(No Model.)

W. R. BAKER.

GRAIN BINDER.

No. 382,938. Patented May 15, 1888.

Fig. 2.

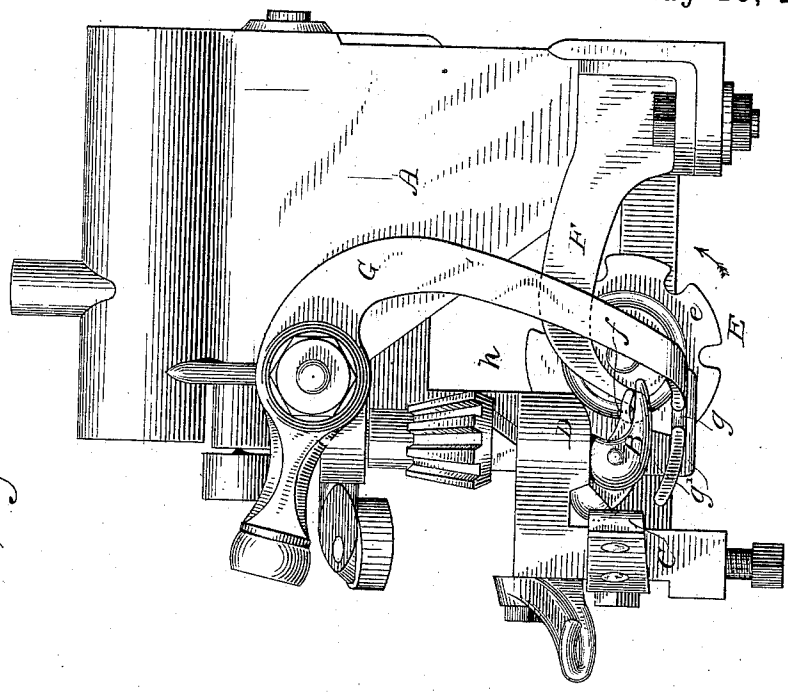


Fig. 1.

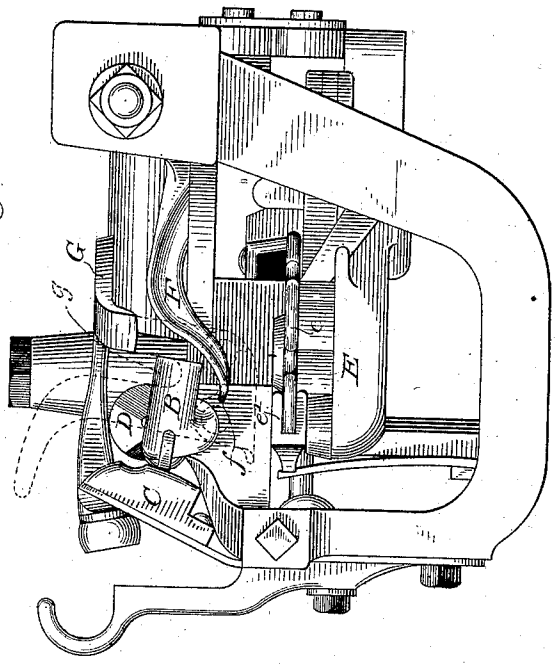
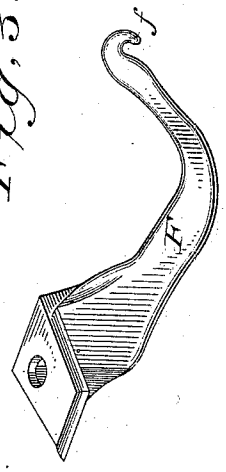


Fig. 3.



WITNESSES.

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UNITED STATES PATENT OFFICE.

WILLIAM R. BAKER, OF CHICAGO, ILLINOIS.

GRAIN-BINDER.

SPECIFICATION forming part of Letters Patent No. 382,938, dated May 15, 1888.

Application filed August 8, 1884. Serial No. 140,023. (No model.) Patented in England July 19, 1884, No. 10,330; in Victoria October 2, 1884, No. 3,854; in New Zealand November 20, 1884, No. 1,300; in South Australia February 2, 1885, No. 531, and in New South Wales February 3, 1885, No. 1,008.

To all whom it may concern:

Be it known that I, WILLIAM R. BAKER, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Grain-Binders, (for which Letters Patent have been granted with my knowledge or consent in England on the 19th day of July, 1884, No. 10,330; in Victoria on the 2d day of October, 1884, No. 3,854; in New Zealand on the 20th day of November, 1884, No. 1,300; in South Australia on the 2d day of February, 1885, No. 531, and in New South Wales on the 3d day of February, 1885, No. No. 1,008,) of which the following is a specification.

In grain-binding machines manufactured by the McCormick Harvesting Machine Company for the past two seasons there has been employed in connection with the knotter or tying-bill and with the cord-holder an intermediate cord-guide bolted to the supporting bracket or frame in which the knotter is carried, and curved downward and inward, so that as the binder-arm approaches the holder to deliver the strand or cord which it carries this strand shall be deflected if out of its proper position, and carried to a point where it overlies the jaws of the knotter, and be prevented from lateral displacement thereafter. In practice, however, it has been found that one or both strands will occasionally slip past the end of the guide and fall too low for the action of the knotter, or sometimes be carried past the end of this guide by the onward rotation of the holder-disk, or by the thrust of the yielding holder-frame. I have therefore now provided the end of said cord-guide with a recurved hook or finger, thereby forming a notch, within which both strands, after being in succession guided to their position over the knotting-jaws, will rest and be prevented from escaping, and in this my present invention consists.

In the drawings, Figure 1 is a front elevation of a binding-head embodying my improvement. Fig. 2 is a top plan view thereof; Fig. 3, a detached view of a cord-guide.

A is the stock of the binding-head, and B a knotter, of the type known as "tying-bills," supported therein. The axis of this knotter in the present instance is shown as horizontal, or substantially so; but it will be obvious from the ensuing description that it may assume any desired inclination, provided the relation of the other parts thereto is maintained.

C and D are cams which control the pivoted jaw of the knotter, the latter cam operating to open it when it has partially completed a revolution to admit the ends crossed over the loop beneath it, and the former to sharply close it upon these ends as the revolution is finished.

At a proper distance beneath the jaws is a holder, E, composed in this instance of a rotating notched disk, *e*, which takes into a spring-pressed shoe, *e'*, and is intermittingly moved to force the cord into said shoe, and thereby clamp it. It is desirable that the holder should yield or move up toward the knotter during the tying operation, in order to render up slack. The length of the ends stretched between knotter and holder at the moment of the initial movement of the former will in such case often be so great as to cause a very considerable liability to escape from the action of said knotter when it once commences its revolution, since its surfaces are necessarily to some extent cam-shaped. Moreover, whether the holder is movable or stationary, this tendency usually to some extent exists, as there must be a certain space at all times between it and the knotter or band-securing device. With a movable holder, also, which must be hinged at a distance from the knotter, the cord-strands held must necessarily partake of the arc movement at the clamping end of the holder, and are pushed out away from their proper position as the latter rises. These defects have heretofore been partially obviated by the employment of the curved deflecting or guiding arm F, which was arranged between the knotter and holder, being attached firmly to the top or frame by a bolt or other connection and directed on that side of the cord-receiving space opposed to the knotter, inward and downward toward and underneath the latter, and then laterally a short distance outward, as shown. This serves to guide or lead the band ends of the cord into proper position for the initial action of the knotter, and also to resist and correct the sidewise thrust, push, or displacement given them by said knotter

as they slip over its crown to form the cross or twist in the loop. As formerly constructed this arm was open at its end and the cord sometimes slipped past it, or else was carried past it by the revolution of the holding-disk or by the outward thrust of the holder as it rose, so that when the knotter-jaws opened to grasp the end of the strands and complete the knot the strands were occasionally out of their proper position, and would not enter between the jaws, and therefore the band was not tied and the sheaf escaped unbound; hence I recurve or turn backward the end of the guide-arm, without, of course, making its effective length any shorter, so as to form a finger, *f*, between which finger and the main portion of the arm the strands are caught when they have reached their proper position, and beyond which they cannot slip. They will therefore be absolutely retained in position and certainly grasped in the jaws of the knotter as it is completing its revolution.

Upon the frame is mounted another guide-arm, G, having a guideway, *g*, which, when the binding-arm is laying the cord to form the band, rests in front of the knotter and co operates with the other guide is positioning the cord. In order that the arm G may subserve other functions, it is pivoted upon the stock and controlled at its heel end in such manner that after the knot is formed it is swung aside and bears upon the band between the knotter and the sheaf to strip it forcibly from said knotter. A knife, *g'*, is also attached to this guiding and stripping arm G in such position that as it starts on its sidewise movement to strip the knot said knife is brought against the strands stretched between the other cord-guide and the holder and severs them.

In the binding-head I have chosen for illustration the inner or under jaw of the knotter is the pivoted one. The binding arm delivers the cord to the holder through the space or opening *h* behind both cord-guides, and at this time the knotter is stationary with its jaws in a substantially horizontal position transverse to this opening. When both ends of the cord have been delivered to the holder, the disk *e* of the latter moves one notch in the direction of the arrow, carrying them into the shoe and firmly clamping them. This movement takes the ends stretched between the knotter and holder along the curved edge of the guide F, and lays them in the notch formed by the guide-arm and its hook, in which position they are stretched against and beneath the chin of the knotter, which then commences to rotate. By the time the knotter has entered the third quarter of its revolution the loop is formed and the ends leading to the holder are crossed thereover. The inner jaw now opens and passes on one side of the two strands, while the fixed outer jaw passes on the other. Just as the revolution is completed the jaws come together under the force of the cam C and seize the strands. The stripper-arm is then actuated to sever these strands between the the holder and guide-arm and draw the loop forcibly from the knotter, whereby it is tightened upon the ends held between the jaws of the latter, and finally these ends are wrenched from the knotter and the sheaf is discharged, completing the binding operation.

I claim—

1. In combination with the knotter or band-securing device, an underlying cord-guide having a recurved hook at its end beneath the knotter, and a holder beneath the cord-guide adapted to receive the ends of the band and carry them along the guide until they come into the recess formed by said hook and in position for the action of the band-securing device.

2. The combination of the knotter or tying-bill, a swinging holder which moves theretoward during the tying operation, and a cord-guide arranged between the knotter and holder and having a recurved hook at its end adjacent to the knotter, whereby the proper position of the band ends relatively to the latter is preserved irrespective of the directional thrusts imparted to them.

3. The cord-guide F, having the outline shown and described, with the recurving-hook *f* at its end, and arranged substantially as set forth.

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Witnesses:

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