(No Model.) 3 Sheets—Sheet 1.

L. MILLER & A. E. ELLINWOOD.

GRAIN BINDER MECHANISM TRIP.

No. 438,703. Patented Oct. 21, 1890.

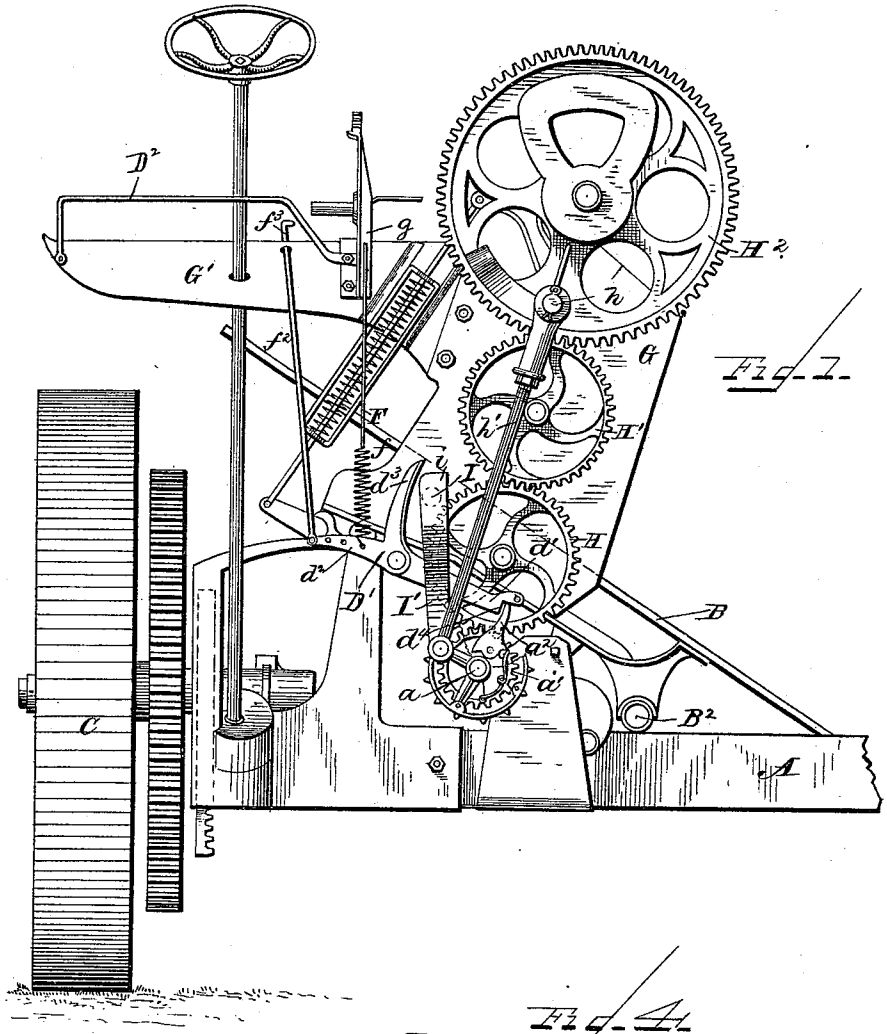

Fig. 1.

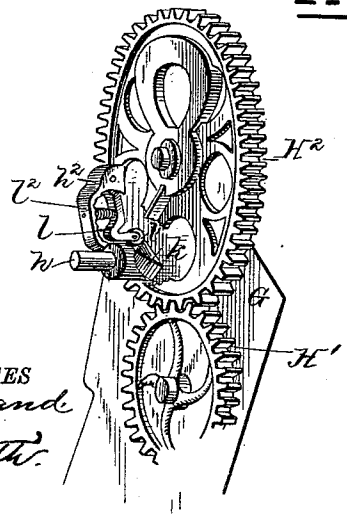

Fig. 4.

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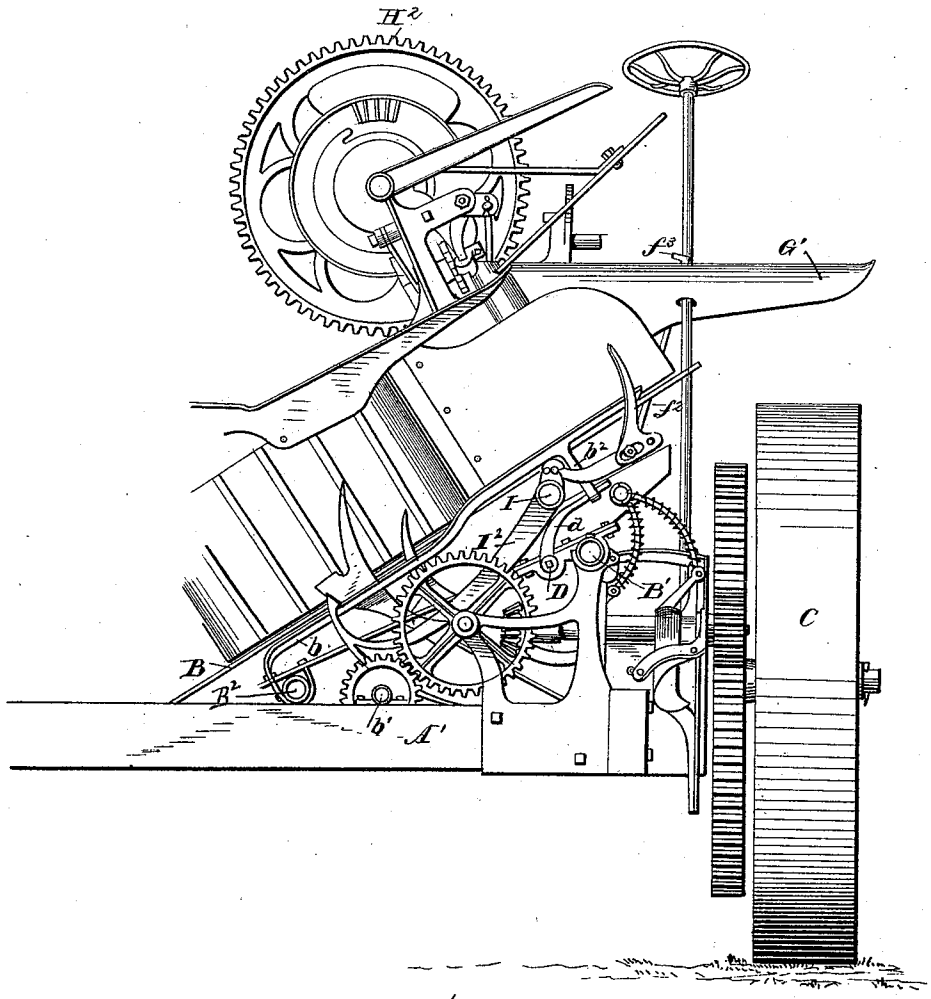

Fig. 2.

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GRAIN BINDER MECHANISM TRIP.

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Fig. 3.

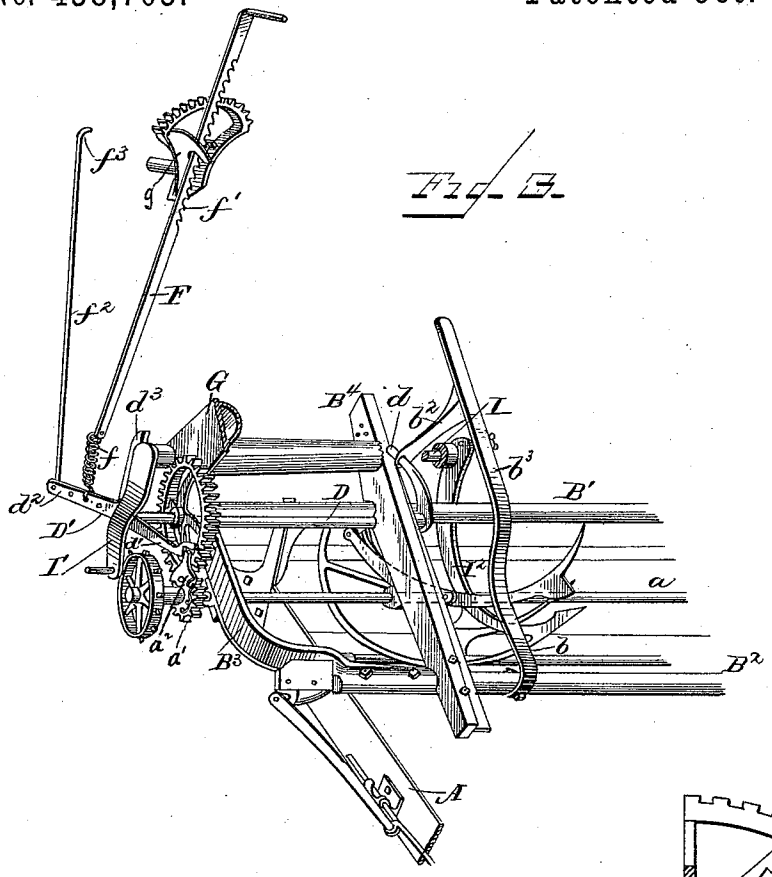
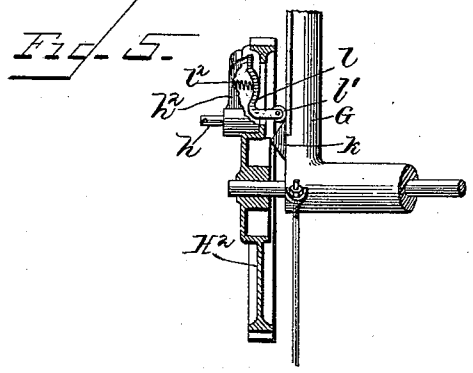


Fig. 5.



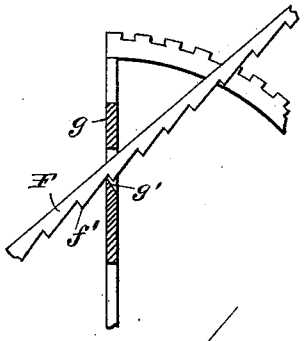


Fig. 3a

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LEWIS MILLER AND AUGUSTUS E. ELLINWOOD, OF AKRON, OHIO; SAID ELLINWOOD ASSIGNOR TO SAID MILLER.

GRAIN-BINDER MECHANISM TRIP.

SPECIFICATION forming part of Letters Patent No. 438,703, dated October 21, 1890.

Application filed November 30, 1885. Serial No. 184,332. (No model.)

To all whom it may concern:

Be it known that we, LEWIS MILLER and AUGUSTUS E. ELLINWOOD, both of Akron, county of Summit, and State of Ohio, have invented a new and useful Improvement in Grain-Binding Mechanism Trips, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification.

Our invention relates to the means for tripping and setting in motion the binding mechanism of a harvesting and grain-binding machine, and to the means for holding the same in proper position and preventing back action in the intervals of rest between the binding operations; and it consists in a novel arrangement of spring bar or lever in connection with the binder-table and the binding mechanism for automatically releasing and setting said binder mechanism in motion; also, in the means for holding up the trip arm or lever during the operation of binding and until the parts have returned to the proper position of rest out of the way of the grain accumulating to form another bundle, and in the means for preventing back action or movement of said parts.

In the accompanying drawings, Figure 1 is a front elevation of so much of a harvesting-machine as is necessary to show the improvements, and Fig. 2 a rear elevation of the same. Fig. 3 is a perspective view looking from the front and grain side, showing the trip mechanism and other parts with which the same is connected. Fig. 3ª represents a section through a standard on the gear-standard arm, showing the spur engaging the gear-trip rack-bar. Fig. 4 is a perspective view of the upper end of the binder-gear standard and of the gear and crank wheel actuating the knotter-actuating and needle shafts, said wheel being partly broken away to show other parts; and Fig. 5 represents a section through the parts shown in Fig. 4, taken in line with the cam projection on the binder-gear standard.

The machine represented in the drawings is similar in its organization to that described in Letters Patent No. 276,448, granted to Lewis Miller April 24, 1883, and will therefore not be herein described in detail further than is necessary to an understanding of the improvements herein claimed.

A A′ indicate the main or platform frame, or rather the front and rear sills thereof, in suitable supports, upon which the longitudinal tubular binder-frame bars B′ and B^2 are supported, the outer one B′, or that nearest the driving-wheel C, being supported in a higher plane than the inner one B^2, for giving to the transverse bars B^3 B^4 of said frame and to the binder-table B, supported thereon between the grain-platform or platform-carrier and the path of the driving-wheel, an inclined position, as shown.

The main binder-gear shaft *a* is mounted in suitable bearings on the binder-frame, and is provided with packer-actuating cranks, and has a continuous rotary movement imparted to it through suitable gearing connecting it with the main drive-wheel in any usual or preferred manner. This shaft *a* has a spur gear or pinion *a′* mounted loosely upon it near its forward end, adapted to be engaged by said shaft for actuating the binder mechanism at intervals, and to be disengaged therefrom for permitting said mechanism to remain at rest while grain is accumulating to form a bundle in any well-known manner, a^2 indicating the clutch dog or pawl, by the action or movement of which the pinion *a′* is connected with or disconnected from its shaft *a*. The needle and packers in the construction shown are arranged to operate from beneath the inclined binder-table, which will be provided with suitable transverse slots to permit the passage of said parts through it in a manner well understood.

Just in advance of the plane in which the needle moves is a yielding rod or lever *b*, made, preferably, in the form of a flat bar set in the inclined position shown, conforming to the inclination of the binder-table, with its lower end made thin enough to form a spring and curved downward and secured to the lower longitudinal binder-frame bar B^2, as shown, or to some other convenient point of support. This bar above its spring portion and at or near the center of its length is curved upward, passing through a slot in the binder-table, and then outward again, as

indicated at b^3, bringing its end adjacent to the drive-wheel side of the machine into a higher plane than its opposite or spring end, above the surface of the binder-table, and over a slot therein and within the path of and under the grain moving over the table. The bar b is provided near its upper end with a pendent arm b^2, having an eye in its end, through which an outwardly-projecting arm d on the rear end of a rock-shaft D passes, said shaft being supported in suitable bearings in the binder-frame and provided at its forward end with an arm or T-shaped (inverted) lever D′, united rigidly to the shaft D at or near the junction of the upright arm d^3 with the arms d' d^2 thereof. The arms of the lever D′ are in or near the same vertical plane with the clutch dog or pawl a^2, and the arm d' extends within the path of said pawl in such manner that in the rotation of the latter with the pinion a' on the shaft a the clutch dog or pawl a^2 comes in contact with the end of arm d' or with a shoulder d^4 thereon, and is vibrated relatively to the pinion a' sufficiently to disengage the latter from the sprocket-wheel on the end of the shaft, thereby allowing the pinion to remain stationary while the shaft a continues to rotate for actuating the packers. A spring e, secured to the pinion a', serves to throw the clutch dog or pawl in the reverse direction when said clutch dog or pawl is released from the arm d', and thereby to engage the pinion with the sprocket-wheel on the shaft in the usual manner.

The arm d^2 of lever D′ extends on the opposite side of the shaft D from arm d', and has a series of perforations formed in it at different distances from the shaft D, through any one of which perforations a spiral spring f may be connected at one end with said arm d^2, the upper end of the spring being connected with the lower end of an adjustable rod F.

The rod F has a series of teeth at f', adapting it to engage a tooth or spur g' on an arm G′ of the binder-gear standard G, a guiding-loop g on said arm serving to hold the rod F against accidental displacement. By adjusting the rod F up or down the tension of the spring can be regulated, and by attaching the spring to the arm d^2 at a point nearer to or farther from the shaft D the length of the lever-arm can be varied, and by means of the two adjustments the resistance to the rocking of the shaft D can be adjusted, as required, for regulating the size of the bundles.

The end of arm d^2 has a rod f^2 attached to it, which passes up through an eye or perforation in the arm G′, and has its upper end bent to form or is otherwise provided with a treadle at f^3, by pressing upon which and overcoming the tension of spring f the driver can raise the arm d' and release the pawl-arm a^2 for setting the binder mechanism in motion at will. The pinion a' operates, through intermediate gears H and H′, on a gear-wheel H^2, fast on the knotter-actuating shaft, and provided with a crank-pin at h, connected through a pitman h' with a crank-arm I″ on the needle-shaft I for imparting a rocking or vibratory movement to the latter in a manner well known.

The crank-arm I′ has formed on its heel end what may be termed a "cam projection" i, which, when the trip-arm d' of lever D is raised for releasing the binder mechanism and as the arm I set in motion thereby is raised, comes in contact with the upright arm d^3 of the lever D′, and, crowding it outward, serves to hold the arm d' up out of the path of the pawl-arm a^2 until the operation of binding is completed and the needle I^2 is returned to proper position below the table for adapting it to permit the passage over its point of the grain for another bundle, when the arm d' drops again within the path of the clutch dog or pawl a^2, and, acting thereon, throws the binder mechanism out of gear. While the parts are in this position, the grain to form another bundle is carried upward on the table B by the packers against the compressor and is compressed between the knotter-shield and the yielding bar b until its pressure serves to depress the latter, overcoming the tension of the spring f and lifting the arm d', when the pawl-arm a^2 is released, permitting the pinion a' to become engaged with the sprocket-wheel on shaft a and set in motion the binder mechanism.

The binder-gear standard G is provided on its forward face with suitable stud-shafts for the intermediate gears H and H′, and on its rear face with suitable tubular arms inclosing the knotter-actuating and needle shafts in a manner similar to that described in Patent No. 276,448, referred to, and with an arm G′, projecting on its drive-wheel side, forming in practice a support for the driver's-seat standard and foot rail or rod D^2, and for various means for effecting the necessary adjustments of the machine, as indicated in the drawings and in part hereinbefore described.

The gear-standard G has formed on its forward face a cam or V-shaped projection k, and the adjacent face of the gear-wheel H^2 has a curved arm l pivoted at one end to it, the opposite or rear end of said arm (relative to the direction of its movement) carrying a friction-roller l', which just as the wheel H^2 is completing its revolution passes over the cam k, and, being held outward behind the same by a spring l^2, serves when the binding mechanism is thrown out of gear to prevent any backward movement of said mechanism, and so as to hold the latter in proper position of rest until it is again thrown into gear, as explained.

The wheel H^2 is recessed or provided with a socket at h^2 on its rear face to accommodate and permit the vibratory movement of the arm l and its roller l' and of the spring l^2 for holding said arm or roller in proper working position.

Having now described our improvements, we claim as new—

1. The slotted binder-table, in combination with a flexible bar or spring rigidly secured at one end beneath and passing up through a slot in said table, a rock-shaft carrying a binder trip-arm and having a second arm connected to a pendent arm on the yielding end of said flexible bar, substantially as and for the purpose described.

2. The combination, with the slotted binder-table, of the yielding bar or spring rigidly secured at one end beneath and projecting up through a slot in said table and provided on its yielding end with the pendent arm, the rock-shaft connected with said pendent arm, the T-shaped tripping-lever D′, fast on said shaft, a cam on the binder-shaft acting on said lever, and the binder gear-shaft *a*, carrying the driving sprocket-wheel, loose pinion, and the connecting-pawl, with its trip-arm, substantially as described.

3. The combination, in a mechanism for automatically starting and stopping the binder mechanism, of the yielding arm *b*, rigidly attached at one end beneath the binder-table, the rock-shaft connected with the yielding end of said arm, a lever fast on said shaft forming the binder gear-trip, and a cam on the needle-shaft, acting on an arm on said gear trip-lever for holding the trip during the operating of the binder mechanism, substantially as described.

4. The combination, with the shaft *a*, its clutch-dog and pinion, the trip-lever D′, having arms *d′* d^3, and perforated or apertured arm d^2, of the rod F, having adjusting-teeth at its upper end to engage an arm of the gear-standard and adjustably connected to said arm d^2 by a spring *f*, said spring serving to afford tension for holding the trip-lever in operative connection with the clutch-dog, substantially as set forth.

5. The combination, with the shaft *a*, carrying the pinion and clutch-dog, and the rock-shaft D, carrying the T-shaped trip-lever having the apertured arm d^2, of the adjustable toothed rod F, with its connecting-spring *f*, and the presser-rod f^2, also connected to said arm d^2, and whereby the arm d^2 is pressed downward to trip the binding mechanism, substantially as described.

6. The combination, with the gear-standard G, having the V-shaped cam *k*, and the gear-wheel H^2, carrying the spring-pressed arm *l*, of the pitman *h′*, connected at its lower end to the crank-arm I′, having the cam-shaped heel and the T-shaped trip-lever D′, having its arm d^3 extending contiguous to the heel of the crank-arm, so as to be brought into engagement therewith, substantially as specified.

In testimony whereof we have hereunto set our hands this 6th day of November, A. D. 1885.

LEWIS MILLER.
AUGUSTUS E. ELLINWOOD.

Witnesses:
N. N. LEOHNER,
W. K. MEANS.