

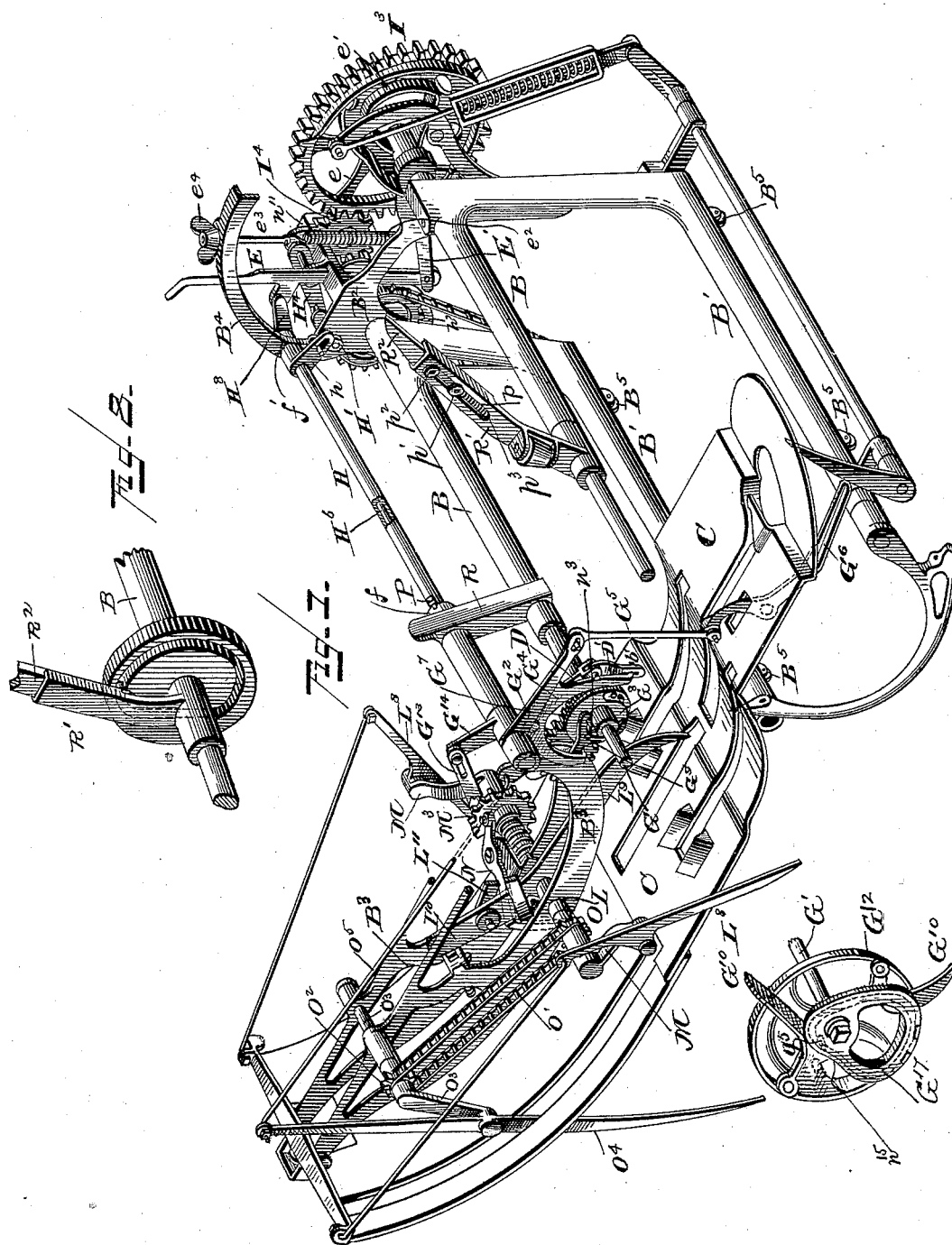
(No Model.)

3 Sheets—Sheet 1.

M. L. NICHOLS.  
GRAIN BINDER.

No. 423,389.

Patented Mar. 11, 1890.



WITNESSES  
H. L. Curand  
H. M. Stirling

INVENTOR  
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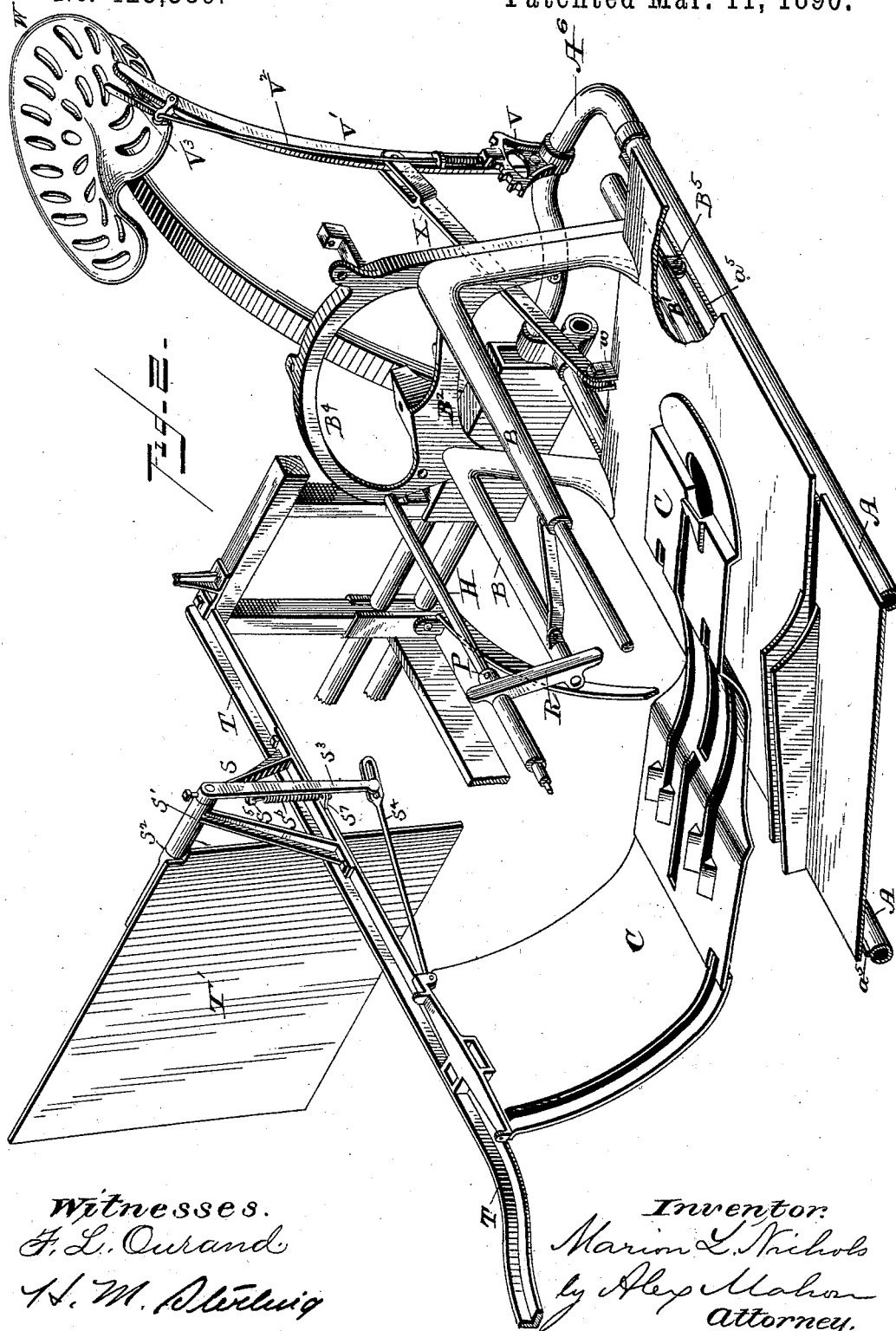
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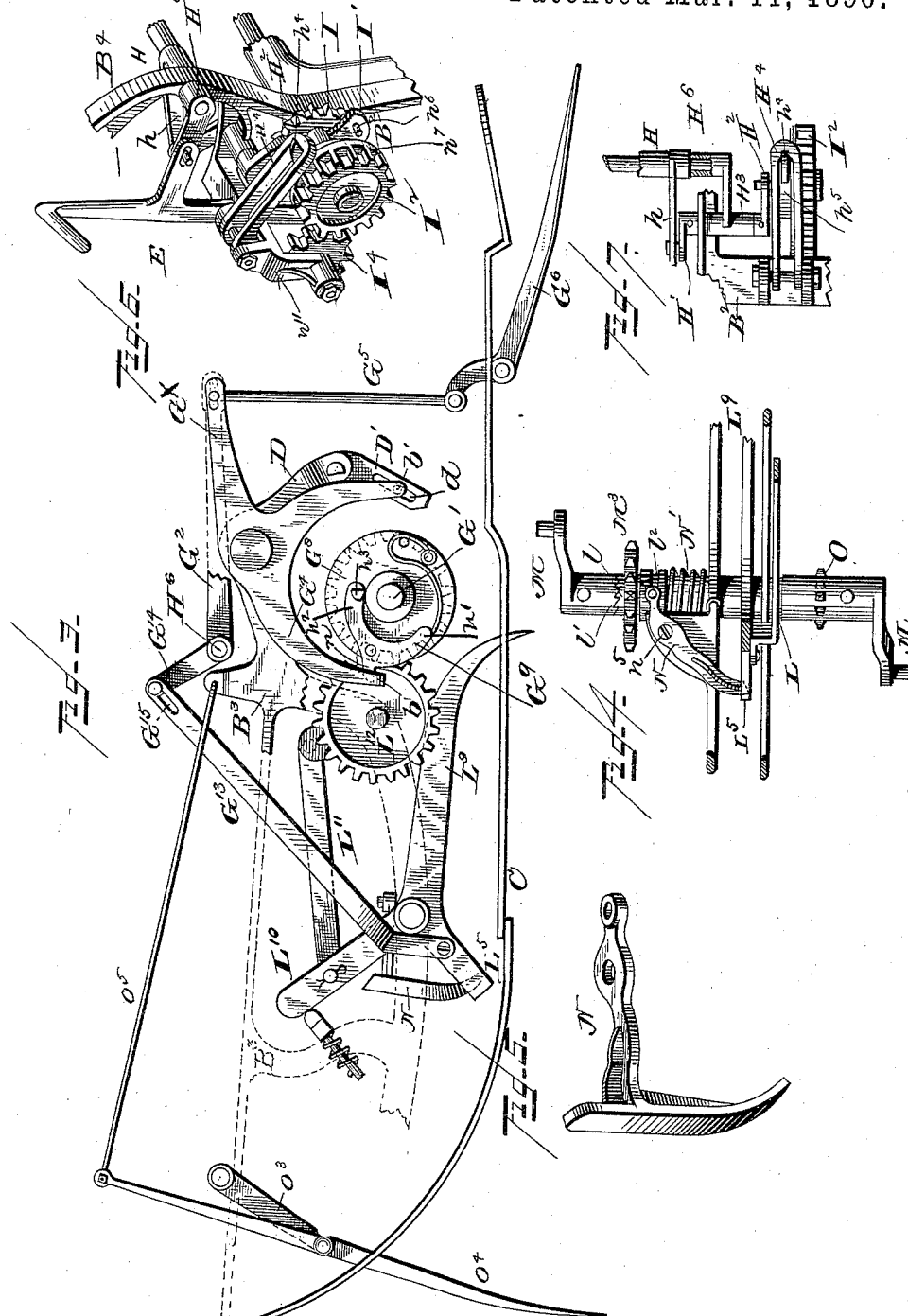
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# UNITED STATES PATENT OFFICE.

MARION L. NICHOLS, OF NEW YORK, N. Y., ASSIGNOR TO THE NICHOLS HARVESTER COMPANY, OF SAME PLACE.

## GRAIN-BINDER.

SPECIFICATION forming part of Letters Patent No. 423,389, dated March 11, 1890.

Application filed February 7, 1889. Serial No. 299,053. (No model.)

*To all whom it may concern:*

Be it known that I, MARION L. NICHOLS, of New York, county of New York, State of New York, have invented new and useful Improvements in Grain-Binders, of which the following is a full and exact description, reference being had to the accompanying drawings, making part of this specification.

My invention relates to improvements on the trip mechanism and the mechanism for controlling the header board or flag and imparting an accelerated movement thereto by and in the operation of adjusting the binding devices, described in Letters Patent granted to me January 8, 1889, No. 395,991.

The invention consists in pivoting the grain trip-arm to overhang the grain-table and in connecting said arm directly with the trip-arm controlling the clutch mechanism between the continuously-operated main packers and the intermittently-operated separator.

It further consists in a novel construction of clutch-lever controlling the auxiliary packers to be acted upon by the separator-arm, whereby said packers are thrown out of action by the direct engagement of the separator-arm with the clutch-lever.

It further consists in combining the separator, controlled in its action by the grain-trip, with the auxiliary packer-clutch and binder-mechanism trip in such manner that the separator shall at its first impulse act to throw the auxiliary packers out of action, and at the completion of its forward movement to throw the binder-trip into action.

It further consists in connecting and operating from the auxiliary packers a butt hastener or forwarder for engaging the butts of the grain and carrying them forward into reach of the auxiliary packers.

It further consists in a novel construction of slotted pivoted yoke or frame arranged to engage the pawl which locks the pinion through which the binding mechanism is operated to its shaft, whereby the same is held positively until acted upon by the separating-arm.

It further consists in a novel manner of connecting the header board or flag with the binder and the means for actuating the same,

and to certain details in the construction and arrangement of parts, all as hereinafter described.

In the accompanying drawings, Figure 1 is a perspective view of the binding-mechanism frame with the knotting devices removed. Fig. 2 is a perspective view of the same with the knotting mechanism removed, showing a portion of the main frame of the machine and the means for connecting the header board or flag mounted on the main frame with the binder-mechanism frame. Fig. 3 is a side elevation of the grain trip-arm, the mechanism for imparting motion to the separator, the trip mechanism for throwing the separator into action, and the secondary auxiliary packer-arm. Fig. 4 is a plan or top view of the shaft for communicating motion to the main auxiliary packers and the mechanism for throwing the same out of action. Fig. 5 is a perspective view of the lever for throwing the auxiliary packers out of action. Fig. 6 is a perspective view of a portion of the binder-mechanism frame, showing the end of the shaft for communicating motion to the packers, and the pinion mounted thereon, through which motion is communicated from said shaft to the binding devices, and the devices for unclutching said pinion from the shaft and holding it out of action. Fig. 7 is a top view of the same, and Fig. 8 is a perspective view showing a modification of the manner of operating the contractible ejector-arm.

The main and auxiliary packers, the separator, and the several trip mechanisms are mounted in the binder-frame, which consists of the arching rear frame  $B^4$ , connecting-bar  $B^3$ , upper tubular cross-bars  $B B$  and lower tubular cross-bars  $B' B'$ , and frame-bars  $B^3 B^3$ , to which the breast-plate  $C$  is connected, constituting the movable binder-mechanism frame, and which is mounted upon and adapted to move on trackways  $a^5$  on the bars  $A$  of the harvester-frame, the lower bars  $B' B'$  being provided with rollers  $B^5$ , which engage said trackway, the other parts of the harvester-frame herein shown, but not particularly described, being constructed in any usual or preferred way.

The shaft  $G'$ , which communicates motion

to the main packers, auxiliary packers, and separator, is mounted in one of the tubular frame-bars B, and has loosely mounted upon it near its outer end a pinion G<sup>7</sup>, having a disk or plate G<sup>8</sup> secured thereto, and carrying on its outer face a rock spring-pawl G<sup>9</sup>. This pawl is provided with arms *n n'*, from one of which projects a lug *n*<sup>3</sup>.

On the shaft G' are rigidly secured the packer-wheels G<sup>12</sup>, only one being shown, and from the inner face of the outer one (the one shown) project friction-rollers *n*<sup>15</sup>, to engage the lug *n*<sup>3</sup> of the pawl G<sup>9</sup>, and through which engagement to cause the pinion to be engaged with its shaft, as described in the patent before referred to. Upon the opposite end of the shaft G' is mounted a sprocket-wheel I, having an enlarged hub or disk I' formed therewith, and from the outer face of which disk project friction-rollers *n*<sup>6</sup>, and adjacent to this wheel the shaft G' has loosely mounted upon it a pinion I<sup>2</sup>, also having a hub or disk *n*<sup>7</sup> formed thereon, and on which disk is pivoted a rocking spring-pawl *h*<sup>5</sup>, having an arm, (not shown,) from the side of which projects a lug. (Not shown.) The pinion I<sup>2</sup> transmits motion when engaged with its shaft to the main binder-mechanism gear I<sup>3</sup> through an intermediate pinion I<sup>4</sup>, mounted in suitable bearings *n*<sup>11</sup> in the arching frame B<sup>4</sup>.

The packer-wheels G<sup>12</sup>, which are mounted on the shaft G' on each side of the frame-bars B<sup>3</sup>, have pivoted to them the angularly-formed packing arms or fingers G<sup>10</sup>, which arms are pivoted upon the side faces near the periphery of the wheels, and have at their points of angles projecting therefrom lugs *g*<sup>5</sup>, to engage cam or trackway G<sup>17</sup>, secured to the shaft G' or to the frame in any preferred way.

A shaft L, parallel with the shaft G', is mounted in the frame B<sup>3</sup> in front of said shaft G', and at a point over the inner end of the carrier or apron, and has mounted upon it the separator L<sup>9</sup>. This separator has an extension or arm L<sup>10</sup>, which is connected through a link L<sup>11</sup> with a pinion L<sup>12</sup>, meshing with and driven from the pinion G<sup>7</sup>, and in the movements of the pinion L<sup>12</sup> acting through the link to force the separator outward toward the carrier to catch and hold the incoming grain and divide it from that accumulated to form the bundle.

An arm or lever E is mounted in suitable guideways in the frame B<sup>4</sup> and has pivoted to it a lever E', which is also pivoted on the frame, and this lever E' carries on its outer end a friction-roller (not shown) to engage and be engaged by internal and external cam-faces *e e'*, formed upon or connected to the binder-mechanism drive-wheel I<sup>3</sup>, and by means of which the lever, and through it the trip mechanism, is held, after being thrown into action, positively during the time the tying mechanism is in action, as described in the patent before referred to. The lever E' has connected to it at a point between its pivot

and its point of connection with the upright arm or lever E a spiral spring *e*<sup>2</sup>, which is connected at its upper end to a screw-threaded rod *e*<sup>3</sup>, mounted in a bearing in the arching bar of the frame B<sup>4</sup>, and which rod has mounted thereon a thumb-nut or handle *e*<sup>4</sup>, by which the tension of the spring on the lever E' may be adjusted to regulate the size of the bundle, as described in the patent before referred to.

Mounted in bearing *f f'* in the frames B<sup>3</sup> B<sup>4</sup> is a hollow shaft H, and within the hollow shaft is mounted a rock-shaft H<sup>6</sup>. This rock-shaft H<sup>6</sup> has mounted on one end, or that adjacent to the arching frame B<sup>4</sup>, a crank-arm H<sup>8</sup>, which crank-arm is connected to the upright arm or lever E, and has mounted on its opposite end a crank-arm G<sup>2</sup>, to which is connected a bifurcated or forked arm G<sup>4</sup>, pivoted to the frame B<sup>3</sup> at a point above the shaft G'. One arm extends down on each side of the shaft G', and each arm is provided with a lug *b b'*, projecting inwardly from its lower end and into the path of the pawl G<sup>9</sup>. An arm D extends from the frame B<sup>3</sup> and has a depending arm D' connected thereto to lie closely to the inner face of the bifurcated or forked arm G<sup>4</sup>, and which arm D' at its lower end is provided with an elongated slot *d*, through which the lug *b'* of the bifurcated arm passes. The trip-arm G<sup>6</sup> is pivoted to the under side of the breast-plate, having its heel end project up through a slot in the same, and which heel end is connected to an arm G<sup>x</sup>, projecting from the bifurcated or forked arm through a link G<sup>5</sup>.

A link G<sup>13</sup> is connected to the separator and extends back therefrom, and is in turn connected to a crank-arm G<sup>14</sup>, keyed or otherwise secured to the hollow shaft H, and through which connection to rock said shaft as the separator is thrown forward to catch and hold the incoming grain. The link G<sup>13</sup> is provided with an elongated slot G<sup>15</sup> at its point of connection with the crank-arm G<sup>14</sup>, which slot is for the purpose of permitting the separator to move nearly the full extent of its throw in acting on the grain before the link G<sup>13</sup> acts on the crank-arm.

A crank-arm *h* is mounted on the hollow shaft H adjacent to the frame B<sup>4</sup>, which arm is connected to a double-crank shaft H' H<sup>2</sup>, having its bearings in the frame B<sup>4</sup>. One of the arms H' engages the crank-arm *h* through a slotted connection, while the opposite arm H<sup>2</sup> of the shaft extends out therefrom in an opposite direction to the arm H' and engages a slotted yoke H<sup>4</sup>, pivoted on the frame B<sup>4</sup>, and located thereon in such position that the end of the yoke shall be in the path traveled by the pawl *h*<sup>5</sup>, and by the engagement of said yoke with the arm *h*<sup>4</sup> of said pawl to throw and hold the binder-operating gear out of action with the sprocket-wheel, as described in the patent referred to.

A set-screw P passes through a perforation in the frame, where the sleeved shaft has

its bearings, and by its engagement therewith serving, by frictional contact, to produce a tension on the binder-clutch trip.

The auxiliary packers  $L^8$  are mounted and driven from crank-arms M on the auxiliary packer-shaft L, on which the separator is mounted, and motion is communicated to said shaft from a sprocket-wheel (not shown) on the main packer-shaft  $G'$  through a sprocket-wheel  $M^3$ , mounted loosely on the shaft L. This sprocket-wheel  $M^3$  is provided on one side with a hub having a ratchet-face  $l$ , which is caused to engage a corresponding ratchet-face  $l'$  on the hub of one of the cranks to which the auxiliary packers are connected, and which hub is fixed to the shaft, and the sprocket-wheel is provided on its other side with a hub or collar  $l^2$ , with which a shipping or switch lever N, hereinafter referred to, is connected. A spring  $N'$  engages the hub of the sprocket-wheel and serves to force the clutch-faces into engagement, and the lever serves to force and hold the clutch-face out of engagement and permit the sprocket  $M^3$  to run loosely without communicating motion to the shaft L.

The switch-lever N is made in angle form and is mounted on a pivot  $n^5$  on the frame, and has one of its arms to engage the collar or hub  $l^2$  on the hub of the sprocket-wheel, while the other arm extends to and into position to be engaged by an arm  $L^5$ , projecting from the separator-arm  $L^9$ . The arm  $L^5$  projects from the separator at such point and the engaging face of the lever N is curved in such manner that the separator will act upon the switch-lever to throw the auxiliary packers out of action immediately in commencing its downward movement, so that the separator-arm shall not be forced to act upon grain being carried in by the packers or that the packers shall be thrown out immediately upon the separator beginning to rock.

Mounted on the auxiliary packer-shaft and keyed thereto is a sprocket-wheel O, which engages through a suitable chain  $O'$  with a sprocket-wheel  $O^2$  on a crank-shaft  $O^3$ , carrying a butt-hastener  $O^4$ , which acts to engage the butts of the grain and carrying them into reach of the auxiliary packers, the upper end of said hastener  $O^4$  being connected through a link  $O^5$  to any convenient point of the binder-frame, and from which it will be seen that the auxiliary packers and the butt-hastener are thrown simultaneously out of action on the first movement of the separator when said separator is thrown into action by the trip mechanism controlled by the grain accumulated to form the bundle.

The shaft by which the knottor mechanism is driven passes through one of the tubular cross-bars B, and has mounted thereon the ejector-arms, only one being shown, and to bring the parts into proper working relation said cross-bars B are brought closely together, and to provide for an ejector-arm which shall be of sufficient length to properly eject the

bundle and at the same time pass the cross-bar on which the main packers are mounted the ejector-arm is constructed and acted upon in the following manner:

On the frame, in line with one of the ejector-arms, is arranged a cam or track R, and the ejector-arm  $R'$  is provided with a sliding spring-extension  $R^2$ , fitting in a socket formed in the end of the main portion. The main portion  $R'$  is provided with an elongated slot  $p$ , and the extension is provided with outwardly-projecting pins  $p'$   $p^2$ , engaging the slot  $p$ , to hold the extension engaged with the main portion, and said pins regulating the extent of movement of the extension, a spring  $p^3$ , mounted in the main portion, engaging the extension to press the same outward, and the cam or track R engaging the point to force the same into the slot against the action of the spring.

In Fig. 8 is shown a modification in the manner of operating the extension of the ejector-arm  $R'$ , in which case an irregularly-formed trackway is fixed to the bar B, and the extension  $R^2$  is provided with a pin to engage the trackway, which is so formed that the extension will be drawn in or forced out at the proper time as the shaft carrying the ejector-arm is revolved.

Mounted on a cross-frame bar T of the frame of the harvester proper adjacent to the movable binder-frame is a frame S, which has a bearing  $S'$  formed in its upper end, in which the rock-shaft  $S^2$ , carrying the header board or flag  $T'$ , is mounted to oscillate, and upon which shaft is mounted an arm or lever  $S^3$ , having at its lower end a pin projecting at right angles to the main portion, and which engages a link  $S^4$ , connected to the binder-frame, which is adapted to be moved by means hereinafter described. The link at the point of connection with the lever  $S^3$  is provided with an elongated slot, which permits the binder-frame to be moved within certain limits in both directions without acting on the header board or flag. A lug  $S^5$  projects from the inner face of the lever  $S^3$  a short distance below its point of connection with the shaft  $S^2$ , and to which is connected one end of a spiral spring  $S^6$ , the other end of said spring being connected to a lug  $S^7$ , projecting from the cross-bar T directly below and in line with the shaft  $S^2$ , and which spring forms an elastic connection between the lever  $S^3$  and the frame, in a manner that will be readily understood.

Mounted on the rear frame-bar  $A^6$  of the harvester-frame proper is a segment-rack V, having pivoted thereto a lever  $V'$ , which has connected thereto a spring-pawl  $V^2$ , connected to a handle  $V^3$ , mounted on the end of the lever, the lever being arranged within convenient reach of the driver's seat W.

A link X is connected to the movable binder-frame, about centrally of the width thereof, to a suitable lug  $w$ , formed thereon or connected thereto in any suitable manner,

and which link extends back and is connected to the operating-lever, and by means of which connection with the lever the binder-frame may be adjusted in relation to the canvas or carrier to adapt the machine to long and short grain, in a manner that will be readily understood.

The action of the device for connecting the header board or flag with the harvester-frame and binder-frame, as above described, is similar to that described in the patent before referred to, or so that an accelerated movement is imparted to the header board or flag in the movement of the binder-frame in such manner that as the binder-frame is moved forward to provide for short grain the header board or flag is caused to maintain a position relative to the needle about equal to the distance between the needle and the line of the cutters, and thus insure the tying of the grain centrally, as will be understood.

Having now described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination, with the continuously-operating packers, the intermittently-operating separator, the trip controlling the clutch mechanism between the continuously-operating packers and the separator, and a grain-trip acted upon by the grain accumulated to form the bundle mounted to overhang the grain-table and connected directly with the clutch-trip, substantially as described.

2. The combination of the auxiliary intermittently-operating packers, the clutch-lever for throwing the same out of action, and the separator-arm acting to throw the auxiliary packers out of action by the direct engagement of the separator with the clutch-lever, substantially as described.

3. The combination of the separator controlled in its action by the grain-trip, the auxiliary intermittently-operating packers, the clutch mechanism for throwing the auxiliary packers out of action, and a binding-mechanism

trip, substantially as described, whereby the separator is caused at its first impulse to act to throw the auxiliary packers out of action, and at the completion of its forward movement to throw the binding-mechanism trip into action, as set forth.

4. The combination of the intermittently-operating auxiliary packers, a butt-hastener, and mechanism for operating the same, and a clutch mechanism for throwing both said auxiliary packers and the butt-hastener out of action before the binding mechanism is thrown into action, substantially as described.

5. The combination of the pinion through which motion is communicated to the binding mechanism, a pawl for engaging the same with its operating-shaft, and a slotted yoke or frame to engage the pawl, and a separator acting through intermediate mechanism on the yoke or frame to release the pawl, substantially as described.

6. The combination of the header board or flag mounted on an oscillating shaft having its bearing on the main frame of the harvester, a depending lever connected to said shaft, a movable binding-mechanism frame, and a link connected to the binding-mechanism frame and to the lever below the point of oscillation, substantially as and for the purpose set forth.

7. The header board or flag mounted on an oscillating shaft having its bearings on the main frame, a depending lever connected to said shaft, a spring connected with the lever and with the main frame in the same vertical plane with the shaft, and a link connected to the movable binder-frame and to the lever, substantially as described.

In testimony whereof I have hereunto set my hand this 31st day of December, A. D. 1888.

MARION L. NICHOLS.

Witnesses:

ALEX. MAHON,  
F. L. OURAND.