

J. GARRARD.
GRAIN-BINDER.

No. 175,965.

Patented April 11, 1876.

Fig. 1

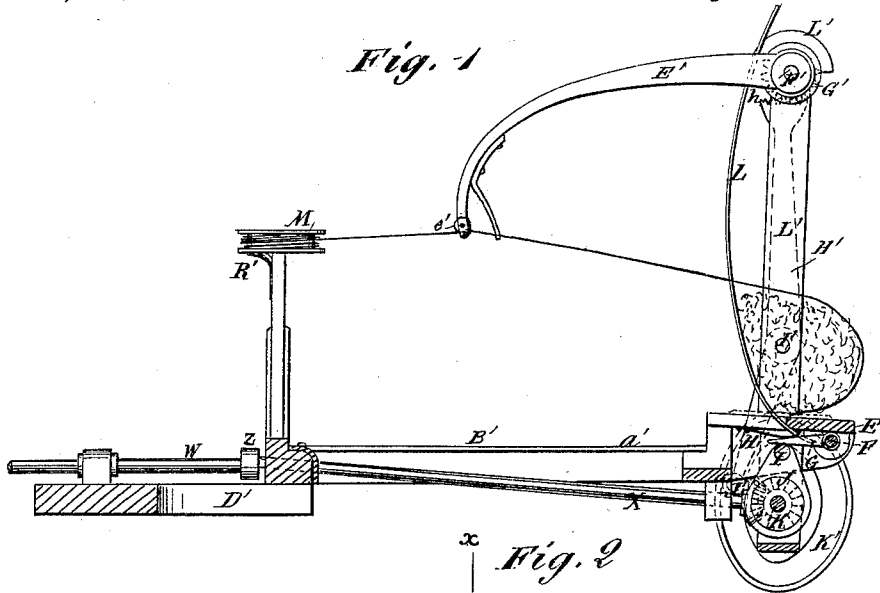


Fig. 2

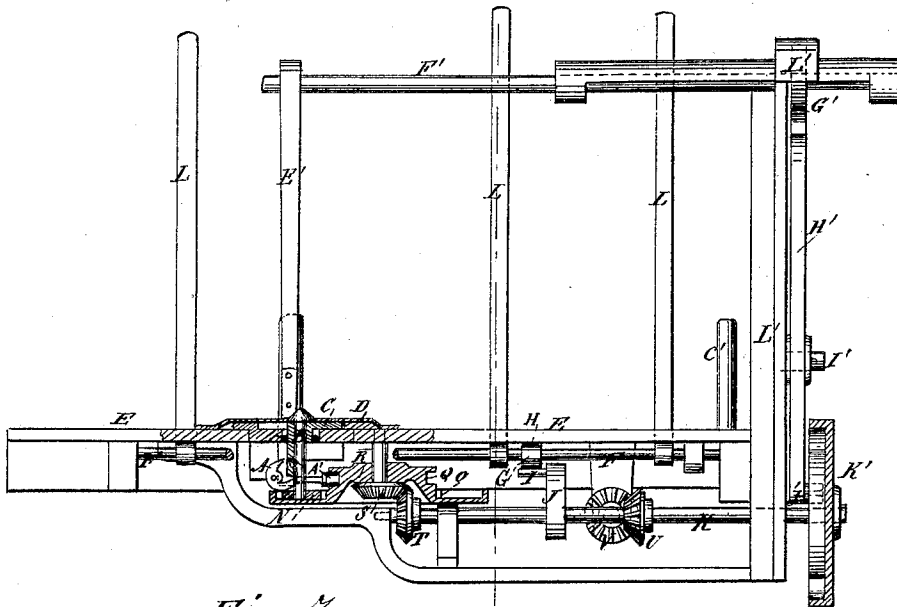
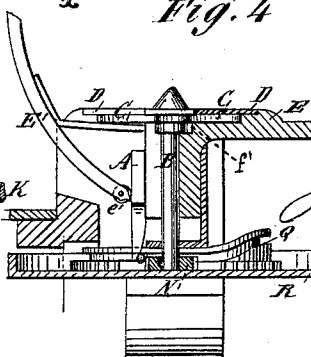
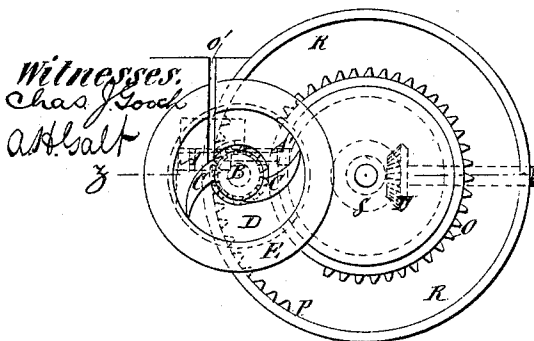


Fig. 3

Fig. 4



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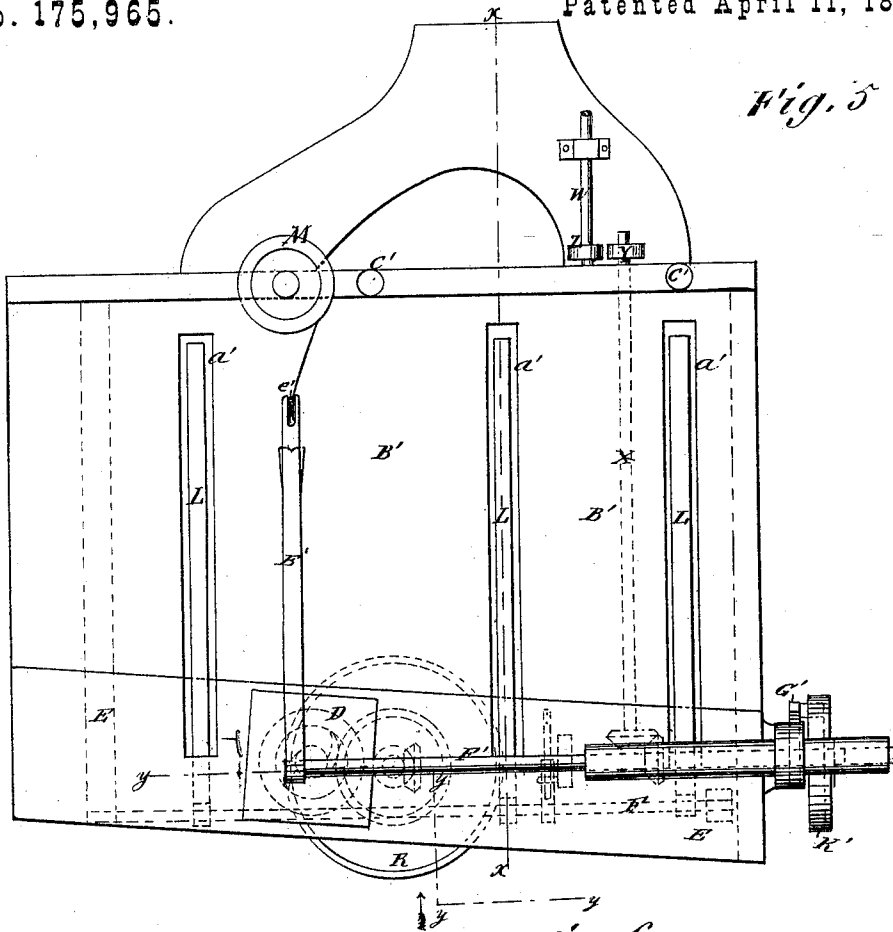


Fig. 5

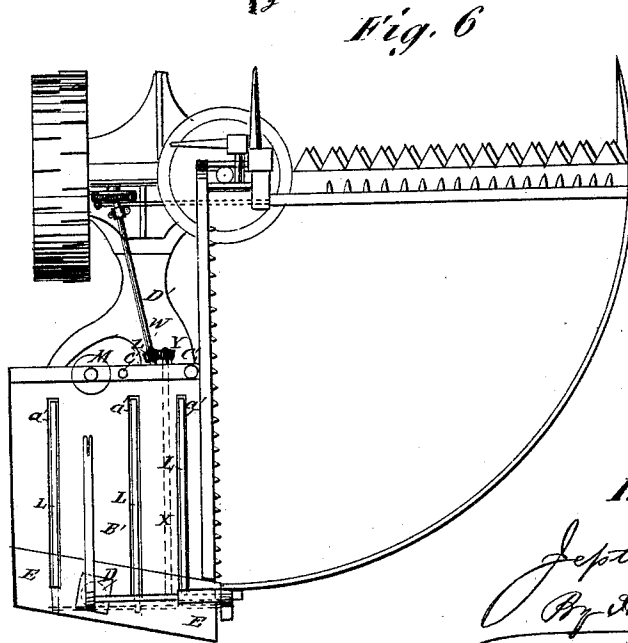


Fig. 6

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UNITED STATES PATENT OFFICE.

JEPHTHA GARRARD, OF CINCINNATI, OHIO, ASSIGNOR TO EXCELSIOR
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IMPROVEMENT IN GRAIN-BINDERS.

Specification forming part of Letters Patent No. **175,965**, dated April 11, 1876; application filed
February 11, 1876.

To all whom it may concern:

Be it known that I, JEPHTHA GARRARD, of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Grain-Binders, of which the following is a specification:

This invention relates to improvements in the class of grain-binders described or referred to in Letters Patent granted to me the 26th day of October, 1875, in which the grain, received in a suitable cradle, is drawn into a compact and cylindrical bundle by the pressure of the wire around it.

My present improved machine differs from the other in that the wire is carried around the bundle by an arm which is not depended on to form or pack the bundle within the cradle previous to the application of the band. The two parts of the wire are introduced at the same side of the twister axis in succession, so as to be caught by diametrically-opposite arms of the twister. The wire is severed by nippers consisting of a stationary jaw, which maintains an unchanged relation to the twister axis, and a moving jaw, which is actuated by an arm running in a camway or groove in a gear which drives the twister. The said gear is constructed with an internal and external segment of cogs, which act successively on the twister, so as to drive it in opposite directions, its backward movement preventing the entrance of the wire between the twister-arms until the proper moment.

The apparatus is adapted to a sweep-rake reaper, the binder-platform being applied at the delivery side of the reaper-platform, and provided with a prominence at the corner at which the grain enters to receive the pressure of the grain as it is raked from the platform to condense the straw, as hereinafter described. The binder-platform converges in width from its receiving side, and is slotted to receive elevating-arms, by which the bundle is carried up against the wire and upon an elevated table over the twister where the wire is closed around it and the bundle formed, as hereinafter described.

In the accompanying drawings, Figure 1 is a side elevation, partly in section, on the line *xx*, Figs. 2 and 5, showing the position and manner of operating the lifting-arms. Fig. 2

is an end view, partly in section, on the line *yy*, Fig. 5, showing the parts in position for operating the nippers and twister, wire-carrier, and lifting-arms. Fig. 3 is a top view of the mechanism for twisting and severing the wire. Fig. 4 is a vertical section of the same on the line *zz*, showing the relative positions of the wire-carrier, nippers, and twister-shaft when the twister takes the bight or second end of the wire-band. Fig. 5 is a top view of the platform and binding device. Fig. 6 is a top view on a smaller scale, showing my device connected with a reaper, and in combination with a sweep-rake.

A represents a pair of nippers consisting of a fixed and movable jaw, to the latter of which is rigidly connected an arm or tail, A', for operating it. B is the twister-shaft; C, the twister-arms; D, the cover for twisters. E is the elevated outer end of the platform on which the grain is bound. F represents the shaft of lifting-arms; G, the lever by which the arms are lifted on crank I of cam J, on main driving-shaft K. H represents a spring attached to the platform E, and bearing downward on the lever G. L L represent lifting-arms. N is the pinion on the twister-shaft. O and P represent, respectively, inner and outer gear or cogged segments on the driver R, that actuates the twister and nippers. Q represents the camway of driver R, by which the arms A' of the movable nipper-jaw are actuated. S is a bevel-pinion on shaft of driver R, and T a bevel-pinion on the main shaft K. U represents a bevel-pinion on the main shaft K, with which gears a bevel-pinion, V, on the counter-shaft X, which is driven through the medium of pinions Z Y, by a connection-shaft, W, attached to the running gear of the reaper. B' represents the platform on which the grain is received. C' is an elevation or prominence of any form on the corner of the platform B', nearest the cutter-bar of the reaper. D' represents a connecting support for the platform B' to the reaper. E' is a wire-carrier projecting from a shaft, F, on which is a pinion, G', into which meshes a segmental gear, *h*, at the extremity of an arm, H', fulcrumed at I', at the lower end of which is a friction-roller, J', the whole being supported on a standard, L'. The friction-roller J' runs

in the cam K', on shaft K. M is the wire-reel. *a'* is a slot in platform B', through which carrying-arms L partly drop. *e'* is a pulley on end of wire-carrier E'. *f'* is sleeve about shaft B, operating in the manner described in my patent of 26th day of October, 1875. O' is a slot in platform E and cover D. R' is a friction-driver to permit the passage of the wire.

Operation: This combination of the binding devices is geared to the reaper and timed with the sweep-rake. The operation is as follows: As the rake brings the grain, head on, to the binder-platform, the heads of the grain pass beyond the prominence C' on the inner end of said platform, and by the action of said prominence and the pushing of the rake the butts are forced along the rake toward its outer end, thus reducing the width of the gavel. The gavel is further reduced in width, especially toward the heads, by the inclined elevated outer end E of the platform, the crowding of the heads from both sides tending to further force the butts together. The lifting-arms L now take the gavel and raise it against the wire to the level of the outer elevated end E of the binder-platform and over the twister. At this time the wire is held at its extremity in the nippers A and passes through the pulley *e'*, on the carrier E', to the reel M. After the lifting-arms have done so much of their work that the carrier E' in its movement toward the nippers shall be behind said lifting-arms, the carrier moves down and carries the wire now around the bundle to the nippers, the prong going between the platform and cover and the top of the nippers, thus bringing the wire certainly within reach of the twister-arm and of the cutting-edge of nippers. The lifting-arms are raised by the lever G and crank I of the cam J, and returned to position by the spring H. The arms move back as soon as the twister has taken the wire, and the wire-carrier, as soon as the nippers have closed on the wire, moves back and stands at its first position in readiness for its next movement.

It is intended that the lifting-arm shall furnish no pressure on the bundle after the twister takes the bight or second end of the wire, and that the wire-carrier shall at no time furnish a pressure, assist in gathering, or afford a support to the bundle.

The nipper-jaw and twister are actuated by the gear and camway of the driver R, the tail or prolongation A' of the nipper lying in said camway. The gear is so made that a part of it shall drive the twister forward and a part reverse it, while the driver has a continuous revolution. While the lifting-arms are bringing the straw to the twister the twister is reversing. At the proper time the

twister takes the forward rotation and sweeps the wire into the sleeve and secures it. The nippers then open to allow the first end of the band to escape. The carrier now brings the wire through the slot O' to the open nippers and twister; the twister sweeps this end of the wire into the sleeve and secures it. The nippers cut the second end of the wire band free, and at the same time seize and hold the wire as in the first position. The twist completed, the twister reverses and frees the loose ends of the band. The sheaf is then discharged by the device described in my patent of February 15, 1876, or by other suitable means.

The nippers A have one stationary jaw with a cutting-edge and notched surface, and one movable jaw with a cutting-edge and a notched surface. The cutting-edges in the operation of cutting overlap and the notched surfaces fit into each other to better hold the wire. The movable jaw has beyond the pivot, on which it turns, a prolongation sufficiently long to reach the camway in the driver R. This end of the prolongation may have a friction-roller. The camway serves to hold the nippers shut, and at the proper time open them, keep them open as long as may be necessary, and to reclose and hold them shut.

The nippers and twister are rigidly connected, so that the relation of the fixed cutting-edge and the twister-shaft is constant.

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

1. A slotted grain receptacle or platform, having one side wider than the other, and having a prominence on its inner and also an elevation on its outer end, the outer elevation inclining from said wider to said narrower side, and being broad enough to support a bundle of straw, substantially as shown.

2. The arms L, constructed substantially as shown, in combination with nippers A, twister B C, platform B', and wire-carrier, substantially as shown.

3. The wire-carrier E', constructed and operated substantially as shown, in combination with the arms L, nippers A, twister B, platform B', and reel M, substantially as shown.

4. The gear-wheel R, constructed substantially as shown, in combination with shaft and pinion of twister.

5. The reel M in combination with the friction device R', carrier E', pulley *e'*, nippers A, twister B C, and platform B', substantially as shown.

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Witnesses:

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