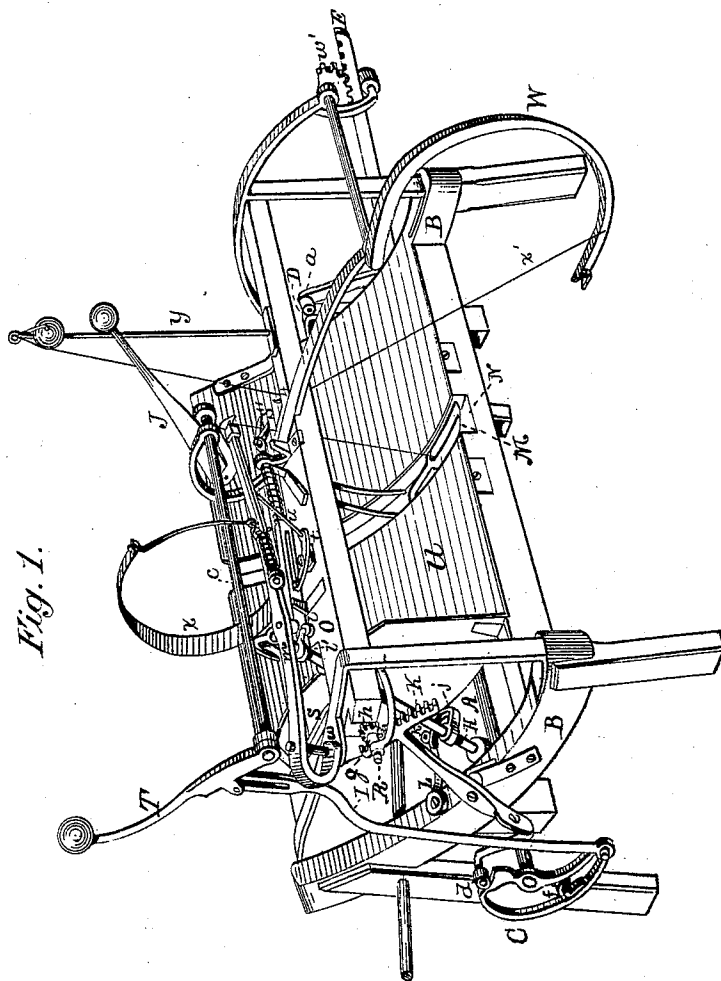


F. W. RANDALL & W. L. RAYMENT.

No. 179,058.

Patented June 20, 1876.

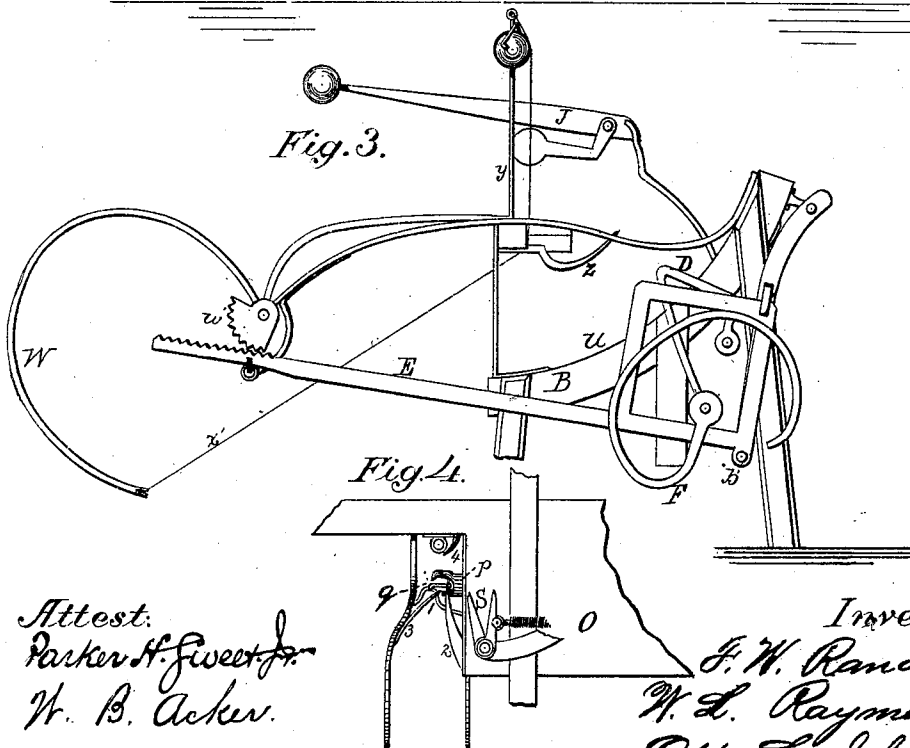
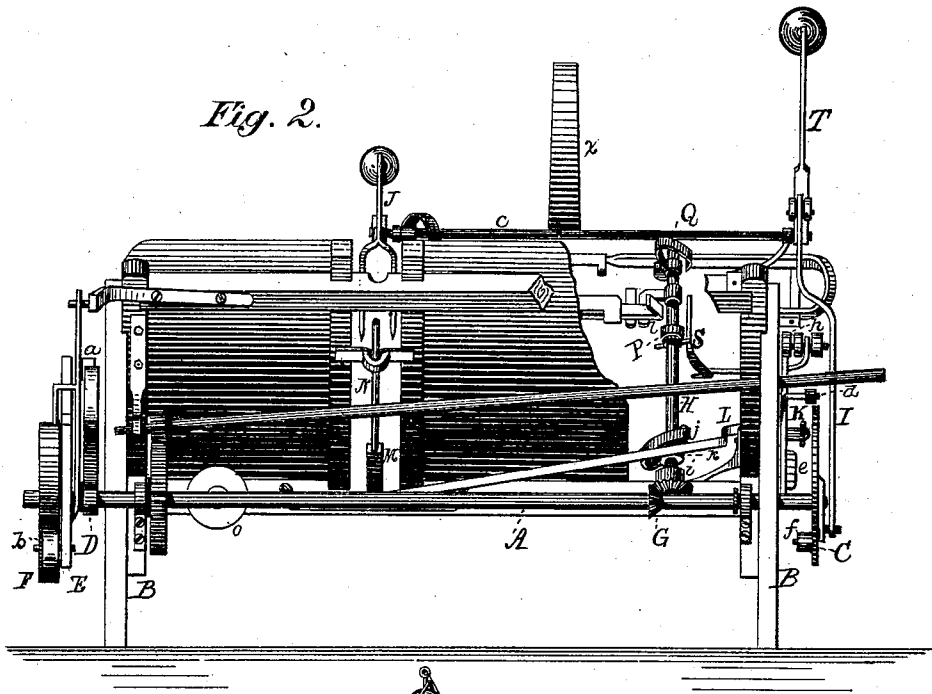


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F. W. RANDALL & W. L. RAYMENT.
GRAIN-BINDER.

No. 179,058.

Patented June 20, 1876.



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UNITED STATES PATENT OFFICE.

FRANK W. RANDALL AND WILLIAM L. RAYMENT, OF BURLINGTON, MICH.

IMPROVEMENT IN GRAIN-BINDERS.

Specification forming part of Letters Patent No. **179,058**, dated June 20, 1876; application filed June 6, 1876.

To all whom it may concern:

Be it known that we, FRANK W. RANDALL and WILLIAM L. RAYMENT, both of the village of Burlington, in the county of Calhoun and State of Michigan, have invented certain Improvements in Grain-Binders, of which the following is a specification:

Our invention relates to an improved twine-binding attachment for that class of harvesters which elevate the grain, the machine being hung to that part of the frame of the harvester to which the hand-binding platform is attached by means of a rod passing through the frame of the binder; and it consists in the details of construction and arrangement of parts, all as will be hereinafter more fully described, and pointed out in the claims.

Referring to the drawings, Figure 1 represents a perspective view of our invention. Fig. 2 represents a rear elevation. Fig. 3 is an end view, and Fig. 4 is a detail view of knot-tier.

We will now proceed to describe our invention, first commencing with the construction of the main driving-shaft, and parts connected therewith.

A represents the main driving-shaft, hung to posts secured beneath the quarto-cylindrical frame B, a crank-cam, C, being keyed upon the rear end of said shaft, as shown in Fig. 1, while at the opposite end of the same shaft is secured a U-shaped cam, D, moving bar E and cam F, which engages with the friction-roller *b* upon the moving bar E, *a* also being a friction-roller situated upon the moving bar E, which engages with the U-shaped cam D. Near the rear end of said shaft A, and secured thereto, is a miter-gear, G, which operates the inclined shaft H. To the crank-cam C, at the rear end of the main driving-shaft, is connected the slotted pitman I, which operates the pivoted gathering-arm J, secured to the forward end of the shaft *c*. The crank-cam C also operates the segmental swing-bar K, pivoted upon the frame B, by means of the friction-roller *d*, the flange *e* engaging with the friction-roller *f* on said crank-cam C. The cylinder *g*, which carries the knot-tier *p* on its forward end, is rotated by the pinion *h* engaging with the said swing-bar K. The inclined shaft H is operated by a miter-gear

wheel, *i*, engaging with the miter-gear G, on the driving-shaft A, the cam *j* being situated near the lower part of said inclined shaft H, which, acting in connection with the friction-roller K upon the pivoted arm L, operates the sliding forked support M, situated beneath and near the center of the frame B, and working in open slotted way N. On the upper end of the inclined shaft H, and beneath the platform O, which carries the knot-tying apparatus, is situated the double lug-shaped cam *p*. Just above the platform O, on the grabber *m*, is the friction-wheel *l*, and at the extreme upper end of said shaft H is the U-shaped cam Q. The cam P operates the hook-bar R, which passes through the cylinder, by coming in contact with the friction-roller situated on the spring-bar S. The grabber *m* is pivoted to the frame B, as shown at *w*, and is operated by the U-shaped cam Q at the extreme upper end of the inclined shaft H. *x* is a flat spring secured to the platform O, and connected to the arm of the grabber *m* in a suitable manner, said spring serving to keep the friction-wheel upon the grabber in close contact with the U-shaped cam Q. The grabber *m* is also provided with a sliding rod actuated by a coiled spring, the front part of said rod being provided with a suitably-shaped end for retaining the binding-cord. The lower jaw of the shear S' is stationary with the platform O, while the upper jaw is operated by the friction-roller *l* on arm *l'* on the inclined shaft H, actuating the rod carrying the upper jaw of the shear, said rod moving in suitable guides, and provided with a coiled spring, which keeps the jaws of the shears open. The pivoted lever *t*, in connection with the rod U, connected with the sliding rod of the grabber *m*, serves to open the jaws of the grabber to liberate the binding-cord. The binding-cord is guided to the knot-tier by suitably-shaped guides, as shown in Fig. 4, and marked 1 2 3 4. The cams D and F, on the end of the main driving-shaft A, provided with friction-rollers, operate the U-shaped arm W by means of the segmental gear *w'*. The arm W is provided with a slotted forked head of peculiar shape, and to the forward end is attached the compressing-cord *w''*, which passes up through an eye opposite the head of the knot-tier; from thence to an

eye at the upper part of the standard *y*, and secured to the weight which slides thereon. The function of said compressing-cord is to carry the bundle of grain from the binding-table to the knot-tier, compressing the same in a compact manner, so that after the knot is tied the expansion of the bundle will secure the band in position, the forks *z* serving to keep the bundle from becoming entangled with the knot-tying mechanism.

Having thus described the construction and arrangement of the several parts of our improved invention, we will now proceed to describe its operation. The crank-cam C on the main driving-shaft A, turning in the direction of the arrow, operates the weighted lever T, by means of the slotted pitman I, which causes the pivoted gathering-arm J on the end of the shaft *c* to penetrate the falling grain and gather the bundle, moving it down the quarto-cylindrical table *u* against the binding-cord. Simultaneously with this movement, the friction-roller *k* passes off the cam *j*, allowing the forked support *m*, by its own gravity, to move downward, forming a support for the bundle, when the gathering-arm J has moved the bundle beyond the table *u*. At this juncture the forked head of the U-shaped arm W passes beneath the bundle, and, catching the binding-cord, carries it around said bundle, and in a suitable position to be received by the grabber *m*, which holds the loose end of the binding-cord, which passes through the head of the sliding-fork support M, thence through the eye of the spring-bar *n* to the spool *o*, upon which it is wound beneath the table *u*. The grabber *m* now moves, carrying the cord into the head of the knot-tier *p*, when the hook R, by moving outwardly, confines the binding-cord in place. The knot-tier is now revolved by the swing-bar *k*, causing the ends of the cords composing the band to cross each other, thereby forming a loop. The knot-tier, by a back turn of about a quarter of a revolution, causes the two ends of the cord to pass into the hook R. The cam P on the inclined shaft draws the hook within the knot-tier *p*, and presses the ends of the cord against a pin in the head

of the knot-tier. The jaw of the grabber now releases the loose end of the cord, and the continuous cord is secured in its place, and is moved within the shear S'. The loop has now passed off the knot-tier *p*, the continuous cord being cut within the shears, and the horn on the head of the knot-tier being turned downward, the loop slips off the horn, and the bundle drops to the ground securely tied, thus completing the operation.

Having thus described the construction and operation of our invention, we claim as new and useful—

1. In a grain-binding machine, the combination of the main driving-shaft A, provided with crank-cam C, U-shaped cam D, moving bar E, cam F, and miter-gears G and *i*, with the inclined shaft H, slotted pitman I, gathering-arm J, segmental swing-bar K, pivoted arm L, forked support M, platform O, lug-cam P and U-shaped cam Q, hook-bar R and spring-bar S, platform O and U-shaped arm W, the several parts being constructed, arranged, and combined to operate the knot-tying mechanism, substantially as and for the purpose described.

2. The gathering-arm J, U-shaped arm W, and grabber *m*, in combination with the knot-tier *p*, substantially as and for the purpose described.

3. The hereinbefore-described knot-tier, consisting of the horned head and pin, hook *q*, operated by the cam C, segmental swing-bar K, lug-cam P, and hook-bar R, substantially as described.

4. The standard *y*, provided with a compressing-cord, U-shaped arm W, having a forked head of peculiar construction, in combination with the fork *z* and supporting-fork M, substantially as and for the purpose described.

5. The spring *x* and grabber *m*, in combination with the rod U, pivoted lever *t*, and the shears S'.

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Witnesses:

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