

No. 829,328.

PATENTED AUG. 21, 1906.

A. DURIEU, JR.
CANE HARVESTER.

APPLICATION FILED AUG. 16, 1905.

4 SHEETS—SHEET 1.

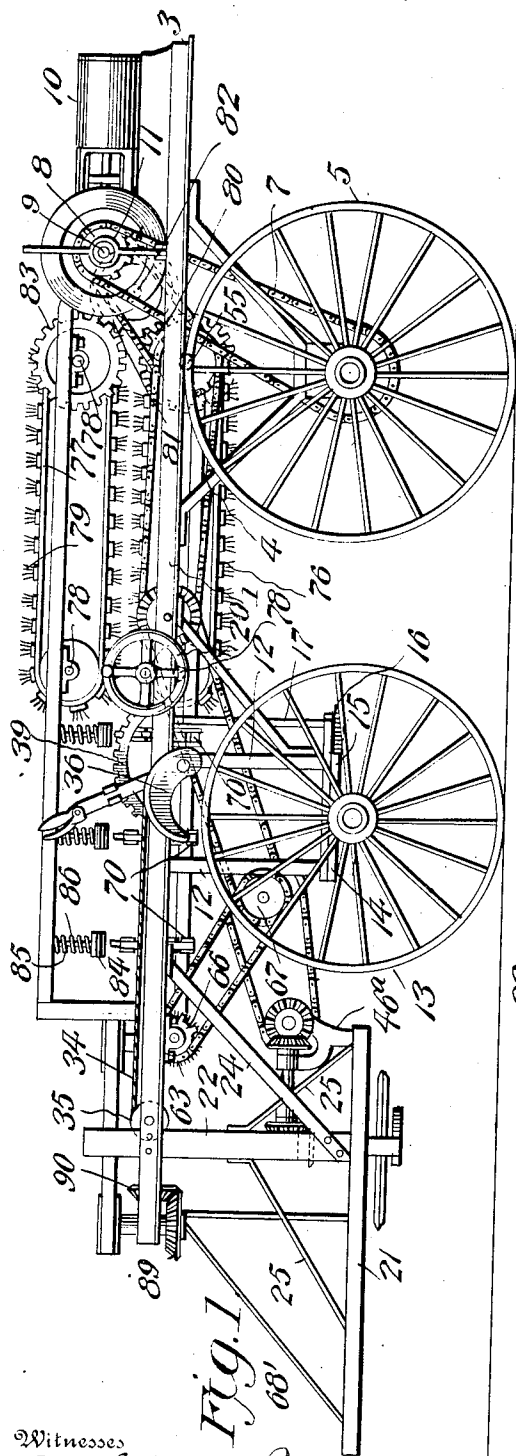


Fig. 1.

Witnesses
Geoffman
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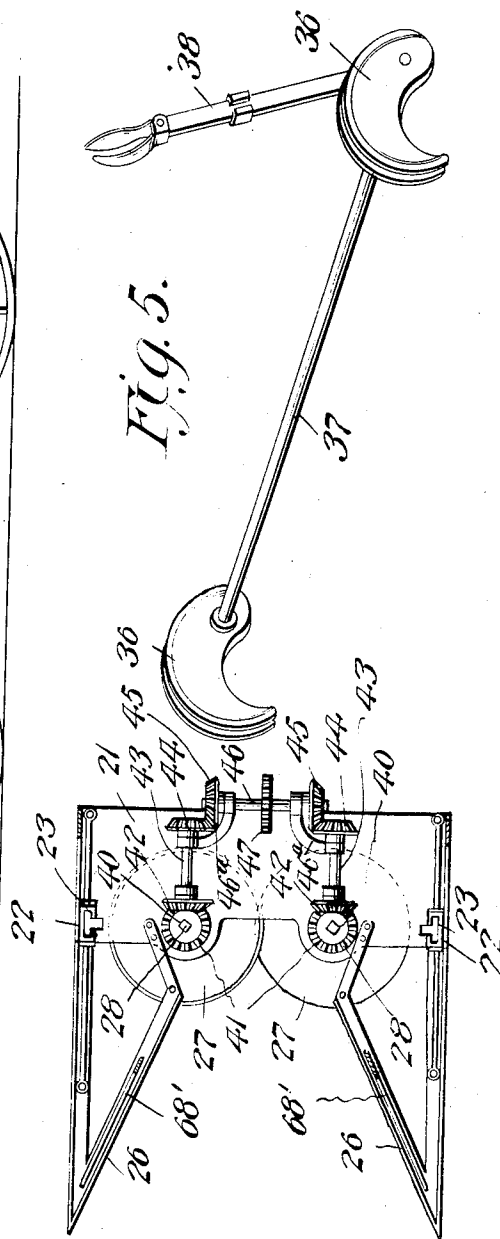


Fig. 4.

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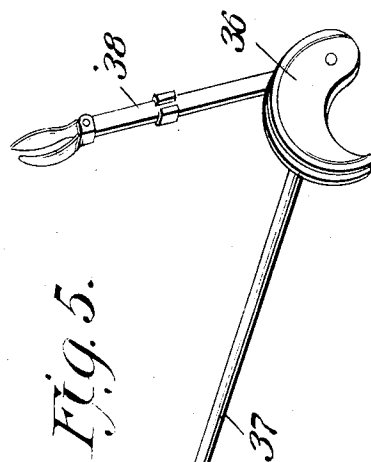


Fig. 5.

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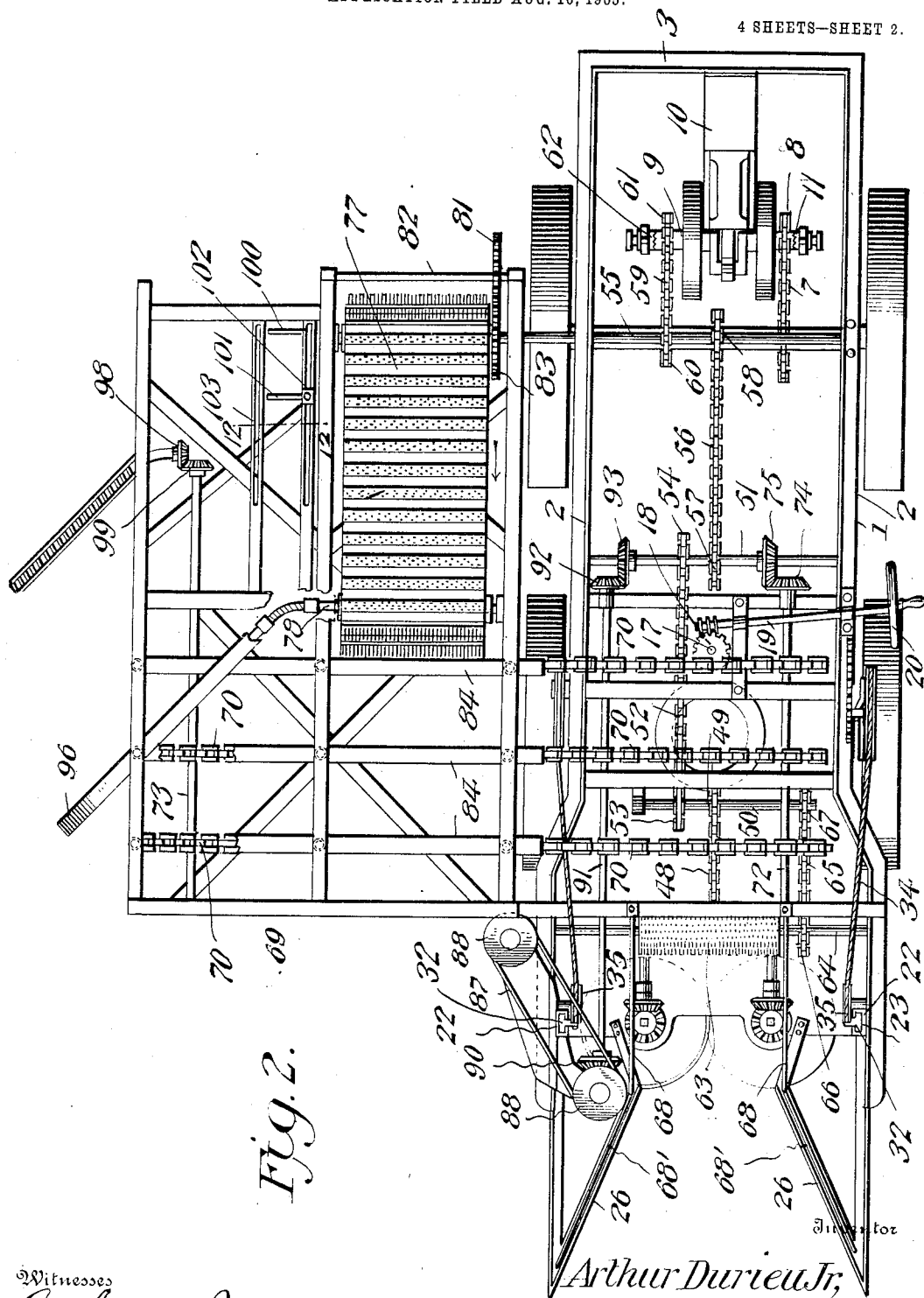


Fig. 2.

Witnesses

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4 SHEETS—SHEET 3.

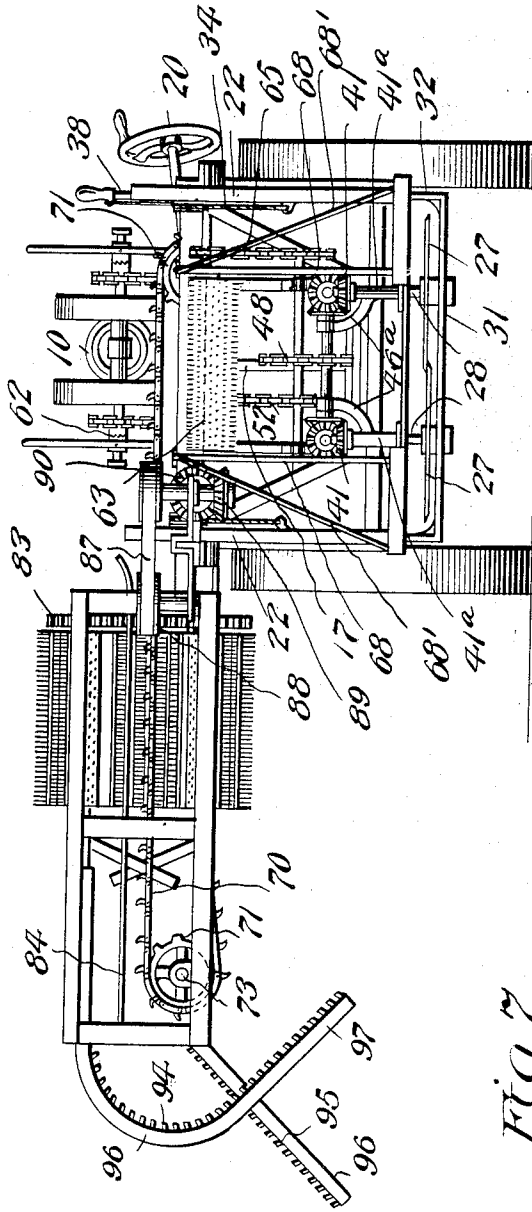


Fig. 3.

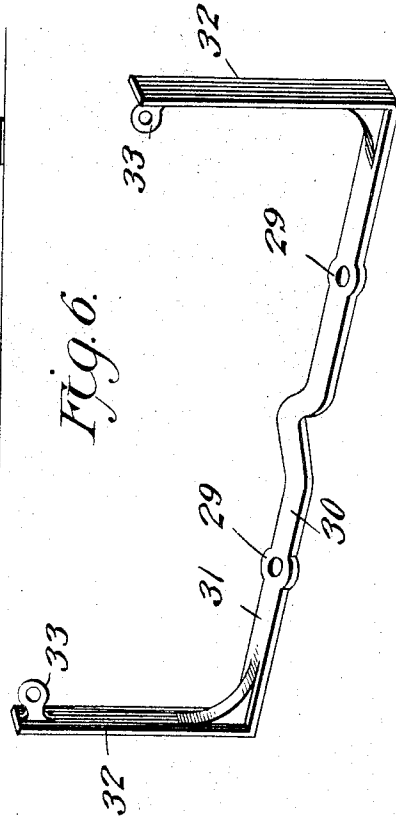
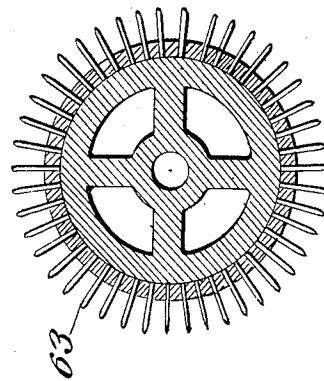


Fig. 6.

Fig. 7.



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4 SHEETS—SHEET 4.

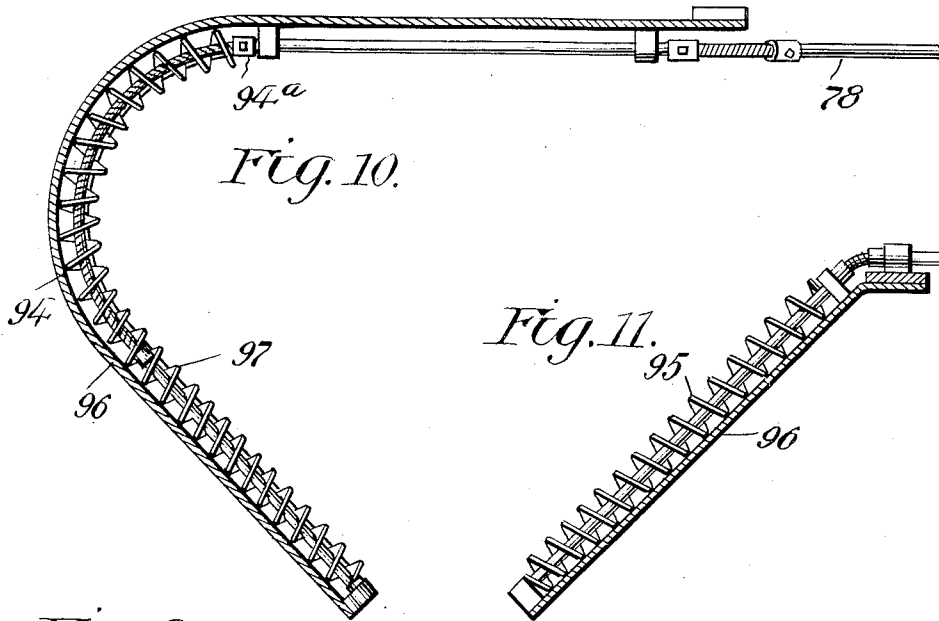


Fig. 8.

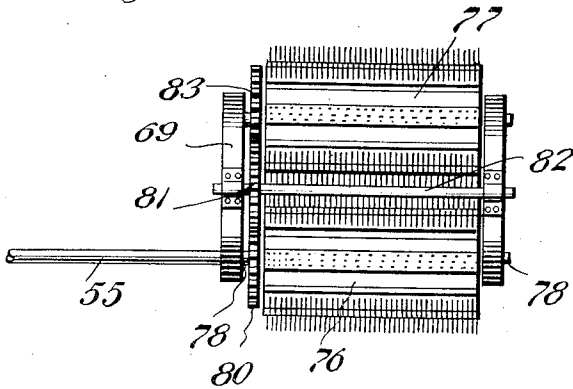


Fig. 9.

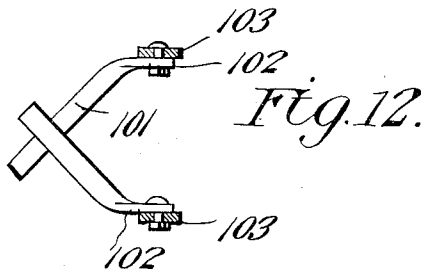
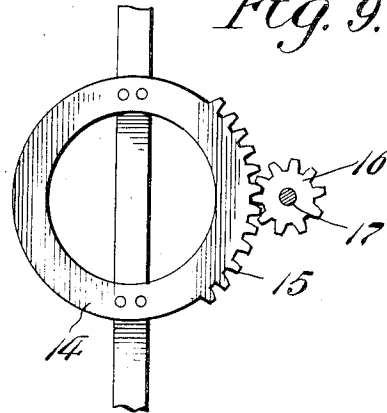


Fig. 12.

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UNITED STATES PATENT OFFICE.

ARTHUR DURIEU, JR., OF NEW ORLEANS, LOUISIANA.

CANE-HARVESTER.

No. 829,328.

Specification of Letters Patent.

Patented Aug. 21, 1906.

Application filed August 16, 1905. Serial No. 274,438.

To all whom it may concern:

Be it known that I, ARTHUR DURIEU, JR., a citizen of the United States of America, residing at New Orleans, in the parish of Orleans and State of Louisiana, have invented new and useful Improvements in Cane-Harvesters, of which the following is a specification.

This invention relates to a machine for harvesting sugar-cane, its object being to provide a simple and efficient construction of machine which cuts, tops, and strips the blades from the cane and deposits the cane across the furrow upon the ground in position to be easily gathered by hand or machine.

In the accompanying drawings, Figure 1 is a side elevation of a cane-harvester embodying my invention. Fig. 2 is a top plan view of the same. Fig. 3 is a front end elevation. Fig. 4 is a top plan view of the cutter-deck and its supported parts detached from the machine. Fig. 5 is a detail view of the shaft and cams for raising and lowering the cane-cutters. Fig. 6 is a detail view of the adjustable bracket carrying the cutters and raised and lowered by said shaft and cams. Fig. 7 is a cross-section through the feed-roller. Fig. 8 is a view looking from the rear toward the stripping and breaking belts. Fig. 9 is a top plan view showing the rack-and-pinion mechanism for turning the movable member of the fifth-wheel. Figs. 10 and 11 are detail longitudinal sectional views of the discharge devices; and Fig. 12 is a section on the line 12 12 of Fig. 2, showing the arrangement of the breaking-blades.

Referring now more particularly to the drawings, the numeral 1 represents a main supporting-frame which may be of any preferred construction and is provided with longitudinal side bars or beams 2, connected at their rear ends by a rear cross bar or beam 3.

The side bars 2 are attached to depending brackets 4, to which are attached the axle and supports of rear supporting-wheels 5. The wheels 5 serve as driving-wheels, a sprocket-wheel 6 being fixedly attached to the axle thereof and driven by a sprocket-chain 7, passing around a sprocket wheel or pinion 8 on an engine-shaft 9. The shaft 9 is suitably journaled on the frame 1 and driven by a hydrocarbon or other engine 10, supported upon the rear portion of the frame. A

clutch device 11 of any preferred construction is provided for throwing the sprocket-wheel 8 into and out of gear with the shaft 9 to couple and uncouple the driving-gearing.

Hangers 12 project downward from the frame-bars 1 and support the axle and fifth-wheel of front supporting and steering wheels 13. The movable member 14 of the fifth-wheel is toothed at its rear to form a segment 15, with which meshes a pinion 16, mounted upon the lower end of a steering shaft or post 17, carrying at its upper end a worm-wheel 18, meshing with the worm on a worm-shaft 19, carrying at its outer end a hand-wheel 20. By operating this shaft motion may be transmitted to the steering and supporting wheels 13 to turn the same in one direction or the other to steer the machine.

Arranged below the front portion of the frame 1 is a guide and cutter deck or platform 21, which is supported from the main frame by vertical hangers 22, which are grooved to form guides 23 open on their inner sides, as clearly shown in Fig. 4. The hangers 22 are reinforced from the frame 1 at each side of the machine by a brace 24, and the platform is reinforced at each side from the hangers by braces 25. The said deck or platform carries guides 26, convergently related to gather the cane in the forward motion of the machine and conduct the same in compact form rearwardly to be severed by cutting means.

The cutting means comprises horizontal cutting disks or wheels 27, arranged to rotate in a horizontal plane and fixedly mounted upon vertical shafts 28, journaled at their lower ends in bearings 29, formed upon the main bar or horizontal portion 30 of a supporting-bracket 31, the vertical members or arms 32 of which are fitted to slide in the guides 23 of the hangers 22 and are formed with laterally-projecting eyes 33, which extend outwardly through the slots on the inner sides of said guides and are attached to the forward ends of adjusting cords or cables 34. The cables 34 pass over direction-pulleys 35, carried by the frame 1, and extend rearwardly and are attached to eccentric shoes or cams 36, carried by a transverse shaft 37, suitably supported upon the frame 1, to which shaft is fixed an adjusting-lever 38, provided with a dog or pawl to engage a toothed rack 39, fixed to the frame 1, by

which motion may be transferred to the bracket 31 to raise and lower the cutting-disks 27 to cut the cane at the desired height near the stubble. The cutter-wheels 27 revolve in opposite directions, and their shafts 28 are formed with squared upper ends 40, (see Fig. 4,) fitting in similar openings in beveled gears 41, by which they are driven, this construction constituting, in effect, a feather connection whereby the shafts are connected with the beveled gears to rotate therewith, and yet are permitted to slide freely there-through to raise and lower the cutters. The beveled gears 41 are driven by beveled pinions 42, carried by horizontal shafts 43, provided at their rear ends with beveled pinions 44, which mesh with pinions 45 upon the outer ends of a transverse shaft 46, carrying an intermediate sprocket-wheel 47, driven by a chain 48 from a sprocket-wheel 49, carried by a transverse shaft 50, which in turn receives motion from a counter-shaft 51 through the medium of a sprocket-chain 52, passing around sprocket-wheels 53 and 54 on said shafts. The gears 41 are revolubly mounted upon the upper ends of tubular standards 41^a, carried by the platform 21 and through which the shafts 28 extend and by which they are guided in their adjusting movements, while the shafts 43 and 46 are journaled in brackets 46^a, carried by the platform. The counter-shaft 51 is driven from a transverse power-shaft 55 by means of a chain 56, passing around sprocket-wheels 57 and 58, and said power-shaft in turn receives motion from the engine-shaft 9 through a chain 59, engaging sprocket-wheels 60 and 61 on said shaft. The sprocket-wheel 61 is connected with the shaft 9 by means of a clutch device 62, whereby it may be thrown into and out of engagement therewith to start or stop the motion of the cutters and other operating parts of the machine.

Arranged upon the forward portion of the machine above the rear portion of the deck or platform 21 is a peripherally spurred or spiked feed-roll 63, mounted on a transverse shaft 64 and operatively connected with the shaft 50 by a sprocket-chain 65, engaging sprocket-wheels 66 and 67, fixed on said shafts. This roller revolves in an upward and rearward direction to throw the gathered and cut stalks of cane upward onto the upper front portion of the frame 1. Fixed guide-rods 68 extend downward from the forward portion of the frame 1 to the rear ends of the guides 26 and serve to conduct the stalks of cane from the latter to the roller 63 and maintain the cane in contact with said roller, so that the spurs or spikes thereof will penetrate the cane and force it upwardly onto the upper front portion of the frame. Guide-rods 68' are also provided and extend on an upward inclination from the outer ends of

the guides 26 to the guide-rods 68. These rods 68' are provided to guide any cane that may have been blown or fallen across the furrows to an upright position for proper passage to the feed-roll.

Extending horizontally from one side of the main frame 1 is a horizontal side frame or platform 69, and operating transversely of the frames 1 and 69 is a stalk-conveyer consisting of a series of conveyer-chains 70, which pass over guide sprocket-wheels 71, mounted on the frames, and is adapted to convey the cut stalks thrown by the feed-wheel 63 upon the frame 1 over to the frame 69. The respective end sets of sprocket-wheels 71, on which the chains 70 are mounted, are carried by longitudinal shafts 72 and 73, and motion is communicated to the shaft 72 from the transverse counter-shaft 51 by spur-gears 74 and 75.

Mounted upon the inner rear portion of the frame 69 are lower and upper stripping and breaking brushes 76 and 77, each consisting of an endless belt mounted upon shafts 78 and provided with transverse rows of bristle or steel brush-heads 79. As the cane travels laterally from the frame 1 to the frame 69 the upper portions, including the tops thereof, pass between the respective upper and lower working stretches of the brush-belts and are stripped thereby of their blades and shoots and the tops also broken at the proper joint. It will be understood that this operation of stripping the blades and breaking the tops is accomplished by the action of the steel brushes 79 of the belts 76 and 77, which as the cane is moved laterally by the conveyer-belts 70 strip the blades from the upper half of each stalk. As the upper portion of the stalk is thus weakened by the removal of the shoots therefrom and as the butts of the stalks are held firmly against the conveyer-chains 70 by presser-bars 84, the brushes acting on the stripped tip of the stalk tend to bend the same and break it at the joint. Where the tip of the cane is slender and weak, the topping action will be accomplished by the brushes as they strip the leaves therefrom, and in most cases the tips will be broken from the stalks prior to the passage of the latter beyond the brushes; but in order to insure the topping of stiff or refractory stalks I provide auxiliary breaking means, as hereinafter described, to top the stalks which pass through the brushes without breakage. The rear shaft of the lower brush 76 is formed by a continuation beyond the frame 1 of the power-shaft 55, and arranged thereon is a spurred gear 80, meshing with a similar gear 81 on a shaft 82, the gear 81 also being in mesh with a gear 83 on the rear shaft of the upper brush 77, whereby traveling motion is imparted to said brushes from the power-shaft 55.

The stalks are held down upon the con-

veyer-belt 71 while they are being acted upon by the brushes 76 and 77 through the medium of guide-bars 84, extending transversely at the forward portion of the frame 69. These bars are yieldingly supported from the upper portion of the frame 69 by guide-stems 85, about which are arranged coiled springs 86, said springs acting to permit an upward yielding movement of the bars 84 to compensate for variations in the sizes of the stalks while serving to hold said bars pressed down upon the stalks to maintain them in position upon the conveyer-chains while the blades thereof are being stripped and the tops broken by the brushes. The bars 84 thus operate as yielding guides and pressure-shoes to hold the stalks in position while they are being treated.

In order to properly position the stalks for treatment, an equalizing guiding device 87 is provided. This guiding device consists of an endless belt passing around guide sheaves or rollers 88, suitably mounted upon the forward portion of the frame 1 to act upon the stalks as they pass therefrom to the frame 69. The shaft of one of the guide-sheaves 88 carries a beveled gear 89, meshing with a beveled pinion 90 on the forward end of a shaft 91, which extends rearwardly to a point adjacent to the counter-shaft 51 and is driven therefrom by intermeshing beveled gears 92 and 93. The belt 87 extends obliquely from a point adjacent the inner and forward end of the right-hand guide 26 to the inner and forward end of the frame 69, so that the butts of the stalks thrown up by the feed-roller 63 will engage the inner stretch thereof and will be gradually forced inwardly and rearwardly thereby as the stalks are being conveyed from the frame 1 to the frame 69 by the conveyer-belts 70. By this means the butts of the stalks will be brought into alinement, thus properly assembling the stalks for treatment by the stripping and breaking brushes. After the stalks have been treated by the stripping and breaking brushes they are conveyed by the conveyer-belts 70 to the outer side of the frame 69, where they are engaged by discharge devices 94 and 95, each of which comprises a flexible worm-shaft disposed within a suitable casing 96, which casing is open or slotted on one side to allow the teeth of the shafts to project to engage the stalks. The discharge device 94 extends from a point beyond and adjacent to the forward ends of the stripping devices forwardly at an oblique angle beyond the outer side of the frame 69 and terminates in a downwardly and inwardly extending hook-shaped stalk-turning portion 97, while the discharge device 95 projects obliquely in a forward direction beyond the outer side of the frame in rear of the said discharge device 94. The worm portion of the shaft 94 is downwardly disposed or projects from the under side of its

casing 96, while the worm portion of the discharge device 95 is forwardly disposed or projects from the upper portion of its casing. By this construction the stalks conveyed beyond the frame by the two discharge devices 94 and 95 are turned so that they will drop downwardly upon the ground to lie at right angles, or substantially so, to the adjacent furrow, thus enabling them to be conveniently gathered by hand or by a machine. This action is due to the fact that the top end of the stalk will be moved outward by the discharge device 95, while the butt-end thereof will be moved downward and inward by the discharge device 94, thus turning it to a position at right angles to the position in which it lies when treated by the stripping and breaking brushes and transversely of the frame of the machine. The inner end of the worm-shaft 94 is suitably driven from the forward shaft of the brush 77, being preferably connected thereto by a suitable coupling 94^a, while the worm-shaft 95 is provided at its inner end with a beveled gear 98, which is driven by a beveled gear 99 on the rear end of the shaft 73. In order to provide for the breaking of the tops of those stalks which are not broken by the brushes 76 and 77 or incompletely broken thereby, as hereinafter described, breaking-blades 100 and 101 are arranged upon the frame 69 beyond the said brushes. These blades are adjustably mounted by means of brackets or carrier-pieces 102 in slotted guides 103. The guides 103 extend longitudinally of the frame 69 beyond and parallel with the stripping-brushes and in vertical alinement one above the other, and the blades extend therefrom in crossed relation in the path of movement of the tops of the stalks. When the tops of the stalks come in contact with one or the other of the blades, two of which are employed to insure breakage, their movement will be arrested by the blades, while the butts of the stalks will continue to feed forward under the action of the chains 70 and will be held from slipping backward on said chains by the presser-bars 84, whereby under the pull of the chains the tops of the stalks will be snapped off. Through their adjustable engagement with the guides the blades may be disposed at different distances from the forward end of the frame 69 to act upon the tops of stalks of different lengths.

From the foregoing description, taken in connection with the accompanying drawings, the construction and mode of operation of my cane-harvester will be readily understood, and it will be seen that it provides a simple, convenient, and effective construction of machine, whereby the stalks may be quickly cut, gathered, and treated. It is thought that the advantages of this device will be readily appreciated without further description.

Having thus described the invention, what is claimed as new is—

1. In a cane-harvester, the combination of a wheeled supporting-frame, gathering and cutting devices at the forward end of said frame, a stalk-conveyer movable transversely of the frame, means for elevating the cut stalks to said conveyer, stripping and breaking devices disposed longitudinally of the frame and adapted to act upon the stalks, and an equalizing guide device adapted to act upon the stalks before they are treated by the stripping and breaking devices to even the butts of the stalks.
2. In a cane-harvester, the combination of a wheeled supporting-frame, gathering and cutting devices at the forward end of said frame, a conveyer movable transversely of the frame, means for elevating the cut stalks to the conveyer, stripping and breaking devices adapted to act upon the traveling stalks, and an obliquely - arranged stalk-guide adapted to act upon and level the butts of the stalks as the latter are being conveyed to the stripping and breaking devices.
3. In a cane-harvester, the combination of a wheeled supporting-frame, a cutter deck or platform carried by said frame, gathering devices carried by the deck, cutters for severing the gathered stalks, shafts carrying said cutters, a support for the shafts vertically adjustable to regulate the position of the cutters, means for operating said support, and conveying and stripping mechanism for the stalks.
4. In a cane-harvester, a supporting-frame, gathering and cutting mechanism, stripping and breaking devices, conveying means, and supplemental breaking devices for acting upon the stalks when broken or incompletely broken by the first-named stripping devices.
5. In a cane-harvester, a wheeled supporting-frame, gathering and cutting mechanism at the forward end of the frame, stripping and breaking brushes, a transversely-movable conveyer, a feed device for elevating the cut stalks to the conveyer, discharge devices for discharging and turning the stalks, stalk-adjusting means to act upon the conveyed stalks preliminary to their passage to the stripping and breaking brushes, a motor upon the frame, and means for operating the described parts from the motor.
6. In a cane-harvester, the combination of a wheeled supporting-frame, gathering and cutting mechanism at the forward end of said frame, a stalk-conveyer movable transversely of the frame, means for conveying the cut stalks from the gathering and cutting mechanism to said conveyer, spring-actuated means for pressing the butts of the stalks against the conveyer, stripping and breaking means disposed in rear of the conveyer and in the line of movement of the tops of the stalks carried thereby, means disposed in the line of movement of the stalks for adjusting and leveling the butts of the stalks carried by the conveyer prior to the action of the stripping and breaking mechanism thereon, and means for operating the several parts.
7. In a cane-harvester, the combination of a wheeled supporting-frame having a platform extending laterally therefrom, cutting and gathering mechanism at the forward end of the frame, a conveyer movable transversely across the forward portions of the frame and platform, means for feeding the cut stalks from the gathering and cutting mechanism to said conveyer, a butt-equalizing device arranged in the path of movement of the butts of the stalks passing from the frame to the platform to adjust and level the stalks, means upon the forward portion of the platform to bear upon the stalks and hold them against the conveyer, and means upon the rear portion of the platform for stripping and breaking the stalks as they feed across the platform and are held in positive engagement with the conveyer by the presser means.
8. In a cane-harvester, the combination of a wheeled supporting-frame having a platform extending laterally therefrom, gathering and cutting mechanism at the forward end of said frame, a stalk-conveyer movable transversely across the forward portions of the frame and platform, presser means upon the forward portion of the platform to press the butts of the stalks against the conveyer, an equalizing guide device arranged to operate upon the conveyed stalks to even the butts thereof prior to their engagement by the presser means, endless belts arranged in superposed relation upon the rear portion of the platform and movable in planes longitudinally thereof to strip the tops of the stalks, drive mechanism on the supporting-frame, and means for actuating the various working parts from the drive mechanism.
9. In a cane-harvester, the combination of a wheeled supporting-frame, gathering and cutting mechanism at the forward end of said frame, a conveyer for the gathered stalks movable transversely of the frame, stripping and breaking means for acting upon the stalks carried by the conveyer, and spring-actuated presser-bars carried by the frame and adapted to hold the butts of the stalks in engagement with the conveyer while the tops are being acted upon by said stripping and breaking means.
10. In a cane-harvester, a supporting-frame, gathering and cutting mechanism carried thereby, a conveyer for the gathered stalks, stripping means, and breaking-blades arranged in the path of movement of the stalks carried by the conveyer, said blades being disposed in crossed relation and adjustable upon the frame to operate upon different lengths of stalks.

11. In a cane-harvester, a supporting-frame having guides, a stationary deck or platform, gathering means carried by said platform, gears carried by the platform, a
5 bracket vertically adjustable with relation to the platform, shafts supported by the bracket and having a feathered engagement with the gears to rotate therewith and slide therethrough, cutters carried by said shafts,
10 and means for raising and lowering the bracket to vertically adjust the cutters.

12. In a cane-harvester, a supporting-frame, cutting and gathering mechanism carried thereby, means for conveying the gathered stalks and moving them in a plane parallel with the frame to one side thereof,
15 means for stripping the moving stalks, and means at the delivery side of the frame for turning the stalks to a position at right angles thereto, said means comprising front
20 and rear discharge devices, the former having a downwardly and inwardly curved portion, the latter being arranged to extend outwardly at a downward angle, both of said

discharge devices being extended at an angle 25 in a forward direction from the frame, to respectively operate upon the butts and stripped portions of the stalks.

13. In a cane-harvester, a supporting-frame carrying cutting and gathering mechanism, means for conveying the gathered stalks positioned longitudinally of the frame to one side thereof, operating means for the aforesaid parts, spiral discharge devices at the discharge-point, said devices being arranged one in rear of the other at an outward and forward inclination and the front discharge device having a downward and inward curvature, flexible shafts for driving said discharge devices, and means for driving 35 said shafts from the operating mechanism. 40

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

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