

P. HANSON.
GRAIN BINDING HARVESTER.

No. 558,946.

Patented Apr. 28, 1896.

Fig. 1.

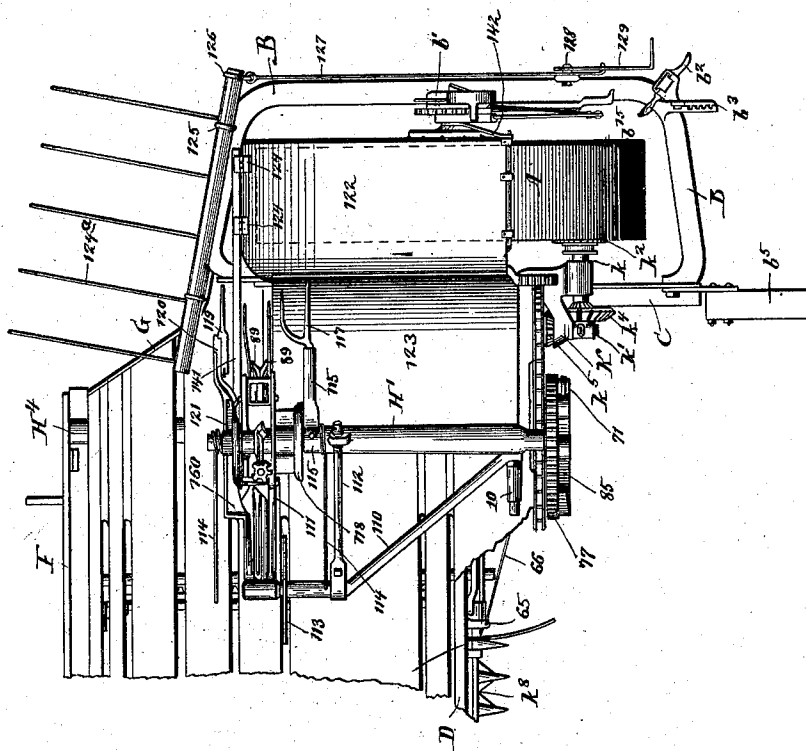


Fig. 1^b.

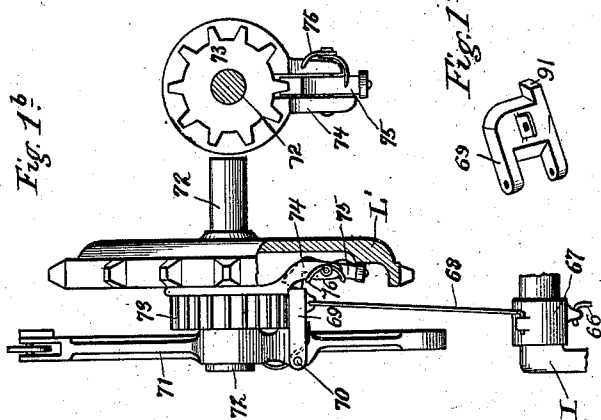


Fig. 1^c.



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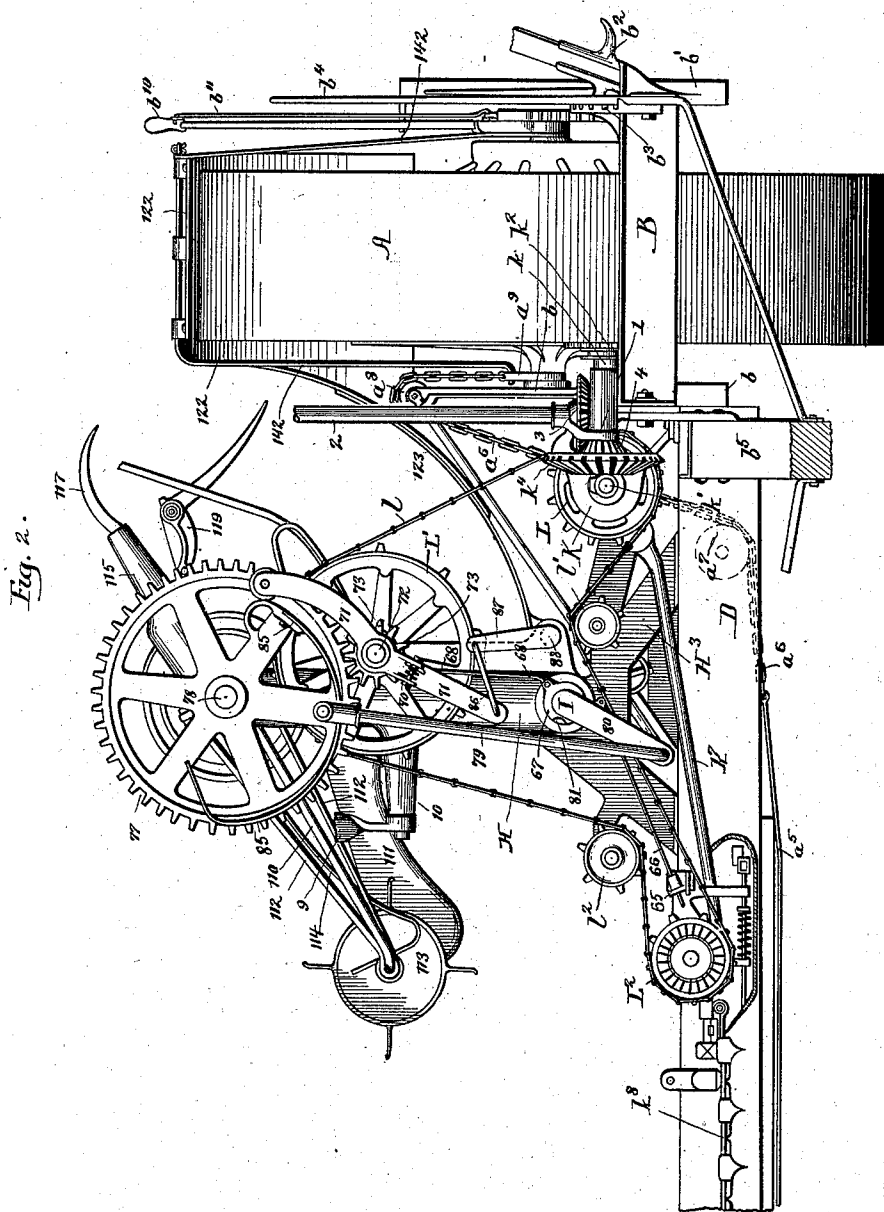
(No Model.)

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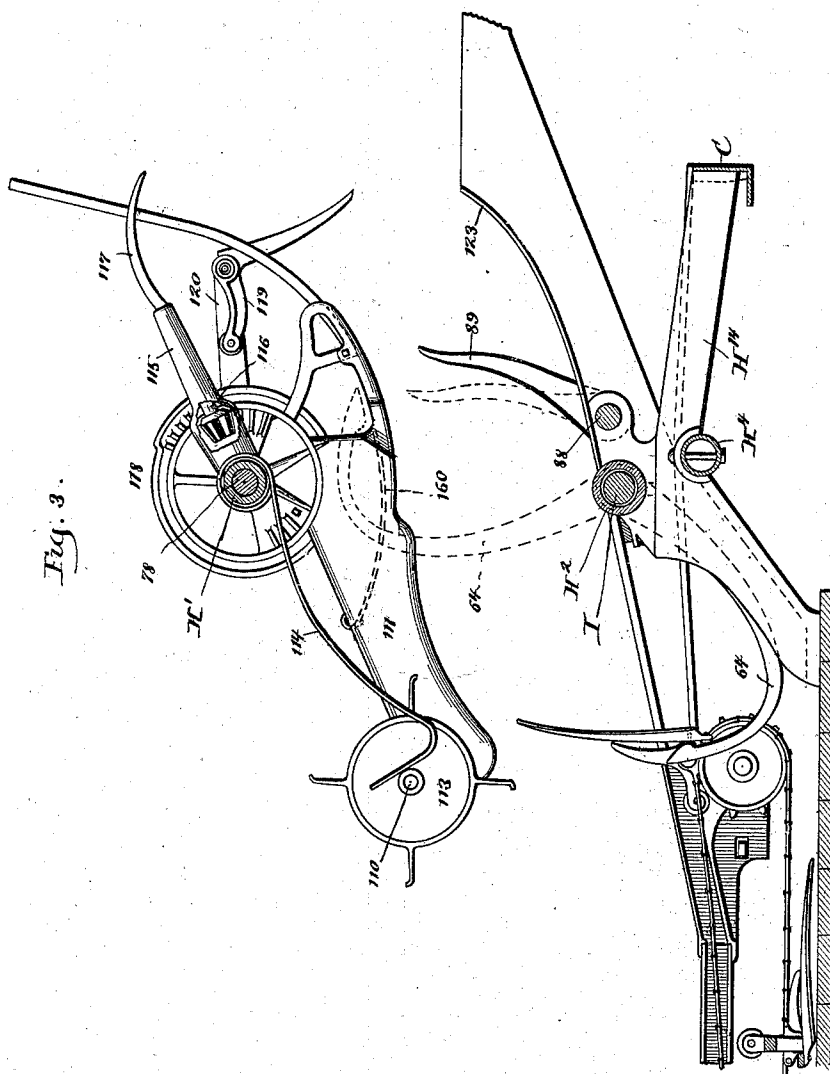
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UNITED STATES PATENT OFFICE.

PAUL HANSON, OF CHICAGO, ILLINOIS.

GRAIN-BINDING HARVESTER.

SPECIFICATION forming part of Letters Patent No. 558,946, dated April 28, 1896.

Application filed February 4, 1889. Serial No. 298,663. (No model.)

To all whom it may concern:

Be it known that I, PAUL HANSON, a resident of Chicago, Cook county, Illinois, (formerly residing at St. Paul, county of Ramsey, State of Minnesota,) have invented certain new and useful Improvements in Grain-Binding Harvesters, of which the following is hereby declared to be a full, clear, and exact description.

The invention designs to improve the structure of harvester-machines having automatic grain-binding mechanism attached thereto, and comprises certain improvements therein, the exact nature of which will appear from the description following, and be thereafter more distinctly pointed out by claims at the conclusion thereof.

In the accompanying drawings like parts have like designations throughout.

Figure 1 is a general plan view of the improved machine. Figs. 1^a and 1^b are detail views of the binder-trip mechanism; Fig. 2, a view thereof in front elevation; Fig. 3, a view in side elevation at the binder mechanism to display the ejector-arms, breast-plate, and connected mechanism.

The drive-wheel A is provided with the usual loose axle, near the ends of which the side frame B is suspended by the inner and outer arc-shaped side irons *b b'* of familiar structure. Frame B incloses the drive-wheel A and at its ends is firmly bolted to the cross-bar C, ordinarily of angle-iron. Cross-bar C is rigidly fastened against the inner side iron *b*, to which is also secured immediately beneath said cross-bar the end of the front bar D. Said front bar extends thence in a straight line along the front of the platform to the inner or grain side of the machine. Front bar D is preferably formed of angle-iron and at its grain end is secured to an end bar (not shown) parallel with the cross-bar C and which at the rear is joined to the back bar F. Said back bar F by bent bar G is united to the side frame B to complete the foundation-frame of the harvester. Seat-spring socket and foot-rest *b*², together with the quadrant-rack *b*³, which coacts with tilt-lever *b*⁴ to adjust the height of the draft-pole *b*⁵, is usually cast in one piece with the side frame B. The grain-wheel at the inner end of the harvester-platform (not shown) has its stud-shaft

mounted in a slide, which engages with guides carried by the platform. A chain extends from the slide for the stud-axle of the grain-wheel and over a suitable pulley beneath the inner end of the platform (near its front) is connected by a rod *a*⁵ and chain *a*⁶ about pulley *a*⁷ and sheave *a*⁸ on the inner side iron *b* to the collar *a*⁹, loosely encompassing the axle of the drive-wheel. Any adjustment of the side frame B and connected mechanism with reference to the axle of the main drive-wheel will be communicated through chain *a*⁶ and rod *a*⁵, &c., thus causing the inner end of the platform to be adjusted in unison at the grain-wheel. Hand-lever *b*¹⁰ and its latch *b*¹¹ are mounted loosely upon the axle of the main drive-wheel A at the outer side iron to actuate a pinion-pawl (not shown) engaging with the segment-rack on the adjacent side iron and thus raise or lower the main platform.

The main binder-frame is composed of the usual upright standard H, having the overhanging arm H' to sustain the knotter mechanism and the under sleeve or arm H² to receive the binder-arm shaft I, as usual. The binder-frame is firmly held in place by legs or feet extending thence and securely bolted at the front to the truss-frame H³, attached to the front bar and at the rear to the truss H⁴, Fig. 3, which is fastened at its ends to the cross-bar C and to the base-boards of the harvester-platform. Near the point where the binder-frame is secured to the back truss H⁴ the latter is expanded to furnish a cup-like bearing secured to the hollow tube H⁴, which extends to the rear and is fastened to the back bar F of the machine. At the side of cross-bar C near the front thereof is fastened the irregularly-shaped casting K, which affords journal-bearings for the drive-pinion shaft *k* and for pitman-shaft *k'* at right angles thereto. The drive-pinion *k*² upon shaft *k* meshes with a circular rack secured to the main drive-wheel in familiar fashion. Pinion *k*² runs free upon its shaft *k* unless shifted laterally by a forked lever (not shown) having curved ends to inclose the collar of said pinion. When thus shifted inward, the spline of pinion *k*² engages with a feather or gear set upon the pinion-shaft *k* to drive the same. When in operation, the power is transmitted by pinion and pinion-

shaft k^2 k , gear-wheel k^4 , and pinion k^5 to crank and pitman k^7 and sickle k^8 .

Upon pitman-shaft k' is rigidly secured a sprocket-wheel L, over which passes the chain 5 l to the binder sprocket-wheel L', carrier sprocket-wheel L², (for the elevator of the low-down platform,) and idler-sprockets l' l^2 , one of which is capable of adjustment to take up the slack. Mounted loosely upon the 10 main pinion-shaft k , next against the journal thereof, is an irregular collar 1, through which passes the shaft 2, designed to rotate the harvester-reel. A pinion 3 at the lower end of said shaft meshes with the gear-wheel 4, cast 15 in one piece with bevel-pinion k^4 . The companion mount for the axle of the reel (not shown) consists of the upright bar 9, Fig. 2, broken off, pivotally set upon the stud 10, projecting from the main binder-frame.

20 As here shown, the invention is applied to a harvester having a low-down platform upon which the grain falls as it is cut and delivered, thence onto the binder-table by means of an elevator mechanism having suitable fingers 25 which project through slits in the platform. The elevator mechanism works intermittently, and when proper amount of grain is delivered thereby onto the binder-table the elevator comes to a standstill and simultaneously 30 operates the tail of a pivot-plate 65, secured at the front of the platform near the outer end of the sickle-bar. Plate 65 by its connecting-rod 66 slightly turns the sleeve 67, mounted upon the binder-arm shaft I. 35 Sleeve 67 connects by rod 68 with a spring-trip block 69, pivoted at its tail by pin 70 at the front of compressor-lever 71. Said lever 71 rides loosely upon stud-shaft 72, sustained from upright standard H of the binder- 40 frame, which loosely carries the binder sprocket-wheel L'. Upon the same stud-shaft between compressor-lever 71 and sprocket-wheel L' is the loose pinion 73, having the bifurcated arm or extension 74, in which is 45 pivotally set the spring-dog 75. Dog 75 carries a friction-roll thereon to engage easily with any one of the series of lugs projecting from the face of the constantly-revolving sprocket-wheel L'. When sleeve 67 on 50 binder-shaft I is turned in manner already detailed by the movement of trip-plate 65, rod 68 draws down the trip-block about its pivot 70 against the stress of the tension-spring and permits the dog of pinion 73 to interlock with sprocket-wheel L' and thus compels said pin- 55 ion to revolve therewith.

Pinion 73 meshes into the main wheel 77, secured to the front end of shaft 78, said shaft being journaled in the overhanging arm H' of the binder-frame and serving to operate the knot- 60 ter and discharge mechanism of the binder. When binder-wheel 77 begins to revolve, through the medium of pinion 73 and sprocket-wheel L, the rod 79, connected, as shown, 65 to the crank-pin upon binder-wheel 77 and to binder-shaft crank-arm 80, compels said crank-arm, together with the binder-arm at

the opposite end of shaft I, to rise above the binder-deck. At the outset said crank-arm 80 contacts with a lug 81 upon sleeve 67 and 70 confirms the turn given to said sleeve about its bearing upon shaft I to completely withdraw the trip-block down and away from any premature engagement with the arm carried by pinion 73. 75

With the commencement of the revolution of the main binder-wheel 77 the upper end of compressor-lever 71 is caught and turned about its stud-shaft 72 by the stout cam-like spring 85, extending into the path of said lever, 80 and, as here shown, attached to the main wheel 77. Through the medium of link 86, which joins the lower end of compressor-lever 71 to the crank-arm 87, carried at the front of compressor-shaft 88, said compressor-shaft is 85 turned in its bearings on the main binder-frame, Fig. 3, so that the forked compressor-arms 89 at the rear end of said shaft are raised above the binder-deck in direction to confront the binder-arm 64 and thus to compress the 90 gavel. The compression gradually increases by reason of the cam shape given to spring 85, against which cam-compressor lever 71 bears; but when main wheel 77 has performed about one-half of its revolution said cam- 95 spring 85 turns abruptly inward toward the center, thus releasing compressor-lever 71 and allowing compressor-arms 89 to fall away beneath the table in readiness for the discharge-arms to act in ejecting the bundle. 100

Since the needle-arm must rise an invariable distance to properly lay the cord across the knotter, it is plain that any excess thickness or irregularity in the size of the gavel will cause unusual strain or cramping, to avoid 105 which the spring-cam 85 serves not merely to actuate and maintain the compressor 89 in position confronting the needle-arm, but by yielding slightly, as may be requisite, eases the part in play from any undue strain de- 110 veloped during compression.

The discharge of the bundle from the binder is effected during the latter half-revolution of the main binder-wheel 77 by the means presently detailed. When the discharge is to oc- 115 cur, binder-arm 64 and crank 80, at opposite ends of shaft I, are performing the reverse traverse to a normal position of rest. Just before this is reached the trip-block is lifted at its spring-pivot 70, so as to disengage the 120 arm of pinion 73 from sprocket-wheel L' and thereby stop the further movement of said pinion together with main wheel 77 and the mechanism which it controls.

At the inner or grain side of the main binder- 125 frame extends a bracket 110, having horizontal terminal at the rear, which serves as a mount for the familiar breast-plate 111, which at its outer end is hung, as usual, on the knotter-operating shaft 78. Brace 112 extends 130 from bracket 110 through a lug on arm H' to secure and stiffen the parts. Wheel 113 swings loosely upon bracket 110 at the side of breast-plate 111 and aids in passing the

loose fluffy grain beneath the breast-plate, and as well prevents the grain becoming entangled in the knotter mechanism.

The cord holding and tying devices may be of any suitable or well-known type, that which is shown herein being the same as set forth by my Patent No. 377,828, dated February 14, 1888, (application filed January 30, 1884.)

Secured to binder-shaft 78 and revolving therewith is the sleeve-arm 115, within which travels the pinion-shaft 116 for the forward forked discharge-arm 117. The pinion on said discharge-arm shaft is made with "delay" surfaces and engages with racks located at about opposite points on gear-disk 118, which surrounds binder-shaft 78 and is secured to breast-plate 111.

The rear ejector-arm 119 is pivotally set at its elbow-bend upon a bar 120, which is here shown affixed to the knotter cam-wheel 121. Both ejectors move in unison when shaft 78 revolves, but as appears, Fig. 3, the front ejector 117 is mounted (radially) somewhat ahead of the other, so that in descent toward the binder-table said ejector 117 encounters the bundle first and tends to turn the butt more toward the stubble side. Just before it meets the bundle the shaft-pinion 116 engages with the rack on gear-disk 118, imparting a half-turn to ejector 117 about its own axis, so that the curved tires of its forked end come snugly against the burden.

Conveniently secured to the hubs of the ejectors 117 119 by a turn or so around the hubs are the clearing-springs 114, which project thence from shaft 78 toward the grain side of the machine and terminate near the bracket 110. When rotation of shaft 78 occurs, the springs 114 descend in radial path until the bundle is reached, against which they bear with increasing tension as the shaft winds their coils tighter and tighter prior to the arrival of the ejectors. Thereafter the springs 114 move with the ejectors and aid to expel the bundle, which having finally cleared the deck presents no further obstacle to the springs 114. Shaft 78 is then at a standstill, but the springs are yet under coil-tension and quickly unwind, the free ends being tossed over the vertical and coming finally at rest again in position shown by Fig. 3. Stop-notches at the joint of elbow-ejector 119 with bar 120 will limit the play of the ejector about its pivot. At rest said ejector stands as shown by Fig. 3, but after bar 120 has described a little more than one-half of its revolution the heel of ejector 119 in descent toward the binder-table comes into the path of the cam-race 160, which is here shown conveniently arranged at the rear under side of breast-plate 111. Immediately that the ejector-heel bears against the cam-plate said ejector turns quickly about its elbow-pivot and its tip thereupon stands stoutly at work in position against the bundle. The two ejectors 117 119 now move in unison to

expel the bundle over the tail of the deck. The further revolution of shaft 78 advances bar 120 until the heel of elbow-ejector 119 clears the cam-race, whereupon the ejector stands released and exerts no further thrust upon the load; but the forward ejector 117 still persists, and just before the time when its fellow ejector 119 drops away the shaft-pinion 116 of said ejector 117 encounters the other segment-rack on disk 118, which compels ejector 117 to describe another half-revolution on its own axis. By reference to the plan view, Fig. 1, it will be seen that the ejector 117 has two tines, one of which is nearly straight, while the other curves away from axial line. When the minor half-revolution just referred to occurs, the curved tine (being then nearest the front of the machine) rises quickly away from the binder-deck, tossing the butt of the bundle before it and over the hood-apron. The other tine is in action to impart a final kick under movement of shaft 78, so that with the impetus already acquired the bundle clears the table and is thrown into the carrier with its butt toward the stubble side of the field.

The hood 122, preferably of sheet metal, curves loosely down beneath the binder-table and is hinged at 124 to a bar 141 or like support. At its front the hood 122 is sustained by ears from a pivot-rod having arms 142, which depend at the sides of main wheel A and terminate in collars or like bearings encircling its axis. By this arrangement hood 122 is constantly sustained above the main wheel and yet allows for the readjustment of the binder-table together with other parts of the main frame, when these are shifted in respect to the axle of the main drive-wheel.

At the rear and below hood 122 is a bundle-carrier 124^a, journaled, as at 125, on the main frame. The head of the carrier is connected by crank-arm at 126 to the trip-rod 127, which extends forward and is united to foot-lever 129, rocking on stud 128 at the side frame. If the driver rests his foot against the treadle of foot-lever 129, the bundle-carrier 124^a is maintained in raised position in readiness to receive the bundles as they are swept over the hood 122 by the final action of the ejector-arms. When several bundles have accumulated, the driver, by release of lever 129, permits the weight of the bundles to rock the carrier 124 about its pivot 125, so that the stubble can catch the bundles to drop them from the carrier.

Having thus described the invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination with the needle-arm and with the revolving yielding cam, of the compressor mechanism actuated by said cam, substantially as described, whereby the compressor confronts the needle-arm about the gavel and relaxes slightly against excessive strain, substantially as set forth.

2. The combination with the revolving wheel having a yielding cam thereon, of the compressor-lever bearing against said cam and the compressor-shaft controlled by said lever, substantially as described.
3. The combination with the binder-wheel 77, having spring-cam 85 thereon, of the compressor-lever 71 bearing against said cam, the link 86 and the compressor-shaft 88, substantially as described.
4. The combination with the rotating shaft above the binder-deck of the ejector-arm revolving therewith and rotating upon its own axis, substantially as described.
5. The combination with the rotating shaft 78 and with the sleeve-arm 115, of the discharge-arm 117 journaled therein, and the gear-disk 118 engaging a pinion upon said discharge-arm shaft, substantially as described.
6. The combination with the rotating shaft 78 and with the cam-race plate 160, of the elbow-like ejector-arm 119 pivoted to an extension from said shaft, substantially as described.
7. The combination with the rotating shaft 78 and with the cam-race plate 160, of the knotted cam-wheel 121, provided with an extension 120 and the elbow-like ejector-arm 119 pivoted thereto, substantially as described.

8. The combination with the rotating shaft 78 and with the cam-race plate 160, of the front and rear ejector-arms 117, 119 revolving with said shaft and constructed substantially as set forth, whereby said rear arm may swing free after clearing the race-plate, while the front ejector rotates about its own axis, substantially as described.
9. The combination with the binder-shaft of the ejector-arm, and the flexible elastic clearing-springs separately mounted upon said shaft in advance of the ejector whereby on contact with the bundle the clearing-springs are detained and follow thereafter the ejector to impart a final stroke to the bundle, substantially as described.
10. The combination with the binder-table and with the main drive-wheel, of the movable hood or cover extending from said table over said wheel and pivotally sustained from the axle thereof, substantially as described.
11. The combination with the swinging hood 122 and with the main drive-wheel, of the pivot-arms 142 to sustain said hood about the axle of said drive-wheel, substantially as set forth.

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