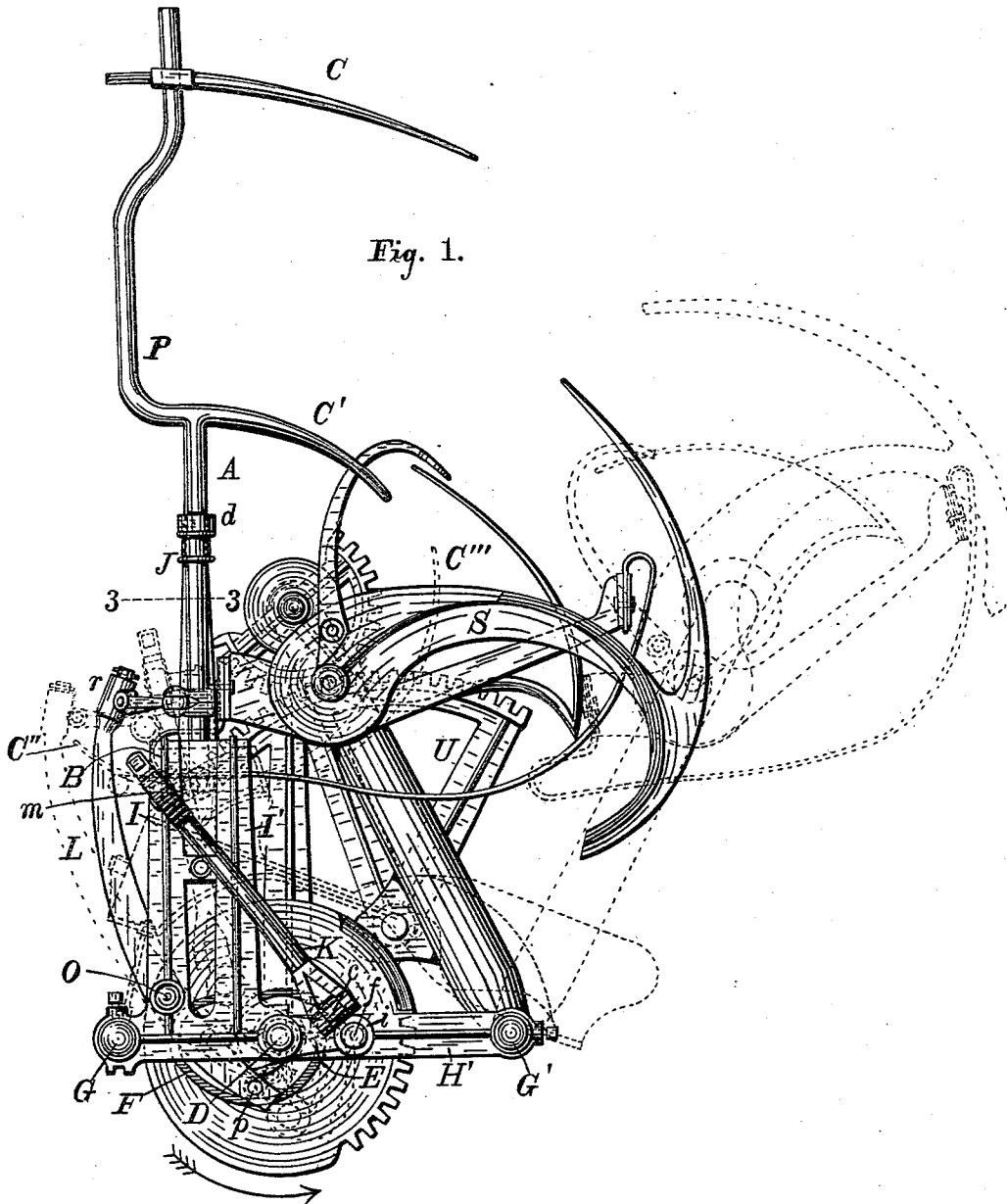


4 Sheets—Sheet 1.

No. 424,507.

Patented Apr. 1, 1890.



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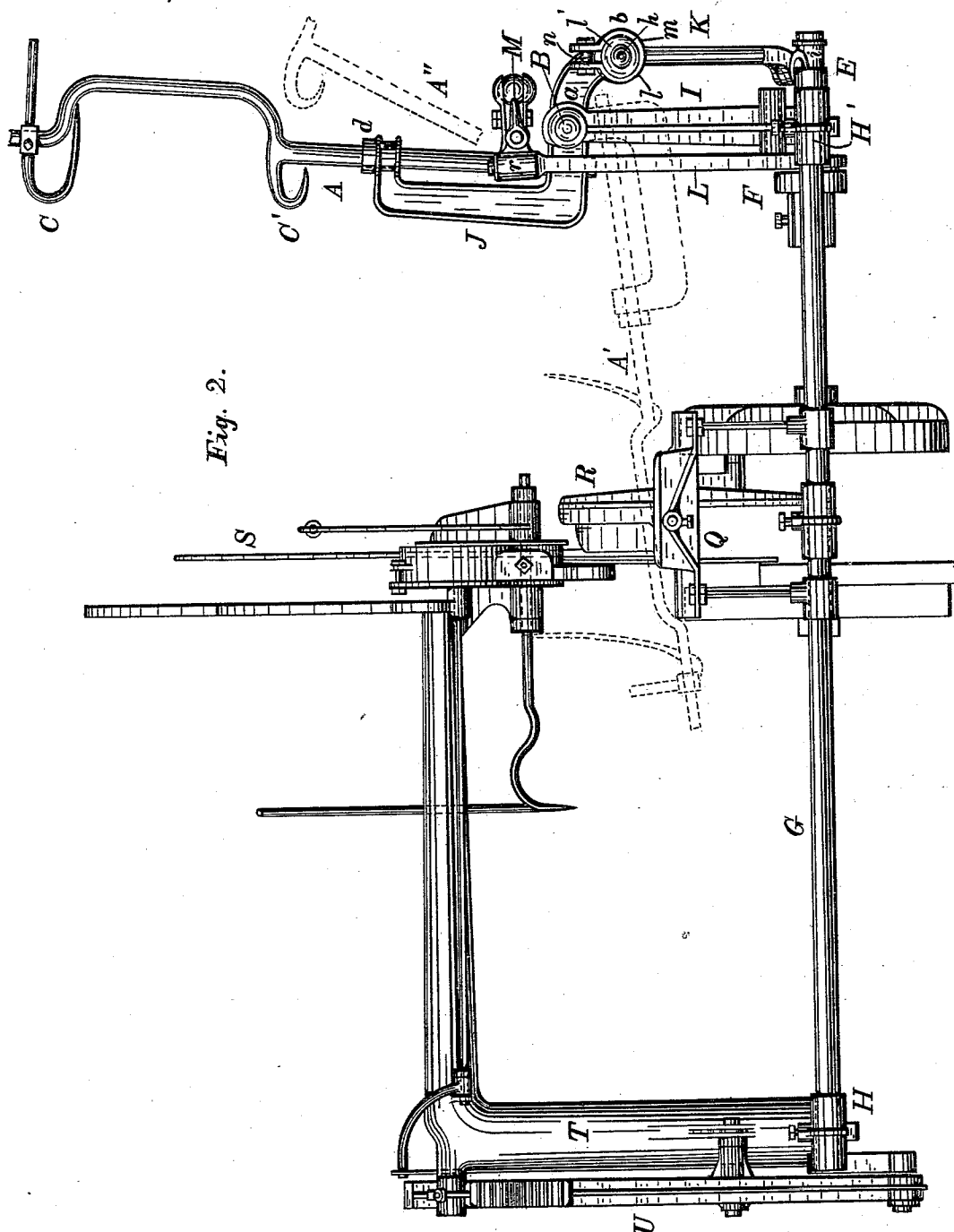
(No Model.)

4 Sheets—Sheet 2.

J. R. SEVERANCE.
GRAIN BINDER.

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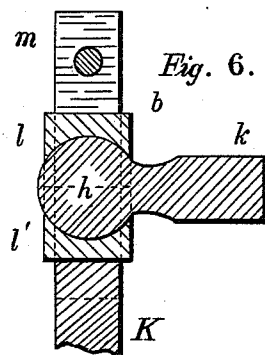
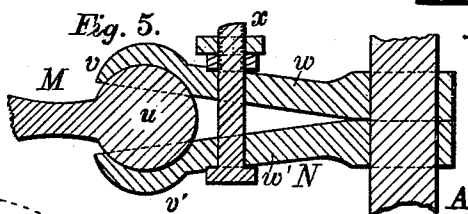
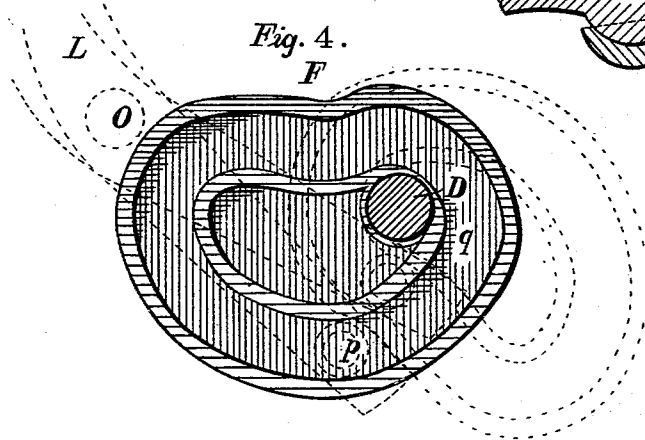
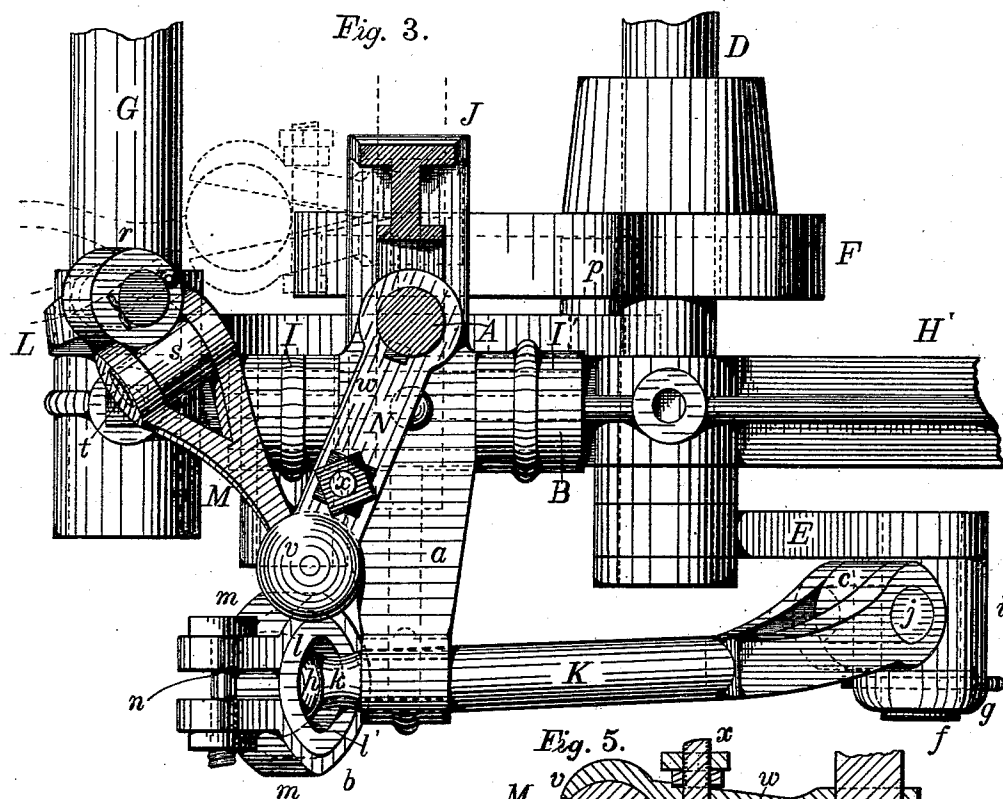
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4 Sheets—Sheet 3.

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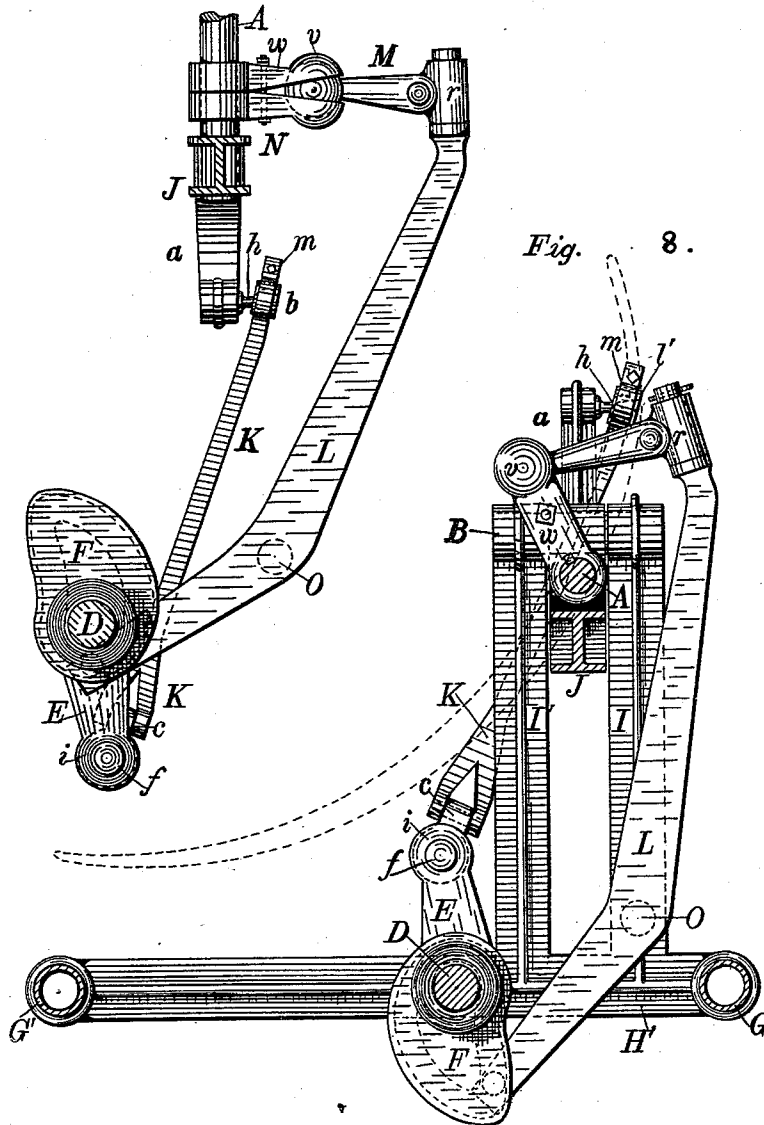
4 Sheets—Sheet 4.

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Fig. 7.



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UNITED STATES PATENT OFFICE.

JAMES R. SEVERANCE, OF POUGHKEEPSIE, NEW YORK.

GRAIN-BINDER.

SPECIFICATION forming part of Letters Patent No. 424,507, dated April 1, 1890.

Application filed November 30, 1888. Serial No. 292,245. (No model.)

To all whom it may concern:

Be it known that I, JAMES R. SEVERANCE, of Poughkeepsie, New York, have invented certain Improvements in Grain-Binders, of which the following is a specification, reference being had to the accompanying drawings.

My present invention relates to an improved construction of the bundle-discharging mechanism described in my patent, No. 277,356, dated May 8, 1882.

My improvements are fully set forth and described in the following specification and the accompanying drawings, and the novel features thereof specified in the claims annexed to the said specification.

In the accompanying drawings, representing my present improvements in grain-binders, Figure 1 is a rear elevation. Fig. 2 is a side elevation taken from the left-hand side of Fig. 1. Fig. 3 is a plan showing the parts below the line 3 3, Fig. 1. Fig. 4 represents the cam detached. Fig. 5 is a sectional view through the jointed connection between the lever and the discharger-arm. Fig. 6 is a sectional view through the joint between the connecting-rod and the support for the discharger-arm. Fig. 7 is a front elevation of the parts in the position they occupy when the discharger-arm is vertical. Fig. 8 represents the same when the discharger-arm is horizontal.

The construction of the binding mechanism is substantially the same as that described in my previous patent, No. 345,546, and in my pending application, Serial No. 217,390. The bundle, after being bound, rests on the platform and is discharged in rear of the machine by the vibrating discharger-arm A, Fig. 2, which oscillates on the pivot B, as indicated by the full and dotted lines in said figure. The discharger-arm is provided with the prongs or horns C C', which engage under the bundle and lift it from the platform, delivering it, as the arm vibrates, on the stubble immediately behind the machine, butt-end down.

The discharger-arm is operated from the binder-shaft D by means of the crank E and the cam F, and the connecting mechanism hereinafter described. It will be observed that in addition to the vibrating movement

in the vertical plane about the pivot B it is necessary to impart to the discharger-arm an oscillating movement on its longitudinal axis, in order to enable the prongs or fingers C C' to engage under the bundle as it lies on the platform. The vibration in the vertical plane is imparted to the discharger-arm by the crank E on the shaft D, while the oscillation about the axis is produced by the cam F. The shaft D, which also operates the knotting mechanism, is connected with the gearing of the harvester in such manner as to receive a single complete revolution for each bundle which is bound. This result is secured by suitable trip mechanism and a clutch and gearing on a continuously-revolving shaft driven from the main wheel of the harvester, as described, for instance, in my previously-mentioned cases. The binding mechanism is also operated from the shaft D.

In the accompanying drawings, the frame of the binder is shown as consisting of the rods G G', (which may be hollow,) connected together at their front and rear ends by the cross-bars H H'. The binder-frame is supported on the frame of the harvester on suitable guides or ways, which permit its adjustment lengthwise of the grain. The knotting mechanism, which may be of any ordinary or preferred type, is supported on the binder-frame.

On the rear cross-bar H' of the binder-frame is placed one or more upright posts I I', which support the pivot B of the vibrating discharger-arm. The posts are preferably cast in one piece with the cross-bar, as indicated in the rear elevation, Fig. 1. At their upper ends they are provided with suitable journals, in which the pivot B turns. The discharger-arm A is sustained by the vibrating support J, pivoted in the uprights I I' and provided with a rearward extension a, Fig. 2, to which the connecting-rod K is attached by the universal joint b. The discharger-arm is journaled in the support J, so that it can turn about its longitudinal axis under the influence of the cam F, lever L, rod M, and crank-arm N. Collars d, or other suitable devices, secure the discharger-arm from end play. The support J may be given any desired shape adapted to the purposes for which it is de-

signed. The pivot B may be either keyed or pinned in the support; or the support may be arranged to turn on the pivot.

On the rear end of the shaft D is secured
 5 the crank E, provided with the crank-pin *f*,
 on which the collar *i* is secured by the ring *g*,
 or other suitable device. The collar *i* is pro-
 vided with a perforated lug *c*, Fig. 3, to which
 10 the lower end of the connecting-rod K is
 jointed by the pin *j*. This arrangement con-
 stitutes in effect a universal joint between
 the crank E and the connecting-rod K, which
 permits the swinging of the connecting-rod
 15 as the support J vibrates. The other end of
 the connecting-rod is attached to the arm *a*
 on the support J by a joint, which permits
 movement in planes at right angles with each
 other, and which consists of the ball *h*, Fig.
 20 6, on the end of the stud *k*, inserted in the
 arm *a*, and the divided socket-pieces *l l'*, which
 are secured in the yoke *m* on the connecting-
 rod K. The bolt *n* serves to clamp the yoke
m on the socket-pieces *l l'*, the opposing sur-
 25 faces of which are recessed out to fit the ball
h. A universal joint *b* is thus formed be-
 tween the end of the connecting-rod K and
 the arm *a* on the vibrating support of the
 bundle-discharger. As the crank E revolves,
 30 the arm A, carrying the fingers C C', will vi-
 brate about the pivotal axis B, as indicated
 by the full and dotted lines in Fig. 2, so as to
 effect the discharge of the bundle. The range
 of the movement is also indicated in this fig-
 35 ure, as it is only necessary to cause the dis-
 charger-arm to swing behind the vertical
 plane in which the axis B is located to a suffi-
 cient degree to insure the delivery of the bun-
 dle in rear of the machine. Any other pre-
 40 ferred form of universal joint may be em-
 ployed at either end of the connecting-rod K.

In order to secure the oscillating movement
 of the discharger-arm A about its longitudi-
 nal axis, I apply to it the crank-arm N, which
 45 receives motion from the lever L by means
 of the connecting-rod M. The lever L is piv-
 oted to the cross-bar H' or the standard I, as
 shown at O, Fig. 1, and its lower end is pro-
 vided with a stud or roller *p*, which engages
 50 with the cam-groove *q* of the cam F. The
 cam F is secured on the shaft D in such posi-
 tion relatively to the crank E and the cam-
 groove *q* is made of such a shape as to impart
 the requisite rolling movement to the arm A.
 55 While the arm is raising the bundle from the
 platform it rests on the concave side of the
 fingers C C', little or no rolling movement be-
 ing imparted to the arm A at this time, as
 the roller *p* is then in the circular portion of
 the cam-groove *q*. During the return move-
 60 ment of the arm, however, the cam F oper-
 ates the lever so as to cause the arm to turn
 or roll on its longitudinal axis, so as to cause
 the fingers C C' to engage under the bundle
 on the platform. The cam first swings the
 65 upper end of the lever inward, causing the
 arm to roll on its longitudinal axis by means
 of the jointed connection M and crank-arm

N, so that the points of the fingers are di-
 rected downward toward the outer edge of
 the platform and outside of the bundle there-
 70 on. As the arm A continues to descend, a
 rolling motion in the opposite direction is im-
 parted to it, so that the fingers pass inward
 under the bundle in position, as indicated by
 the dotted lines C'' C''', Fig. 1, to lift the
 75 bundle from the platform when the arm rises.
 The cam-groove *q* is given a suitable shape
 adapted to produce the rolling motion in one
 direction and then in the other, as represented
 in the enlarged view, Fig. 4. The connections
 80 between the upper end of the lever L and the
 discharger A are built with universal joints,
 so as to permit the relative movements of the
 parts. As the crank E and cam F are firmly
 secured on the shaft D the movements of the
 85 discharger-arm are always properly timed
 relatively to each other. The universal-joint
 connections between the lever L and the dis-
 charger-arm are conveniently formed, as rep-
 90 resented in the accompanying drawings. Thus
 on the upper end of the lever L is fitted a col-
 lar *r*, free to revolve thereon, having on one
 side a lug *s*, to which the connecting-rod M is
 pivoted by a pin *t*, Fig. 3. To secure strength,
 95 the connection M is preferably forked, one
 end of the fork being placed on each side of
 the lug *s*. The other end of the connection
 M terminates in a ball *u*, Fig. 5, which is fit-
 ted between the cup-shaped ends *v v'* of the
 crank-arm N, secured to the discharger-arm.
 100 The crank-arm is conveniently made in two
 pieces *w w'*, secured together by the bolt *x*,
 and both being keyed or otherwise secured on
 the discharger-arm. A single key will serve
 to fasten both parts of the crank-arm to the
 105 discharger-arm. It will be observed that by
 this construction the connection M is provided
 with universal joints at or near each of its
 ends, thus securing the requisite rolling move-
 ment of the discharger-arm, while permitting
 110 the vibration thereof in the vertical plane to
 discharge the bundle.

It is obvious that either the mechanism for
 vibrating the discharger or that for rolling it
 may be used independently of the other, or
 115 that other mechanism for effecting either pur-
 pose may be substituted, while that herein
 shown for the other purpose is retained.

The discharger-arm A is bent or offset, as
 indicated at P, Fig. 1, so that when down, as
 120 indicated by the dotted lines A', Fig. 2, it may
 clear the knotted-casing Q, or any projecting
 part thereon, as R. The extremity of the up-
 ward vibration of the discharger-arm is rep-
 125 resented at A'', Fig. 2, movement to about
 this position being sufficient to secure the
 discharge of the bundle clear of the machine.

My improved bundle-discharger may be
 used in connection with any preferred form
 of binding or knotting mechanism. In the
 130 accompanying drawings I have represented
 it as applied in connection with the bind-
 ing mechanism substantially similar to that
 shown in my pending application, Serial No.

220,509, and in which S, Figs. 1 and 2, is the traveling and vibrating binder-arm; T, the swinging binder-post, and U the segmental gear, by which the movement of the binding-arm is secured from a crank on the front end of the shaft D. The pivot B may be cast in one piece with the support or bracket J.

The range of the movement of the discharger-arm is indicated by the dotted lines A' A'' in Fig. 2, although it may be arranged to swing through a somewhat less angular distance, if desired.

The bundle-discharging mechanism may be operated either directly by the binder-shaft D or by any other suitable arrangement.

It will be observed that by the construction herein shown I am enabled to entirely dispense with gearing, and that the connections herein described are strong and durable and not liable to become clogged in their operation by the straw.

I claim—

1. The combination, with the vibrating discharger-arm A of a grain-binder, of the intermittently-revolving shaft D, crank E, and jointed connecting-rod K for producing the vibratory movement of the arm and cam F, lever L, and suitable connections adapted to give the arm a rolling movement about its longitudinal axis, substantially as described.

2. The combination, with the vibrating and

rolling bundle-discharger of a grain-binder, of an intermittently-revolving operating-shaft, a vibrating support for the discharger connected to a crank on the operating-shaft, which effects the vibration of the arm by a connecting-rod provided with universal joints, a cam on said shaft, a pivoted lever operated by said cam, a crank-arm on said discharger, and a universal-joint connection between the lever and the crank-arm, whereby the rolling movement of the discharger is secured, substantially as described.

3. The combination, with the frame of a grain-binding mechanism, of the vibrating and rolling bundle-discharger arm A, mounted in the vibrating support J, pivoted on standard I above the frame, operating-shaft D, provided with crank E, and connecting-rod K, having universal joints at its ends, whereby the vibrating movement of the discharger is effected, cam F on the shaft D, lever L, pivoted on the frame, crank-arm N, attached to the discharger, and the universal-joint connection M between the crank-arm and the free end of the lever L, whereby the rolling movement of the discharger is secured, substantially as and for the purposes set forth.

JAMES R. SEVERANCE.

Witnesses:

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H. J. HAUSER.