(No Model.) 4 Sheets—Sheet 1.

LA VERNE W. NOYES.

HARVESTING MACHINE.

No. 358,061. Patented Feb. 22, 1887.

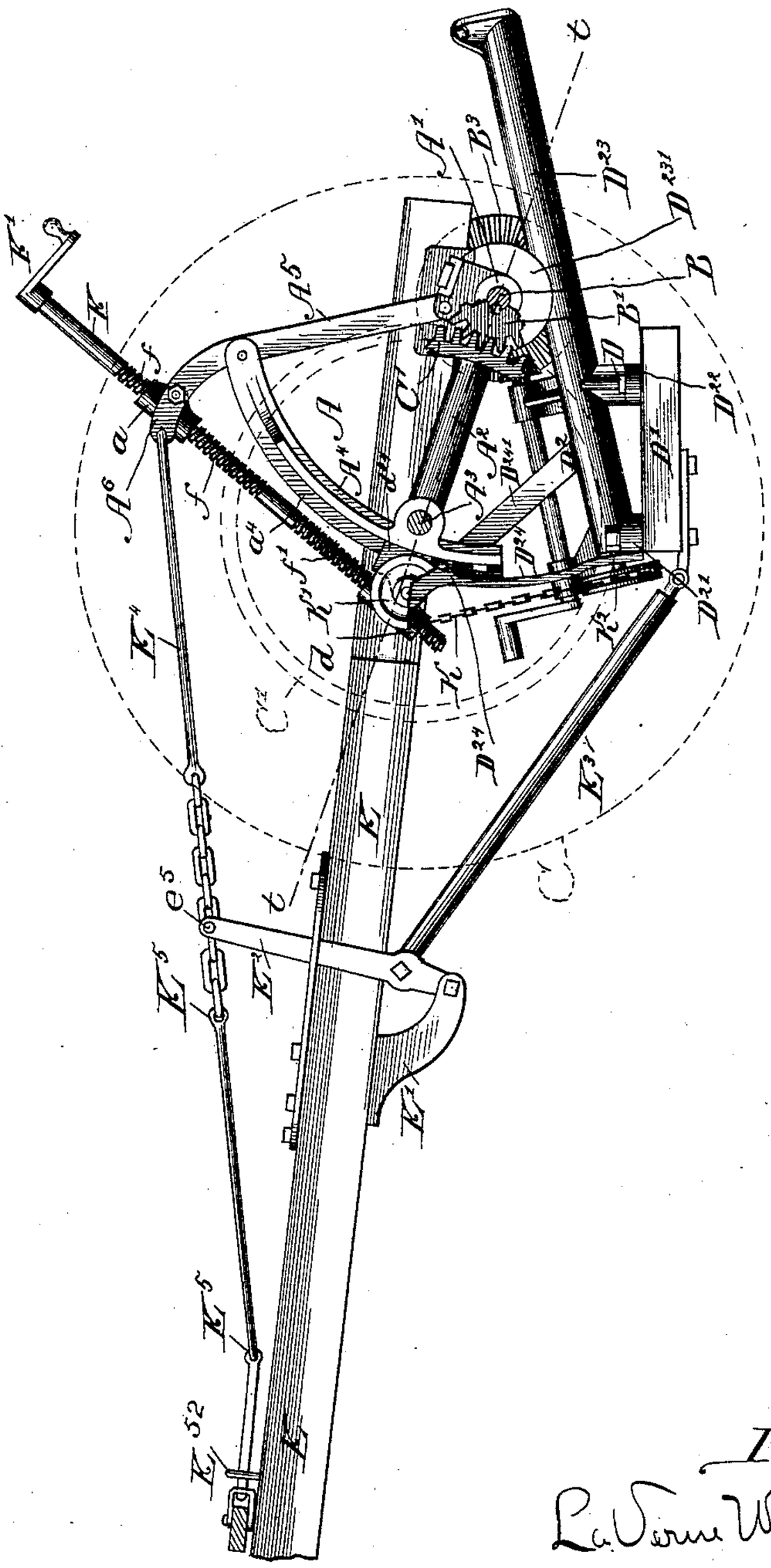


Fig. 1.

Witnesses:

G. G. Jackson—

Howard Hallock.

Inventor:

La Verne W. Noyes

By Thos. S. Burton

Attorney.

(No Model.) 4 Sheets—Sheet 2.

LA VERNE W. NOYES.

HARVESTING MACHINE.

No. 358,061. Patented Feb. 22, 1887.

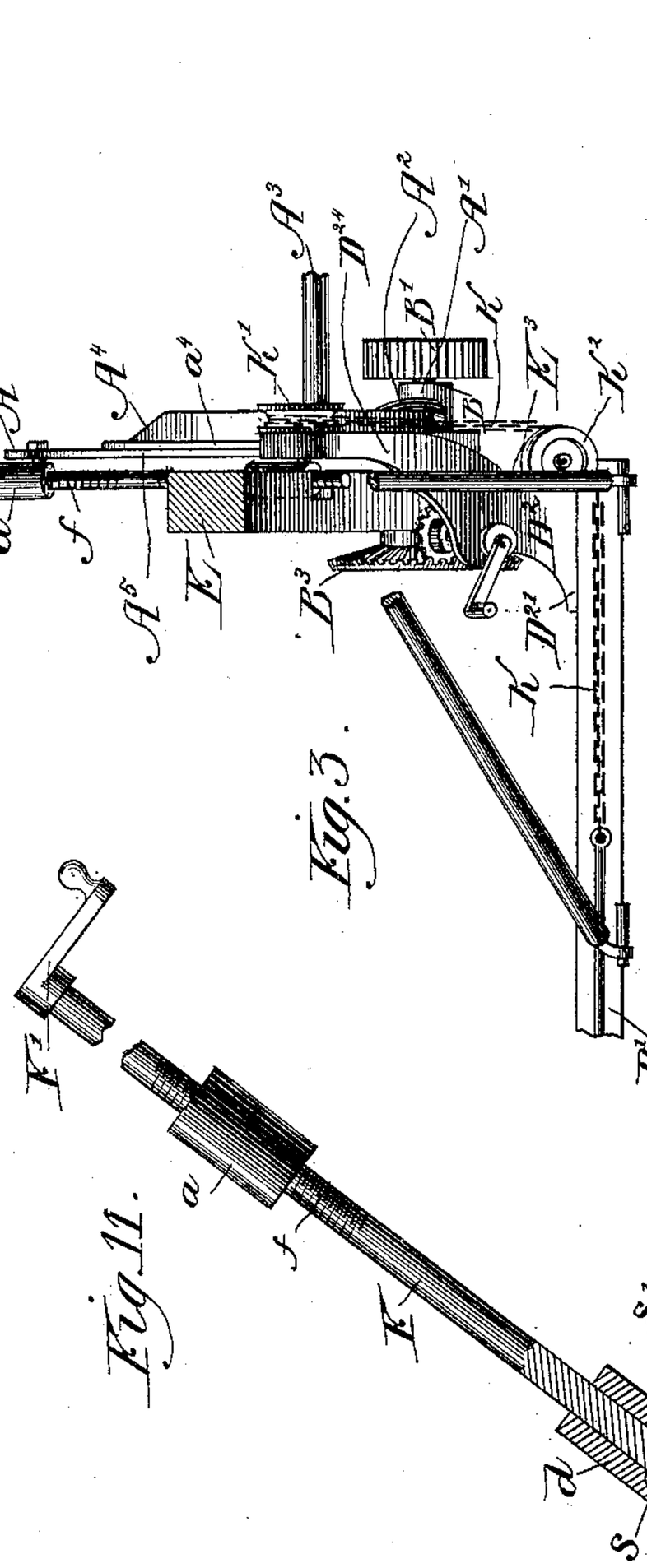


Fig. 3.

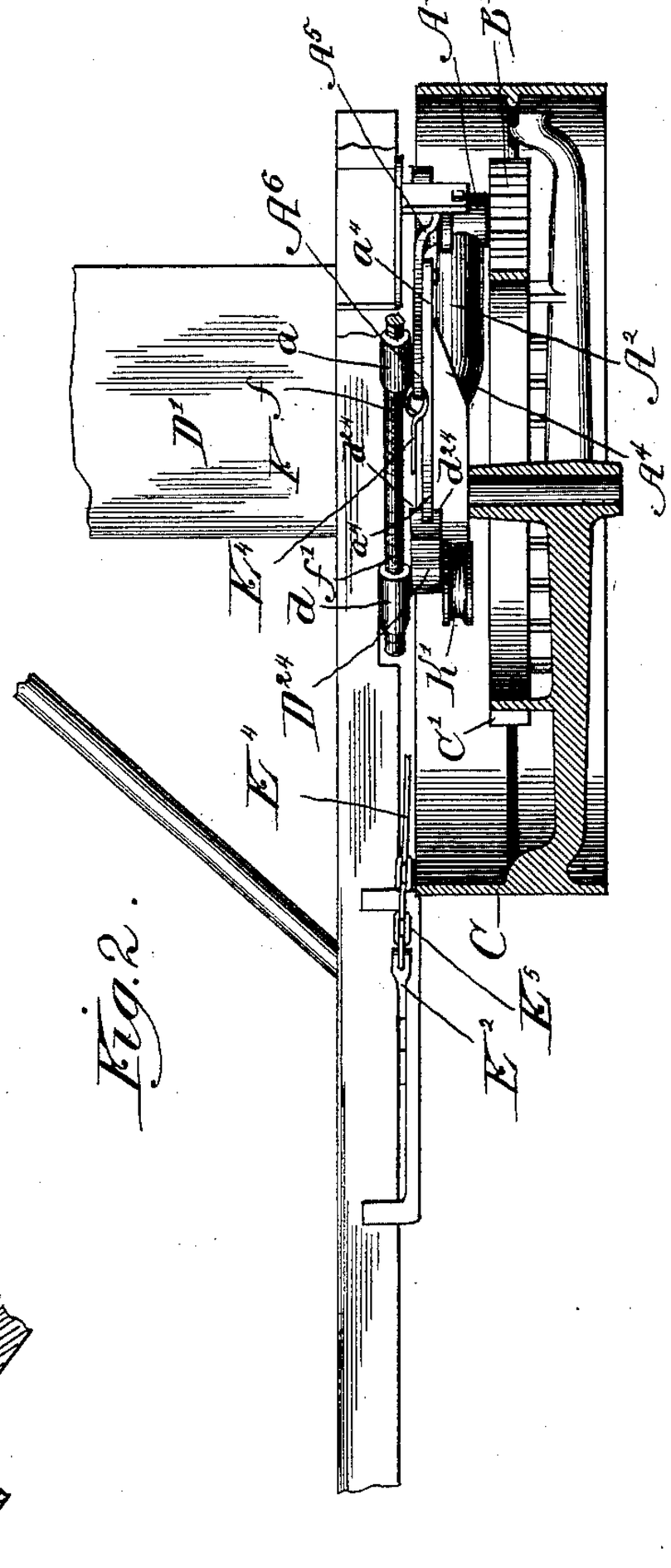


Fig. 2.

Fig. 1.

Witnesses:
G. G. Jackson—
Howard Hallock.

Inventor:
La Verne W. Noyes

By. Chas. S. Burton
Attorney.

(No Model.) 4 Sheets—Sheet 3.

LA VERNE W. NOYES.

HARVESTING MACHINE.

No. 358,061. Patented Feb. 22, 1887.

Fig. 8.

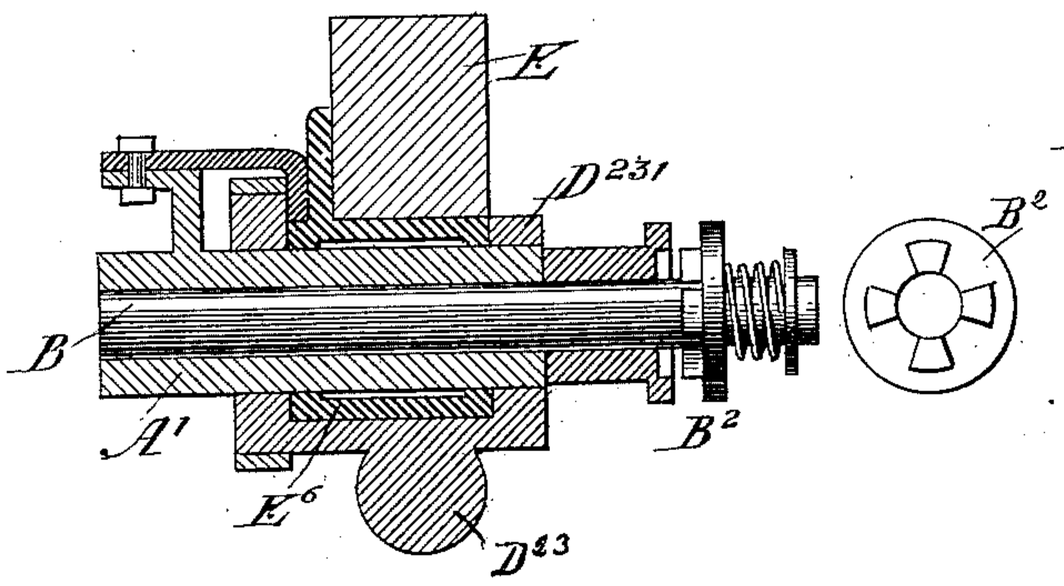


Fig. 9.

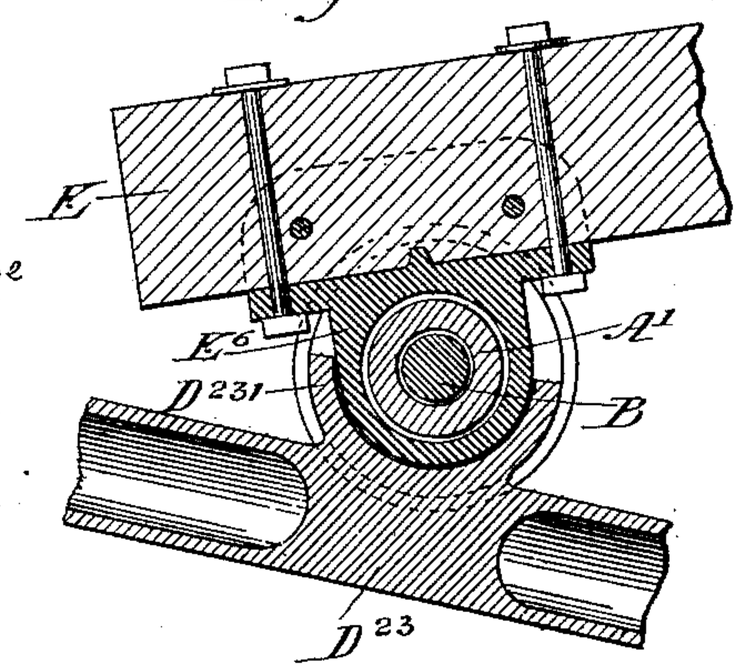


Fig. 4.

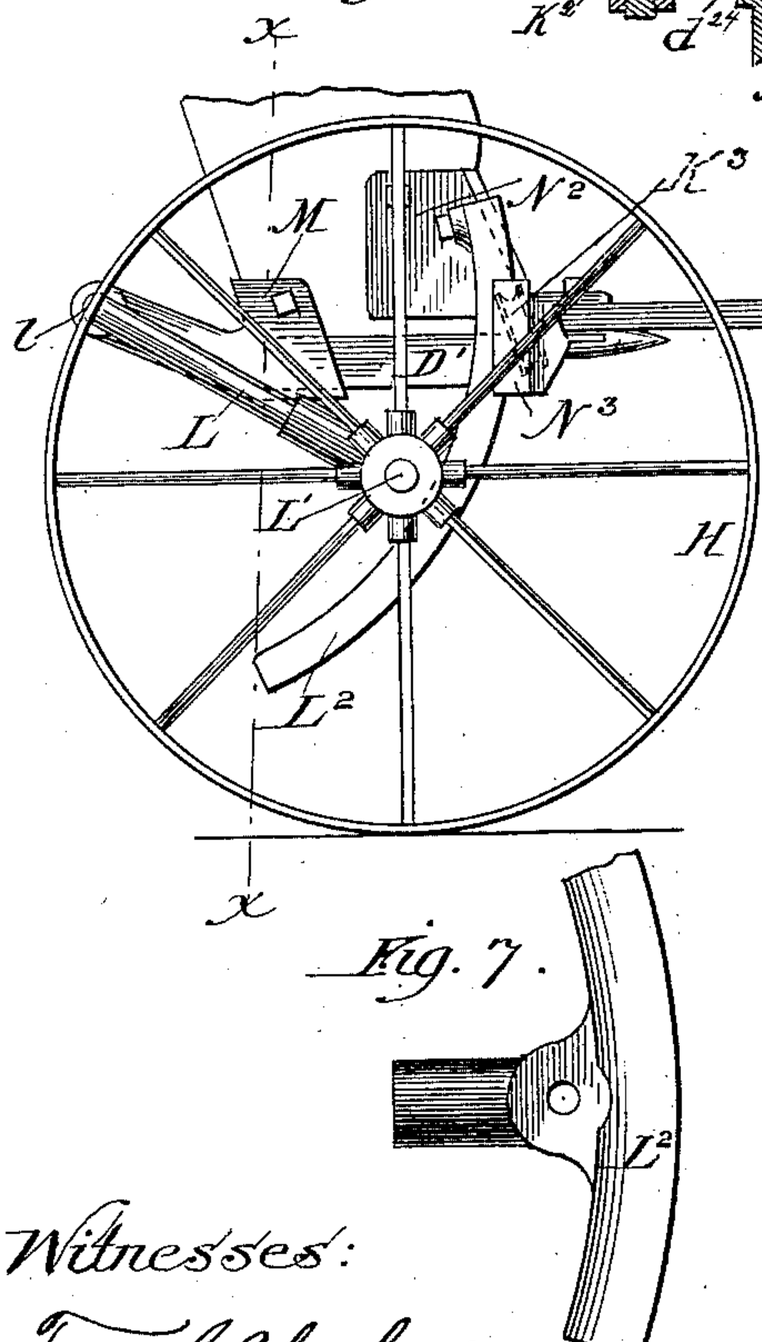


Fig. 10.

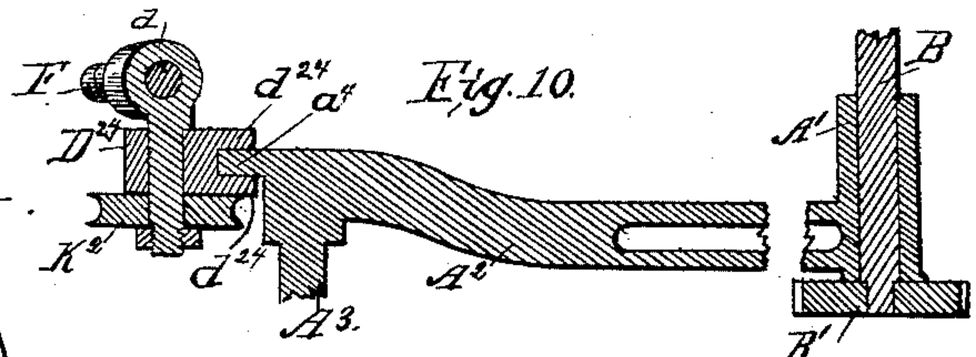


Fig. 5.

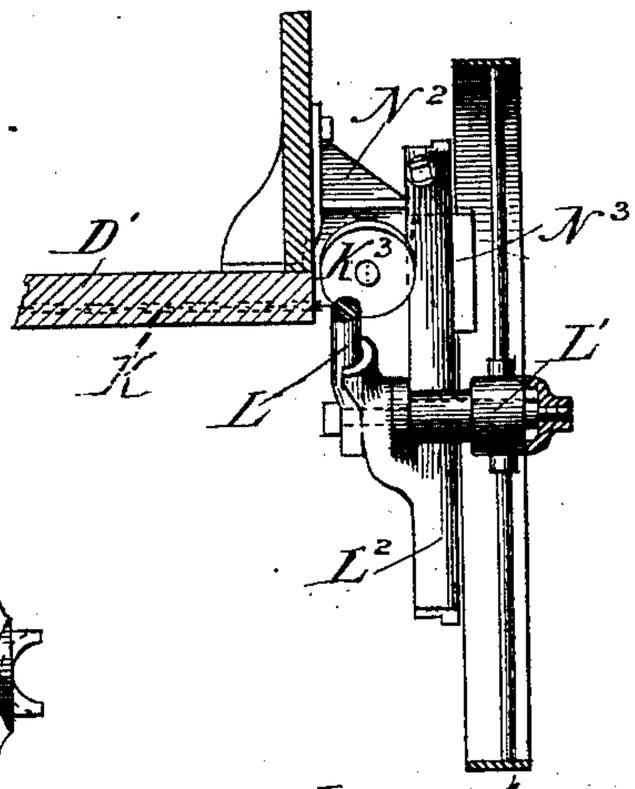


Fig. 6.

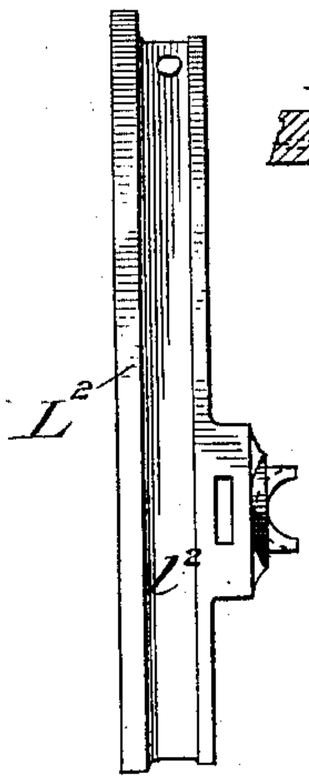


Fig. 7.

Witnesses:

Frank J. Blanchard

Edward Owings Lowrz

Inventor:

La Verne W. Noyes

By Chas. S. Burton

Attorney

(No Model.) 4 Sheets—Sheet 4.

LA VERNE W. NOYES.

HARVESTING MACHINE.

No. 358,061. Patented Feb. 22, 1887.

Fig. 12.

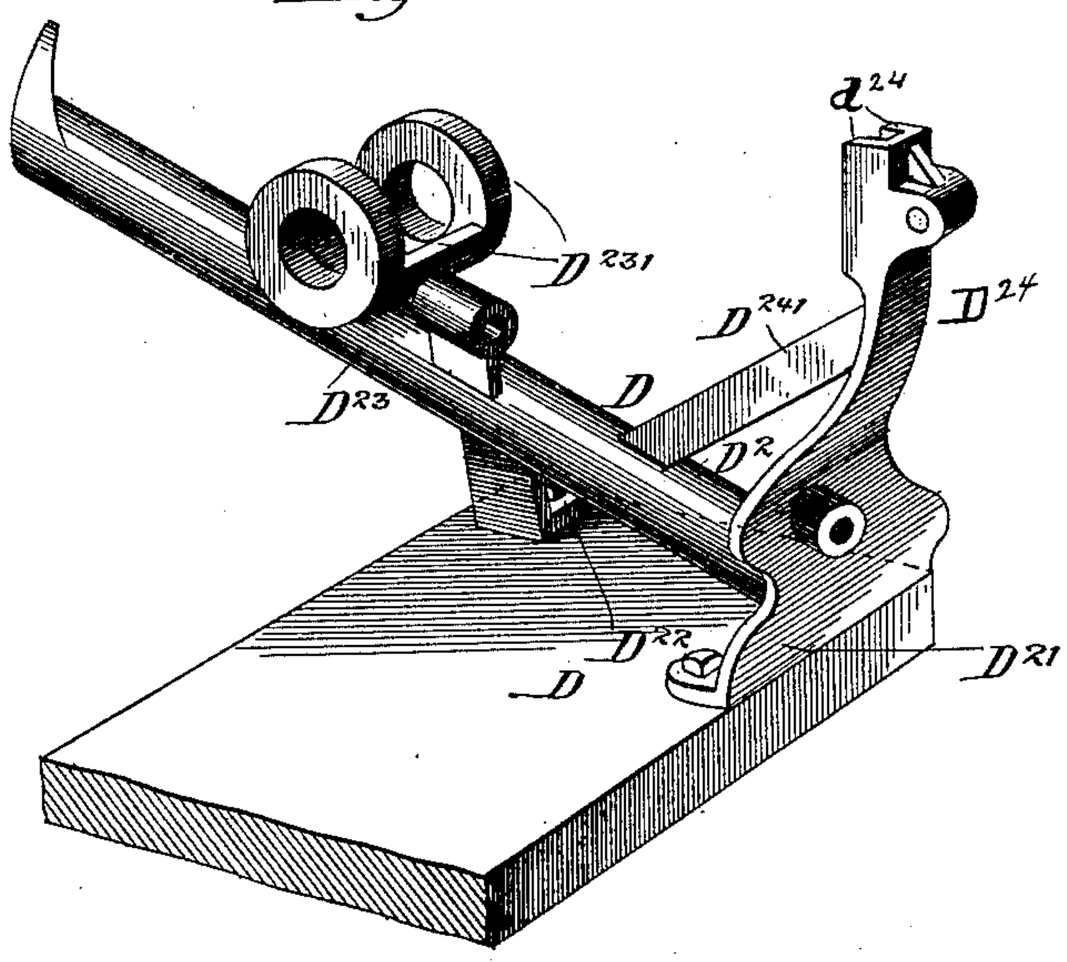
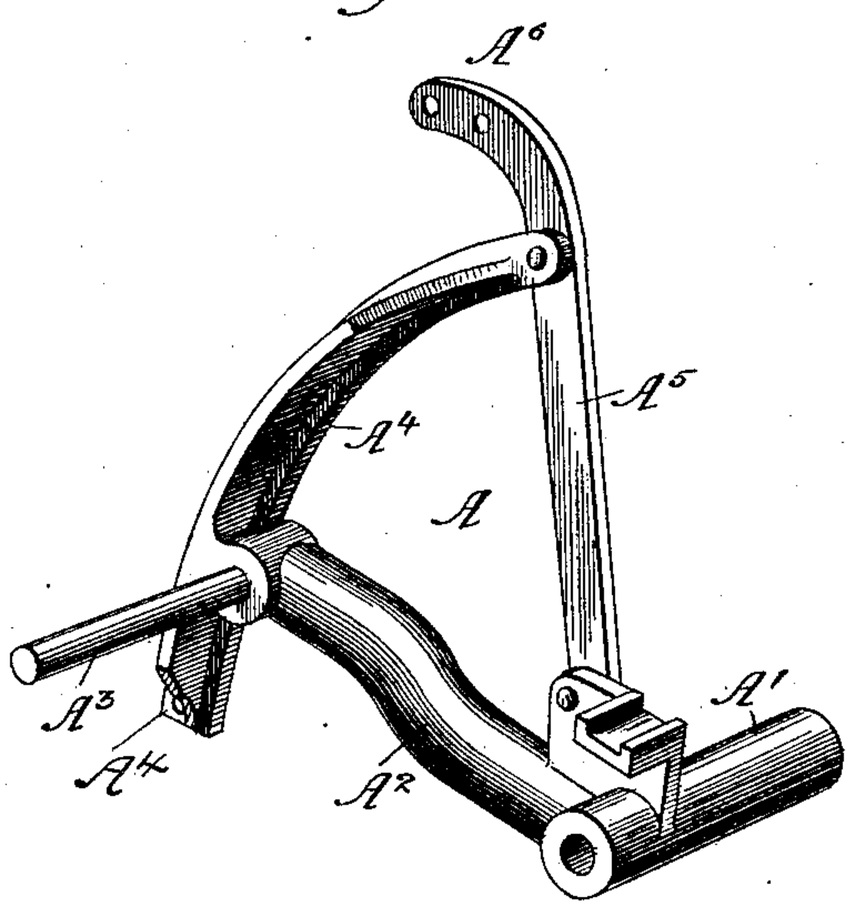


Fig. 13.



Witnesses:
Frank L. Blanchard
Frank C. Caldwell

Inventor:
La Verne W. Noyes
By Chas. S. Burton.
Attorney.

UNITED STATES PATENT OFFICE.

LA VERNE W. NOYES, OF CHICAGO, ILLINOIS.

HARVESTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 358,061, dated February 22, 1887.

Application filed June 29, 1885. Serial No. 170,141. (No model.)

To all whom it may concern:

Be it known that I, LA VERNE W. NOYES, a citizen of the United States, and residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Harvesting-Machines, which are fully set forth in the annexed and following specification.

The purpose of this invention is to provide improved means for adjusting the elevation of a harvester and applying the draft thereto in a manner to facilitate such adjustment.

It comprises, first, mechanism for raising and lowering; second, mechanism for tilting; third, mechansm connecting the raising and lowering and the tilting mechanisms, whereby the tilt or inclination of the machine is automatically readjusted to correspond to the elevation; fourth, the draft-connections constructed to ease the action of the raising and lowering mechanism; fifth, the grain-wheel-adjusting mechanism.

In the drawings, Figure 1 is a stubble-side elevation, the main wheel and driving-gear being shown in dotted lines. Fig. 2 is a partly-sectional plan of the stubble-side adjusting mechanism. Fig. 3 is a detail front elevation of the same. Fig. 4 is a grain-side elevation of the grain-wheel-adjusting mechanism. Fig. 5 is a section on the line *x x* on Fig. 4. Figs. 6 and 7 are, respectively, front and grain side elevations of the grain-wheel guide-segment. Figs. 8 and 9 are, respectively, transverse and longitudinal vertical sections through the main and wheel frames and pole at their common pivot. Fig. 10 is a section taken at the line *t t* on Fig. 1. Fig. 11 is a sectional detail of a modification of the raising and lowering screw-shaft. Fig. 12 is a perspective of the main frame as seen from the grain side in front of the sickle. Fig. 13 is a perspective of the drive-wheel frame as seen from the rear on the stubble side.

The machine herein described is of the class wherein the main frame is journaled or pivoted on the wrist of a crank whose shaft is the axle of the drive-wheel, and the raising and lowering is effected by swinging said crank-wrist through an arc about said axle, the crank-wrist being coincident with the axis of the shaft of the main driving-pinion, so that said pinion is kept constantly in mesh with the gear-rim on the main driving-wheel. As illustrated, moreover, the crank-shaft—the axle of the drive-wheel—is forward of the wrist of the crank, the driving-gear rim being an exterior rim and the pinion being in the rear thereof.

A is the wheel-frame, comprising the crank-shaft, crank-arm, and wrist. The tubular shaft A′ is the crank-wrist, the arm A^2 is the crank-arm, and the shaft A^3 is the crank-shaft and the axle of the drive-wheel.

A^4 is a segment-guide rigid with the arm A^2 and having its center of curvature the axis of the crank-wrist A′.

A^5 is a lever-arm rigid with both the crank-arm and the segment, and constituting a brace for the latter. It terminates in the extension A^6, whose purpose is hereinafter explained. The segment A^4 may also be considered as a lever-arm, which, with the crank-arm A^2, constitutes the wheel-frame, a bell-crank lever being pivoted at the drive-wheel axis and carrying the main frame at one end of one of its arms.

B is the main driving-pinion shaft. It extends through the tubular wrist A′ of the wheel-frame, and carries at the outer end the pinion B′ and at the inner end the clutch B^2 and the bevel driving-gear B^3.

The main drive-wheel C is journaled on the shaft A^3 of the wheel-frame A, and has the exterior gear-rim, C′, meshing with and driving the main driving-pinion B′ in the rear of said gear-rim.

D is the main frame. It comprises the plank D′, which supports the sickle and the conveyer and the gearing-bracket D^2. Said gearing-bracket comprises the bases D^{21} D^{22}, by which it is secured to the plank D′, the main trunk D^{23} extending obliquely upward from front to rear, and having the box D^{231} for the crank-wrist A′ of the wheel-frame A and the upright segment-guide D^{24} braced by the diagonal arm D^{241} and adapted to guide the segment A^4 of the wheel-frame A. The box D^{231} is hollowed to receive the box E^6, secured to the end of the pole E, and said box E^6 is pierced for the crank-wrist A′ of the crank-arm A^2 of the wheel-frame A, said wrist thus becoming the pivot of the hinge of the pole to the main frame. To the side of the segment-guide D^{24}, at its upper end, is pivoted on a horizontal pivot the sleeve *d*,

and at the upper end of the segment A^4, to the extension A^6 at the side thereof, is similarly pivoted the similar sleeve, *a*. One or both of said sleeves are interiorly screw-threaded, and if both, then with threads of opposite pitch, and into them is screwed the shaft F, having the exterior thread or threads *f* or *f'*, or *f* and *f'*, and if both, then of opposite pitch, adapted respectively to the collars *a* and *d*. The upper end of said screw-shaft F is provided with a crank-handle, F', whereby it may be rotated.

If only one of the collars and only one end of the shaft is screw-threaded, the other collar and the other end of the shaft are provided with any convenient and well-known means to prevent longitudinal and permit rotary motion of the shaft with reference to the collar, as the pin *s*, set through the collar and engaging in the annular groove *s'* on the shaft. The engagement of the threads on the shaft and collar, or the engagement of the pin and groove, prevents the longitudinal thrust of the shaft through its bearing. The threads, if present, perform the additional function usual to them, effecting longitudinal movement by rotation of the shaft.

E is the pole. It has the depending bracket E', to which is pivoted the draft-lever E^2, which is connected both to the main frame and to the wheel-frame, the former connection being by means of the link E^3, extending from said lever, to which it is attached above its pivot, but below the pole to the base-plank D', and the latter connection being by means of the link E^4, extending from the upper end of said lever to the extension A^6 at the top of the segment. At the upper end of the lever E^2 it is connected, also, to the draft-chain E^5, to the forward end of which the double-tree is secured, said chain being preferably guided under the loop E^{52} on the pole, and, for convenience, having a long link or rod constituting that portion which passes under the loop. The link E^4 and the draft-chain E^5 are preferably made continuous as one, but secured to the lever E^2 by a pin, e^5, passing through a link of such continuous chain. The length of that portion which constitutes the link E^4 is varied by moving the lever E^2 and securing it to a different link of the chain.

The pole E is hinged to the main frame at the pivot of the latter to the wheel-frame by means of the box E^6, as hereinabove explained.

The raising and lowering is effected by rotating the screw-shaft F by means of the crank F', in which process the sleeves *a* and *d* will accommodate themselves to the changing direction of the said screw-shaft by turning on their horizontal pivots, and the segments A^4 and D^{24} will be retained in proper engagement by the flanges a^4 and d^{24} d^{24} on them, respectively. As the two screw-sleeves *a d* are forced apart or drawn together by the rotation of the screw-shaft the wheel-frame rocks or swings on its shaft A^3, journaled in the hub of the drive-wheel, and the wrist A' descends or rises through an arc in the rear of that shaft and carries the main frame down or up.

The tilting is effected by shortening and lengthening the link E^4, said link being shortened to tilt the sickle down and lengthened to tilt it up. Said link and the draft-chain E^5 being continuous, the adjustment of the former, as described, is effected without changing the distance of the double-tree from the extension A^6 by pinning the continuous chain, which constitutes both the link and the draft-chain, to the lever by a removable pin, e^5, which may be put through different links to adjust the distance, as desired.

Raising the main frame would tend to tilt the sickle down; but to raise the main frame the extension A^6 on the wheel-frame is moved forward, swinging through the upper forward quarter of an arc whose center is the axis of the main pinion. The moving forward of the said lug permits the lever E^2 to swing as if the link E^4 had been lengthened; but the lengthening of said link, as above stated, tends to tilt the sickle up. Thus, by means of the connection described between the raising and lowering and the tilting mechanism, the change of elevation of the main frame produces two opposite and mutually corrective tendencies in the tilting.

The draft being applied to the lever E^2, and that lever being connected by the link E^4 to the extension A^6 on the end of the lever A^5, the effect is as if the machine were drawn by the chain attached directly and solely to the end of said lever A^5. If it were so attached, the two frames (wheel-frame and main frame) being rigid as one, the tendency of the draft applied through said chain would be to tip the entire machine forward; but this tendency would be resisted by the pole because it is locked rigid with the frames and resting on the neck-yoke upheld by the horses, and thereby holding the machine level, and causing the said tendency to tip forward to be converted into a tendency to lift the main frame, the wheel-frame acting as a bell-crank lever pivoted on the axle and carrying the main frame on one arm, the other arm being the segment A^4. These two arms of this bell-crank lever being approximately equal in length, the drawing strain is made effective as a lifting-power of equal amount. The main driving-pinion being geared to the main driving-gear in the rear thereof, the reaction between the said gear and pinion also tends to lift the latter and with it the main frame in which it is journaled. The lifting effect of this reaction added to that above described may be made sufficient to approximately equal the weight of that portion of the machine which has to be raised, so that when the machine is in operation the screw-shaft by which the raising and lowering is effected shall be relieved of strain and friction on its thread, except as to the fluctuating margin of strain due to the variations in the resistance to travel and work and

consequent variations in drawing-power required and exerted. The machine is thereby rendered very promptly adjustable during travel and work with very little effort on the part of the operator.

H is the grain-wheel. It is journaled on the wrist L′ of the grain-wheel crank-arm L, which is pivoted in the rear of the line of the cutter-bar at *l* to the bracket M, which is secured to the grain end of the base-plank D′. Said crank-arm is adapted to vibrate through an arc in front of its pivot, between the end of the cutter-bar between it and the standing grain, and has rigid with it the segment L^2, whose center of curvature is the axis of the pivot *l* of said crank-arm L. To guide said segment, there is provided the segment-guide N^3, integral with the bracket N^2, which secures the divider N′ to the base-plank D′. On said bracket there is also journaled the guide-pulley K^3 for the chain K, which is secured to the upper end of the segment L^2 and guided on its lateral flange l^2, passing thence around the guide-pulley K^3, thence across under the cutter-bar to the stubble side of the machine, thence up around the guide-pulley K^2, journaled at the stubble end of the plank D′, thence over the pulley K′, journaled upon the upper end of the segment-guide D^{24}, thence down to the lower end of the segment A^4, to which it is there made fast.

The operation of these devices above described is to transmit the raising and lowering movement of the stubble side of the machine to the grain side thereof, which is effected in a familiar and obvious manner. The novelty in the described structure consists in pivoting the grain-wheel crank-arm in the rear of the line of the cutter-bar and journaling the wheel thereon in such position that it vibrates past the end of the cutter-bar, the line of thrust of the sickle being within the wheel's circumference, whereby it becomes possible to extend the connecting-chain directly from its fastening at the grain-wheel segment to the guide-pulley at the end of the finger-bar, and so across under the finger-bar.

I claim—

1. In a harvesting-machine, in combination with the drive-wheel, the cranked wheel-frame having its shaft journaled in the hub of the wheel, the main frame pivoted on the crank-wrist of said cranked wheel-frame, the screw-shaft, and the collars forming its bearings, one on the main frame and one on the wheel-frame, both of said collars being provided with devices to prevent longitudinal thrust of the screw-shaft, and one of them interiorly threaded to mate said shaft, substantially as set forth.

2. In a harvesting-machine, in combination with the drive-wheel, the wheel-frame pivoted at the axis of said wheel, the main frame pivoted to the wheel-frame, the screw-shaft having toward its opposite ends threads of opposite pitch, and the oppositely-threaded bearings for said screw-shaft, secured one to the main frame and one to the wheel-frame.

3. In a harvesting-machine, in combination with the drive-wheel, the wheel-frame pivoted at the axis of the wheel, the main frame pivoted to the wheel-frame, and the screw-shaft having its bearings one on the main frame and the other on the wheel-frame, said main and wheel frames being provided with mated segment-guides, whose common center of curvature is the axis of the pivot of said frame, substantially as set forth.

4. In a harvesting-machine, in combination with the drive-wheel having the main driving-gear rim, the cranked-wheel frame pivoted at the axis of the wheel and having the tubular crank-wrist, the main frame pivoted on said wrist, and the main driving-pinion having its shaft journaled within said tubular wrist and meshing with and driven by the main gear-rim, and the screw-shaft having the collars forming its bearings secured one on the main frame and the other on the wheel-frame, both of said collars being provided with devices to prevent longitudinal thrust of the screw-shaft, and one of them being interiorly threaded to mate said shaft, substantially as set forth.

5. In combination with the cranked-wheel frame and the main frame pivoted thereto at the crank-wrist, the pole also pivoted on said wrist, substantially as set forth.

6. In a harvesting-machine, in combination with the main frame having the box D^{23} and the cranked-wheel frame having its wrist journaled in said box, the pole E, having the box E^6, adapted to enter the box D^{23} and be therein secured by the crank-wrist, substantially as and for the purpose set forth.

7. In a harvesting-machine, in combination with the main frame and the wheel-frame pivoted together and adjustably secured in relation to each other, the pole pivoted to one of said frames, the lever pivoted on the pole, and the links connected to said lever and extending one to the main frame and the other to the wheel-frame, substantially as and for the purpose set forth.

8. In a harvesting-machine, in combination with the frame adapted to be rigid throughout, the pole pivoted thereto, a link or brace connected at one end to the frame, and a lever pivoted on the pole and adjustably secured in relation thereto and connected to the other end of the link, substantially as set forth.

9. In a harvesting-machine, in combination with the drive-wheel, the wheel-frame pivoted at the axis of the wheel and having a lever-arm extending upward, the main frame pivoted to the wheel-frame in the rear of said wheel-axis, and the draft-chain connected to said upwardly-extending arm of the wheel-frame, whereby the draft strain tends to lift the main frame, substantially as set forth.

10. In a harvesting-machine, in combination with the drive-wheel, the wheel-frame comprising a bell-crank lever having its ful-

crum at the axis of the drive-wheel, the main frame pivoted on one arm of such bell-crank lever, and the draft-chain connected to the other arm, substantially as and for the purpose set forth.

11. In a harvesting-machine, in combination with the drive-wheel, the wheel-frame comprising a bell-crank lever having its fulcrum at the axis of the drive-wheel, the main frame pivoted on one arm of such bell-crank lever, and means for adjustably securing it in relation to such arm, and the draft-chain connected to the other arm, substantially as and for the purpose set forth.

12. In a harvesting-machine, in combination with the drive-wheel, the wheel-frame comprising a bell-crank lever having its fulcrum at the axis of the drive-wheel, and one arm extending rearward and the other extending upward, the main frame pivoted on the rearwardly-extending arm, the means for adjustably securing said frame in relation to said arm, and the draft-chain connected to the other arm, substantially as and for the purpose set forth.

13. In a harvesting-machine, in combination with the drive-wheel, the wheel-frame comprising a bell-crank lever having its fulcrum at the axis of the wheel, the main frame pivoted on one arm of such bell-crank lever, the screw-shaft having one of its bearings on the wheel-frame and the other on the main frame, and the draft-chain connected to the other arm of the said bell-crank-wheel frame, substantially as set forth.

14. In a harvesting-machine, in combination with the main frame and the oscillating wheel-frame pivoted thereto, the pole having a pivot whose axis is fixed with reference to the main frame, the draft-lever pivoted to the pole and linked to the main frame, and a link from said lever to the wheel-frame adapted to be varied in length, substantially as and for the purpose set forth.

15. In a harvesting-machine, in combination with the main frame and the oscillating wheel-frame pivoted thereto, the pole having a pivot whose axis is fixed with reference to the main frame, the draft-lever pivoted to the pole and linked to the main frame, a link connected to the wheel-frame and prolonged to constitute a draft-chain and adjustably secured to the lever, and the guide-loop on the pole to retain the draft-chain, substantially as set forth.

16. In a harvesting-machine, in combination with the main frame and the wheel-frame and the mechanism for raising and lowering the stubble end, the grain-wheel crank-shaft pivoted to the conveyer-sill in the rear of the cutter-bar and vibrating through an arc in front of its pivot, the grain-wheel journaled on the crank-wrist and vibrating past the end of the cutter-bar, the guide-pulleys K^2 and K^3 in line with the cutter-bar and the chain connected to the wheel-frame at the stubble end and to the grain-wheel crank-arm at the grain end, and running around said guide-pulleys and under the cutter-bar, substantially as set forth.

In testimony whereof I have hereunto set my hand, in the presence of two witnesses, at Chicago, Illinois, this 24th day of June, A. D. 1885.

LA VERNE W. NOYES.

Attest:

CHAS. S. BURTON,

C. H. THORPE.