(No Model.)

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J. I. WOLF.

CORN HARVESTER.

No. 335,170. Patented Feb. 2, 1886.

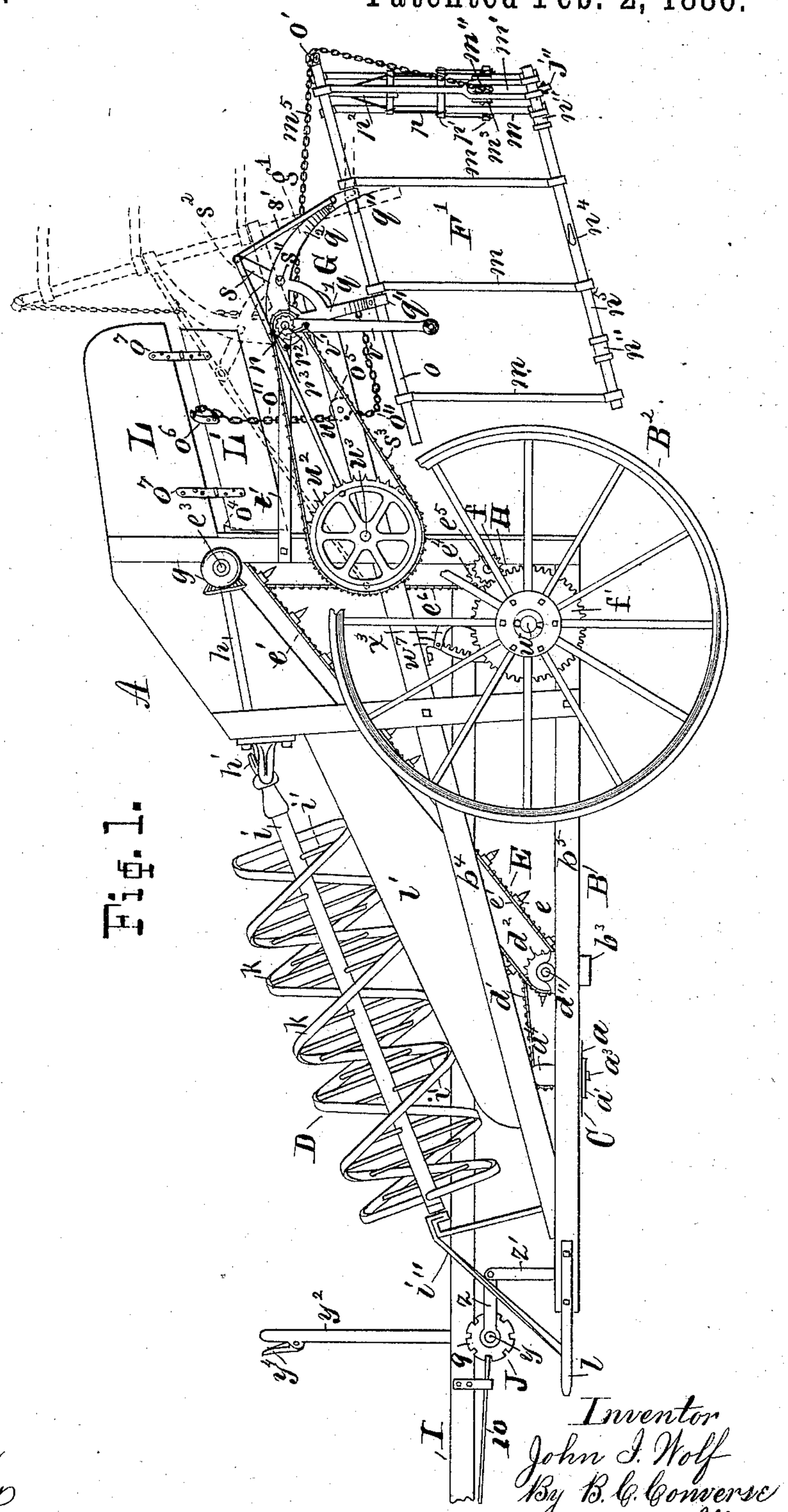

Fig. 1.

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Fig. 2.

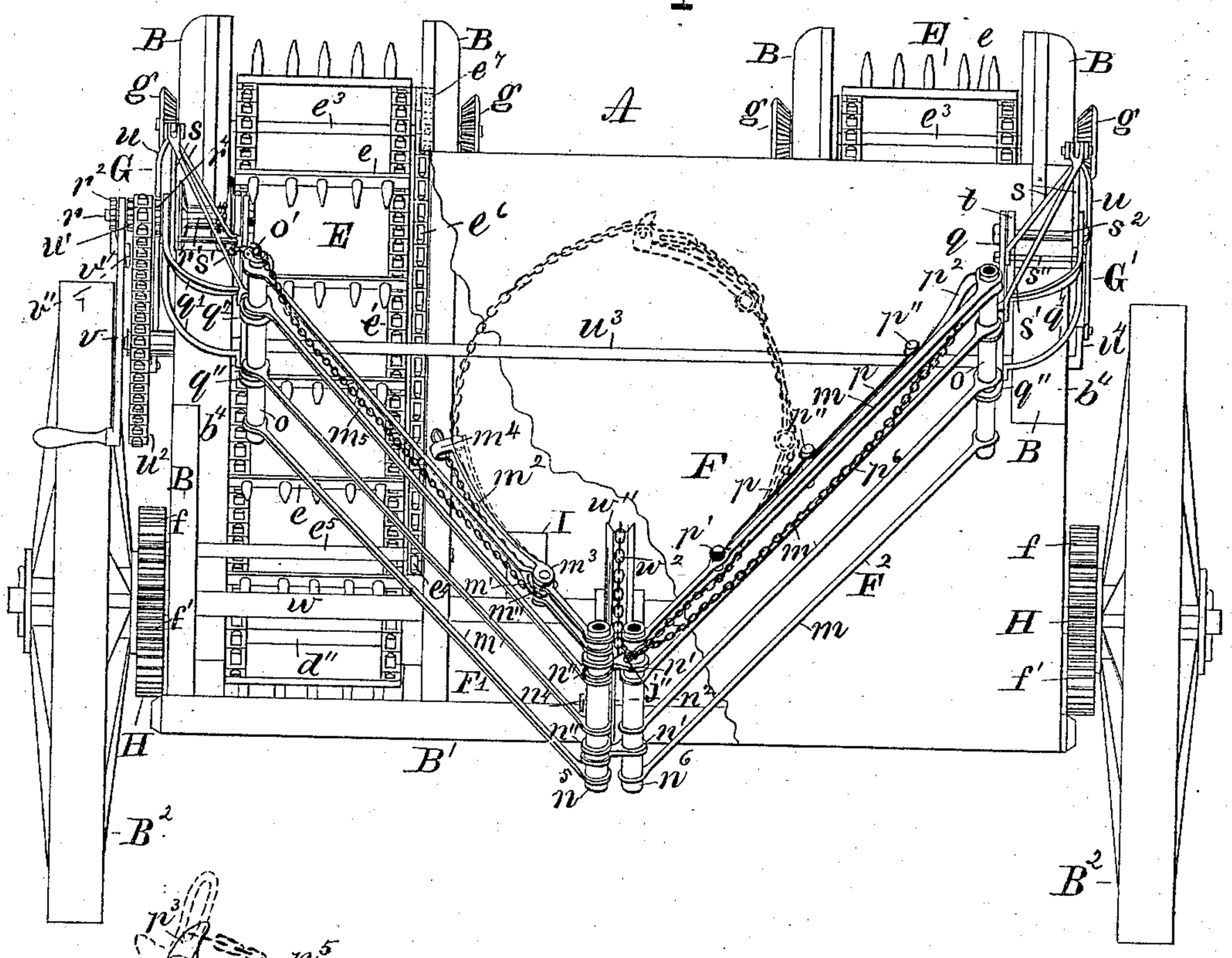


Fig. 3.

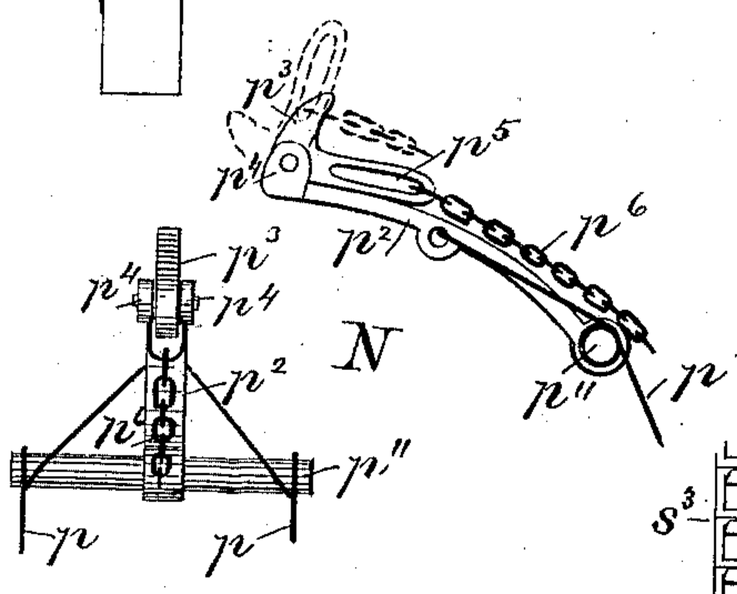
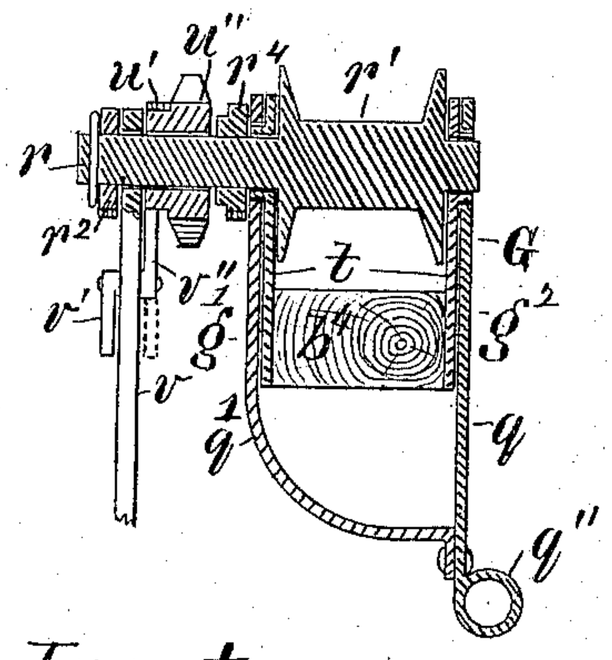
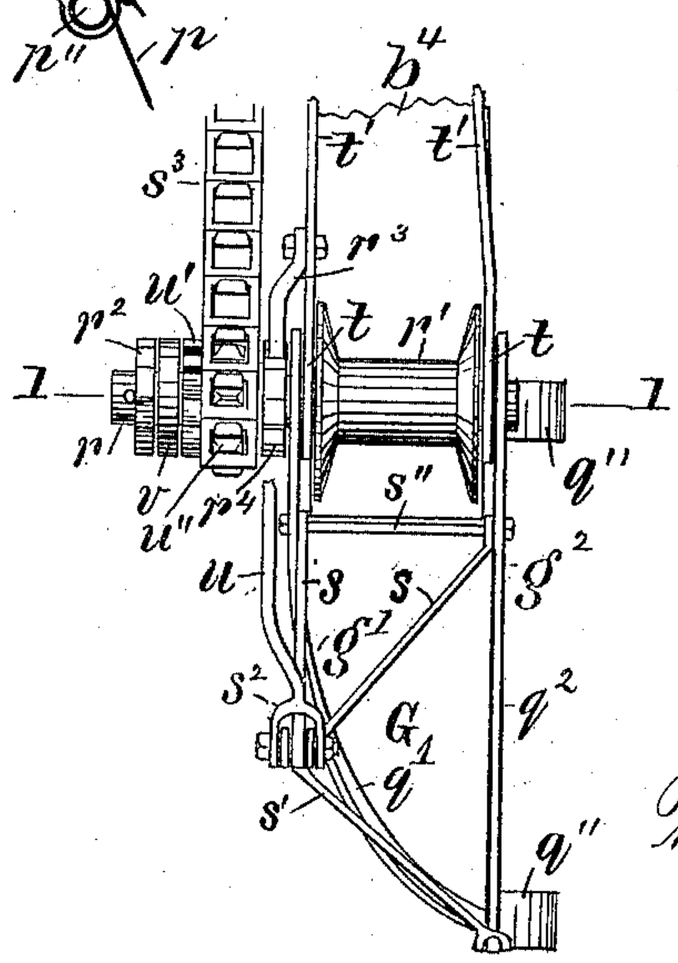


Fig. 4.





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CORN HARVESTER.

No. 335,170. Patented Feb. 2, 1886.

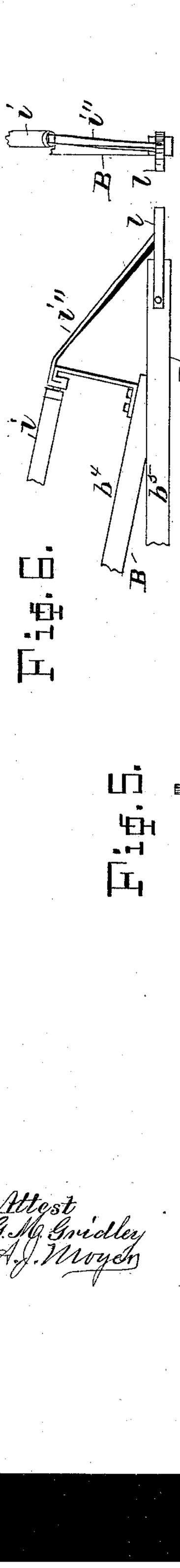

Fig. 6.

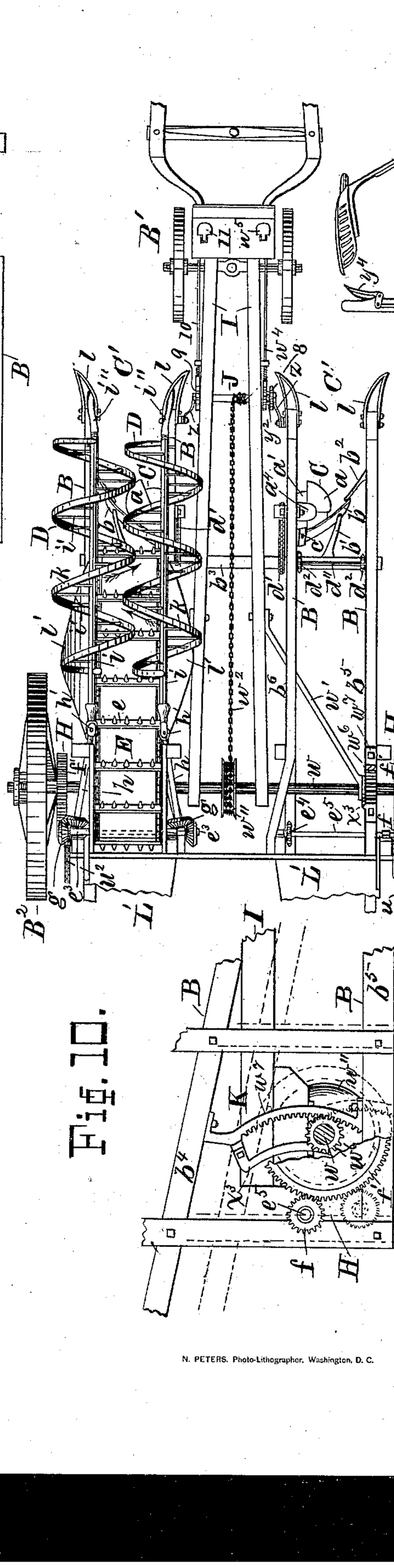

Fig. 5.

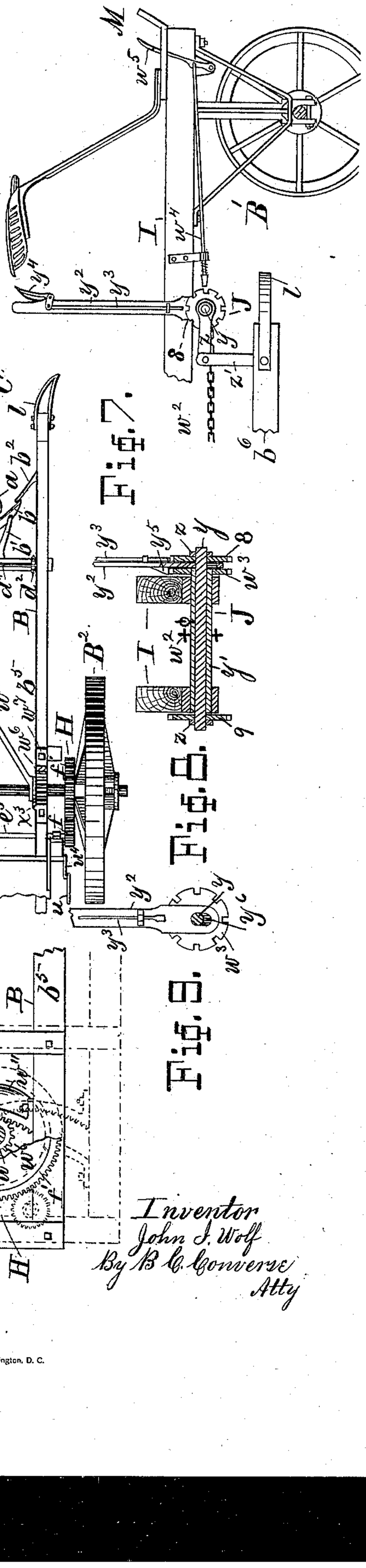

Fig. 7.

Fig. 8.

Fig. 10.

Fig. 9.

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Fig. 11.

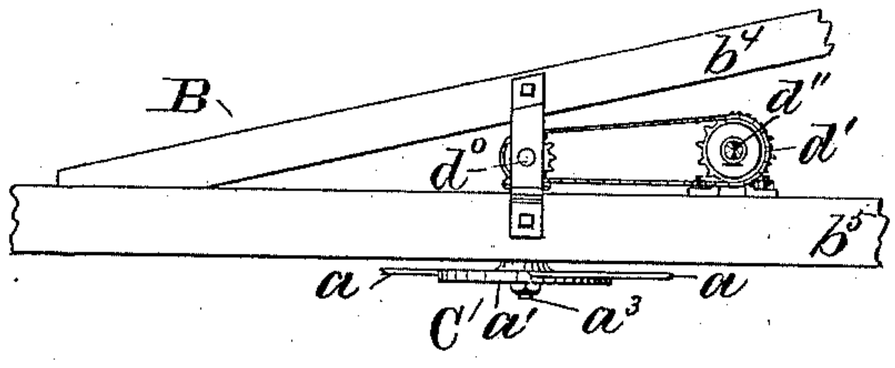

Fig. 12.

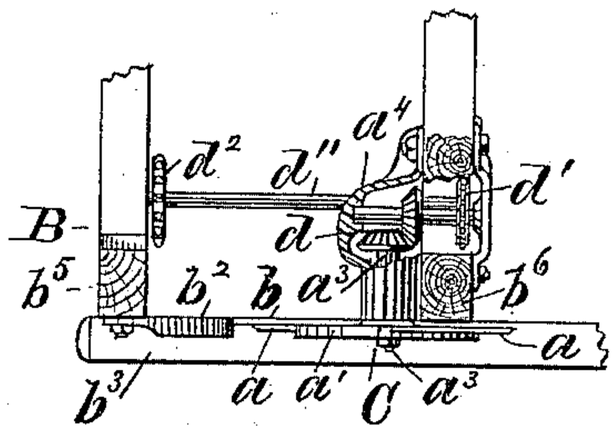

Fig. 13.

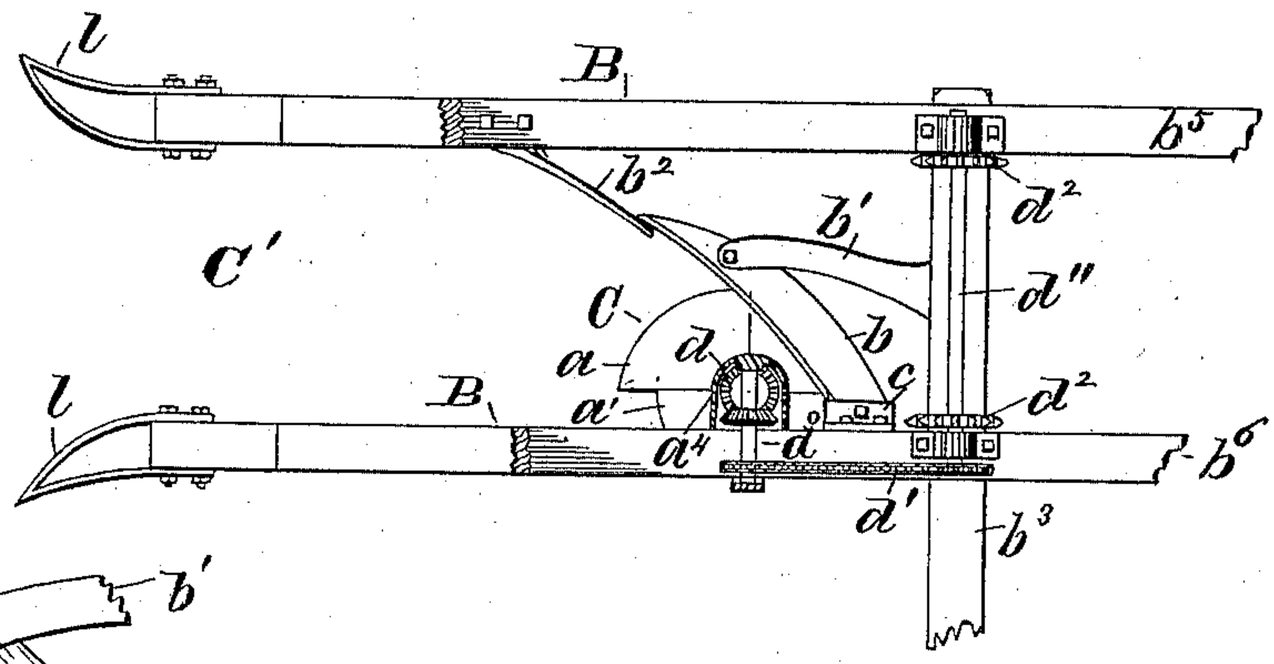

Fig. 14.

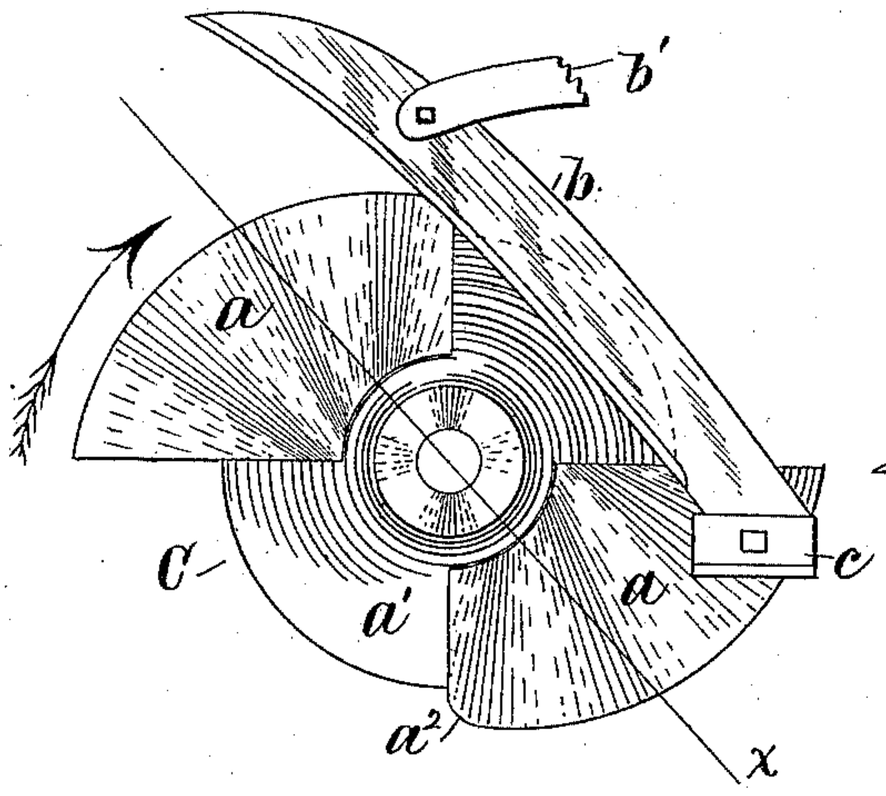

Fig. 15.

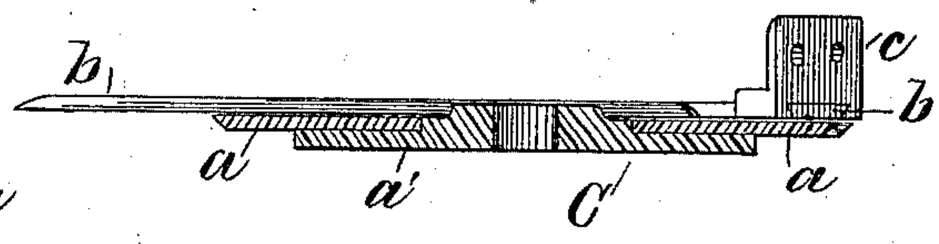

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Fig. 16.

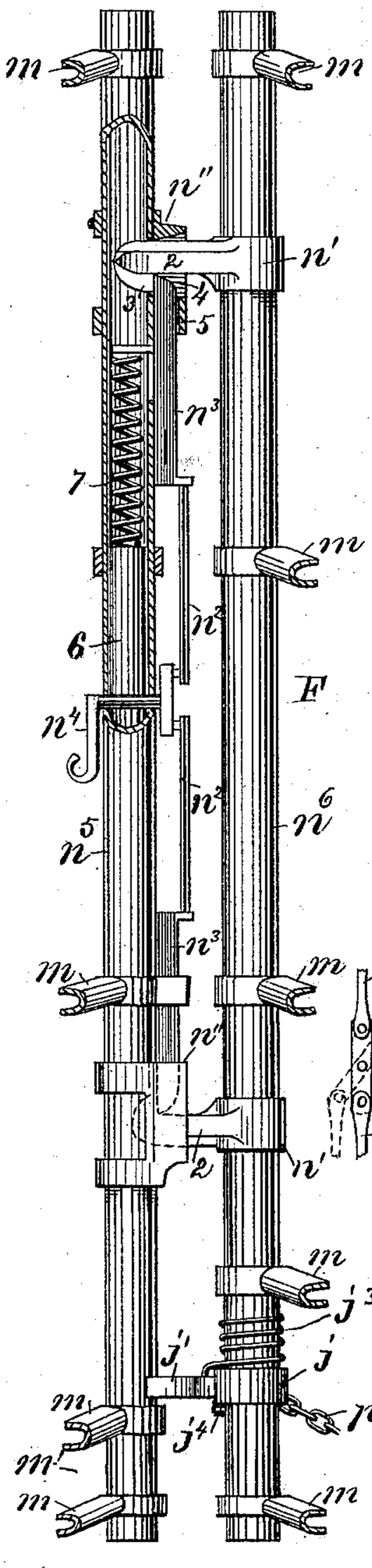

Fig. 17.

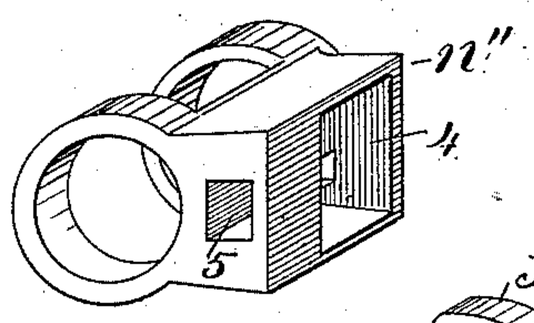

Fig. 19.

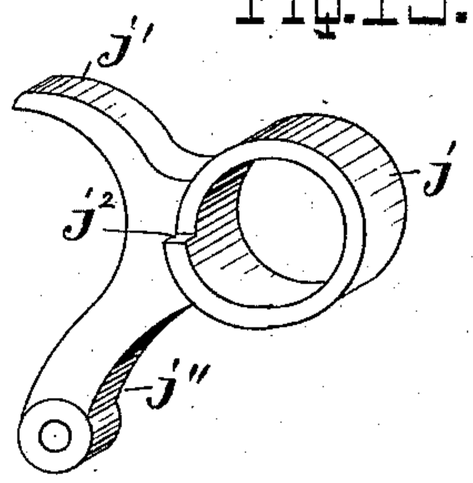

Fig. 18.

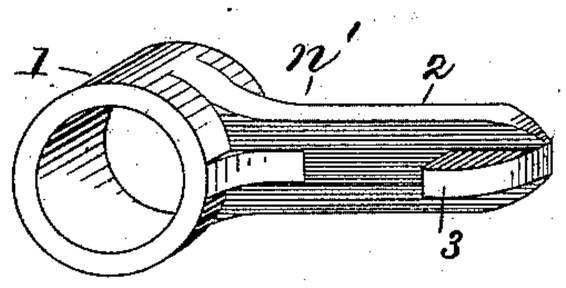

Fig. 20.

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UNITED STATES PATENT OFFICE.

JOHN I. WOLF, OF SPRINGFIELD, OHIO.

CORN-HARVESTER.

SPECIFICATION forming part of Letters Patent No. 335,170, dated February 2, 1886.

Application filed June 11, 1884. Serial No. 134,599. (No model.)

To all whom it may concern:

Be it known that I, JOHN I. WOLF, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Corn-Harvesters; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in corn-harvesters.

My invention relates to that class of corn-harvesters in which a shocker is combined with the cutting apparatus.

The machine is mounted upon traction-wheels having a train of gearing connected therewith, and the corn is cut by rotary knives driven by chain gearing, the corn being carried from the front to the rear of the machine by endless chains having a series of toothed carriers attached to them and dropped horizontally into a shock-holder consisting of two frame-sections hinged at their outer ends and connected detachably at their inner ends, and when a sufficient quantity of corn is therein deposited it is clamped and bound, and the shock rotated to a perpendicular position with the ground surface, when it is dropped to the ground, the holding and clamping devices being instantaneously released at the same time and the shock left standing, the corn being cut and deposited in the shock-holder from two rows at a time. As the machine advances, the ground is cleared for a considerable distance, and the rows of shocks are placed as wide as possible apart.

The machine can be used to cut either two rows or but one, and for the former purpose two sets of cutting and conveying apparatus are used, and the driving-gear is arranged to throw one or both of these sets into operation, as may be required.

Figure 1 is a side elevation of my improved corn-harvester and shocker, the dotted lines of the latter showing its movement when operating. Fig. 2 is a rear view of the machine with the shock-holder in position for receiving the corn from the carriers, enlarged. Fig. 3 is an enlarged view of the shock-turner on the left-hand side of the machine for rotating the shock and for spooling the chain used in clamping the latter. Fig. 4 is a vertical section through the same on line 1 1 of Fig. 3. Fig. 5 is a top view of the machine, the elevating devices on the right-hand side and the shocker being omitted. Fig. 6 is a top view of one of the guideways, with a detail showing an end view of one of the rails and brace, and the reel-shaft connection with the latter from the front. Fig. 7 is a side view of the front truck with its connections, including the driver's seat, and the hand-lever for raising and lowering the "cut" and for tilting the frame. Fig. 8 is a vertical cross-section through the bed-frame or coupling-rails, a vertical longitudinal section through the shaft on which the hand-lever is pivoted, and a vertical section through the attachments of the same. Fig. 9 is a detail of the hand-lever and the rack-wheel attached to the hollow shaft by which the latter is rotated in raising and lowering the frame. Fig. 10 is a side view of the devices by which the pivoted frame is suspended, embracing a portion of the frame to show the connection of said devices therewith. Fig. 11 is a side elevation of the front end of the movable frame to which the knives are attached, and shows the chain-gear connection with the latter. Fig. 12 is a cross-section through the same, with the case which covers the gearing broken away to show the latter and its connection with the shaft of the knives. Fig. 13 is a top view of one of the guideways, through which the corn is brought to the knives and severed by the latter as the machine advances. In this view the position of the knives on the right hand of the machine is shown, with the gearing connected therewith. Fig. 14 is an enlarged top view of the rotary and stationary knives in their operative position. Fig. 15 is a cross-section through line *x* of the same, Fig. 14. Fig. 16 is an enlarged view of the two pipe-bars, which, when connected, as shown in Fig. 2, form the lower angle of the shock-holder. Fig. 17 is a perspective view of the sleeve-section of the catch, by which the two bars shown in Fig. 16 are held together when connected. Fig. 18 is a view of the male section of the same. Fig. 19 is a view of th

spring-latch, to which the end of the binding-chain is attached. Fig. 20 is an enlarged view of a part of one of the carriers by which the corn is elevated and carried to the rear of the machine. It also shows the manner of connecting the chain thereto.

A is the corn-harvester, which consists, in part, of the horizontal bed-rails or stationary part I, extending from end to end of the machine, and supported at the front by a pair of truck-wheels, B′, and at the rear by the wheels B^2 and axle *w*, which latter is pivoted in bearings on the underside of the rails I. The frame proper of the harvester, which carries the cutting apparatus and the devices for elevating and depositing the cut corn in the shocker, is of nearly triangular shape in side elevation, its front end terminating in an angle low down, while the rear part of the machine is considerably elevated, as will be seen by reference to Fig. 1. It is adapted to be raised and lowered, as well as to be tilted, so as to cut corn at different heights.

The machine is designed to cut two rows of corn at a time and deposit the corn in the shock-holder, but is also adapted to cut single rows when required. It is provided with two sets of cutting and elevating apparatus, one of which can at any time be used independently of the other. These are supported one on each side of the two long bed-rails I, which extend from the axle far enough forward in the central longitudinal line of the machine to allow the truck B′ to clear the ends of the guideway-rails in turning, and to facilitate the handling of the machine in cuttting one or two rows. The entire movable frame with its attachments is supported by means of the engagement of the teeth of the rack w^7 with those of the pinion w^6, (seen in Fig. 1 and more clearly in Fig. 10,) and which will be described hereinafter.

The traction or main drive-wheels B^2 are placed at the rear of the frame in order to more evenly balance the machine when the shock is suspended at the rear of the same. Each of the drive-wheels B^2 drives the set of knives, carriers, and spirals on its own side through a train of gears, H, consisting of a large spur-wheel, *f*′, which is bolted to the inside of the hub of wheel B^2 and is concentric therewith. This drives the pinion *f* on the outer end of a short transverse shaft, e^5, which latter is pivoted in bearings on the rear uprights of the frame, and lies behind and parallel with the axle in a plane above the latter. The pinion *f* slides on a spline of the shaft e^5 in throwing it into and out of gear with the spur-wheel *f*′. The inner end of shaft e^5 has a sprocket-wheel, e^4, thereon, and it is connected with a sprocket-wheel, e^7, on the shaft e^3 directly above, by a chain-belt, e^6. This latter shaft has also on the inside of the chute E sprocket-wheels carrying the chain belts *e*′ of the carriers *e*, and driving the short shaft *d*″ at the foot end of the chute. This latter shaft is pivoted in bearings on the rails b^5 and b^6 of each guideway, and has a sprocket-wheel, d^2, at each end, with which the chain-belts *e*′ engage. From the shaft *d*″ the power is transmitted to the short shaft d^0 and bevel-gear *d*, which drives the vertical shaft a^3, on which the disk *a*′ and knives *a a* are fastened at the extreme lower end of said shaft a^3, just below the rail b^6, as seen in Figs. 1, 5, 11, 12, and 13. A short chain belt, *d*′, connects the shaft *d*″ with the shaft *d*, which drives the knife-shaft a^3.

On the extreme end of the shaft e^3, which extends across the top of the chute E outside of the side boards of the latter, is a bevel-wheel, *g*, which engages another on the end of the inclined shaft *h*. This latter shaft is coupled at the forward end on each side of the chute with the rear end of the shaft *i* of the spiral D by a universal coupling, *h*′, thus operating the spirals simultaneously with knives and carriers by the same system of drive-chains and sprocket-wheels.

The lower horizontal frame-bars, b^5 and b^6, which form the inner and outer rails of the guideways C′, respectively, are under the axle, and a considerable space is left between the outer bar, b^5, and the inclined bar b^4 above it, through which space the axle *w* extends to allow the whole frame with its devices to be raised or lowered to any desired height in operating the machine, as seen in Fig. 10, in which the dotted lines show the frame lowered. The means for this adjustment will be described hereinafter.

The cutting apparatus consists, first, of a pair of segmental knives, *a*, each let into recesses equal in depth to the thickness of the knives in the disk *a*′, so that the top surface of the knife-blades *a* shall be flush with that of the disk. The disk is securely fastened on the lower end of a short vertical shaft, a^3, in a sleeve, a^4, cast in one piece with a case covering the bevel-gears by which the rotary knives are driven. A portion of the case is broken away to show the construction in Fig. 12. The gear-wheels are by means of the case protected from obstructions—such as blades, stalks, or dirt—during the operation of the machine.

The outer or cutting edges of the rotary knives *a a* are eccentric to the orbit of the disk, the peripheral line of the same beginning at a point at the forward angle, a^2, about three-fourths of an inch from the edge of disk *a*′, and ending at a point about two and three-quarters inches from the latter, being proximately tangential thereto. The corner or angle a^2 is rounded and the blade beveled from the under side, so that it enters the stalks easily without breaking them. The stalks are caught and severed between the rotary blades *a a* and a long flat blade, *b*, which is stationary, being bolted securely at each end across the top of disk *a*′ in rear of its center, with its lower surface as nearly in contact with knives *a a* as possible without touching them. Its front or cutting edge is beveled on top and

is slightly curved near the outer end. As seen by reference to Fig. 13, it is fastened to the inner guideway-bar, b^6, and extends obliquely forward toward the opposite bar b^4 at at an angle of about forty-five degrees. An angular bracket, c, is bolted to bar b^6, and the rear end of knife b is dovetailed therein, as seen in Fig. 15, and fastened by a bolt. The opposite end of the knife is bolted on its rear edge to an arm, b', which latter extends from a cross-bar, b^3, in rear of the knives, across the guideway. This arm forms a brace in the plane of the knives, as well as a support for the knife b. As the knives $a\ a$ revolve, their cutting-edges pass that of knife b throughout the outer one-third of its length, giving a shear as well as rotary cut by the movement.

To insure the passage of stalks to the knives, a flat guide-bar, b^2, is bolted to rail b^5, extends rearward in line with knife b, its extreme end lapping onto the point of the latter on the front edge. The cornstalks, as each row is straddled by the guideways C', are cut and fall between the spirals D onto the carriers e, and are elevated to the rear of the machine and dropped into the shock-holder. (Seen suspended at the rear end of the latter in Figs. 1 and 2.) The chute E and the spirals D are inclined, so as to form an angle with the bed-rails of the frame, and the shock-holder is pivoted high enough to allow it to rotate the shock, the butts of the corn being about one and a half foot from the ground when the shock is thrown up, ready to drop. The spirals D are long flat rods k, bent spirally over a shaft, i, and attached thereto by spokes i'. Each end of rod k is bent inward and fastened to the shaft. The convolutions are about eighteen inches in diameter and nearly the same distance apart. Shaft i is pivoted at the front end, in the top of an angular brace, i'', at the front of eace guideway-bar, and its rear end is coupled to gear-shaft h by a universal coupling. The cutting apparatus and elevating devices are supported upon the movable frame B, the rear end of which is in form of a butt-board for the shock.

The inclined rails b^4 project in rear of the frame, under boards L, to the ends of which are pivoted, one on each side, the shock-turners G and G', (seen in Figs. 1, 2, 3, and 4,) and to these the two sections F' and F^2 of the shock-holder F are pivoted. The shock-holder sections are quadrangular in shape, and are constructed of straight rods $m\ m$, with ring ends, which clamp pipe-bars forming the upper and lower ends of each section. The upper pipe-bars, o, are pivoted about their middles in ring ends $q''\ q''$ of each of the shock-turners G and G', and the sections hang loosely therein, so that when the two sections are disconnected they will each swing outward. The lower pipe-bars, n^5 and n^6, are provided with connecting and disconnecting devices. One of these bars has hooks 2 3, which enter openings 4 in sleeve-pieces n'' on the opposite bar, and these hooks are held by spring-latches n^3, extending in opposite directions along the bar n^5, and are operated by springs 7 within the pipe-bar. (See Fig. 16.) The spring-latches n^3 have their inner ends connected by pivoted rods n^2 to a T-shaped head on one end of a short crank-lever, n^4, which extends diametrically through the pipe-bar n^5, and which, when partially rotated, disengages latches n^3 from the hooks 2 3 of the ring-pieces n' on the opposite bar, and the two sections fall apart, as before stated. To prepare the shock-holder for receiving the cut corn, the two bars n^5 and n^6 of sections F' and F^2 are connected together, as seen in Fig. 2, and in the enlarged detail, Fig. 16, the latches engaging the hooks automatically. The clamping devices consist of a chain, m^5, on section F', which is attached by one end to spool r' of the shock-turner G on that side, and extends over a small pulley, O', on the end of bar o, thence down the section and around a small pulley, m'', pivoted in the fork of the outer bar, m', of section F', thence on the outside of a bar, m^2, pivoted by its lower end to the same fork, and through a loop, m^4, on the upper end of this bar. After passing through loop m^4 the end of chain m^5 is caught by a right-angled hook, p^3, of the opposite section. This hook is pivoted at its angle between ears p^4 at the top end of bar p^2, the latter being attached to the middle of a short cylindrical bar, p'', as seen in the detail N of Fig. 2. A spring-wire, about one-fourth of an inch in diameter, p, extends through a hole near the middle of bar p^2, each end being extended back and a turn taken around the ends of bars p'', p'', and p', consecutively, and secured to each end of the latter near the lower end of section F^2. The object of this wire is to connect the hook p^3 with the short cylindrical bars p'', p'', and p', and to form a reactionary spring-frame to cause the hook and the chain p^6, (seen connected to the loop-arm p^5 of the former,) when disengaged, to be thrown back onto section F^2. The loop-arm p^5 of hook p^3 extends at right angles from the latter and lies on the outside of the bar p^2. The chain p^6, connected thereto, extends down to the lower end of the section, and is connected with the arm j'' of a rotating spring-latch, j, pivoted on the bar n^6 near its outer end, as seen in Figs. 2 and in Figs. 16 and 19.

The shock-turners G and G' are each made of two flat quadrant-shaped frames, g' and g^2, pivoted on the outer and inner ends of a shaft, r, outside of the two supports $t\ t$, on each side of the end of bar b^4, as seen in Figs. 1, 2, 3, and 4. The one on the left-hand side of the machine has a spool or drum, r', but G', on the right of the machine, has none. The outer frame, g', has its arms $q'\ q^2$ curved laterally inward toward g^2, and their ends lap onto the ends of the arms of the latter (which are straight) and are fastened thereto near the rings $q''\ q''$. On the outer end of shaft r is a fixed ratchet-wheel, r^2, and between this and the ratchet-wheel u' is piv-

oted loosely a hand-lever, *v*. (See Figs. 3 and 4.) The teeth of ratchet-wheel r^2 extend in one direction, and the teeth of the loose ratchet-wheel *u'* extend in the opposite direction. Ratchet-wheel *u'* is in one piece with the sprocket-wheel *u''*. The hand-lever *v* has two loose pawls pivoted one upon each side, and as it is turned upward the outer pawl, *v'*, engages with ratchet-wheel r^2 and turns shaft *r* and drum *r'*, winding up chain m^5 on the drum *r'*, and the hook p^3 and its spring-frame are drawn to the center over the top of the shock, as seen in dotted lines, Fig. 2, after which the shock is tied above the clamp by a cord or wire. The pawl r^3 (seen pivoted to bar *t'*, Fig. 3,) holds the shaft *r* from turning, when the shock is compressed, by its engagement with the teeth of the inside ratchet-wheel, r^4, which is rigidly attached to shaft *r*. After the operation of compressing and tying the shock, the latter is partially rotated until brought into a perpendicular position by turning hand-lever *v* in the opposite direction. In this operation pawl *v'* becomes disengaged and drops down, as seen in Fig. 4, and pawl *v''* now engages the teeth of ratchet-wheel *u'*, turning sprocket-wheel *u''*, which, by means of the connection of chain s^3, turns the large sprocket-wheel u^2 on the end of shaft u^3.

By reference to Fig. 1 it will be noticed that a long lever, *u*, is pivoted at its front end in the rim of wheel u^2, (or on a pin on the latter,) and extends back to the top of arms *s* on the shock-turner G. At this point lever *u* forks, as seen in the top view, Fig. 3, and is pivoted to the top ends of the two converging arms or braces *s s*, both of which can be seen in this figure. From the ends of arms *s s* a rod-brace, *s'*, leads down to the rear end of arm q^2. Now, as sprocket-wheel u^2 is rotated from right to left, shock-turner G is elevated by means of lever *u*, and at the same time the shock-turner G' on the opposite side of the machine is also elevated and partially rotated by means of a crank, u^4, on the end of the transverse shaft u^3, extending across the machine in rear of the butt-board. The connection of the lever *u* on the right-hand side of the machine with shock-turner G' being the same as with G the illustration of the latter is deemed sufficient.

In Figs. 1 and 5 apron-boards L' are seen. These, as seen in Fig. 1, are hinged to the lower edge of the rear top board, L, which extends back over the shock-turners and hangs down while the shock-holder is being filled. By the operation of elevating the shock-turners, chain *o''*, connected with arm *q'* of the latter, is pulled downward around pulley o^5, (seen in dotted lines on the inside of bar b^4,) and its upper end being connected with a projecting arm, o^6, on the top edge of apron-board L', the latter is thereby elevated to a horizontal position, as seen in Fig. 5, which shows the apron-boards broken off. As the boards L' are elevated, they press in the top ends of the projecting flat vertical springs o^4 on the butt-board, and when they reach the horizontal position the springs are released and thrown outward under them, thus supporting each one. These apron-boards receive the few stalks which are cut before the shock-holder is again connected.

The final operation of releasing the shock and dropping or setting the same may be understood by reference to the several figures. When the shock-holder is thrown up with its inclosed shock, the two sections F' and F^2 stand nearly perpendicular, as seen in the dotted lines, Fig. 1, which shows a portion of the shock-holder in dotted lines, and the operator in rear of the machine now seizes the bell-crank lever n^4 and partially rotates it, disengaging the connecting devices on pipe-bars n^5 and n^6, and the two sections F' and F^2 instantly separate, the pivoted hook *j* on pipe-bar n^6 being released. The pull of chain m^5 on the point of hook p^3 throws up the loop-arm p^5 of the latter, as seen in dotted lines in detail N, and is released therefrom. Hook p^3 and its chain p^6 are now thrown back onto section F^2 by the reaction of spring-wire *p*, and the two sections of the shock-holder, now being clear of the shock, which is dropped upright, are again lowered and connected, the apron-boards L' swung down to the position seen in Fig. 1, and the operation of cutting the corn and filling the shock-holder repeated as before.

To let the frame B down, and to adjust it for cutting the corn at different heights, it is provided with the toothed rack w^7, (seen in Fig. 10,) which, with the other parts, forms the device K. The rack is of segmental shape, and stands vertically between rails b^4 and b^5 on each side of the frame, to which its ends are fastened. The rack is in front of the axle, and its teeth are engaged by a fixed pinion, w^6, on the latter, which is held thereto by a curved guard-bar, x^3, in rear of the axle and parallel with the rack, and is secured to the latter at its top end and to the rail b^5 at the lower end. The frame is lowered by its own gravity, the axle *w* rotating in its bearings and causing the pinion w^6 to traverse the rack.

To elevate the frame, a chain, w^2, around a drum-pulley, *w''*, in the middle of the axle, Fig. 5, leads from the under side of said pulley forward in the central longitudinal line of the machine between rails I to the short transverse shaft J, pivoted in bearings on the under side of the latter in rear of the truck B'. Shaft J is composed of an inner shaft, *y*, and an outer hollow shaft, *y'*, as seen in the view Fig. 8. It is operated by a hand-lever, y^2, which is loosely pivoted to the inner shaft, *y*, on the right-hand end between the outer notched wheel, 8, on the end of the same shaft, *y*, and the notched wheel w^3 on the end of the outer shaft, *y'*. As seen in Fig. 9, this lever has a slot, y^6, therein, which allows it to be raised endwise, so as to disengage a fixed lug, y^5, on its inner side from notches in wheel w^3 on the outer shaft. When it is thus raised and dis-

engaged from wheel w^3, it can be engaged with wheel 8 of the shaft y by means of latch-rod y^3, which is operated by pressing its latch y^4 when grasping the lever. To elevate the frame and its mechanism, the hand-lever y^2 is down, with its lug y^5 in a notch in wheel w^3, and it is thrown backward, winding chain w^2 onto shaft y' from the under side, rotating axle w and its pinion w^6 rearward, unwinding chain w^2 from off pulley w'' as the axle is rotated.

To retain the frame at any desired height, a latch-rod, w^4, (seen on the right hand of bars I, Figs. 5 and 7,) engages a notch in wheel w^3 on this end of the hollow shaft y'. In Fig. 7 this wheel is not seen, being on the inner side of lever y^2. Latch-rod w^4 extends back from a foot-lever, w^5, (seen pivoted at the forward end of the bars I on the right-hand side,) and its top or treadle end extends up through the foot-board M at the right-hand end of the latter. To tilt the frame, a pair of jointed levers, z and z', connect the front end of the inner guide way-bar, b^6, with each end of the inner shaft, y, lever z being rigidly fastened to the shaft and lever z' secured in the same manner to the end of bar b^6. These bars are short and about the same length and pivoted at their connecting ends. When desired to tilt the frame either up or down, the lever is disengaged from the outer shaft by raising it up, as before stated, latch-rod y^3 engaged with a notch in wheel 8, and at the same time latch-rod 10, on the opposite side of bars I, is disengaged from wheel 9 on the left-hand end of shaft y, and lever y^2 thrown either backward or forward, as required, the adjustment being retained by the engagement of latch-rod 10 with the wheel 9, the disengagement of the latter being performed by foot-lever 11 in the same manner as that of the latch-rod w^4.

The driver can manipulate both the hand-lever and foot-levers easily from his position on seat D' over the truck B' on the front end of the coupling-bars I.

The chain elevators have a link with a screw-bolt, e'', cast integral therewith, as seen in Fig. 20, by which the carriers e are fastened to the chain. In the view shown the top part of e'' is threaded internally, and a round-headed screw engaging therewith secures the end of the bar thereon, which latter is bored through for the purpose and slipped over it.

I claim as my invention—

1. In a corn-harvester, a cutting apparatus consisting of the rotary segmental knives with eccentric cutting-edges, said knives being secured upon a pivoted horizontal disk, a fixed knife extended across the latter, with which said rotary knives engage, and a guide-bar attached to the guideway-rail and extending thereform in line with said fixed knife and overlapping the same, as set forth.

2. In a cutting apparatus for a corn-harvester, a rotary disk, a pair of segmental knives thereon, their upper or cutting edges in the same plane therewith, and a stationary knife extending across the same at an angle of about forty-five degrees to the line of the guideway, the edges of said rotary knives being eccentric to the peripheral line of the disk, for the purpose set forth.

3. In a cutting apparatus for a corn-harvester, the segmental rotary knives with the front or entering angles of their blades rounded, and the lines of the cutting-edges being eccentric to their center of rotation, in combination with a stationary knife extending obliquely forward across the top surface of said rotary knives, and a guide-bar in line with said stationary knife and lapping onto the point of the same, as and for the purpose hereinbefore set forth.

4. In a cutting apparatus for a corn-harvester, the eccentric segmental knives a a, disk a', the oblique stationary knife b, extending forward from the guide-rail at an angle of about forty-five degrees, and the guide-bar b^2, as and for the purpose set forth.

5. The combination, with the fixed and movable frame-sections of the cutting apparatus, the endless-chain carriers, and spiral reels, of the system of gearing, the main drive-wheels, and pivoted truck, arranged and operated as set forth.

6. In a corn-harvester, the combination of a cutting apparatus consisting of the fixed and the rotary knives, elevating devices consisting of endless-chain belts with toothed carrier-bars thereon, and the shocking devices consisting of pivoted separable frames provided with devices for compressing and rotating the shock, releasing and dropping the same, and means in connection with the frame and the several operative devices thereon for regulating the height of the cut and the distance through which the shock is dropped to the ground.

7. In a corn-harvester, the longitudinal coupling-rails, the pivoted truck, the main drive-wheels provided with spur-gears, the cutting apparatus, the elevating and shocking devices, and the system of gearing connecting said drive-wheels with said cutting and elevating devices, and operated as set forth.

8. In a corn-harvester, the combination of cutting, elevating, and shocking devices, all being supported and operated upon a movable frame, provided with means for raising and lowering and tilting the same to regulate the cut and the height from which the shock is dropped to the ground.

9. In a corn-harvester, the combination, with the main frame, the adjustable frame, the vertical toothed rack-bars, and guards attached thereto, of the rotary axle provided with pinions engaging said rack-bars and having a winding-drum thereon, the hollow shaft and inclosed solid shaft journaled in the main frame and provided with the notched wheels, the jointed levers connecting said adjustable frame with the said solid shaft, the chain connecting the winding-drum of the axle with the said hollow shaft, and a hand-lever pivoted on said solid shaft having an endwise movement, and provided with a lug and latch-rod en-

gaging said notched wheels, to raise and lower and secure the frame, as set forth.

10. In combination, the main axle having pinions and a winding-drum thereon, the drive-wheels rotating on said axle, the longitudinal coupling-rails having bearings in which the axle may be rotated, the truck supporting the front ends of the coupling-rails, the pivotally-suspended frame provided with vertical toothed racks engaging said pinions, guards attached to said racks and frame to retain said racks and pinions in engagement, a transverse hollow shaft containing a solid shaft and journaled on said coupling-rails, a chain connecting said hollow shaft and said winding-drum on the axle, and an adjustable pivoted hand-lever adapted to operate the hollow shaft and its connections to raise and lower the frame and to operate the inside shaft to tilt the frame, as set forth.

11. In a corn-harvester, the combination, with the system of cutting, elevating, and shocking devices and means for operating the same, of the adjustable frame, means for pivotally suspending said frame at the front end, means for supporting it adjustably at the rear end, and means for raising, lowering, and tilting the same, as set forth.

12. In a corn-harvester, the combination of a stationary frame, an adjustable frame carrying the devices for cutting, elevating, and shocking the corn, a transverse shaft journaled on the front of the stationary frame, a hand-lever adjustably pivoted on said shaft and adapted to be operated from the driver's seat, and means connected therewith by which the adjustable frame may be raised, lowered, and tilted, as set forth.

13. In a corn-harvester, the combination of the longitudinal bed-rails, the axle, the bearings on the rear ends of said bed-rails for said axle, the drive-wheels rotating on said axle, the pivoted truck supporting the front ends of said bed-rails, the adjustable frame, and the adjustably-pivoted hand-lever and its auxiliary connections operated thereby, as described, whereby said frame may be raised, lowered, and tilted from the driver's seat.

14. In a corn-harvester, the combination of the bed-frame consisting of the longitudinal coupling-rails extending from end to end of the machine, bearings on the rear ends (on the under side) of said coupling-rails, an axle adapted to rotate in said bearings and provided with pinions and a winding-drum, drive-wheels rotating on the ends of said axle, a pivoted truck supporting the front ends of said coupling-rails, an adjustable frame having guideway-rails at the front and provided with racks intermediate its side bars engaging said pinions and supporting the rear end of said adjustable frame, a transverse shaft on said coupling-rails, jointed levers connecting the inner guideway-rails with the ends of said transverse shaft, a chain connecting the latter with the drum on said axle in the central longitudinal line of the machine, a hand-lever pivotally attached to said shaft, and means connected therewith for raising and lowering said adjustable frame for tilting the same and for adjusting it at any desired height or angle in cutting the corn, as set forth.

15. In combination, guideway C′, guide-rail b^6, knives *a a*, the fixed knife *b*, angle-plate *c*, and brace *b′*, as and for the purpose set forth.

16. In combination, the guideway C′, having rails b^5 and b^6, the rotary knives *a a*, the fixed knife *b*, and the guide-bar b^2, as and for the purpose hereinbefore set forth.

17. In combination with the cutting and elevating devices and the main drive-gears *f′*, pinions *f*, shafts e^5, sprocket-wheels e^4, chain belts *e′*, and sprocket-wheels e^7, connecting said main drive-gears with said cutting and elevating devices, whereby both are simultaneously operated, as set forth.

18. In a corn-harvester, the combination of the two longitudinal coupling-rails, the pivoted truck, the main drive-wheels provided with spur-gears attached to the hubs of the same, the axle having the fixed pinions thereon, the pivotally-suspended adjustable frame provided with toothed racks and jointed lever-connections, the pivoted adjustable hand-lever, the auxiliary connecting devices of said hand-lever, axle, and frame, whereby said hand-lever is adapted to perform the double function of vertically adjusting and tilting said frame, and the foot-levers by which said frame and its cutting apparatus and shocking devices are retained at the proper height and angle when adjusted, as set forth.

19. In a corn-harvester, a movable frame carrying the cutting, elevating, and shocking devices thereon, and pivotally suspended at the front end by jointed levers, and at its rear end by racks and pinions, in combination with means connected to said supporting devices, whereby said frame is vertically adjusted, substantially as hereinbefore set forth.

20. In a corn-harvester, the combination of an adjustable frame and mechanism for adjusting said frame, consisting of a compound shaft in two sections, one section being a hollow shaft having a notched wheel on one end, a solid shaft extending through and journaled in said hollow shaft, provided with a notched wheel on each end, an adjusting hand-lever pivotally attached to the inside shaft between the notched wheel on the latter and the notched wheel on the outside shaft, and provided with a fixed lug engaging the notches of the latter inner wheel, and a latch-rod adapted to engage the notches of the outer wheel, and mechanism, as described, connecting said frame and said shafts, substantially as set forth.

21. In a device for operating the adjustable frame of a corn-harvester to raise, lower, or tilt the same, the combination of the hollow shaft, the solid shaft passing through the hollow shaft, a toothed wheel on one end of the hollow shaft, a toothed wheel on each end of the inside shaft, a hand-lever pivoted between a toothed wheel of the inside shaft and the

toothed wheel of the outside shaft, and having a lateral movement, means attached to said lever for engaging the toothed wheel on each side of the same, intermediate devices to operate the said frame, the foot-levers, and the latch-rods connected with the latter—one on each side of the bed-rails—and adapted to be operated to engage the toothed wheel of each shaft, as and for the purpose set forth.

22. In a corn-harvester, the combination, with the adjustable frame, of the guideway-rails having outwardly-curved front ends, the cutting apparatus consisting of the rotary segmental knives and the fixed oblique knife, the guide-bar adapted to guide the stalks to said cutting apparatus, the chain belts and toothed carrier-bars, the spiral reels, and means for operating the same, whereby the stalks are guided to the knives, cut, and elevated, as set forth.

23. In a corn-harvester, the combination, with the adjustable frame, of the guideway-rails having outwardly-curved front ends, the cutting apparatus consisting of the horizontal rotary knives and a fixed oblique knife, said knives being attached to the inner guideway-rail, a guide-bar attached to the outer guideway-rail extending rearward in line with said fixed knife, the endless-chain belts and toothed carrier-bars, the spiral reels, the system of driving mechanism for operating the same, and the shocking devices consisting of a shock-holder in two sections for receiving the cut corn, compressing devices, and a spring-frame, means for detaching said compressing devices, and mechanism for rotating the shock and releasing and dropping the same.

24. In a corn-harvester, the combination of the elevating-belts provided with toothed carriers, the spiral reels, a holder for receiving the cut corn preparatory to compressing and tying the same, the apron-boards L′, hinged at one edge to the rear top boards, L, over said holder, and devices for rotating the shock adapted also to elevate the said apron-boards, substantially as set forth.

25. In combination, the hinged apron-boards L′, provided with the projecting arm o^6, the chains o'', the pulleys o^5, the shock-turners G and G′, the transverse shaft connecting the latter, the long rod-levers, the sprocket-wheels and chain belts, and the crank-lever and its attachments adapted to operate said shock-turners, substantially as and for the purpose set forth.

26. In a shocking device for corn-harvesters, the combination of the hinged separable frames provided with automatic latching devices, the pivoted shock-turners, the transverse shaft having a sprocket-wheel at one end and crank-lever at the other, the long jointed levers, chain-gearing, and the pivoted crank-lever provided with pawls and adapted to engage alternately with the ratchet-wheels on the opposite sides of the same, substantially as and for the purpose set forth.

27. In a shocking device for corn-harvesters, the combination of pivoted separable frames provided with automatic latching devices, chain-clamps provided with a hook, means for disengaging the same, a spring-frame, the winding-drum, the pivoted crank-lever, the ratchet-wheels, and the pawls adapted to engage the latter when operated, substantially as set forth.

28. In a corn-harvester, the combination of the shock-turner pivoted at the rear of the machine—one on each side—a shock-holder composed of two pivoted separable rectangular frames suspended from said shock-turner frame, latching devices to connect said frames, the compressing devices, and a crank-lever pivotally attached to the shaft of one of said shock-turners and provided with loosely-pivoted pawls—one on each side—adapted to engage alternately with a fixed and a loose ratchet-wheel when the lever is rotated in opposite directions, said lever being adapted to operate the compressing devices when rotated in one direction, and to operate the shock-turning devices when rotated in the opposite direction, as set forth.

29. In a corn-harvester, the combination of the two apron-boards, the two pivoted rectangular shock-holder frames, shock-turner frames pivoted one to each side of the frame of the machine, from which said frames the shock-holder frames are suspended, automatic latching devices to connect the frames, means for releasing the same, compressing-chains provided with a hook, a spring-frame adapted to disengage the latter, and a crank-lever provided with a loosely-pivoted pawl on each side, one of said pawls adapted to engage a ratchet-wheel on one side of said lever to operate the compressing-chains, and the other pawl adapted to engage the ratchet-wheel on the other side of said lever (when the latter is rotated in the opposite direction) to operate the devices for rotating the shock and for elevating the apron-boards, as set forth.

30. In a shocking device, the combination, with the shock-turner G, of the compressing devices, the chain m^5, the shaft r, drum r', crank-lever v, provided with the loosely-pivoted pawl v', ratchet-wheel r^2, pawl r^3, and ratchet-wheel r^4, whereby the chain m^5 is wound up and the compressing devices operated, as set forth.

31. In a shocking device, the combination of the pivoted separable frames F′ and F², provided with automatic latching devices, the compressing devices, the pivoted shock-turners G and G′, the transverse shaft w^3, the long jointed levers u, sprocket-wheels w'' and u^2, chain belt S^3, crank-lever v, having pawl v'', and ratchet-wheel u', formed in one piece with the sprocket-wheel w'', whereby the shock is rotated and dropped in an erect position, as set forth.

32. The combination, with the shock-holder and the auxiliary devices described, of a single crank-lever and means connected therewith whereby the shock is compressed when said

lever is operated from right to left, and is rotated to an erect position for dropping when said lever is operated from left to right, as set forth.

33. The combination, with the adjustable frame and means for raising, lowering, and tilting the same, of a shocking device consisting of a shock-holder having two separable pivoted frames, devices for compressing the shock, and means for rotating the same and for releasing said shock and dropping it erect upon the ground, as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN I. WOLF.

Witnesses:
B. C. CONVERSE,
W. H. NAGEL.