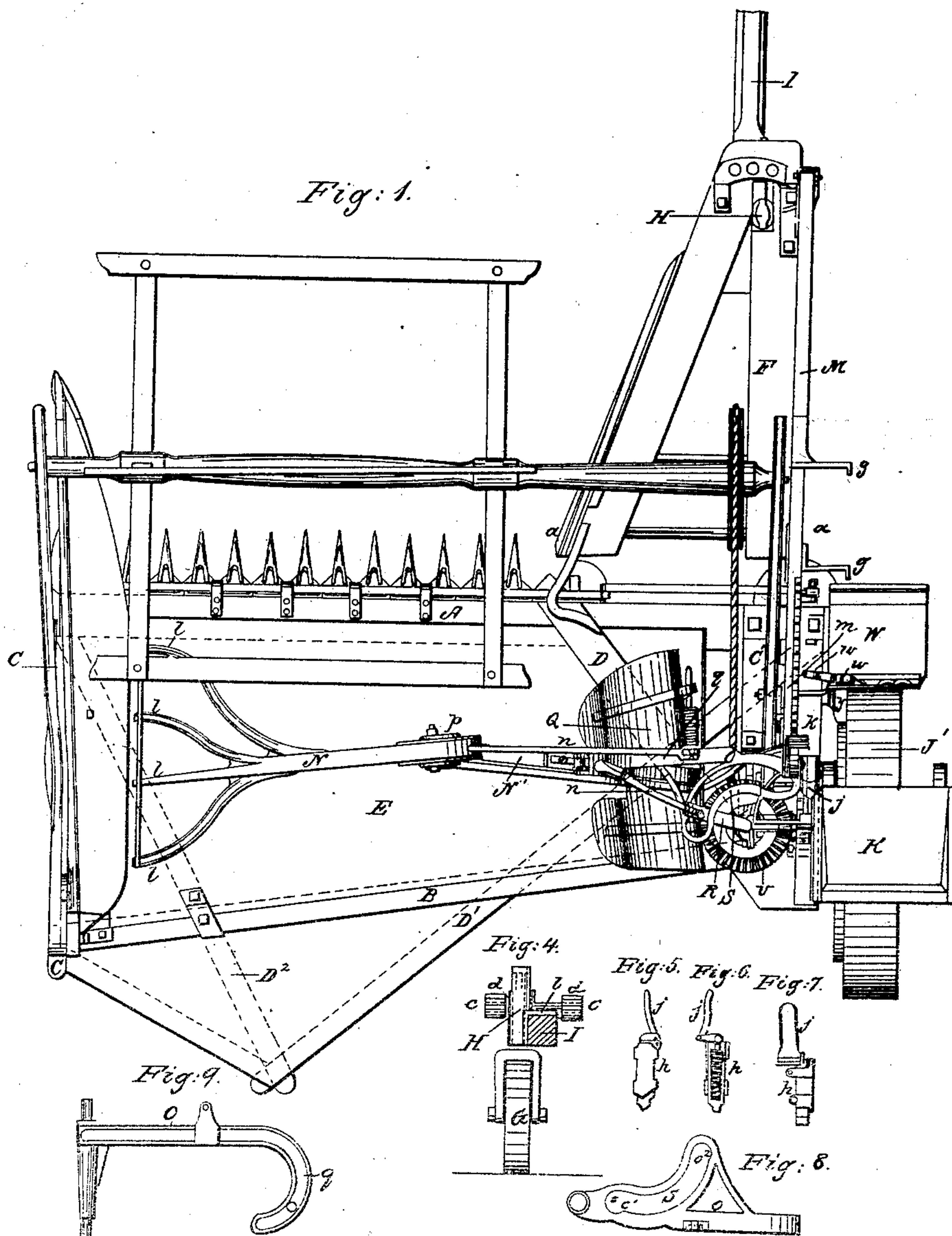


S. T. HOLLY.

Harvester.

No. 34,804.

Patented March 25, 1862.



Witnesses:
J. S. Ferguson.
H. L. Pennell.

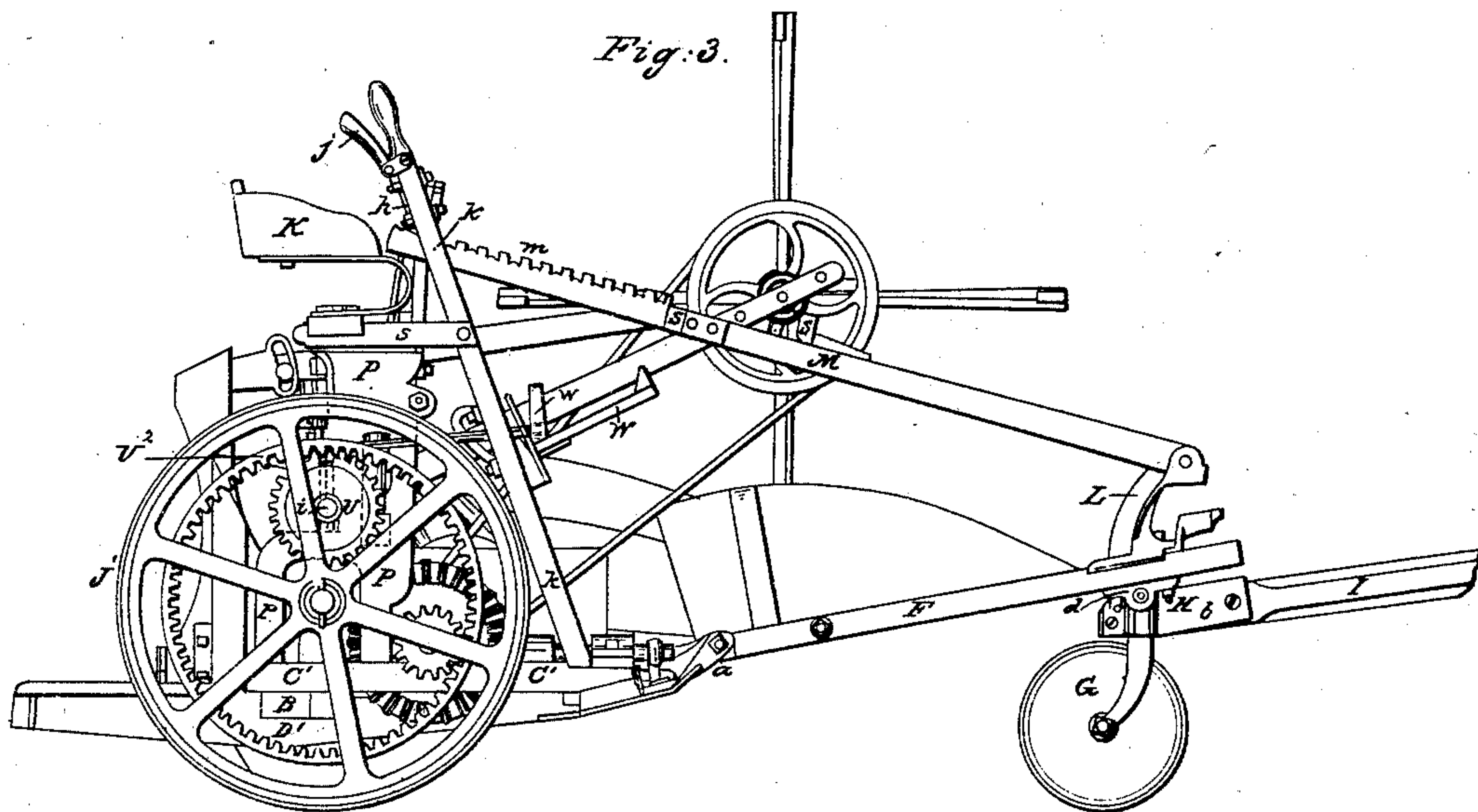
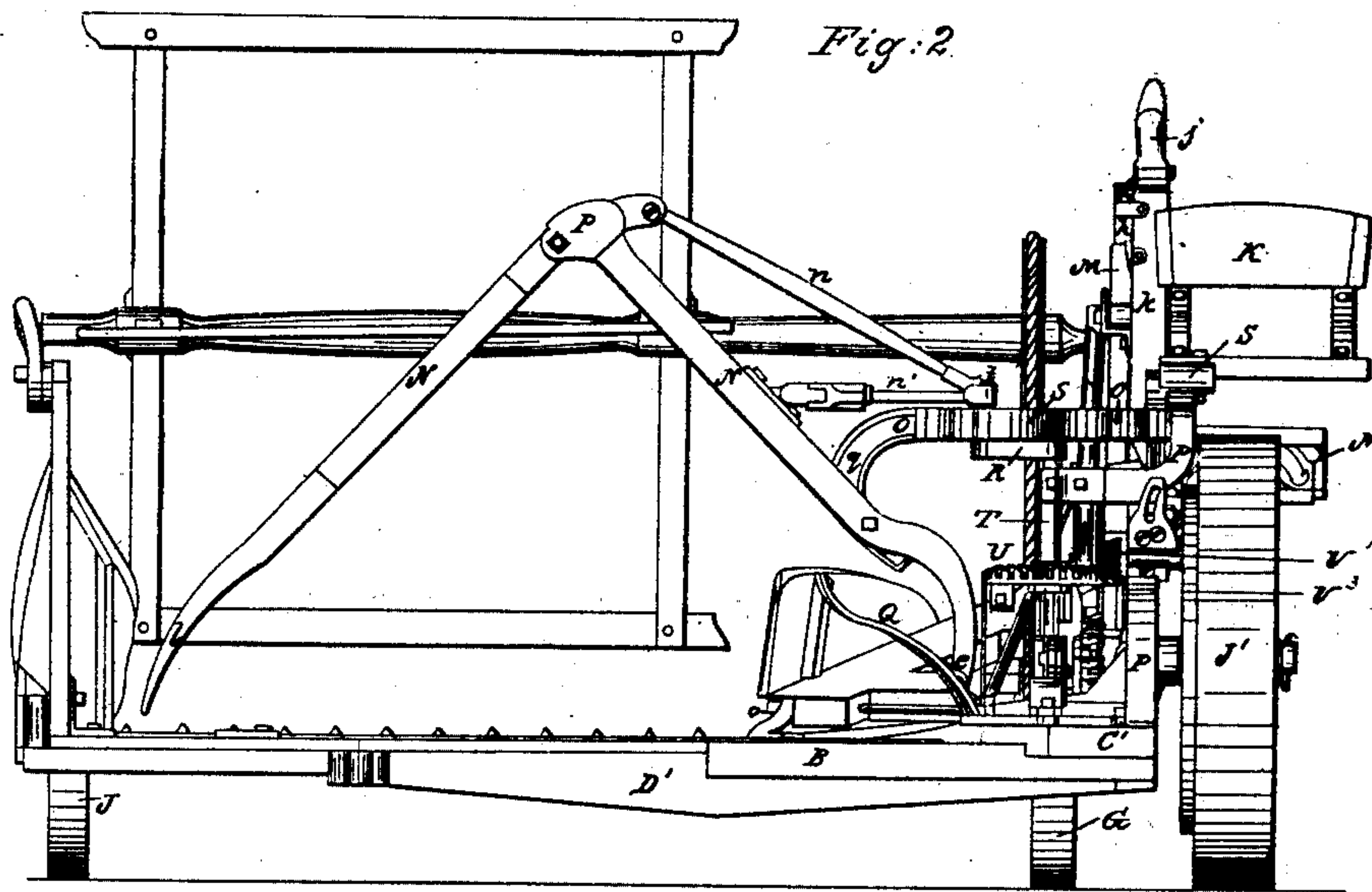
Inventor:
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S. T. HOLLY.

Harvester.

No. 34,804.

Patented March 25, 1862.



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UNITED STATES PATENT OFFICE.

SOLOMON T. HOLLY, OF ROCKFORD, ILLINOIS, ASSIGNOR TO MARY MANNY.

IMPROVEMENT IN HARVESTERS.

Specification forming part of Letters Patent No. 34,804, dated March 25, 1862.

To all whom it may concern:

Be it known that I, SOLOMON T. HOLLY, of Rockford, in the county of Winnebago and State of Illinois, have invented certain new and useful Improvements in Harvesters; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 represents a plan of a Manny harvester with my improvements applied thereto. Fig. 2 represents a rear elevation of the same. Fig. 3 represents a side elevation of the same. Fig. 4 represents a front elevation of the compound spindle-box of the caster-wheel, and the caster-wheel detached from the machine. Figs. 5, 6, and 7 represent the spring-catch of the raising and lowering mechanism of the cutter detached from the machine. Fig. 8 represents a top view of the rake-crane detached from the machine, and Fig. 9 a rear elevation of the same.

My invention is divided into several parts, the first of which has reference to the combination of a caster-wheel at the rear end of the tongue with the machine. In harvesting-machines constructed previous to my invention an arrangement has been introduced to maintain the spindle of the caster-wheel in a vertical position both lengthwise and crosswise to the line of draft, so as to insure the free turning of the caster-wheel. This part of my invention consists in a combination for accomplishing this object more effectually by combining the caster-wheel with the tongue in advance of it, and with the part of the machine that is behind it by means of a compound spindle-box fitted with vertical bearings for the spindle of the caster-wheel, with horizontal trunnions which extend crosswise to the line of draft to the right and left of the caster-spindle, and with which the hinder part of the machine is connected, so as to oscillate upon the trunnions, and with fastenings for the tongue, so that the carrying of the front end of the latter by the neck-yoke maintains the upright position of the caster-spindle in the direction of the line of draft, while the part of the machine that is behind the caster-wheel acting upon the trunnions maintains the upright position of the caster-spindle crosswise to the line of draft.

The second part of my invention has reference to the raising and lowering of the cutter-bar by tipping the cutter-frame of the ma-

chine upon the axles of the carrying-wheels, and is applicable to those harvesting-machines in which the cutter-frame of the machine is preceded by a part of the machine which is connected with the cutter-frame by a hinge-joint, whether such part of the machine be a reach intervening between the tongue and the cutter-frame, or be the tongue itself. In some machines of this class it has been customary to tip the cutter-frame, so as to raise or lower the finger-beam, by means of a lever which is rigidly secured to the part of the machine in advance of the main frame, and extends backward within reach of the driver, who must raise its hinder end in order to raise the cutter-bar. In other machines of this class a thrust-bar has been employed, its front end being jointed to the part of the machine which precedes the cutter-frame, and its hinder end being operated by a lever. The lever arrangement is objectionable, because it requires the exertion of a considerable force by the hand of the driver in an inconvenient direction. The thrust-bar operated by a lever is objectionable from its indirect action, its complexity, and the necessity of placing the lever in a position where it interferes with other parts of the machine. The object of this part of my invention is to enable the thrust-bar to be operated directly by the foot of the driver, and to enable him to exert advantageously the combined muscular force of his leg and arm. To this end this part of my invention consists in arranging the thrust-bar in such manner that its hinder end is within the range of motion of the driver's foot, in providing it with foot-plates, and in combining it with a standard to which the locking apparatus of the thrust-bar is secured, and which is within reach of the driver's hand, the whole combination being such that the driver, grasping the upper end of the standard with his hand and applying his foot to the thrust-bar, can pull with his hand and push with his foot. As by this combination the driver can exert the muscular force of both arm and leg, he is enabled to change the position of the finger-beam and cutter-bar quickly and with great ease to himself, while the necessity of employing a lever to operate the thrust-bar is dispensed with.

The third part of my invention has reference to the securing of the finger-beam in any desirable position; and it consists in combining the thrust-bar above-described with a rack

and a spring-catch, the former secured to the thrust-bar, and the latter being connected with the standard to which the driver's hand is applied when the finger-beam is to be raised or lowered, the combination being such that the end of the catch engaging in a notch of the rack on the thrust-bar makes rigid the connection between the cutter-frame and the preceding portion of the machine that is jointed thereto, and that the catch is disengaged by the act of grasping the standard by the driver's hand when he wishes to raise or lower the finger-beam.

The object of the fourth part of my invention is to lessen the cost of constructing self-raking harvesting-machines; and it consists in combining the driver's seat with the frame of the rake mechanism, so that this frame fulfills two functions—viz., sustaining the rake mechanism and sustaining the driver's seat.

The object of the fifth part of my invention is to operate an automatic rake; and it consists in the combination of the main gathering-arm of the rake with a crank that revolves in a horizontal plane, or thereabout, and with a rake-crane fitted with a cam-plate that is horizontal, or thereabout, the crank-pin moving in the cam-slot of the horizontal cam-plate, and being connected with the gathering-arm, so that the movement of the crank in a plane that is horizontal, or thereabout, gathers the cut grain into a gavel, swings the rake backward, discharges the gavel behind the machine, extends the rake, and swings it to the divider end of the grain-platform in a position to gather a new gavel.

The sixth part of my invention enables the mechanism by which the rake is caused to move along the grain-platform, parallel therewith, to be made in such manner as to occupy less space. In preceding machines with which I am acquainted the rake-handler or secondary gathering-arm is extended a considerable distance above the elbow-joint of the main gathering-arm, and its extended extremity is connected by a radius-bar with a secondary arm of the rake-crane, that extends from the crane-axis in the opposite direction to the main arm of the rake-crane. This secondary arm prevents the location of an elevated driver's seat in the most advantageous position to enable the driver to control the machine, and the object of my invention is to dispense with the necessity of using such arm. To this end this part of my invention consists in the combination of the projecting end of the secondary gathering-arm of the rake with the same arm of the rake-crane that supports the main gathering-arm of the rake (or with some other arm at the same side of the crane-axis) by means of a radius-bar which is pivoted to the crane at a point between the axis on which the crane swings and the main gathering-arm of the rake. As in this combination there is no projection from that side of the rake-crane which is toward the driver's seat, the latter may be located as deemed most advantageous.

The seventh part of my invention has reference to the palm or gavel receiver of the rake mechanism. Palms have heretofore been connected by hinge-joints with the rake mechanism, and been fitted with springs, so that they yield to the pressure of the gavel and accommodate themselves to gavels of different sizes. In such arrangements, however, the hinge-joint has either been located at the upper edge of the palm or above that edge, and in either case the lower edge of the palm yields and recedes from the rake-teeth, whereby the grasp upon the gavel is weakened. The object of this part of my invention is to obviate this defect in yielding palms for automatic rakes; and it consists in combining the lower edge of the palm with the part of the rake mechanism that supports it by means of a hinge-joint and a spring, so that the lower edge of the palm maintains its proximity to the rake-teeth, and consequently the grip upon the gavel, while the body of the palm, turning upon this lower joint, yields to accommodate itself to gavels of different sizes. This combination is also attended with an advantage in depositing the gavel behind the machine, for as the rake extends and releases the grasp upon the gavel the palm (being turned upon its lower edge by the spring) bears the gavel toward the ground.

The object of the eighth part of my invention is to enable the rake mechanism to be thrown into gear or out of gear with facility; and it consists in combining an intermediate-cog-wheel shaft which communicates motion to the rake mechanism with an oscillating box operated by a lever, so that by the tipping of the box in one direction or the other the said shaft is tipped and the teeth of the cog-wheels, which imparts motion to the rake, are engaged or disengaged.

My invention is represented in the accompanying drawings as applied to a Manny combined harvesting-machine. The frame of this machine is composed of two main divisions. The first of these divisions is the frame which supports the finger-beam, the raking mechanism, and the driver's seat, and may be denominated the "main" frame or "cutter" frame. The second division is the reach or portion of the machine which connects the main frame with the tongue. The main frame or cutter-frame of the machine is composed, mainly, of the finger-beam A, the back beam, B, the cross-bar C at the divider side of the machine, the cross-bar C' at the draft side of the machine, and three diagonal braces, D D' D², (represented in Fig. 1 in dotted lines, where they pass under the platform E.) The back beam, B, in this frame extends beyond the diagonal brace D² at the divider side of the machine, and is connected with the hinder end of the cross-bar C at that side, so that this cross-bar, to which the grain-wheel is secured and which therefore sustains the weight of the divider side of the machine, is firmly connected at its hinder end with the remainder of the frame.

The diagonal brace D^2 , which extends from the divider end of the finger-beam to the end of the main diagonal brace D' , crosses beneath the back beam, B , and as it is partially cut away where it intersects with this beam it is there strengthened by a metal strap.

The reach F extends in advance of the cutter-frame, its hinder end being connected with the front side of the cutter-frame by means of a hinged joint at a . The front end of this reach is supported by a caster-wheel, G , whose spindle is sustained in a compound spindle-box, H , which combines the reach with tongue I , to which the horses are attached. This spindle-box has a socket of sufficient depth to receive the spindle of the caster-wheel and sustain it. It is fitted with two trunnions, c , which project in opposite directions from its sides, are perpendicular to the spindle of the caster-wheel, and are parallel with the finger-beam of the machine. It is also fitted with fastenings b , to which the butt of the tongue I is firmly secured. The reach is connected with the trunnions by means of boxes d , so that the trunnions and boxes form a hinge-joint, upon which the reach turns when its hinder end is raised or depressed, and as these trunnions extend parallel with the finger-beam of the machine the caster-spindle is maintained in an upright position, or thereabout, crosswise to the line of draft, by which I mean the line of direction in which the point of application of the draft of the horses progresses over the ground. The fastenings for the tongue are set at such an angle to the caster-spindle that when the front end of the tongue is supported by the neck-yoke of the horses the caster-spindle is upright; hence the caster-spindle is maintained in an upright position in reference to the line of draft. As the line of draft is parallel, or thereabout, with the surface of the ground in one direction, while the finger-beam is parallel, or thereabout, to the surface of the ground crosswise to the line of draft, the caster-spindle is maintained by my compound box in a position that is perpendicular, or thereabout, with the surface of the ground, and the caster-wheel is free to turn to accommodate itself to the movement of the machine.

As before stated, the cutter-frame of the machine and the reach, which in this instance is the part of the machine which precedes the cutter-frame, are connected by a hinge-joint. The cutter-frame is supported by two running-wheels, the one, J , at the divider side or "grain end" of the machine, as it is sometimes called, and the other, J' , at the draft side of the machine, and the cutter-frame can be tipped upon the axles of these wheels (as a cart-body is tipped on its axle) to raise or lower the finger-beam A , which is at its front side. The driver's seat K is in this instance located upon the cutter-frame, and is supported above it in an elevated position above the axle of the running-wheels. The driver's seat and its support thus constitute the arm of a lever, which, being moved from or toward the reach, causes

the cutter-frame to tip upon the axles of its running-wheels. In order to enable the driver while on his seat to effect this tipping, a thrust-bar, M , is provided, whose butt, in lieu of being jointed directly to the reach, is pivoted to the upper end of an arm, L , that is secured to the reach and projects above the trunnions of the caster-spindle box. The arm L at the reach thus constitutes the arm of a lever, which, being moved from or toward the cutter-frame of the machine, causes the reach to tip upon the trunnions of the caster-spindle box as an axis, so that its hinder end (which is connected with the cutter-frame) is raised or lowered. The hinder end of the thrust-bar is supported by a friction-wheel secured to a standard, f , in the vicinity of the driver's seat. It is fitted with two foot-plates, g g' , that are in a convenient position to receive the driver's foot, so that the driver, while seated, can apply his foot to the thrust-bar.

In order to secure the finger-beam in any position in which it is placed by the action of the thrust-bar, the latter is fitted at its hinder end with a rack, m , and a spring-catch, h , is secured to the standard in the vicinity of the driver's seat in such a position that the end of the bolt of the catch engages in any notch of the rack m that is opposite it, and retains the rack and the thrust-bar, to which the rack is secured, in their positions. The most convenient mode of constructing the spring-catch is that represented in detail at Figs. 5, 6, and 7, where the bolt of the catch has a longitudinal slot, in which a coiled spring is inserted. One end of this spring bears against the lower end of the slot of the bolt. Its other end bears against a snug that is cast in one piece with the casing of the bolt and protrudes from it into the upper end of the slot of the bolt. The catch-bolt is connected by a small crank with a lever-handle, j , located at the upper end of the standard k , so that the driver can release the rack from the catch by applying his left hand thereto previous to operating the thrust-bar by his foot. The combination of the thrust-bar with the other parts of the machine enables the driver to exert his strength in a very advantageous manner in raising or lowering the finger-beam and cutter, because the direction in which the force has to be exerted is that in which he can use the muscles in his leg and arm with the greatest effect, as he can push the thrust-bar with his foot, and at the same time pull upon the upper end of the standard, which is grasped by the hand that operates the lever-handle of the catch, and he is firmly sustained in his position against the strain of the thrust-bar by the sides and back of the driver's seat. Moreover, as but one of the driver's hands is required in raising or lowering the cutter-bar, the driving of the horses by the other hand is not interfered with. As the butt of the thrust-bar is pivoted to the end of an upright arm upon the reach, instead of directly to the reach, the useful effect of this arm as a lever is made

available in reducing the amount of force to be exerted by the driver.

The main frame of the machine is fitted with a platform, E, upon which the cut grain is received as it falls, and from which the cut grain is removed at intervals by an automatic rake, which is drawn lengthwise over the platform to gather the grain into a gavel, is swung backward off the platform to remove the gavel therefrom, is extended backward from the platform in order to discharge the gavel and to be at a sufficient distance from the place where the gavel is formed to reach the divider end of the platform when swung over it, and is swung forward over the platform to be in a position to gather a new gavel. The rake-teeth *l l l* are secured to the lower end of a rake-handle or secondary arm N, whose upper end is pivoted between a pair of cheek-pieces, *p*, secured to the upper end of a main gathering-arm, N', that is pivoted to the arm of a rake-crane, O, and the rake-crane is pivoted to a frame, P, which permits it to swing laterally, so as to swing the rake off or onto the platform of the machine. The upper end of the handle or secondary arm N of the rake projects above the cheek-pieces, and its projecting end is connected by a radius-bar, *n*, with the same arm, *q*, of the crane which sustains the main arm of the rake. The function of this radius-bar is to cause the rake-teeth to move parallel, or thereabout, with the surface of the platform in gathering the grain, and as it is connected with the arm of the crane on the same side of the pivots thereof as the rake, and also at a point between the rake and the crane-pivots, it does not interfere with the location of the driver's seat in any position at the side of the crane-pivots opposite to the rake, or with any mechanism located thereat. The rake-teeth operate in connection with a palm, Q, which is connected with the lower end of the main gathering-arm N'. The connection is made by means of a hinge-joint, *e*, located at or near the lower edge of the palm, so that this lower edge cannot yield or alter its relation to the rake, while the body of the palm, turning upon the hinge at its lower edge, can yield to accommodate itself to the greater or less size of the gavel of grain. The palm is pressed toward the rake-teeth by means of a spring, *r*, which tends to turn the palm downward as the rake-teeth, in extending from the palm, slacken their pressure upon the gavel; and this downward action of the palm tends to lay the gavel upon the ground in an undisturbed condition.

All the movements required in raking and discharging the grain from the machine are effected by a crank, R, which turns in a horizontal direction, and operates in combination with a horizontal cam-slot, S, formed in the arm of the rake-frame. The crank in this instance is secured to a rotating shaft, T, which is fitted with a beveled wheel, U, whose teeth engage with those of a pinion, U', secured to one end of an intermediate shaft, *i*. The op-

posite end of this intermediate shaft is fitted with a pinion, U², whose teeth engage with those of a master-wheel, U³, secured to one of the running wheels of the machine, which thus becomes the driving-wheel J'. The crank-shaft T is supported by its boxes in an upright position perpendicular, or thereabout, to the platform of the machine, and parallel, or thereabout, with the axis of the rake-crane O. The crank-pin protrudes through the cam-slot S in the crane-arm, and is fitted with a friction-wheel, which in the rotation of the crank bears against the sides of the cam-slot and swings the crane backward and forward, thus swinging the rake off and onto the platform of the machine. From the position of the crank-shaft in reference to the crane-pivots, the crank-pin is acting in that end *o*, Fig. 8, of the slot which is nearest the swinging axis of the crane at the time the rake is to be swung off the platform; hence this movement is effected with speed, and the gavel is quickly removed out of the way of the falling grain. The cam-slot is of such form that when the rake-teeth are to be drawn lengthwise over the platform to gather the grain the crank-pin is traversing a portion of the slot (from *o*² to *o*¹) which is concentric with the crank; hence during this period the crank does not tend to swing the crane laterally, but holds it and the rake connected with it over the platform. The drawing of the rake-teeth toward the palm Q, and their extension therefrom, is effected by the same crank, R, by connecting its pin *t* with the main gathering-arm N' by means of a connecting-rod, *n'*. When the crank-pin is traversing the concentric portion of the cam-slot from *o*² to *o*¹, the portion of the main gathering-arm above its pivot as the crane-arm is drawn toward the axis of the crane, and the arm is made to assume an erect position, while at the same time the radius-bar *n*, acting upon the upper end of the secondary arm of the rake, compels it to turn upon its pivot at the upper end of the main arm, whereby the rake-teeth are drawn along the platform toward the palm Q. When the crank-pin reaches the end of the cam-slot nearest the swinging axis of the crane, the radial lines extended from the center of the crank-pin to the center of the crank-shaft and from the center of the crank-pin to the swinging axis of the rake-crane are approximately in the same straight line; hence at this period when the rake is being swung off the platform the movement of the rake-teeth toward or from the rake-crane is exceedingly small, and for all practical purposes amounts to nothing, so that the grasp of the rake-teeth upon the gavel is not materially slackened until it is swung off the platform when the rake is extended by the movement of the crank-pin from the crane-axis. The approximation of the radial lines (extended from the center of the crank-pin to the axis of the crank-shaft and axis of the crane) to one straight line takes place again when the crank-pin has reached the outer end

of the cam-slot and is swinging the rake onto the platform, so that at this period no material movement of the rake-teeth toward or from the crane is effected and the rake-teeth swing in the arc of a circle upon the divider end of the platform.

The frame P, which sustains the boxes of the rake-crane pivots, the upper box of the crank-shaft T, and the box of the intermediate shaft, *i*, also sustains the driver's seat K, which is bolted to flanges cast at its upper end, so that this frame performs the two functions of sustaining the rake mechanism and the driver's seat, thus rendering a separate support for each of these purposes necessary. This frame also sustains the standard *k*, which supports the hinder end of the thrust-bar M and the driver's foot-board W, the standard being connected with the upper end of the frame by means of a bar, *s*.

In order to throw the rake mechanism out of gear or into gear, the box V of the intermediate shaft, *i*, of the two cog-pinions U' U² is arranged to oscillate upon a pivot, *z*, so that by tipping it in one direction the teeth of the beveled pinion U' are lifted out of gear with those of the beveled wheel U on the crank-shaft of the rake mechanism, whereby the connection between the crank-shaft and the driving-wheel is broken, so that the rake ceases to operate, while by tipping the box in the reverse direction the teeth of the beveled pinion are engaged with those of the beveled wheel, the connection between the crank-shaft and the driving-wheel is restored, and the rake is caused to operate. The tipping of the box is effected by means of a rock-shaft, *y*, which is fitted at one extremity with arms *ww*, that are in this instance within the control of the driver's foot, and at its other extremity with a crank whose pin is received in a slot, *u*, formed in the plate of the tipping-box V of the intermediate shaft; hence the driver, by bearing upon one or the other arms of the rock-shaft, which, with its arms and crank, constitute a lever, can tip the intermediate shaft, so as to throw the rake out of or into operation, and this he can do without moving from his seat or using his hands for the purpose.

In the foregoing description the term "horizontal," when applied to the rake mechanism, has been used, for convenience, to express a plane that is parallel, or thereabout, with the raking-platform, in contradistinction to perpendicular, or thereabout, thereto.

The parts of the machine represented which have not been particularly described are substantially the same as the corresponding parts of the Manny combined machine, which is well known to manufacturers of harvesters and to the public. Therefore it is not deemed necessary to describe them minutely.

Having thus described the best mode of applying my improvements in a practical form, I deem it proper to state that I do not limit my invention to the precise construction of the various parts of the machine, and that the

construction and arrangements of the parts may be varied as circumstances render expedient, or to suit the peculiar views of constructors of harvesting-machines.

What I claim as my invention in harvesting-machines, and desire to secure by Letters Patent, is—

1. The combination of a caster-wheel with a tongue in advance of it, and with the part of the machine that is behind it, by means of a compound spindle-box fitted with lateral trunnions and with fastenings for the tongue, the combination, as a whole, being substantially as described.

2. The combination of the cutter-frame of a harvester, the hinged part of the machine, which precedes it, a thrust-bar jointed to one portion of the machine, and an elevated driver's seat and standard secured to the other portion of the machine in such manner that the driver can exert the muscular force of both his leg and arm in elevating the finger-beam, substantially as set forth.

3. The combination of the thrust-bar with a rack and spring-catch, the former being secured to the thrust-bar and the latter being connected with the standard, to which the attendant's hand is applied when the finger-beam is to be raised or lowered, substantially as set forth.

4. Combining the driver's seat with the frame of the machine by means of the frame of the rake mechanism, so that this last frame performs two functions, substantially as described.

5. The combination of the main gathering-arm of a rake with a crank that moves in a horizontal plane, or thereabout, and with a rake-crane having a cam-plate that is horizontal, or thereabout, the combination, as a whole, being and operating substantially as described.

6. The combination of the projecting end of the secondary gathering-arm of the rake with an arm of the crane that is at the same side of the crane-axis by means of a radius-bar pivoted to the cam-arm, between the axis thereof and the main gathering-arm of the rake, substantially as herein described.

7. The combination of the palm with part of the rake mechanism that supports it by means of a joint located at or near the lower edge of the palm, and a spring that causes the palm to turn upon this lower joint, substantially as described.

8. The combination of an intermediate cog-wheel shaft of the rake mechanism with an oscillating box operated by a lever, substantially as described.

In testimony whereof I have hereunto subscribed my name.

SOLOMON T. HOLLY.

Witnesses:

E. S. RENWICK,
W. L. BENNEM.