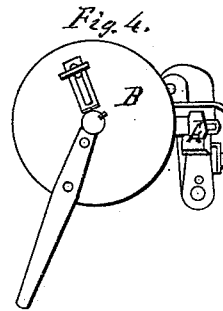
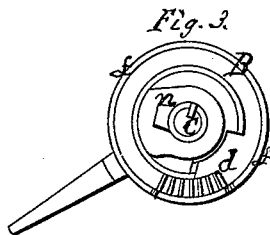
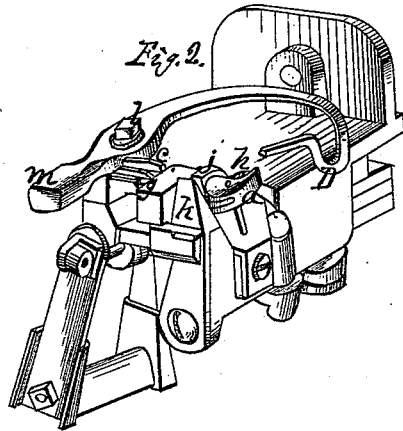
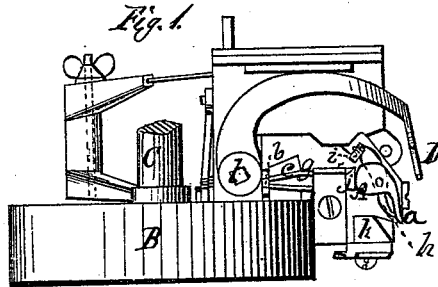


J. F. APPLEBY.  
Grain-Binder.

No. 208,137.

Patented Sept. 17, 1878.



WITNESSES  
*E. M. Gallaher*  
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By *J. S. Brown*  
*his* ATTORNEY

# UNITED STATES PATENT OFFICE.

JOHN F. APPLEBY, OF DE PERE, WISCONSIN.

## IMPROVEMENT IN GRAIN-BINDERS.

Specification forming part of Letters Patent No. 208,137, dated September 17, 1878; application filed July 8, 1878.

*To all whom it may concern:*

Be it known that I, JOHN F. APPLEBY, of De Pere, in the county of Brown and State of Wisconsin, have invented an Improvement in Tying Apparatus for Harvester-Binders; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification—

Figure 1 being a top view of a cord-tying apparatus for harvester-binders provided with my improvement; Fig. 2, a perspective view of the same; Fig. 3, a view of a part thereof looking forward; and Fig. 4, a front view of the device.

Like letters designate corresponding parts in all of the figures.

I will proceed to describe the construction and operation of the knot-tier of the apparatus, some of the features of which are claimed in another application for Letters Patent, and will herein distinguish the parts now claimed from the other features of novelty possessed by the apparatus.

The knot-tier A proper is provided with a knotting-hook, *a*, which projects laterally from the end of the tier-shaft *b*. The said shaft is mounted in bearings close by the inner or rear face of the cam and rack wheel B, by which the tying apparatus is operated, and which is mounted on a driving-shaft, C. The tier-shaft has a horizontal, or nearly horizontal, position directed toward the gavel-receptacle. When at rest it lies with the knotting-hook, also horizontal, or nearly so, projecting laterally backward, so that when the needle passes over the tying apparatus it lays the cord directly over and across the said knotting-hook. The operation of tying the knot is performed with this hook by a single revolution of the tier-shaft in its bearings at the proper time, which revolution brings it again into position for tying the next band. The revolution of the tier is produced by means of a pinion, *c*, on its shaft gearing intermittently into a segmental rack, *d*, on the cam and rack wheel B, there being as many teeth, less one, on the rack as on the pinion. The rack occupies only a small portion of the circumference of the cam and rack wheel, the remainder thereof being a simple rim or flange, *f*, projecting from

the face of the rack. Against this rim or flange a plane face, *g*, notched into or formed on the pinion, or attached to its shaft, slides, and thereby holds the pinion from turning while this part of the wheel is passing by it, the rim or flange being intermitted where the rack *d* is. Therefore as soon as one end of the rack comes to the pinion it gears into the same, causing the pinion to turn until the rear end of the said rack passes the same.

Upon the knotting-hook *a* is a finger, *h*, pivoted thereto, as shown, so that the tip of the finger can close against the point of the hook, and thereby serve to seize the cord at the proper time and hold the same while the knot is tying, and again release the cord when the tying is completed. This pivoted finger and peculiar cams for opening and closing it, in connection with the knotting-hook, constitute the essential feature of the present invention.

The heel end of the finger *h* has a cam projection, preferably provided with a friction-roller, *i*, which, when it is desired to open or separate the finger from the hook-point, strikes a stationary cam, *j*, situated on or near the adjacent bearing of the tier-shaft in such a position as to perform the said office of separating the finger and hook-point and keep the same separated for the length of time required. The finger is closed against the point of the hook by spring-pressure through the means of a spring-cam, *k*, attached to the frame of the tying apparatus in a suitable position, as shown.

Thus constructed and organized the tier operates as follows: As the needle descends into position for the tying it brings the body-fold of the cord over the knotting-hook, and lays it thereon side by side with the end fold of the cord previously laid there by the retreat of the needle after the tying of the previous bundle. Then the tier A begins to be turned on its shaft, first bringing upward the knotting-hook with the two folds of the cord around it. As the knotting-hook continues to turn over and downward, and before it reaches a vertically-downward position, the cam-roller *i* on the finger *h* strikes the stationary cam *j*, which separates the finger from the point of the knotting-hook, so that when the hook is brought in line with the continuation of the

cord-folds downward the hook-point goes at the side and the finger passes at the other side of the said cord-folds. Directly after the two folds of the cord are thus caught between the hook and its finger the cam-roller *i*, having left the cam *j*, is brought against the spring-cam *k*, which causes the finger and hook to pinch the cord with sufficient pressure to hold the same for completing the tying. Then the knotting-hook having made a complete revolution and returned to its first position, a guide, *D*, which had previously directed and helped to hold the two folds of the cord over the knotting-hook, has imparted to it a rearward movement, carrying with it laterally the cord-folds far enough to draw the cord-loop from the knotting-hook around the folds of the cord held between the hook and finger; and thus, since the tension on the cord continues, the band is completely tied. The cord-guide *D* is a sort of hook with sides inclined each way and terminating in a nearly V-shaped notch, thereby holding the cord laid therein in the proper position and direction. It is

pivoted on a vertical pin, *l*, to the frame of the tying apparatus, and its motion for casting off the cord-loop from the knotting-hook is produced by a heel-projection, *m*, thereon being struck by a cam-projection, *n*, on the hub or other part, or the shaft of the cam and ratchet wheel.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In combination with the rotary knotting-hook *a*, having a pivoted finger, *h*, the stationary cam *j* and spring-cam *k*, for operating the said finger, substantially as and for the purpose herein specified.

2. In combination with the rotary knotting-hook *a*, operating as described, the vibratory cord-guide *D*, substantially as and for the purpose herein specified.

Specification signed by me this 19th day of October, 1876.

JOHN F. APPLEBY.

Witnesses:

J. S. BROWN,

JNO. D. PATTEN.