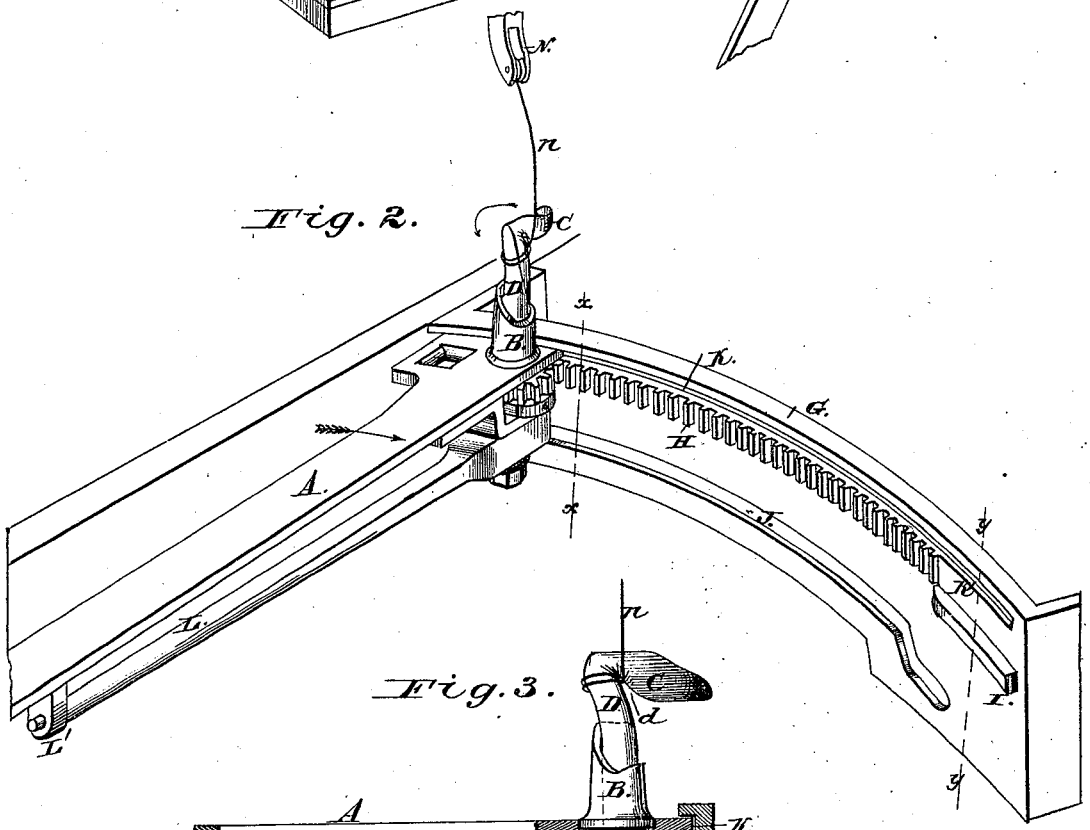
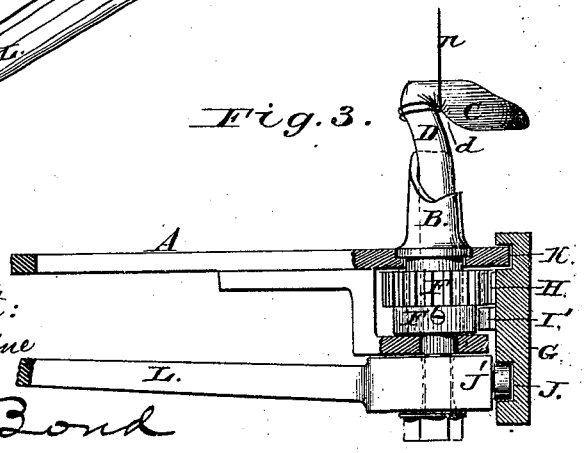


Fig. 3.



Attest:
H. L. Penine
L. L. Bond

Inventor.
Wm. A. Sutphin.

2 Sheets—Sheet 2.

W. A. SUTPHIN.

Grain-Binders.

No. 196,949. Patented Nov. 6, 1877.

Fig. 4.

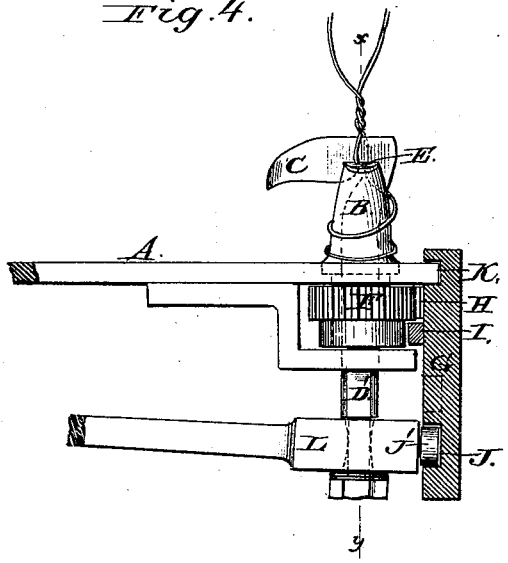


Fig. 5.

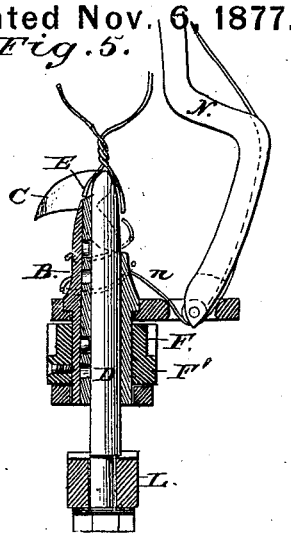


Fig. 6.

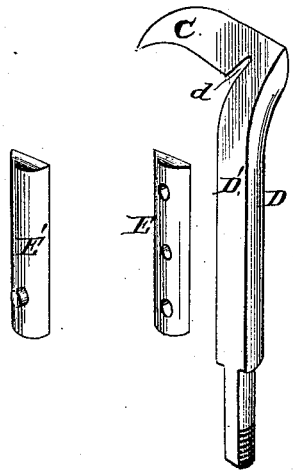


Fig. 7.

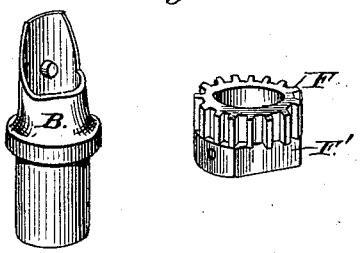


Fig. 9.

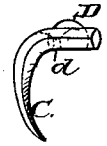
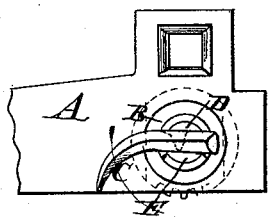


Fig. 8.



Attest:
H. C. Pennie
L. L. Bond

Inventor:
W. A. Sutphin

UNITED STATES PATENT OFFICE.

WILLIAM A. SUTPHIN, OF WASHINGTON, DISTRICT OF COLUMBIA.

IMPROVEMENT IN GRAIN-BINDERS.

Specification forming part of Letters Patent No. **196,949**, dated November 6, 1877; application filed November 1, 1877.

To all whom it may concern:

Be it known that I, WILLIAM A. SUTPHIN, of Washington city, District of Columbia, have invented a new and Improved Band Twister and Cutter and their Operating Devices for Automatic Grain-Binding Harvesters, which improvement is fully set forth in the following specification and accompanying drawing, in which—

Figure 1 is a perspective view of a harvester-elevator with my binder-table attached; Fig. 2, a perspective of the twister and its operating devices; Fig. 3, a section on the line *x x*, Fig. 2, looking toward the twister, showing the twister, &c., in elevation, and the arm supporting the twister broken away; Fig. 4, a section on the line *y y*, Fig. 2, looking toward the twister after it has made the twist and cut loose the bound bundle. Fig. 5 is a section of the thimble and knife on line *x y*, Fig. 4; Fig. 6, a detached view of the twister and knife; Fig. 7, detached views of the thimble and operating-pinion; Fig. 8, a plan of the twister and its supporting-arm, and Fig. 9 a plan showing a modification in the shape of the twister which will carry the wire to the center of rotation more readily.

The object of my invention is to furnish a twister, cutter, and wire-holder in a single device, which shall be simple in construction and easy of operation.

I have shown my invention as applied to the type of binders which have the binding or wire-carrying arm and twister-support attached to a pivoted post, which allows said arm and twister to swing from side to side of the platform; but it is equally applicable to binders where the twister has a fixed position, or is mounted on a reciprocating carriage, and derives its motion from a gear-wheel, sliding rack, or any preferred means of operation.

In the drawing, A is the arm or bar which supports the revolving thimble B. C is the twister or hook for catching the wire, and may be of any desired or preferred form. The hook C is made solid with its shank D, and substantially at right angles therewith. I provide a tapering or inverted V-shaped notch, *d*, at the intersection of the hook and shank, the direction of which is substantially longitudinal with the axis of said shank, the bottom or narrowest point of the notch terminating at or near the center of rotation of the twister.

The notch may be dispensed with, but I prefer its use.

The shank D passes through the thimble B, and has longitudinal movement therein, but is held from turning in the thimble by the flattened side D′, which fits against the flat side of the cutter E, the shank and cutter, when lying together, forming a circle in cross-section. They may, however, be of any other form, provided only that the relative longitudinal movement of the two shall be preserved.

The cutter E is secured to the thimble by a pin or pins in the thimble and a series of holes in the cutter, so that the cutter may be removed for sharpening, or replaced by another, or may be adjusted to the proper cutting-point as it wears away.

It may be found preferable to form a pin on the cutter, as at E′. It may be solid with or attached to the cutter, and to provide the thimble with a series of holes to receive the pins, so that the proper adjustment of the cutter can be made. The cutter may also be made solid with the thimble.

Another means for compensating for wear of the cutter is, the shank of the twister may be adjusted up or down in the bar L by means of washers placed under the nut or under the shoulder on the shank.

The thimble, which is shouldered, is journaled in the arm A, and is rotated by the pinion F. The pinion F and stop and lock collar F′ are made solid or secured together, and they may be secured to the thimble by a set-screw, slot and key, or any preferred means.

A segmental bar or frame-piece, G, is provided with a rack, H, locking-ribs I and I′, (one at each end of the rack,) and grooves J and K. The shank D is reduced in size at its lower end, leaving a shoulder, and is provided with a screw-thread to receive a nut as a means of attaching said shank to the bar L. The bar L is pivoted at L′ to the arm A, and has a hole in its opposite end for the reception of the shank D. The hole is slightly elongated from the center each way, to allow vertical play of the twister.

I have shown the arm A fitted to enter the

groove K at its front end to maintain it in working relation to the operating parts.

The operating parts of the binder are supported on the frame M, which may be made adjustable relative to the length of the grain by any known means.

The wire-carrying arm N and twister-supporting arm A are attached to and vibrate with the post P, which is journaled in the supporting-frame.

I have not shown any means for giving motion to the wire-carrying and twister-supporting arms, but propose to operate them by means substantially such as shown in an application for patent for a mechanical movement filed by me of even date herewith.

The operating parts, as shown in Figs. 1, 2, and 3, are in position to receive the gavel preparatory to placing the wire around it. After a sufficient quantity of grain has been collected against the wire *n* for a gavel, the arm N descends, carrying the wire down on the opposite side of the gavel to the twister, at which time the arm and twister commence to move across the platform, during which movement the twist in the band is made, the bound bundle is cut loose, and the wire from the spool is wound around the thimble, as represented in Figs. 4 and 5. Rotary motion is imparted to the twister by the pinion F as it is carried over the stationary rack. To retain the twister in the desired position at the ends of the rack, the locking-collar, which is flattened at each side, is brought in contact with the flanges I and I′.

The shank of the twister-hook has a vertical play in the thimble, and is governed by the bar L, provided on its end with a pin or anti-friction roller, J′, working in the groove J. The groove J is straight from its forward end to a point where the twist is completed, where it is carried below its straight line the proper distance to give the desired movement of the twister relative to the cutter to sever the wire that has been twisted, as represented in Figs. 4 and 5. After the cut has been made, the wire which was previously wound on the thimble from the spool is, by the upward movement of the arm N, drawn upon the shank, and into the tapering notch *d*, as represented in Figs. 2 and 3, where it is positively held by being wedged between the walls of the notch during the collecting of the gavel and the twisting of the band, when the before-described operation will be repeated.

The point of the twister should stop in such position relative to the wire-carrying arm that as it is raised the wire will be drawn from the thimble into the notch, with the wire from the spool carried on the convex side of the twister, so that as the hook catches the opposite end of the band in its concave side, the two ends of the band will be twisted across the top of the twister. The square edge of the notch *d*, formed by the flattened side of the shank, is drawn down on the end of the cutter, thus forming a shears, which severs the wire that was held in the notch, cutting loose each coil.

The relative movement of the twister and knife may be effected by giving a vertical movement to the knife, while the twister has a fixed position.

The table M^1 is a little lower than the top of the twister, and is provided with a projecting or raised portion, M^2, to cover the twister, leaving only a narrow opening for the point of the wire-carrying arm to pass through. Said raised portion is cut away at *m*, where the twister is drawn down on the knife, so that the sheaf may drop correspondingly.

This construction may be varied, however, so as to bring the twister entirely below the upper surface of the table, and thus dispense with the raised portion; or the twister may be located in a fixed position, requiring only an opening sufficient to admit the end of the wire-carrying arm to pass below the table.

What I claim as my invention is—

1. In combination with the wire-holding spool and suitable wire carrying and delivering mechanism, a twister and circumclosing-thimble, operating substantially as described.

2. The combination, substantially as hereinbefore set forth, of a twister and a circumclosing-thimble, upon which the end of the wire is wound to retain it preparatory to transferring to the shank of the twister.

3. A twister provided with a tapering notch substantially longitudinal with the axis thereof, whereby the end of the band is positively held during the gathering of the bundle and twisting of the band.

4. The combination of a twister and cutter having relative longitudinal movement, substantially as described.

5. A twister constructed substantially as described, in combination with a cutter having relative movement longitudinal with the axis of the twister, whereby the twisted band is severed from the spool-wire.

6. The combination, substantially as hereinbefore set forth, of a twister and a cutter with a thimble, upon which the end of the wire is wound to retain it preparatory to transferring to the shank, where the band is twisted and severed from the spool-wire.

7. The combination of the rack and cam-groove with the thimble, cutter, and twister, substantially as described.

8. The combination of the retaining-ledge and cam-groove with the thimble, cutter, and twister, substantially as described.

WM. A. SUTPHIN.

Witnesses:

L. L. BOND,

JOHN C. TASKER.