(No Model.) 4 Sheets—Sheet 1.

# C. H. LEE.

## SUGAR CANE HARVESTER.

No. 332,411. Patented Dec. 15, 1885.

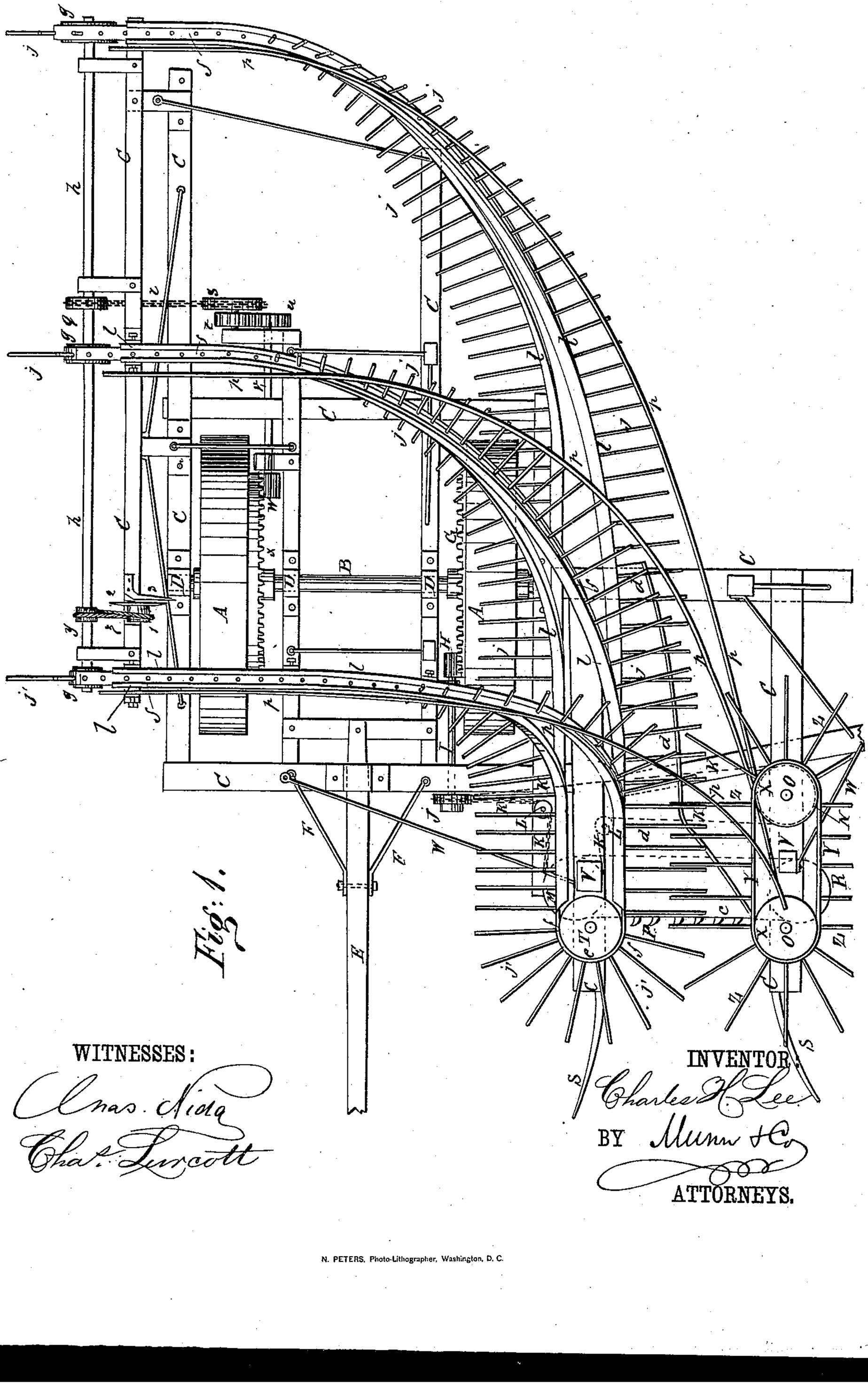

Fig: 1.

WITNESSES:

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Chas. Lescott

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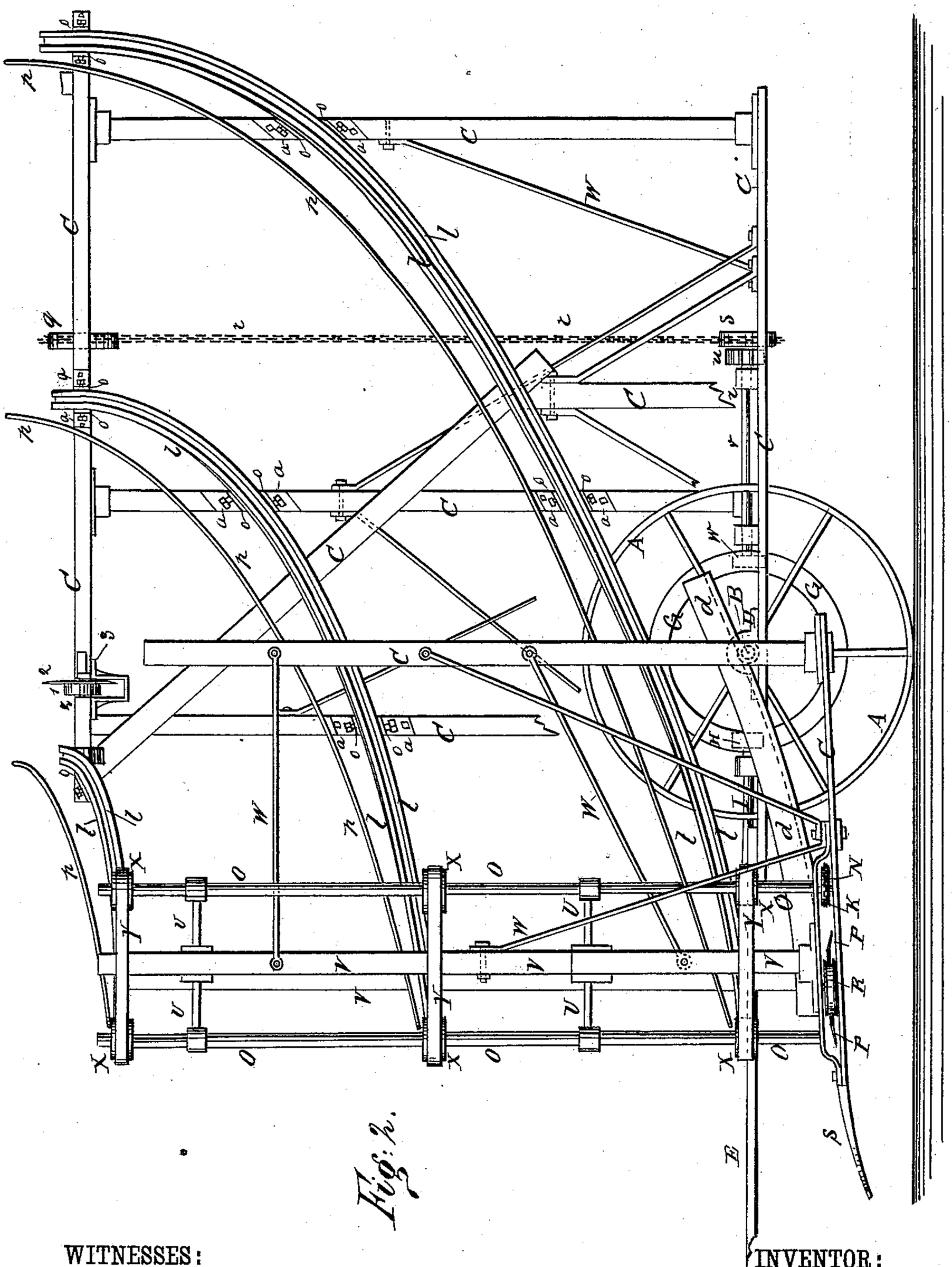

Fig: 2.

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(No Model.) 4 Sheets—Sheet 3.

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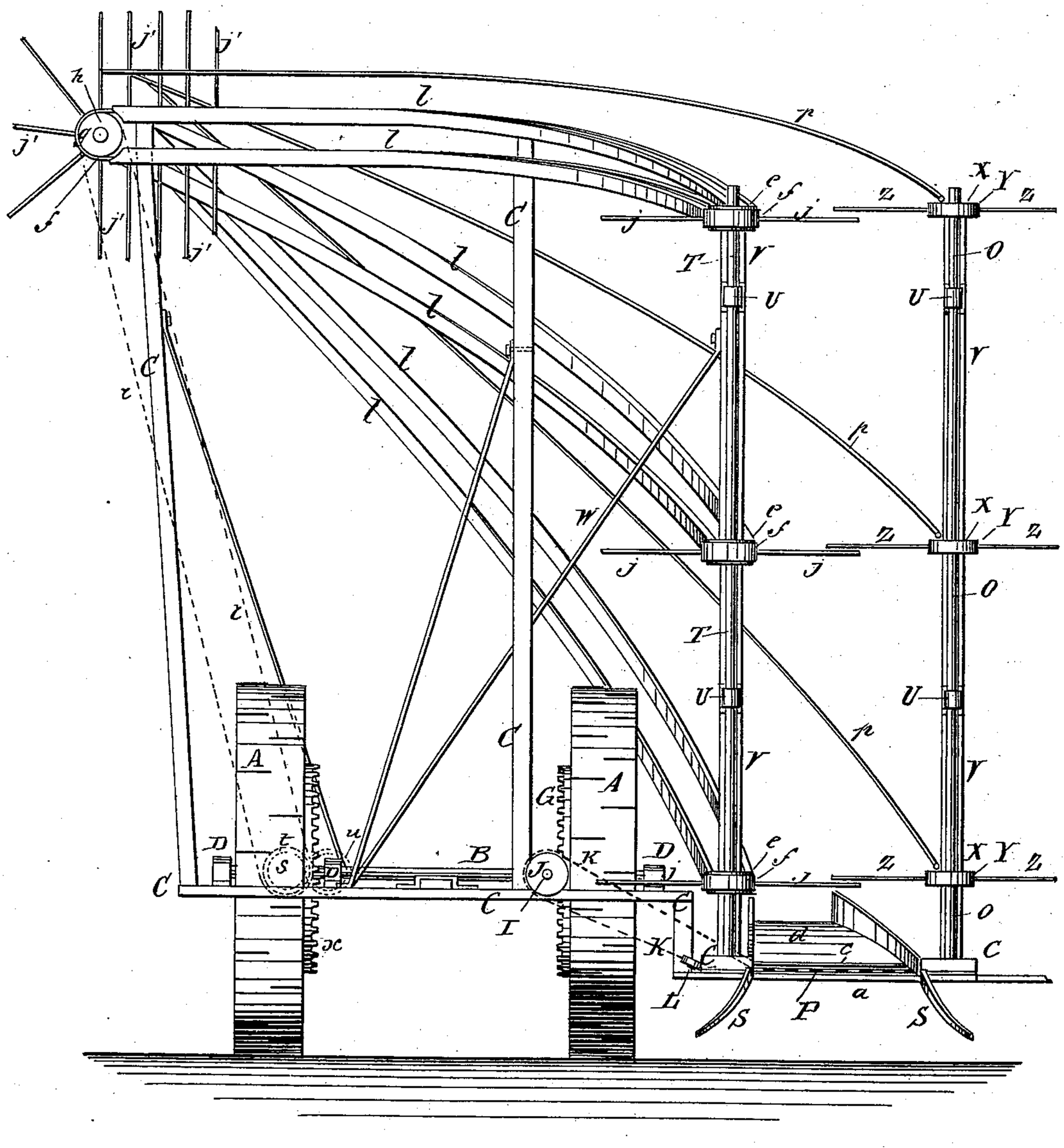
## SUGAR CANE HARVESTER.

No. 332,411. Patented Dec. 15, 1885.

*Fig: 3.*

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4 Sheets—Sheet 4.

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## SUGAR CANE HARVESTER.

No. 332,411. Patented Dec. 15, 1885.

Fig: 4

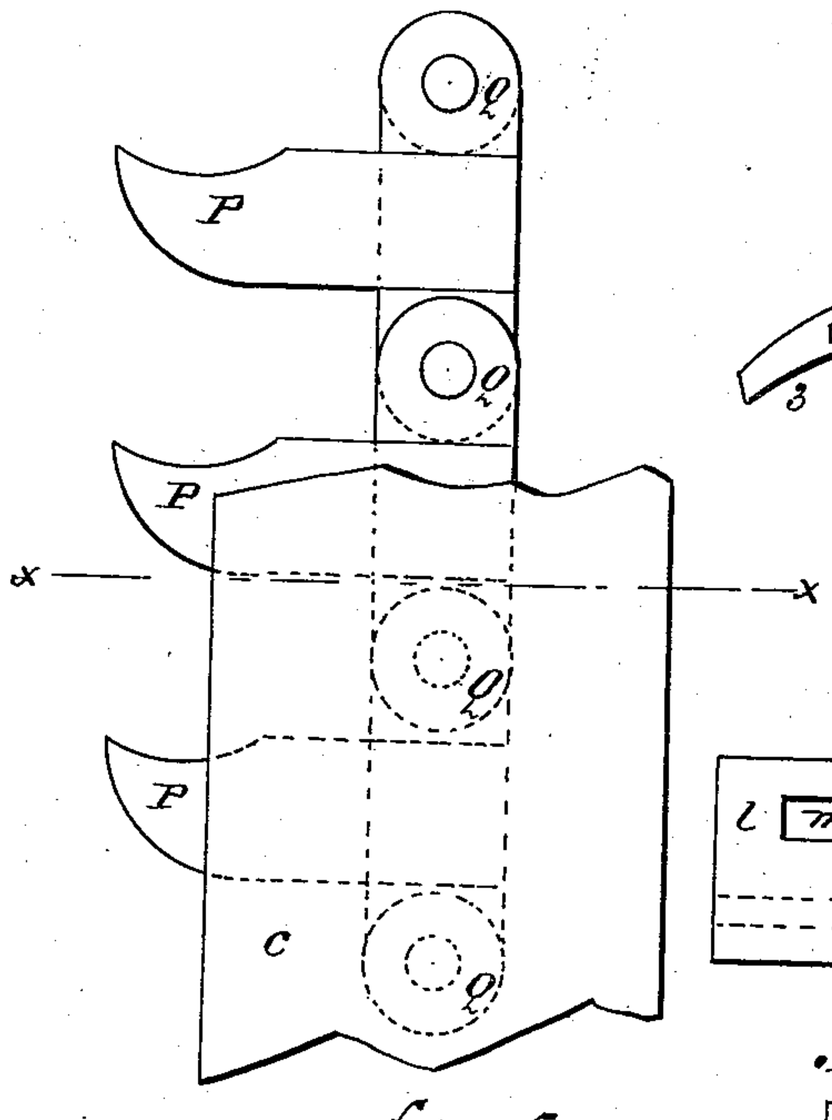



Fig: 5.

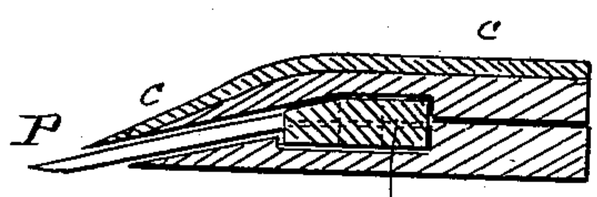



Fig: 6.

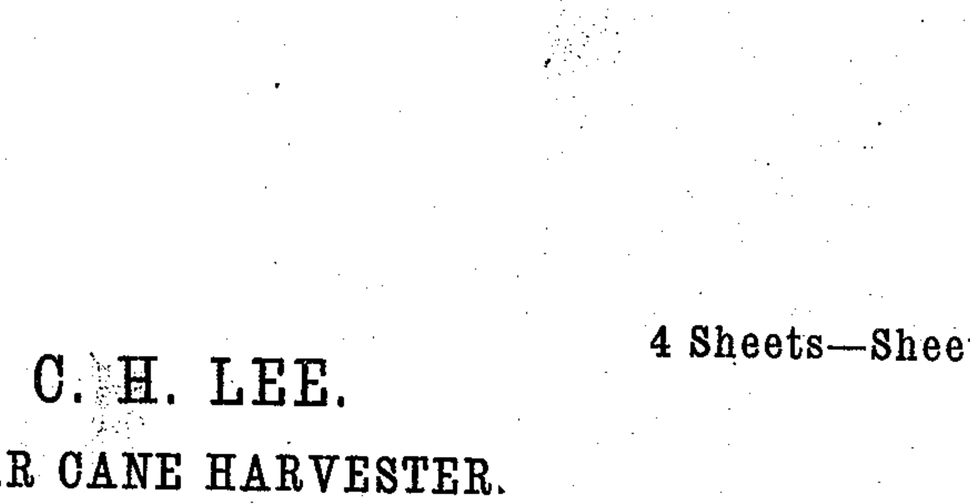


Fig: 10.

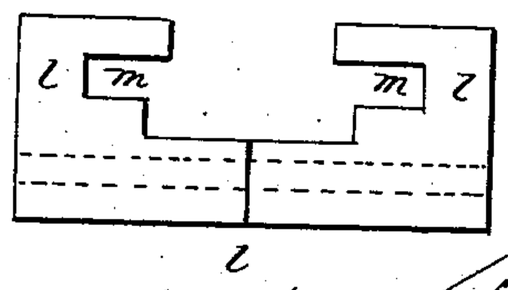



Fig: 15

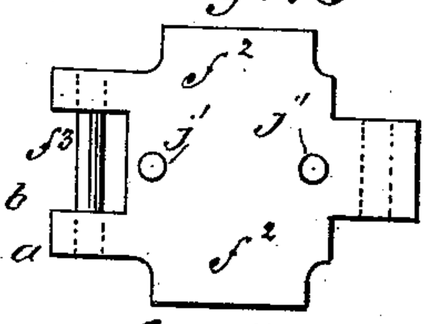



Fig: 11.

Fig: 7.

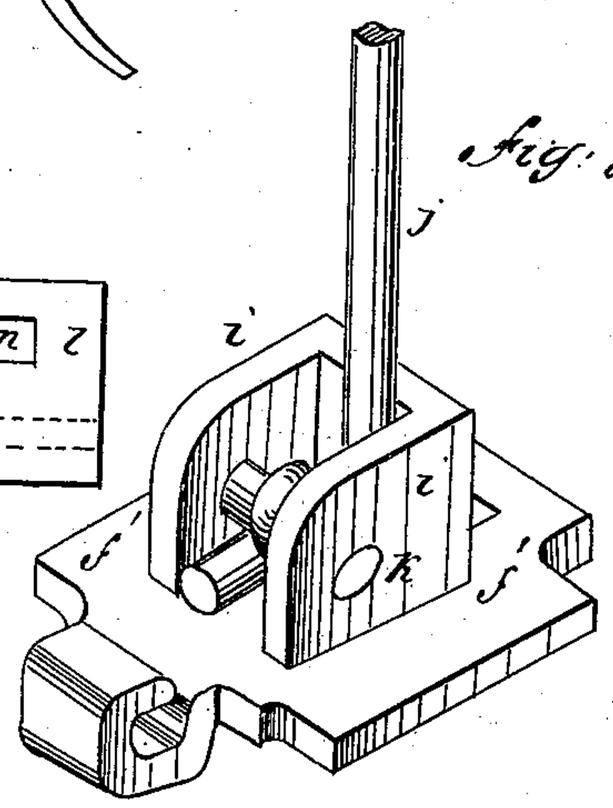



Fig: 12.

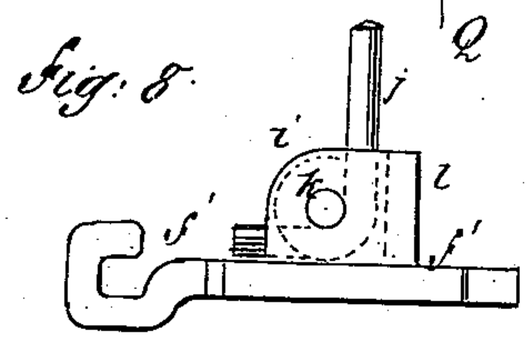



Fig: 8.

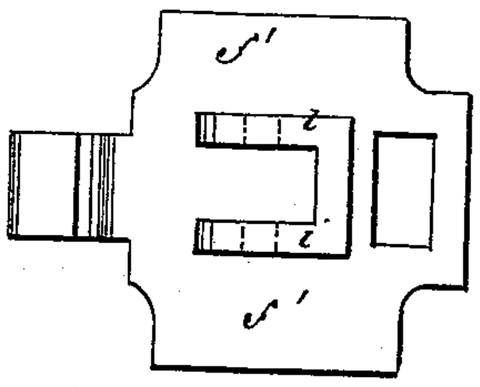
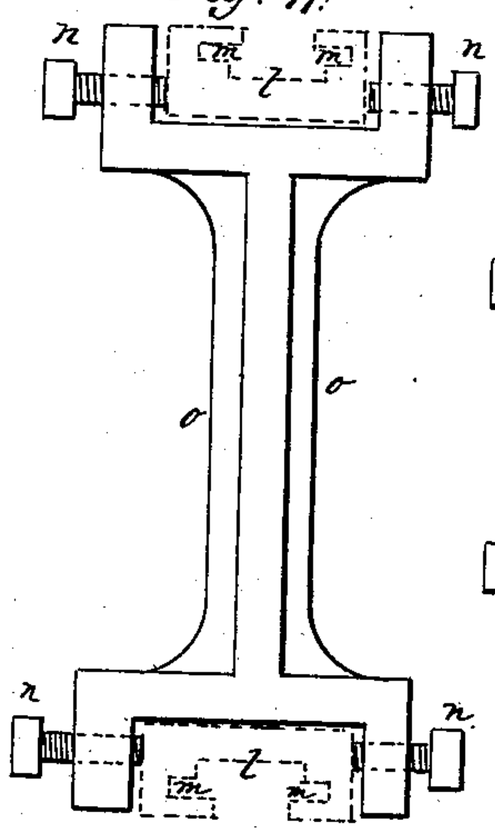



Fig: 9



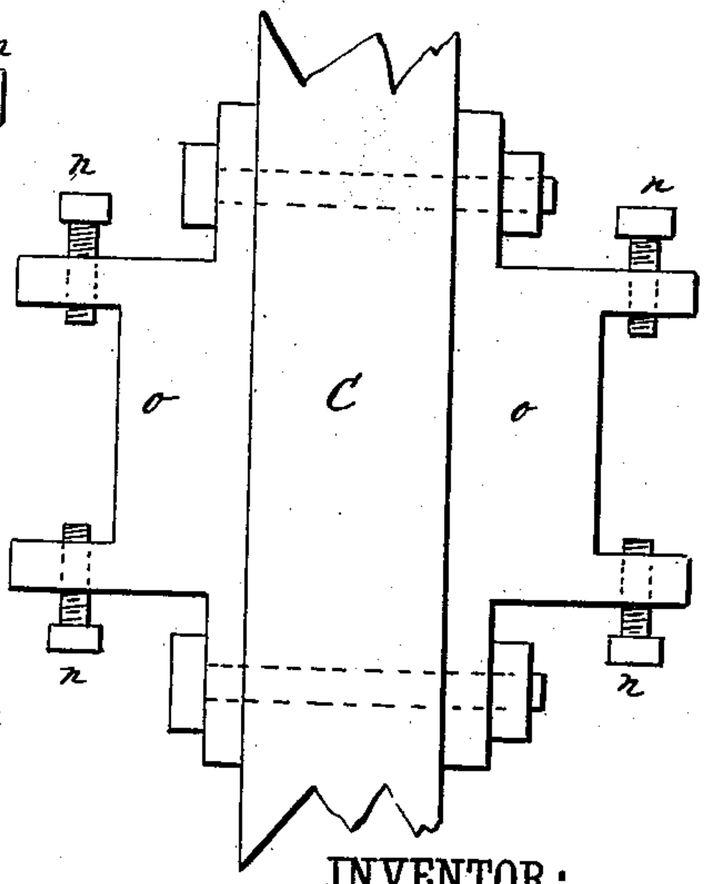




Fig: 13.

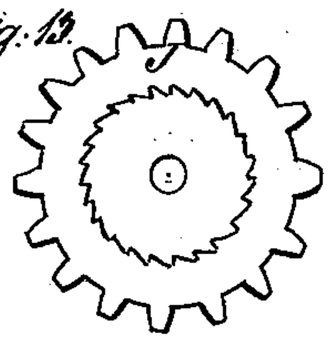
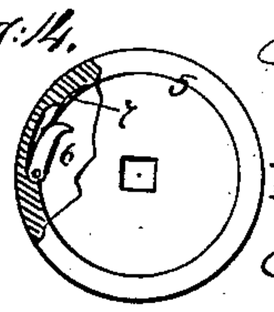


Fig: 14.




WITNESSES:

Chas. Nida.

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ATTORNEYS.

# UNITED STATES PATENT OFFICE.

CHARLES HENRY LEE, OF CENTRALIA, KANSAS.

## SUGAR-CANE HARVESTER.

SPECIFICATION forming part of Letters Patent No. 332,411, dated December 15, 1885.

Application filed September 19, 1884. Serial No. 143,475. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES HENRY LEE, of Centralia, in the county of Nemaha and State of Kansas, have invented certain new and useful Improvements in Sugar-Cane Harvesters, of which the following is a full, clear, and exact description.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1, Sheet 1, is a plan view of my improved machine. Fig. 2, Sheet 2, is a side elevation of the same, parts being omitted and parts being broken away. Fig. 3, Sheet 3, is a front elevation of the same, parts being omitted. Fig. 4, Sheet 4, is a plan view of a portion of the endless chain of knives, parts being broken away. Fig. 5, Sheet 4, is a sectional end elevation of the endless chain of knives, taken through the line *x x*, Fig. 4. Fig. 6, Sheet 4, is a side elevation of the mechanism for topping the stalks. Fig. 7, Sheet 4, is a perspective view of a link of the lower and middle endless elevator-chains. Fig. 8, Sheet 4, is a plan view of the same. Fig. 9, Sheet 4, is a plan view of the same, the arm being removed. Fig. 10, Sheet 4, is an end elevation of one of the supporting-guides for the endless-chain carriers. Fig. 11, Sheet 4, is an elevation of the mechanism for connecting the upper and lower parts of one of the endless-chain carriers. Fig. 12, Sheet 4, is an elevation of the mechanism for connecting the supporting-guides of the endless-chain carriers with the bars of the frame. Fig. 13, Sheet 4, is a side elevation of one of the gear-wheels and its ratchet-wheel. Fig. 14, Sheet 4, is a side elevation of a ratchet-wheel casing, part of the said casing being broken away to show the pawl. Fig. 15 is a plan view of a link of the upper elevator-chain.

The object of this invention is to provide sugar-cane harvesters constructed in such a manner as to cut and top sugar-cane and sorghum, and deposit the cane or stalks in wagons drawn at the side of the harvesters.

The invention consists in a sugar-cane harvester constructed with wheels and axle, and a frame provided with an endless chain of knives, two pairs of vertical shafts having chain-wheels, a horizontal shaft having chain-wheels, endless chains having arms carried by the said chain-wheels and moving in guides, and a driving mechanism, whereby the cane will be cut and the stalks raised, brought into a horizontal position, and discharged from the machine. The knives are provided with connecting links or lugs moving in guide-bars attached to the frame, and protected from wear by a steel facing-plate, whereby the said knives are held in place and protected from the stalks. The vertical shafts are held erect by arms having bearings at their outer ends, and attached to vertical posts of the frame. The links of the lower and middle endless chains of the elevator are provided with U-shaped flanges, to which projecting arms are secured by pins or bolts, whereby the said chains are adapted to carry the stalks. The links of the endless elevator-chains move in recessed guides which have grooves at the sides of their recesses to receive the edges of the said links and guide the said chains. The endless-chain guides are supported from the frame and held in place by forked brackets provided with set-screws. The tops are cut from the stalks by revolving knives working at the side of a stationary knife, and driven by a band and pulleys from the horizontal shaft, as will be hereinafter fully described.

A represents the drive-wheels, the axle B of which is connected with the frame C by bearings D.

To the forward part of the frame C is attached the tongue E, the connection being strengthened by braces F, attached to the said tongue and to the front cross-bar of the said frame.

To one of the drive-wheels A is attached a gear-wheel, G, the teeth of which mesh into the teeth of the small gear-wheel H, placed upon the rear end of the shaft I. The shaft I revolves in bearings attached to the frame C, and to its forward end is attached a chain-wheel or pulley, J, around which passes an endless chain or band, K. The endless chain or band K passes around guide-pulleys L, pivoted to the frame C, around the lower part of a double chain-wheel or a chain-wheel and pulley, M, pivoted to the frame C, and around the chain wheel or pulley N, attached to the lower end

of the rear vertical shaft, O, so that motion will be given to the said chain-wheel M and vertical shaft O from the drive-wheel A.

P are the knives or cutters, to the shanks of which are attached or upon them are formed lugs or links Q. The lugs or links Q of the adjacent knives P overlap, and are pivoted to each other, forming an endless chain of knives, which passes around the upper part of the double chain-wheel M, and around the chain-wheel R, pivoted to the frame C. The shanks of the knives P and the lugs or links Q slide in recesses in the adjacent sides of the bars *a b*, attached to the frame C, and by which the said knives and links are guided, and are supported against the pressure of the stalks, the forward parts of the said knives projecting, as shown in Figs. 4 and 5, to cut the stalks as the said knives are carried forward by the advance of the machine. The upper side of the upper bar, *b*, is faced with a steel plate, *c*, to prevent the said bar from being worn by the friction of the stalk-butts.

*d* is a flanged platform, which forms a continuation of the plate *c*, and serves to support the butts of the stalks until such time as the said stalks are raised to such a height that when they drop from the upper end of the said platform their tops will be caught by the arms of the upper elevator-chain, and the stalks will be suspended by the said arms with all their tops at the same height, so that only the tops of the stalks will be cut off by the knives hereinafter described.

To the frame C, in front of the inner sides of the chain-wheels M R are attached forward-projecting arms S, which are inclined downward and curved outward, as shown in Figs. 1, 2, and 3, to serve as guides to bring the stalks into position to enter the machine.

To the frame C, a little in front of the inner parts of the chain-wheels M R, are pivoted the lower ends of the vertical shaft T and the forward vertical shaft O. The lower end of the rear shaft, O, is also pivoted to the frame C. The vertical shafts O T revolve in bearings in the outer ends of arms U, secured at their inner ends to posts V, placed between the shafts O and at the inner side of the shaft T, and secured at their lower ends to the frame C, and strengthened in vertical positions by brace-rods W.

To the lower, middle, and upper parts of the vertical shafts O are attached chain-wheels X, around which pass endless chains Y.

To the endless chains Y are attached horizontally-projecting arms Z, which, as the shafts O are revolved by the endless chain K, assist in carrying the stalks inward.

To the lower, middle, and upper parts of the vertical shaft T are attached chain-wheels *e*, around which pass endless chains *f*. The endless chains *f* also pass around chain-wheels *g*, attached to the horizontal shaft *h*, which revolves in bearings attached to the upper rear part of the frame C. The links *f'* of the lower and middle endless chains, *f*, are made with a hook at one end and an eye at the other end, and with U-shaped flanges *i* upon their upper sides to form recesses to receive the bases of the arms *j*, which are secured in place by bolts or rivets *k* passing through holes in the side parts of the flanges *i* and in the said arms *j*. The links $f^2$ of the upper endless chain, *f*, are made with a lug at one end and a pair of lugs at the other end, which lugs are perforated to receive a pin, $f^3$, which passes through the pair of lugs of one link and the single lug of an adjacent link inserted between the lugs of the said pair, so as to form a hinged connection between the links. In the body of each link $f^2$ are formed holes to receive arms *j'*, so that the said arms *j'* will be sufficiently close together to support the stalks by their tops when they drop from the upper end of the inclined platform *d*. The links of the endless chains *f* slide in recesses in guide-bars *l*, which have grooves *m* formed in them to receive the side edges of the said links and keep the said links in place in the said recesses. The guide-bars *l* are secured by set-screws *n* in recesses in brackets *o*, which are attached to various parts of the frame C to support the said guide-bars and endless chains, and which must be made of various forms to adapt them to the different positions in which they are to be placed.

Fig. 11 shows a form of bracket for connecting the guide-bars of the two parts of the chains, and Fig. 12 shows a form of bracket for attachment to a post of the frame. The stalks while being carried up the elevator are held down upon the arms *j* of the endless chains *f* by guide-rods *p*, attached to the frame C, and supported in such positions as to be a little above the said endless chains.

To the shaft *h* is attached a chain-wheel, *q*, around which passes an endless chain, *r*. The endless chain *r* also passes around the chain-wheel *s*, journaled to the frame C, and with which is rigidly connected a gear-wheel, *t*. The teeth of the gear-wheel *t* mesh into the teeth of the gear-wheel *u*, attached to the end of the shaft *v*, which revolves in bearings attached to the frame C. To the inner end of the shaft *v* is attached a gear-wheel, *w*, the teeth of which mesh into the teeth of the large gear-wheel *x*, attached to or formed upon one of the drive-wheels A, so that the elevator will be driven from the said drive-wheel. With this construction, as the stalks are cut by the knives P they pass to the carriers in the manner hereinbefore described, are kept in place between the arms *j j'* of the endless chains *f* by the guide-rods *p*, and are carried up by the said endless chains, and dropped over the shaft *h*, the chain-wheels *g* being so graduated in size that the endless chains carrying the butts and middle parts of the said stalks will travel so much faster than the endless chain carrying the tops of the stalks that the said stalks when they reach the shaft *h* will be parallel therewith, and will thus be discharged squarely from the elevator.

To the shaft *h* is attached a pulley or chain wheel, *y*, around which passes an endless band or chain, *z*. The band or chain *z* is crossed and passes around a pulley or chain wheel, 1, journaled to a support attached to a top cross-bar of the frame C.

To the pulley or chain wheel 1 are attached curved knives 2, which, as the said pulley or chain wheel revolves, successively pass the stationary knife 3, attached to the cross-bar of the frame C or the support of the pulley or chain wheel 1, so that the tops of the stalks will be cut off by the knives 2 3 as the said stalks are approaching the shaft *h*. The chain-wheel J and gear-wheel *u* are placed loosely upon their shafts, and with them are rigidly connected ratchet-wheels 4. With the said shafts are rigidly connected flanged disks or casings 5, which inclose the ratchet-wheels 4, and in recesses in the inner sides of the rims of which are pivoted pawls 6. The pawls 6 are held down upon the teeth of the ratchet-wheels 4 by springs 7, attached to the rims of the said casings. With this construction the drive-wheels A can be turned back without giving a rearward motion to the mechanism of the machine.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a sugar-cane harvester, the combination, with the wheels A and axle B and the frame C, of the endless chain of knives P Q, the vertical shafts O O T, having chain-wheels X *e*, the horizontal shaft *h*, having chain-wheels *g*, the endless chains Y *f*, having arms Z *j j'*, the guides *l*, and a driving mechanism, substantially as herein shown and described, whereby the cane is cut and the stalks raised, brought into a horizontal position, and discharged from the machine, as set forth.

2. In a sugar-cane harvester, the combination, with the vertical shafts O O T and the vertical posts V, of the arms U, having bearings at their outer ends, substantially as herein shown and described, whereby the said shafts are held in position, as set forth.

3. In a sugar-cane harvester, the combination, with the links of the endless chains *f*, having U-flanges *i*, of the arms *j* and the pins or bolts *k*, the lower portions of said arms being looped around said pins and having their extreme lower ends resting upon the chain-links, substantially as herein shown and described, whereby the said chains are adapted to carry the stalks, as set forth.

4. In a sugar-cane harvester, the combination, with the endless-chain guides *l* and the frame C, of the forked bracket *o*, having set-screws *n*, substantially as herein shown and described, whereby the said guides are supported and held in place, as set forth.

5. In a sugar-cane harvester, the combination, with the horizontal shaft *h* and the frame C, of the stationary knife 3, the revolving knives 2, and the band and pulleys 3 *z* 1, substantially as herein shown and described, whereby the tops are cut from the stalks as the said stalks are coming into position to be discharged from the machine, as set forth.

6. In a sugar-cane harvester, the combination, with the shafts O O T and *h* and the endless belts *f*, of the guides *l*, substantially as shown and described, whereby the said belts will be guided as they pass from the vertical shafts to the horizontal shaft, as set forth.

7. In a sugar-cane harvester, the combination, with a cutter, of an elevator consisting of endless chains carrying arms and of supporting-shafts, the said elevator being inclined transversely from a vertical to a horizontal position, and having its lower chains speeded faster than its upper chains, substantially as shown and described, whereby the cut cane will be turned from a vertical to a horizontal position before being discharged from the elevator, as set forth.

CHARLES HENRY LEE.

Witnesses:
CHAS. H. BONJOUR,
WILLIAM ALBERT ROOT.