(No Model.) 4 Sheets—Sheet 1.

J. F. APPLEBY.

GRAIN BINDER FOR HARVESTERS.

No. 346,451. Patented Aug. 3, 1886.

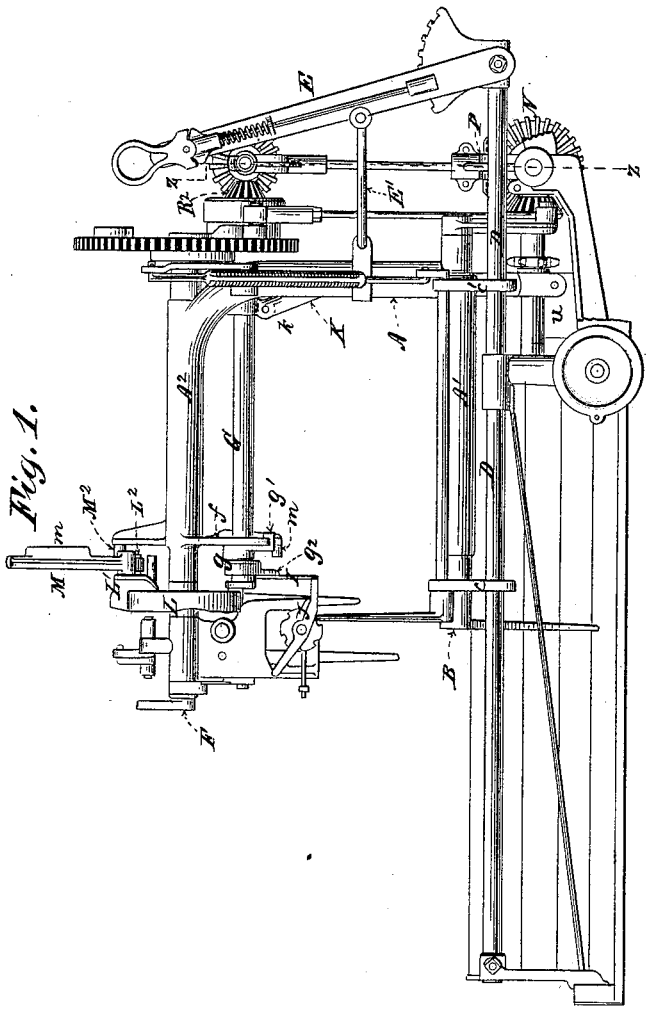

Fig. 1.

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Fig. 3.

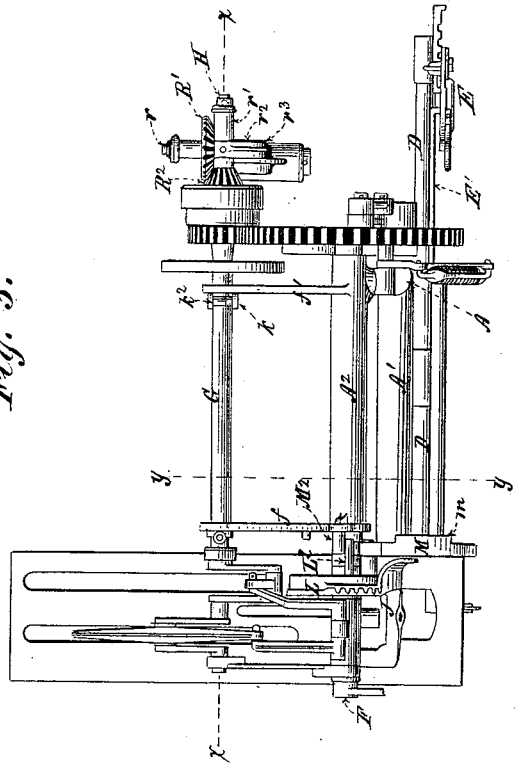
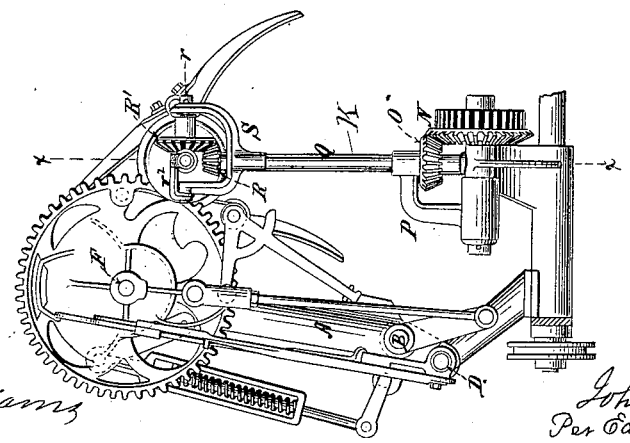


Fig. 2.



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(No Model.) 4 Sheets—Sheet 3.

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GRAIN BINDER FOR HARVESTERS.

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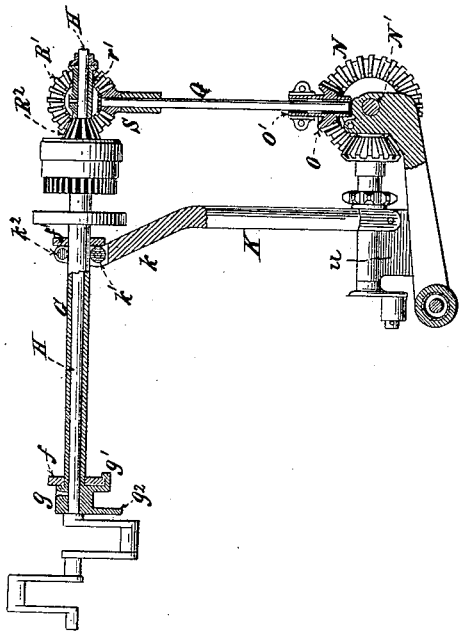
Fig. 4.



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GRAIN BINDER FOR HARVESTERS.

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Fig. 6.

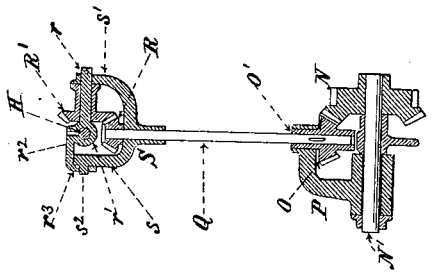
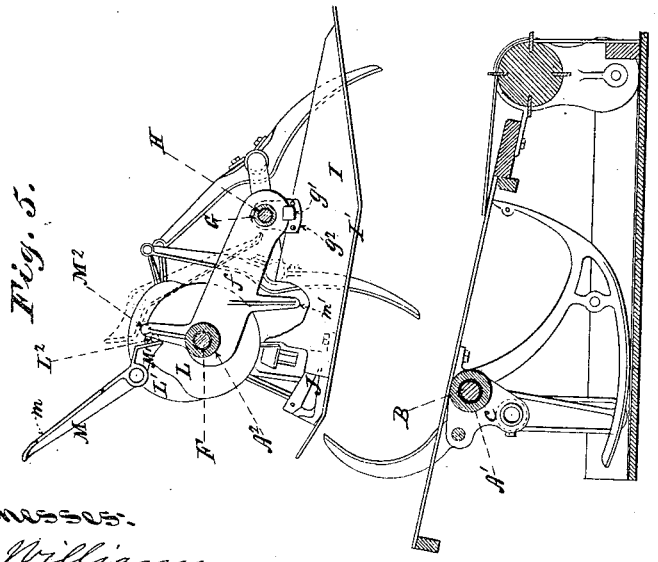


Fig. 5.



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UNITED STATES PATENT OFFICE.

JOHN F. APPLEBY, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR TO THE MINNEAPOLIS HARVESTER WORKS, OF SAME PLACE.

GRAIN-BINDER FOR HARVESTERS.

SPECIFICATION forming part of Letters Patent No. 346,451, dated August 3, 1886.

Application filed July 8, 1885. Serial No. 170,927. (No model.)

To all whom it may concern:

Be it known that I, JOHN F. APPLEBY, of Minneapolis, Minnesota, have invented certain Improvements in Adjustable Grain-Binders for Harvesters, of which the following is a specification.

My improvements relate, first, to the construction and method of supporting the frame of an adjustable binder for a harvester of the kind in which the path for the grain from the platform to the binding mechanism and from the binding mechanism to the ground is wholly unobstructed; secondly, to a construction enabling me to make that one of the gavel-discharging arms which is pivoted to the knotter-operating wheel of greater length than heretofore, the said construction comprising a stationary trip which engages a cam projecting from the hub of the pivoted discharge-arm, and rocks or folds the discharge-arm in toward the axis of the knotter-operating wheel, thereby causing its free end to clear the packer-shaft bearing, which is located inside of and parallel with the knotter-shaft; thirdly, to the transmission from the harvester-gearing of the power to drive the binder by means of pairs of bevel-gears connected by an upright shaft affixed at one end to the hub of one of the bevel-wheels and feathered in the hub of another bevel-wheel, each of the said two bevel-wheels being mounted in a frame adapted to swing on an axis coincident with the axis of the gear with which the bevel-wheel meshes.

The accompanying drawings are as follows: Figure 1 is an elevation of the stubble side of the binder-frame, showing the horizontal member of the main frame of the harvester, upon which the binder-frame slides, and the lever for adjusting the binder-frame. Fig. 2 is a front elevation. Fig. 3 is a top view. Fig. 4 is a vertical section through the line *x x* on Figs. 2 and 3. Fig. 5 is a vertical section through the line *y y* on Fig. 3. Fig. 6 is a vertical section through the line *z z* on Fig. 1.

The binder-frame embraces in a single casting the standard A, the lower horizontal tubular member, A′, and the upper horizontal tubular member, A^2. The lower horizontal member, A′, of the binder-frame affords the bearing for the shaft B of the binder-arm, and is provided with the downwardly-projecting ears *c* and *c′*, which are perforated to receive the horizontal member D of the main frame of the harvester, upon which the binder-frame slides during the act of adjusting it by the usual adjusting-lever, E, pivoted at its lower end to the front end of the horizontal member D of the main frame, and connected by the link E′ with the standard A. The upper tubular member, A^2, of the binder-frame affords the bearing for the shaft F of the knotter-operating wheel, and has cast upon it the laterally-projecting arms *f f′*, perforated at their ends to receive the tube G, which serves as the bearing for the packer-shaft H. At its rear end the tube G is provided with a fixed collar, *g*, from the forward portion of which there extends radially the hooked arm *g′*. The front end of the collar *g* bears upon the rear side of the laterally-projecting arm *f*, and the hook *g′* is adapted to lap over the edge and bear upon the front side of the arm *f*, and to thus hold the tube G so that it is incapable of endwise movement in its bearings in the arms *f* and *f′*. The rear end of the collar *g* is provided with a radially-projecting lug, g^2, which is adapted to be secured to the flange I, projecting up from the horizontal breast-plate I′, which breast-plate is also affixed to the base of the knotter-frame J.

The upper end of the knotter-frame is horizontally perforated, and has its bearing and support on the shaft F. The fastening of the lug g^2 to the knotter-shield holds the hook *g′* in the position in which it is represented in Fig. 4, and thus maintains its engagement with the arm *f*.

An additional support for the binder-frame is afforded by the standard K, rigidly affixed to the bracket *u*, which forms the bearing for the pitman driving-shaft, and is a part of the main frame of the harvester. The upper portion of the standard K is provided with the rearward offset *k*, the upper end of which is forked, and affords the bearings for a roller, *k′*, upon the top of which the tube G bears. A guard-bolt, k^2, extends transversely across above the tube G from one branch to the other of the forked upper end of the standard K, and

serves to prevent the binder-frame from being tilted toward the stubble side of the machine.

The knotter-operating wheel L is provided with the radial projection L′, to which is pivoted the gavel-discharging arm M. The hub of the discharge-arm M is provided with the heel-extension M′, which is engaged by the pin L^2, projecting forward from the side face of the knotter-operating wheel; and by this engagement the discharge-arm M is held in a radial position while it is performing its function of assisting to discharge the bound bundle of grain.

It will be seen that the length of the discharge-arm M is such that if it always stood out radially its free end would not clear the collar *g* on the tube G, in which the packer-shaft has its bearing. To effect such clearance a tripping pin or stud, M^2, is affixed to the vertical part of the arm *f*, as shown in Figs. 1, 3, and 5.

Soon after the commencement of the knotting operation the heel-extension M′ on the hub of the pivoted discharge-arm M is brought into collision with the tripping-stud, and the free end of the discharge-arm is by such collision rocked inward toward the shaft and downward past the collar *g*.

To prevent the gavel-discharging arm from swinging too far around upon its pivot, it is provided upon its front side with the laterally-projecting wing *m*. If the discharge-arm swings too far upon its pivot by reason of the impetus given it by the engagement of the heel-extension cam M′ with the tripping-stud M^2, the wing *m* strikes against the stop *m′*, affixed to and projecting downward from the arm *f*. As the rotation of the knotter-operating wheel continues the upper end of the wing *m* is carried below and under the stop *m′* just before the free end of the discharge-arm M is lowered sufficiently to strike against the gavel.

Motion to drive the binding apparatus is transmitted from the bevel spur-wheel N, which is a member of the main train of gearing of the harvester. The spur-wheel N drives the bevel-pinion O, provided with a hollow hub, O′, having its bearing in the elbow P, which is loosely mounted upon the shaft N′ of the spur-wheel N. An upright shaft, Q, is loosely feathered in the hollow hub O′ of the bevel-pinion O. The upper end of the upright shaft Q has affixed to it the bevel spur-wheel R, which drives the bevel-pinion R′. The latter, in its turn, drives the bevel-pinion R^2, which is what may be called the "prime member" of the system of planet-gearing such as described in my Patent No. 275,114, by which power is transmitted alternately to the packer-shaft H and the shaft of the knotter-operating wheel L.

The upper end of the box S, in which the shaft Q has its upper bearing, is provided with two branches, *s* and *s′*, projecting laterally in opposite directions, and then upwardly. The branch *s′* is transversely perforated near its upper end, and is hung upon the dead axle *r*, upon which the bevel-pinion R′ is mounted. The axle *r* projects through the somewhat elongated hub of the bevel-pinion R′, and is cast in one piece with or affixed to the sleeve *r′*, loosely mounted upon the forwardly-projecting end of the packer-shaft H. An arm, r^2, projecting laterally from the sleeve *r′*, is provided with the downwardly-projecting ear r^3, which is perforated to admit the trunnion s^2, projecting laterally from the upper extremity of the branch *s*. The trunnion s^2 and the dead axle *r* are in alignment with each other, and hence the box S is adapted to swing in a plane parallel with the axis of the packer-shaft, and in so swinging the spur-wheel R is maintained in mesh with the bevel-pinion R′. Similarly, the elbow P, in which the bevel-pinion O has its bearing, is adapted to swing upon the shaft of the spur-wheel N, and in so swinging maintains the bevel-pinion O in engagement with the spur-wheel N. It will be seen that by this organization of the parts the lower part of the shaft Q has the capacity of endwise inward and outward movement in the hub O′ of the bevel-pinion in which it is feathered, and this capacity permits the binder to be adjusted back and forth without breaking the connection by means of which power to operate the binding mechanism is transmitted from the spur-wheel N.

I claim as my invention—

1. In grain-binding mechanism for harvesters, the tubular bearing G for the packer-shaft, in combination with the arms *f f′*, cast in one piece with or otherwise affixed to the binder-frame, and the standard K, affixed to the main frame of the harvester, having its upper portion backwardly offset, and affording at its upper end a bearing upon which the tubular packer-shaft bearing G is supported, whereby the portion of the binder-frame which overhangs the binder-deck derives its support wholly from the front of the machine, and the path of the grain from the platform to the binder-deck and thence to the ground is entirely unobstructed.

2. The combination of a binder-frame, the tubular bearing G, supported from the binder-frame, the standard K, affixed to the main frame of the harvester, having its upper portion backwardly offset, and having its upper end forked and provided with the anti-friction roller *k′*, upon which the tubular bearing G rests, and also provided with a guard-screw, k^2, extending from the upper extremity of one branch of the forked upper end of the standard K to the other transversely across over the bearing G, as and for the purposes set forth.

3. The discharge-arm M, pivoted to the knotter-operating wheel L, and provided with the wing M, in combination with the stop *m′*, affixed to the frame, as and for the purpose set forth.

4. The hooked arm *g′*, cast in one piece with

or otherwise affixed to the tube G, in combination with the arm *f*, as and for the purpose set forth.

5. The upright shaft Q, having at its opposite ends bevel-gears meshing with other bevel-gears and adapted to swing bodily in a plane perpendicular to the axes of the bevel-wheels with which they respectively mesh, the said upright shaft being loosely feathered in the hub of the lower one of the bevel-wheels, with which it is connected, in combination with a horizontally-adjustable frame supporting the upper bevel-wheel and the gearing to which motion is transmitted by means of the shaft Q from the main train of gearing of the harvester.

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