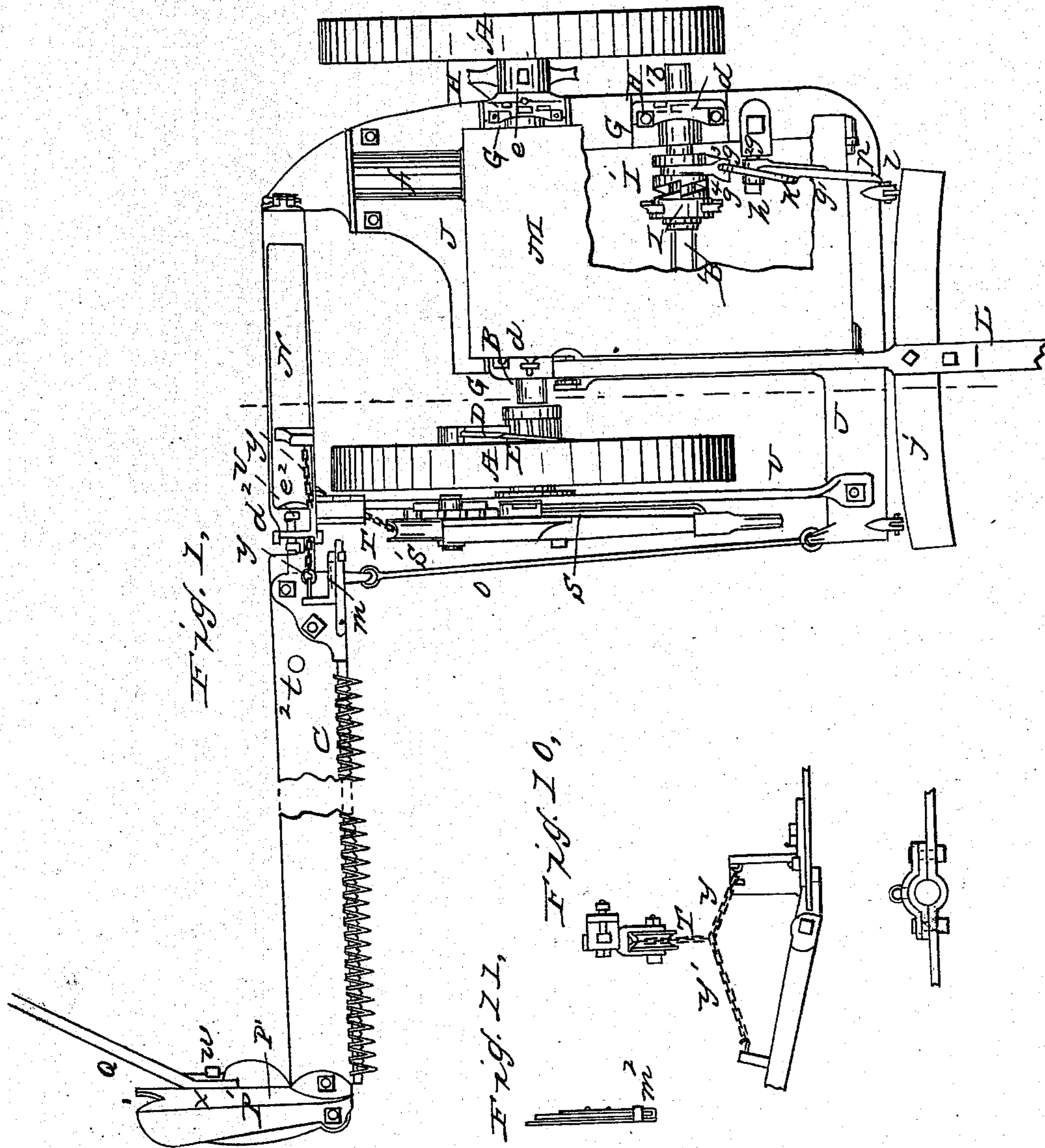


A. B. GRAHAM.

Harvester.

No. 87,561.

Patented March 9, 1869.



WITNESSES:

W. L. Bennett.
John Rankin

INVENTOR:

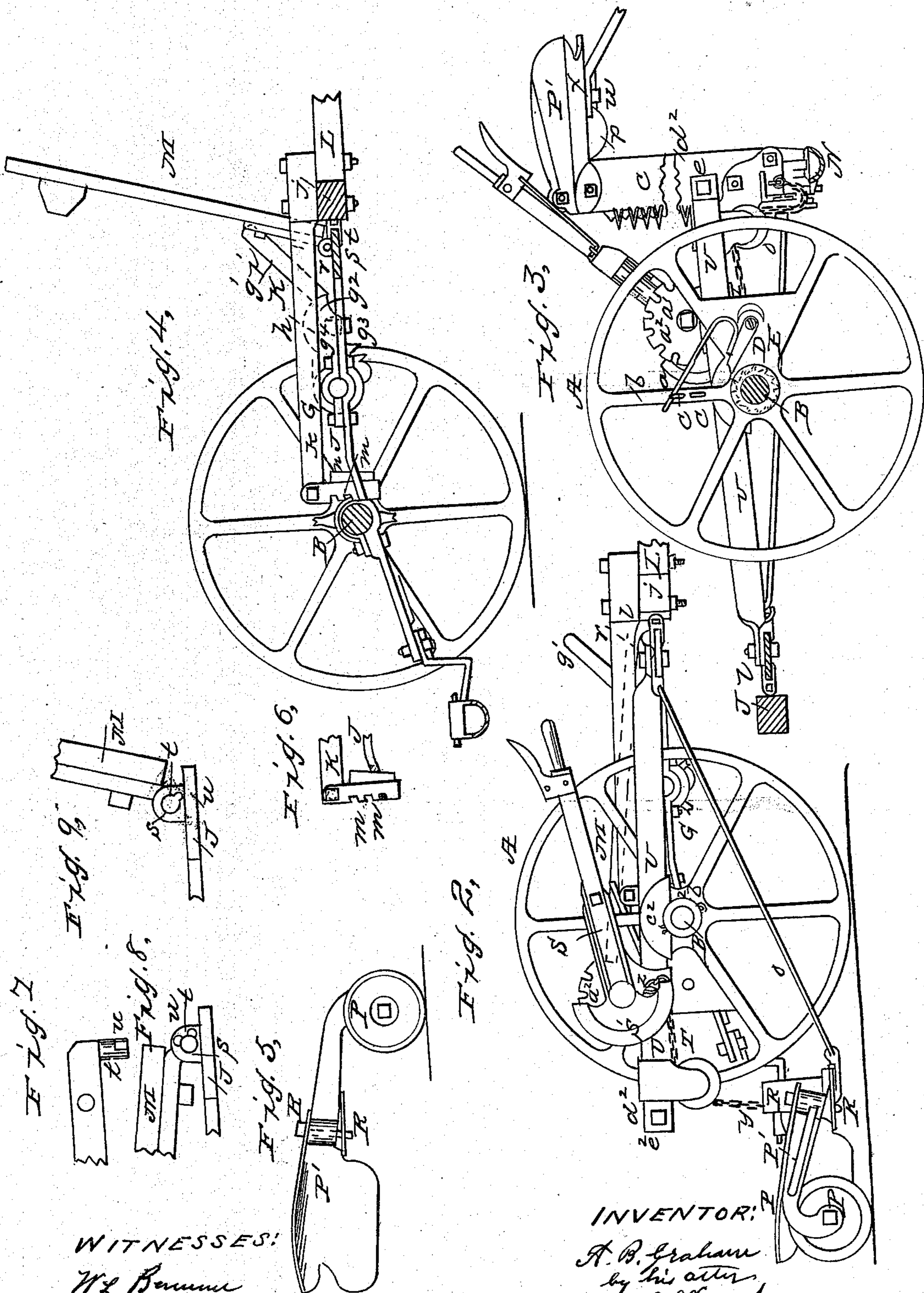
A. B. Graham
by his atty
C. J. Kernuch

A. B. GRAHAM.

Harvester.

No. 87,561.

Patented March 9, 1869.



WITNESSES:
W. L. Bannum
John R. Ashmore

INVENTOR:
A. B. Graham
by his atty
E. S. Lemack

UNITED STATES PATENT OFFICE.

ALVARO B. GRAHAM, OF WAUKEGAN, ILLINOIS.

IMPROVEMENT IN HARVESTERS.

Specification forming part of Letters Patent No. **87,561**, dated March 9, 1869.

To all whom it may concern:

Be it known that I, ALVARO B. GRAHAM, of Waukegan, in the county of Lake and State of Illinois, have invented certain new and useful Improvements in Harvesters, some of which are applicable to other machines; and that the following is a full, clear, and exact description and specification of my said invention.

My invention consists of certain improvements, which constitute parts of it, and may be used separately or collectively, as circumstances render expedient.

The first of these parts of my invention relates to the spring-pawl which connects the driving or other wheel of the machine with a ratchet-wheel, by which power is transmitted to a rotating shaft of the machine; and the improvement consists of the combination of the spring of the pawl with two pins, with either of which it may be engaged at pleasure, the said pins being so arranged relatively to the pawl and its spring that when the spring is engaged with one pin the pawl is held in the proper position for engaging with the teeth of the ratchet-wheel, and when the spring is engaged with the other pin the pawl is held out of engagement with the teeth of the ratchet-wheel. This combination, therefore, affords a ready means of throwing the ratchet-wheel and its connections into and out of gear with the driving-wheel or its shaft.

The object of the next part of my invention is to prevent the screw-bolts or the nuts of the screw-bolts that confine the caps of the pillow-blocks of the rotating shafts from working loose, as they are apt to do, in consequence of the jar and tremor of the machine.

This improvement consists of the combination of a spanner (fitting the nuts or bolt-heads) with the pillow-block cap by means of a lug perforated to admit a key, or its equivalent, the spanner being perforated with a hole which fits onto the lug of the cap, so that the key holds the spanner in its position on the nuts, thereby preventing them from turning.

The next improvement has reference to the clutch-shipper, for engaging and disengaging the clutch that throws a rotating shaft into or out of gear in the machine.

This improvement consists of the combina-

tion of the clutch-lever or shipping-lever with the clutch through the intervention of a helical or skewed rim, which, when rocked or turned, not only shifts the clutch, but also holds it in its position, thus obviating the necessity of using a special catch, bolt, or other fastening for that purpose.

The next improvement has reference to the tongue by which the machine is drawn forward; and consists of the combination of the tongue with the frame of the gearing carriage by means of hinges and a notched plate, and a wedge or filling-piece, which combination enables the inclination of the tongue to be varied, and also enables the tongue to be used as a stiff tongue or as a limber tongue, at pleasure.

The object of the next part of my invention is to enable a floating finger-beam to be raised more equably than heretofore by means of a lifting-lever on the gearing-carriage; and it consists of the combination of the finger-beam with the lifting-lever by means of a forked chain, one branch of which is secured to the finger-beam and the other branch to the vibratable link that connects the finger-beam with the gearing-carriage.

The object of the next improvement is to enable the weight of the floating finger-beam to be supported upon one of the ground-wheels when the machine is removed from place to place, and when it is employed in reaping; and it consists of the combination of the gearing-carriage with a carrying-bar, which projects backward over and is supported by one of the arms upon which one of the ground-wheels turns, and outside the hub thereof, the end of such carrying-bar projecting in the vicinity of the finger-beam when it is turned upright, and being then connected with the finger-beam, so as to transmit its weight to the ground-wheel.

The object of the next part of my invention is to prevent the cutter from sliding endwise out of the guard-fingers of the finger-beam when it is turned upright, and at the same time to permit the said cutter to be readily removed and replaced.

This improvement consists of the combination of the finger-beam with a spring-hook, whose end overlaps the heel of the cutter-bar and prevents it from falling out when placed

in an upright position, while the spring character of the hook permits it to be readily moved out of the way by hand when the cutter is to be removed or replaced.

In order that my improvements may be fully understood I have represented in the accompanying drawing the greater portion of a harvesting-machine in which all my improvements are embodied, certain parts of the machine being omitted in the drawings, in order to enable the residue to be more readily seen, which omitted parts are the same as the corresponding parts of harvesting-machines in general use.

In said drawings, Figure 1 represents a plan of the machine with the finger-beam lowered. Fig. 2 represents a side view of the machine, looking from the divider end of the finger-beam. Fig. 3 represents a vertical section of the machine at the line $x x$ of Fig. 1, with the finger-beam raised, and looking toward the divider end. Fig. 4 represents a vertical section of the machine at the line $x x$ of Fig. 1, looking from the divider end. Fig. 5 represents a view of the divider end of the finger-beam with the caster-wheel in the position it occupies in backing; and Figs. 6 to 11 represent views of detached parts of the machine designated by the same letters as the corresponding parts in the preceding figures.

The gearing-carriage of the machine consists of a frame supported upon and carried by two ground-wheels, $A A'$, with which the moving members of the machine are connected so as to be operated by the turning of the said wheels. These ground-wheels turn upon arms formed upon the ends of the driving-shaft B , with which one or both of the ground-wheels are connected by pawls and ratchet-wheels.

In the machine represented the ground-wheel A , nearer the finger-beam C , alone is used to drive the driving-shaft B , and to this end it is provided with a pawl, D , which is held in gear with a ratchet-wheel, E , secured to the driving-shaft B by means of a spring, a .

In order that the first part of my invention may be embodied in the machine, one of the spokes b of the driving-wheel is fitted with two hook-headed pins, $c c^2$, with either one of which the end of the pawl-spring a may engage.

When the spring is engaged with the outer pin, c , the spring operates to hold the pawl out of gear with the ratchet-wheel, and when the spring is engaged with the inner pin, c' , the spring holds the pawl in gear with the ratchet-wheel.

The driving-shaft B imparts motion to a counter-shaft, B' , by means of a wheel and pinion, the hub F and parts only of the arms of the wheel being shown in the drawing, and the pinion (which is not represented) being applied to the driving end b' of the counter-shaft B' .

The journals of the shafts turn in pillow-blocks $G G G G$, formed upon the frame of

the gearing-carriage; and in order that the next part of my invention may be embodied in the machine, each pillow-block cap is cast with a lug, d , projecting from it, and a spanner, H , is secured to the cap by this lug, for the purpose of preventing the nuts or bolt-heads (whichever be used) from turning, so as to slack the pillow-block caps.

The spanner H is formed with recesses at its ends to fit the nuts, and has a hole through its body to fit upon the lug d . Moreover, the lug is perforated transversely to receive a split-key, e , (or a spring-key, or a strip of leather,) by which the spanner is held in its place.

The counter-shaft B' imparts motion to the crank-shaft that drives the cutter.

As there is no novel peculiarity in the construction and operation of the crank-shaft, and the connecting-rod that connects the crank-pin with the cutter, they are not represented in the drawings.

The crank-shaft, when in place, extends at right angles with the counter-shaft B' , and from its vicinity backward under the main shaft B , and overhangs the rear of the main frame J , the rear part of said frame being made concave, as at f , to permit the passage of the crank-shaft.

The power is transmitted from the counter-shaft B' to the crank-shaft by means of a beveled wheel and pinion, the hub I of the former being fitted to turn freely upon the counter-shaft, and the beveled pinion being secured to the crank-shaft.

The hub I of the beveled wheel is caused to turn with the counter-shaft B' (when the cutter is to be operated) by means of a sliding clutch, I' , which is caused to turn with the counter-shaft by means of a feather fitting into a groove in the hub of a clutch, and the teeth of this clutch engage with corresponding teeth formed upon the hub I of the beveled wheel.

The clutch is moved to and fro on the counter-shaft by means of a shipper, K , whose fork g engages in a groove of the clutch; and in order that the next part of my invention may be embodied in the machine, this shipper is constructed in the following manner: The shipper-lever g^1 is fitted to vibrate upon a stud, h , and the lever-hub g^2 has a helical or skewed circular rim, g^3 , which fits into a helical groove formed in the adjacent concave rim g^4 of the shipper-fork g . Hence, when the lever g^1 is turned in the direction of the arrow i , its inclined rim, acting upon the fork g , moves the latter toward the hub I of the beveled wheel, and consequently engages the clutch I' with the beveled wheel.

When the lever g^1 is turned forward, the fork and clutch are moved in the opposite direction, and the clutch is disengaged.

As the inclination or skew of the rim g^3 of the lever is very gradual, and is small at any one place, the pressure upon the clutch is insufficient to move the shipper-lever; hence the

effect of the construction is to lock the clutch in whatever position it may be, and consequently the necessity of employing a spring-catch or other means to secure the clutch-lever is obviated, the helical rim operating both to move the clutch and to hold it in its proper position.

The gearing-carriage is fitted with a tongue, L, to which the horses are hitched in the usual manner. The cross-bar *j* of this tongue is connected with the frame by ears and bolts, constituting hinges *l*, so that the connection is flexible, if necessary, and the tongue may be used as a limber tongue.

In order that the machine may embody the next part of my invention the rear end, *k*, of the tongue, which extends backward from the cross-bar *j*, is connected with the frame in the following manner: A notched plate, *m*, is pivoted to the end of the tongue, and a slot is formed in the adjacent part of the frame J to permit the notched plate to pass through.

The breadth of each notch (see Fig. 6) of the plate *m* is sufficient to engage with the edge of the frame J, and a wedge, *n*, is provided to fill the space between the plain edge of the notched plate *m* and the end of the slot, when any one notch is engaged with the plate at the end of the slot. Hence, the angle of the tongue may be varied by removing the wedge *n*, disengaging the notch of the notched plate *m*, (by turning the latter on its pivot,) and engaging a different notch with the frame J at the end of the slot, the parts being secured in their new positions by reinserting the wedge *n*; or, if the machine is to be used with a limber tongue, the notched plate may be wholly disengaged from the slot in which it is received, and turned over forward, so as to be out of the slot, in which case the tongue will be perfectly limber.

The driver rides upon the gearing-carriage, his box or seat being secured to a platform, M, which covers the gearing.

In order that the next part of my invention may be embodied in the machine, the platform is not fixed permanently to the frame, but is connected to it by hinges *r r*, arranged at the front end of the platform, so that the platform with the seat may be turned up; as seen in Fig. 4, to permit the gearing to be readily got at for oiling, for repairs, or for other purposes.

The hinges *r r* consist of two lugs, *s s*, (represented upon a larger scale at Figs. 7, 8, and 9,) projecting from the frame, and two pintles, *t t*, projecting transversely from lugs secured to the platform M. The ends of the pintles have ears *u* upon them, and the holes in the lugs *s s* of the frame have notches or slots *o* at their sides, to permit the ears of the pintles to draw through the holes.

When the platform is turned up the ears *u* of the pintles are opposite the notches, (see Figs. 4 and 9;) hence the platform may then be readily removed from the machine by drawing it sidewise, as the ears can then draw

through the notches of the lugs; but when the platform is turned down to its position for use the ears *u* of the pintles are not opposite the notches *o*, (see Fig. 8;) hence the ears then hold the pintles and platform from moving laterally and secure the platform to the machine.

The finger-beam C is connected with the frame of the gearing-carriage by means of a vibratable link, N, and a draft-rod, O. The outer end of the finger-beam is supported by a caster-wheel, P, which is connected with the end of the finger-beam through the intervention of the stock P' of the track-clearer Q.

In order that the next part of my invention may be embodied in the machine, the arm P' of the caster-wheel is connected with the end of the finger-beam by a pivot, R, whose upper end is inclined forward from a vertical line, as represented by the dotted lines in Fig. 2. Hence, when the end of the finger-beam is backed during the turning of the machine, the caster-wheel turning forward reverses the position of its arm P' to the inclination of the pivot R, (compare Figs. 2 and 5,) thereby raising the end of the finger-beam automatically from the ground, and permitting it to back easily over the cut grass behind it, without requiring any care or exertion on the part of the driver for the purpose; while, when the end of the finger-beam is again drawn forward, the caster-wheel arm turning backward reassumes its first position, thereby lowering the end of the finger-beam to its position for cutting.

The track-clearer is secured by a bolt, *w*, to the stock P' at the end of the finger-beam.

In order that the machine may embody the next part of my invention, the stock is constructed with a clasp, *p*, which overlaps the front end, *x*, of the track-clearer and holds it firmly in its place.

In order that the finger-beam may be readily raised for the purpose of passing obstructions, it is connected with a lifting-lever, S, which is pivoted to the gearing-carriage for that purpose; and in order that the machine may embody the next part of my invention, the connection between the finger-beam C and the lifting-lever S is a forked chain, T, one of whose branches, *y*, is connected with the finger-beam C, while the other branch, *y'*, is connected with the vibrating link N.

The main chain T is connected with the grooved rim S' of the hub of the lifting-lever, so as to be wound upon it when the lever is turned for the purpose.

As the chain forks, the effect of moving the lever is to lift the finger-beam and the vibratable link simultaneously, and also to draw the point of application of the chain with the finger-beam toward the connection with the vibrating link, the result of which is that the finger-beam is lifted more equably from end to end than it otherwise would be.

In order that the next part of my invention may be embodied in the machine, the end of the lifting-chain T is connected with the lifting-lever by means of a hook, *z*, so arranged

that its end points upward when the finger-beam is lowered, (see Fig. 2,) so that the hook in that position forms an exceedingly convenient means of connecting and disconnecting the chain with the lifting-lever, and of enabling the effective length of the chain to be readily varied by shifting the ring of the chain that is hooked upon the hook.

The lifting-lever S is provided with a spring-catch, a^1 , by means of which it may be held in any desired position, the spring-catch engaging, for that purpose, in one of a series of notches formed in the rim of a curved plate, a^2 , that is secured to the gearing-carriage.

When the machine is removed from field to field, it is important that the finger-beam should be rigidly held in its raised position and be carried by the gearing-carriage.

In order that the next part of my invention (which relates to this purpose) may be embodied in the machine, the gearing-carriage is provided with a carrying-bar, U, which is secured at its front end to the frame J, extends backward over the end of the arm b^2 of the driving-shaft B, outside of the hub of the ground-wheel A, and is carried by a box, c^2 , which is traversed by the arm of the driving-shaft. The rear end of this carrying-bar extends to the vicinity of the finger-beam, where it is turned upright, and it is fitted with a perforated lug, d^2 , with which the finger-beam, when turned upright, is connected by a screw-bolt, e^2 , that is passed through the hole in the lug d^2 and a corresponding hole, i^2 , in Fig. 1, in the finger-beam.

When the finger-beam is thus raised and secured, its weight is transferred by the carrying-bar to the arm of the driving-shaft, and thence to the ground-wheel A; and the finger-beam is also securely held in its raised position.

Any sufficient connection between the finger-beam and the carrying-bar may, of course, be used in place of the screw-bolt; but it answers the purpose very well.

When the finger-beam is raised, the cutter-bar or sickle tends to slide endwise out of the slots of the fingers. In order that this tendency may be prevented, and that the machine may embody the last part of my invention, the end of the finger-beam nearest the vibratable link is fitted with a spring-hook, m^2 , Figs. 1 and 11,

whose hooked end overlaps the heel of the cutter-stock, and prevents it from dropping endwise out of its place, when the finger-beam is turned up into a vertical position.

As the hook is a spring-hook, or is constructed with a spring-shank, it can be readily disengaged by hand, for the purpose of permitting the cutter-bar to be withdrawn for grinding, or for other purposes.

Having thus described a machine embodying all the improvements which constitute parts of my invention, I declare that I do not restrict my invention to the precise forms and constructions which I have represented and described, but intend to vary the same as circumstances may render expedient, and to apply one or more of my improvements, wherever they may be used with advantage.

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

1. The combination of the ratchet-wheel and spring-pawl thereof with two pins, arranged substantially as before set forth, so as to hold the pawl out of and in gear.

2. Also, the combination of the pillow-block cap, spanner, and perforated lug, substantially as before set forth.

3. Also, the combination of the shipping-lever, clutch, and skewed rim, substantially as before set forth.

4. Also, the combination of the tongue, gearing-carriage, hinges, notched plate, and wedge, substantially as before set forth.

5. Also, the combination of the finger-beam, vibratable link, lifting-lever, and forked chain, substantially as before set forth.

6. Also, the combination of the gearing-carriage with a carrying-bar for the finger-beam, supported upon the axle-arm for a ground-wheel, outside the hub of said wheel, substantially as before set forth.

7. Also, the combination of the finger-beam with a spring-hook to hold the cutter, substantially as before set forth.

In testimony whereof I have hereto set my hand this 23d day of September, A. D. 1868.

ALVARO B. GRAHAM.

Witnesses:

D. N. BARKER,
T. F. CLARKSON.