

No. 781,511.

PATENTED JAN. 31, 1905.

H. FROELICH.
CANE CARRIER FOR SUGAR MILLS.
APPLICATION FILED AUG. 22, 1903.

3 SHEETS—SHEET 1

Fig. 1.

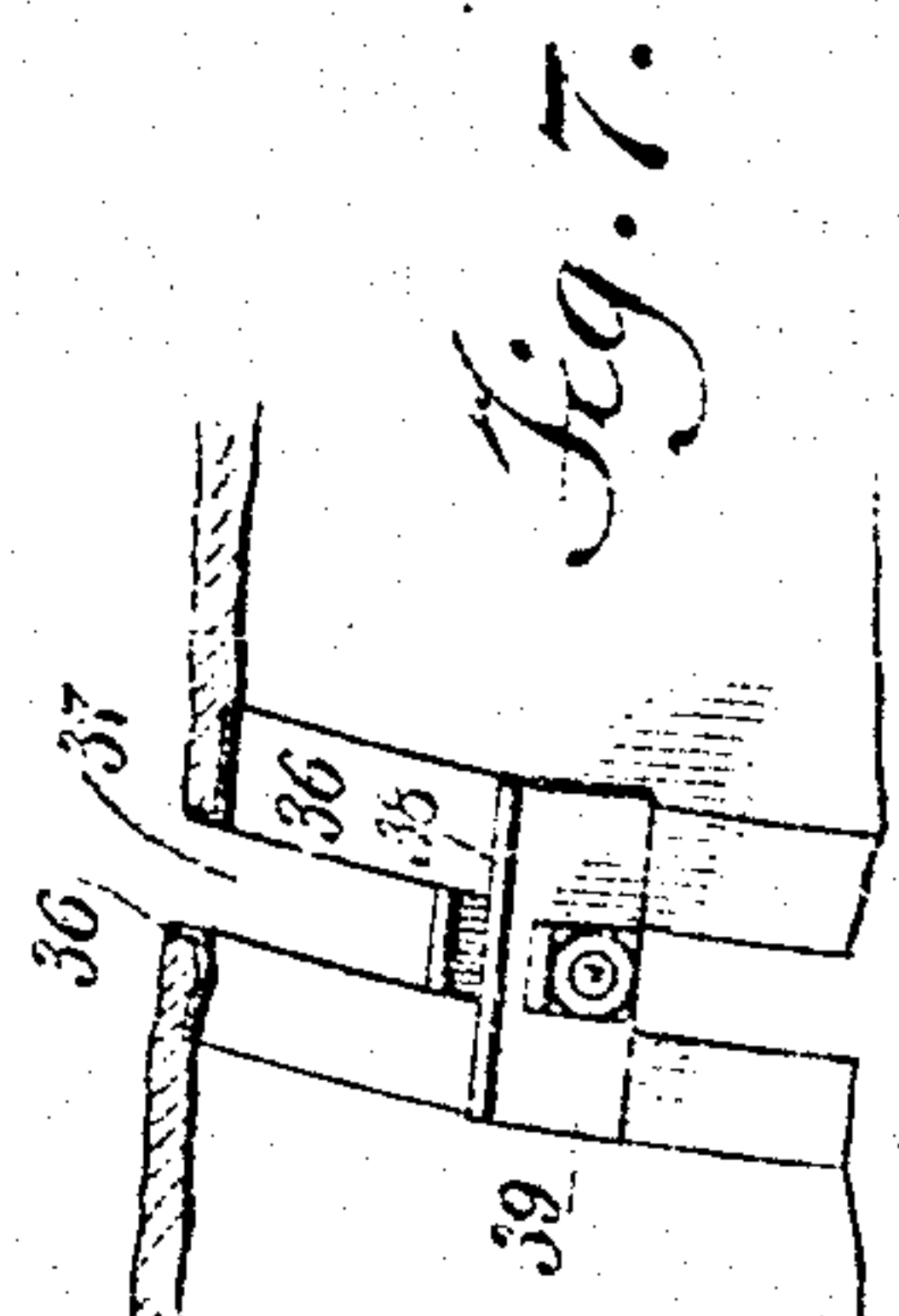
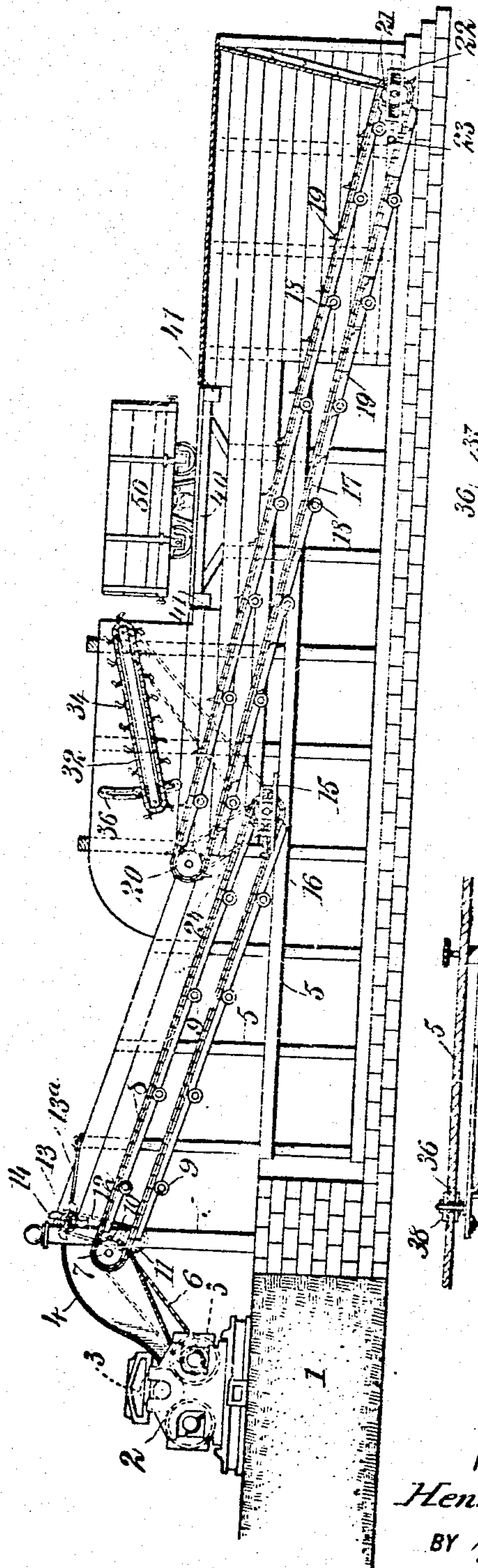


Fig. 7.

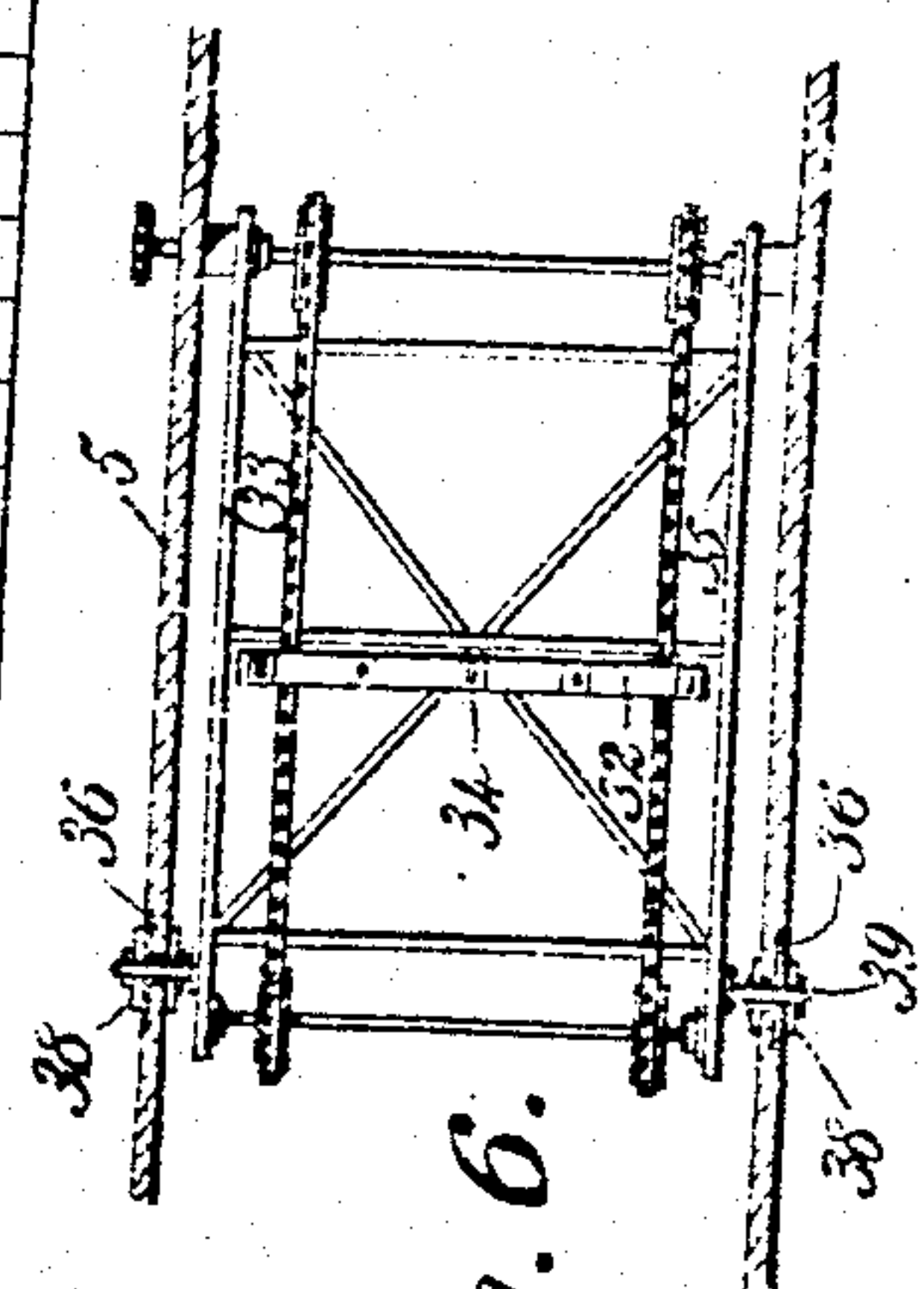


Fig. 6.

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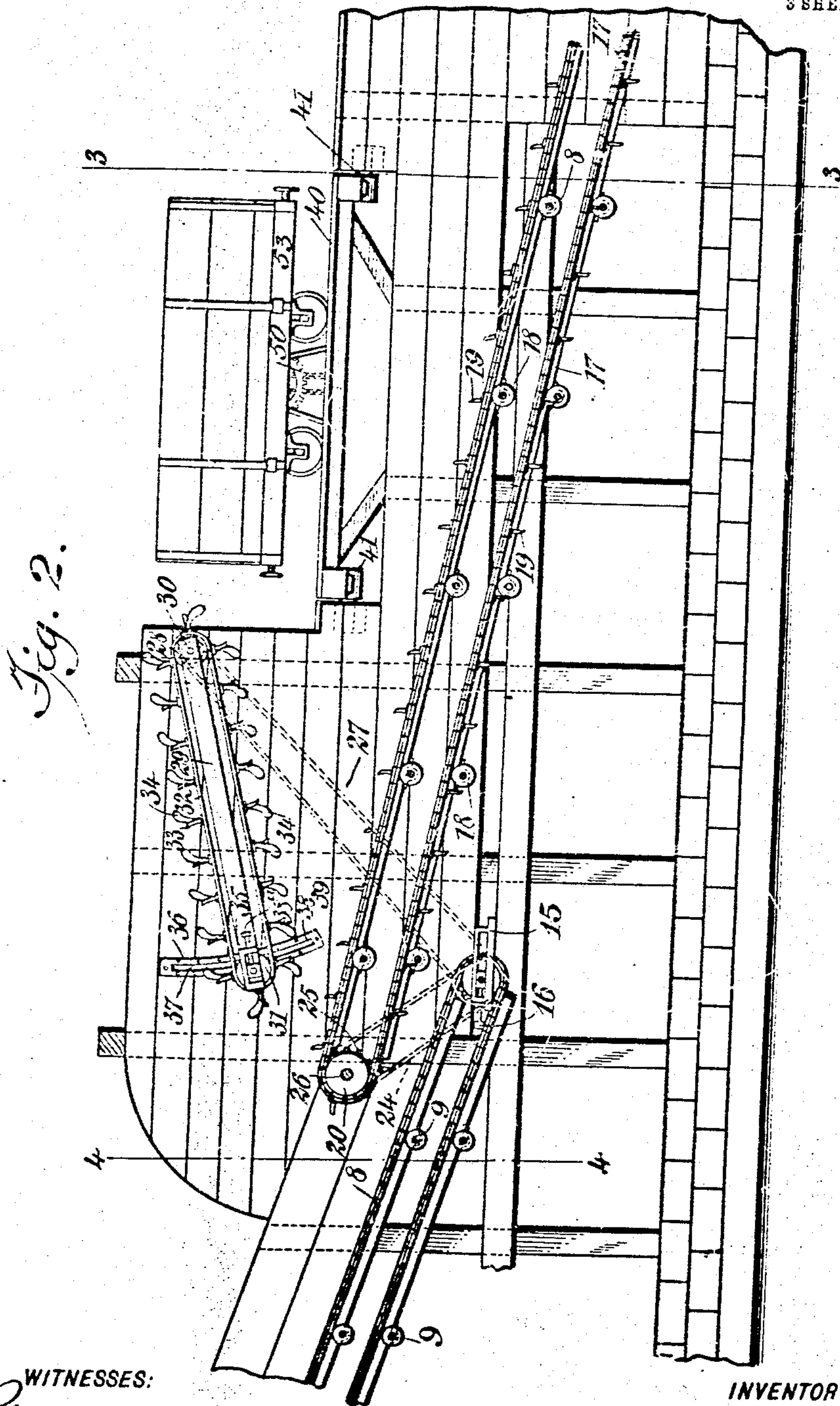
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3 SHEETS--SHEET 2.



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W. Harrison

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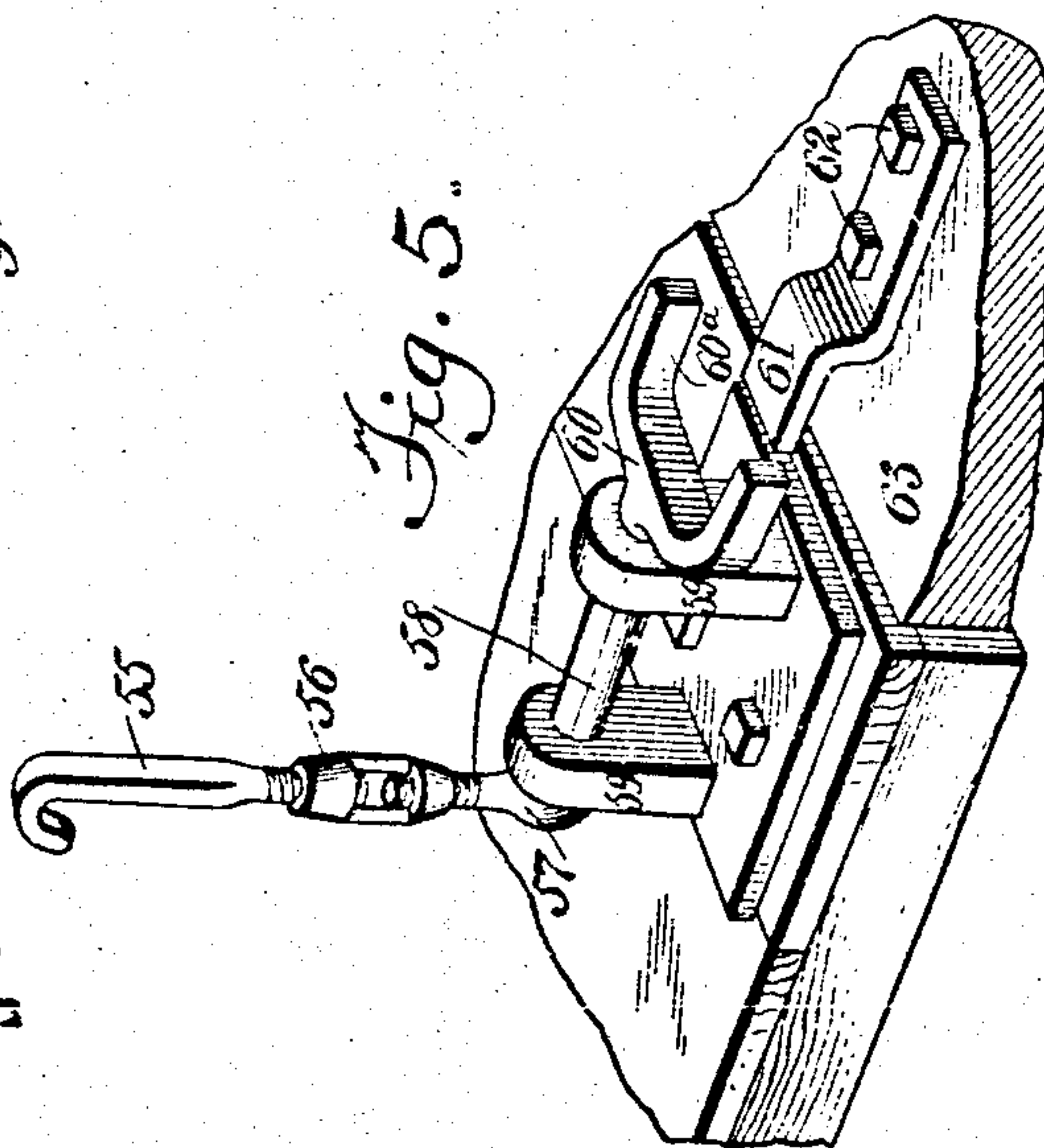
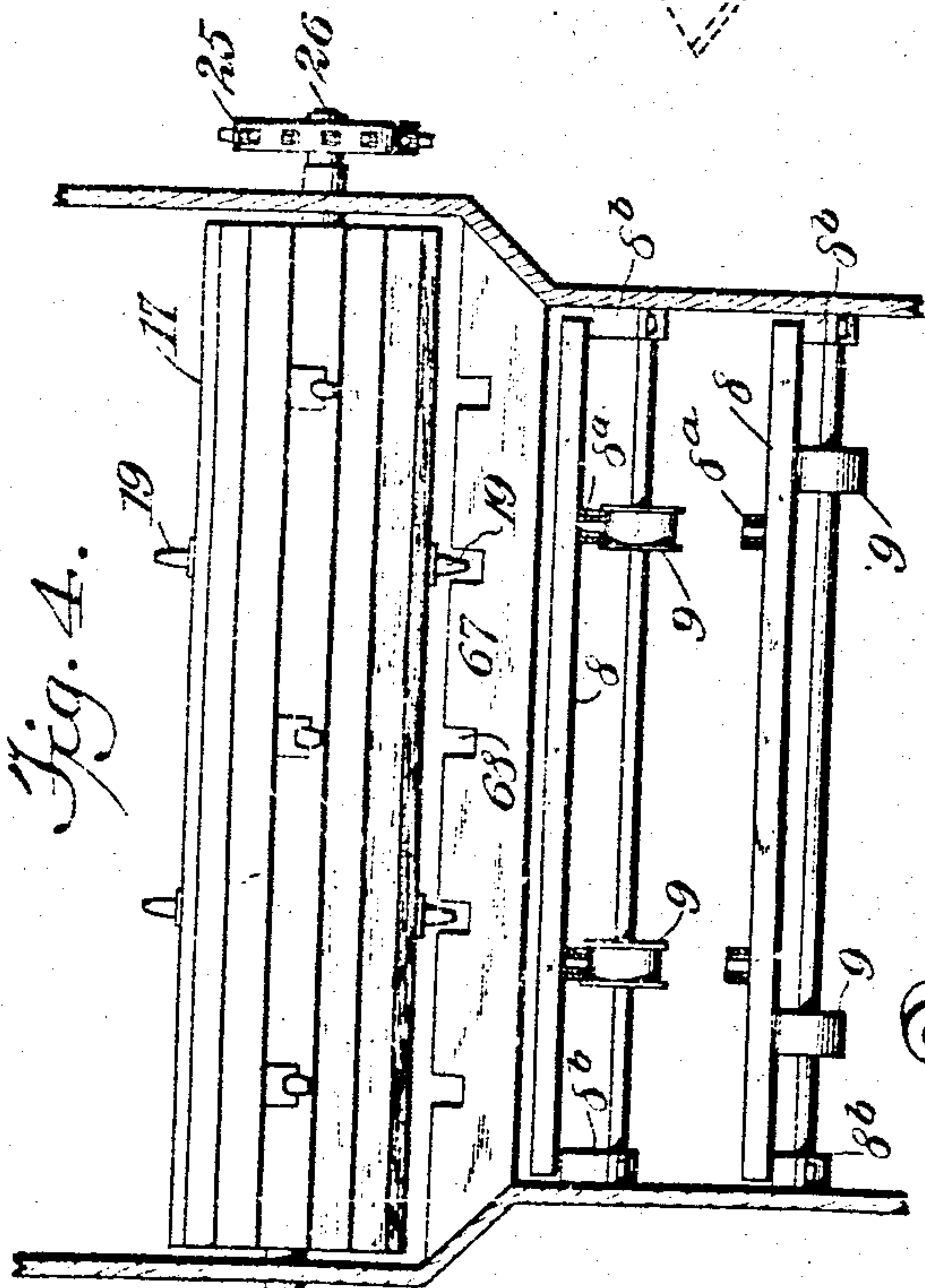
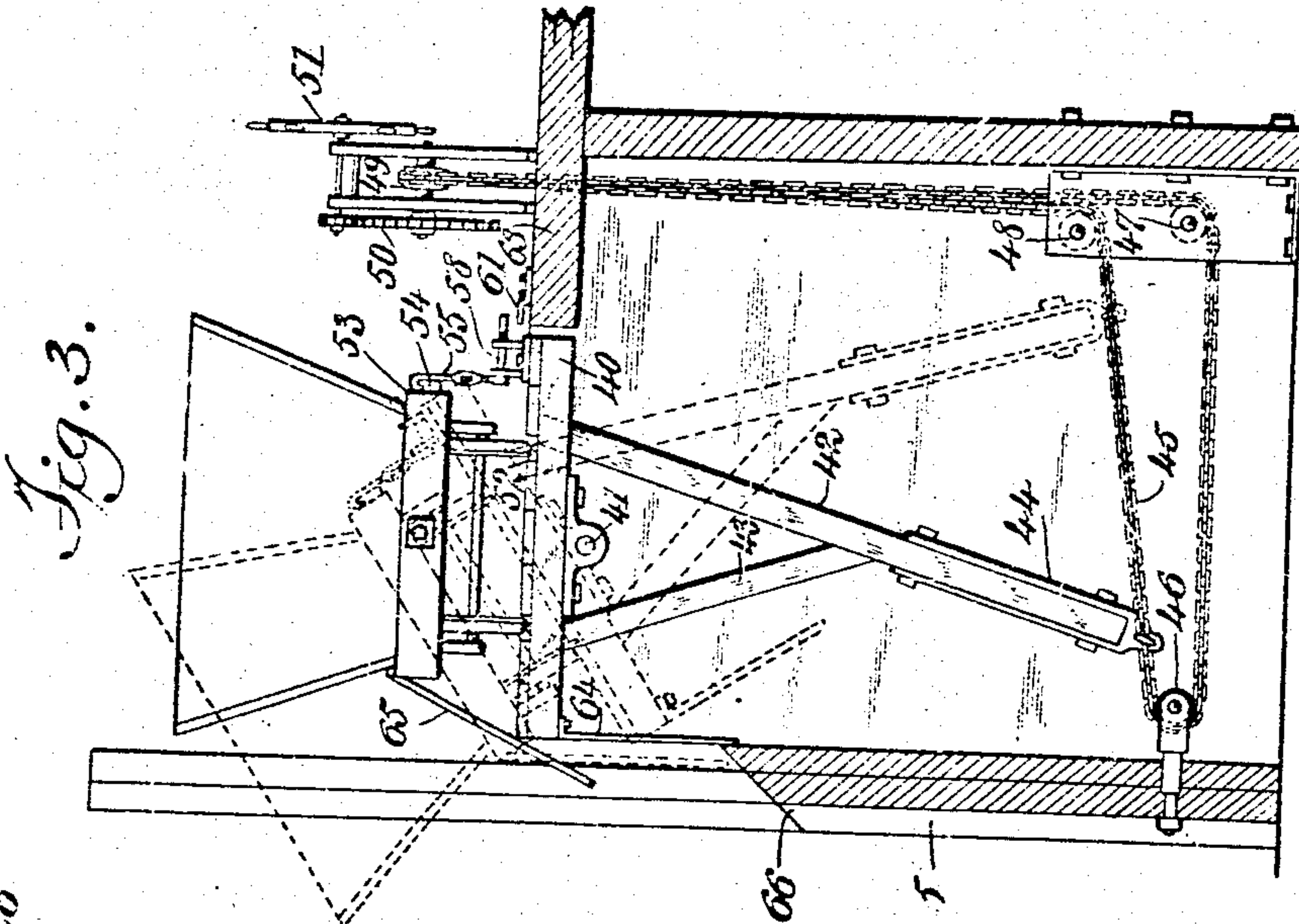
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

HENRY FROEHLICH, OF LIHUE, TERRITORY OF HAWAII.

CANE-CARRIER FOR SUGAR-MILLS.

SPECIFICATION forming part of Letters Patent No. 781,511, dated January 31, 1905.

Application filed August 22, 1903. Serial No. 170,435.

To all whom it may concern:

Be it known that I, HENRY FROEHLICH, a citizen of the United States, and a resident of Lihue, in the Island of Kauai and Territory of Hawaii, have invented a new and Improved Cane-Carrier for Sugar-Mills, of which the following is a full, clear, and exact description.

My invention relates to cane-carriers for sugar-mills, my more particular object being to cause a uniform and even feed of cane to the crusher, thereby dispensing to a great extent with the necessity of manipulating the cane by hand.

My invention further relates to certain details of mechanism whereby the deposit of the cane upon the carriers is effected uniformly and automatically and whereby the distribution of the cane after reaching the carriers and before reaching the crushers is rendered as uniform as possible.

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

Figure 1 is a side elevation showing my invention as applied to a sugar-mill. Fig. 2 is a fragmentary side elevation somewhat enlarged, but otherwise similar to the view shown in Fig. 1. Fig. 3 is a partial vertical cross-section upon the line 3 3 of Fig. 2. Fig. 4 is a vertical cross-section upon the line 4 4 of Fig. 2. Fig. 5 is a fragmentary perspective view showing my improved mechanism for maintaining the cane-car upon its track while being dumped. Fig. 6 is a fragmentary plan of the belt 32 and its connections, and Fig. 7 is a fragmentary perspective view of the adjustable limiting-stop for the belt 32.

Upon a suitable foundation 1 a crusher 2 is mounted in the usual manner, and this crusher is provided with rolls 3. A chute 4 is provided for feeding the cane downwardly and into the crusher. The outer end of the chute 4, together with the many working parts, is mounted upon the framework 5. The crusher is driven in any approved manner, and this part of the mechanism being old needs no description. By means of a sprocket-chain 6 power is conveyed from the crusher to the rollers 7, which drive the endless traveling

apron 8. This apron is provided with bearers 8^a, which rest upon the rolls 9, thereby relieving friction to as great an extent as possible. Connected with a toothed wheel 10 and driven thereby is a gearing 11, from which is driven a sprocket-chain 12, this sprocket-chain causing the rotation of a shaft 13, provided with knives 14. The arrangement of the gearing is such that the knives 14 have a higher speed in the same direction than the upper portion of the endless carrier 8. A take-up 15, provided with a screw 16, serves to tighten or loosen the driven belt or carrier 8. A second endless belt or carrier 17 is so mounted as to be free to travel upon the rollers 18 and is provided with fingers 19, preferably of the shape indicated. This belt or carrier is mounted upon the cylinders 20 21, the latter cylinder being connected with a take-up 22, provided with an adjusting-screw 23. The carrier 17 is propelled by means of a sprocket-chain 24, which engages a sprocket-wheel 25 upon the shaft 26. By means of a sprocket-chain 27 motion is communicated to the revoluble cylinder 28. Connected with the shaft 30 of this cylinder, which forms a pivotal support, is a frame comprising bars 29, and upon the outer or free end of this frame is a revoluble cylinder 31. An endless belt or carrier 32 extends from the revoluble cylinder 28 to the revoluble cylinder 31. Mounted upon this belt 32 are fingers 33 and knives 34. A take-up 35, provided with an adjusting-screw 38^a, is used for the purpose of adjusting the tension of the belt 32. An arc-shaped guide 36 is provided with a slot 37, and slidably mounted upon this guide is a limiting-stop 38, provided with a thumb-nut 39, whereby the limiting-stop may be placed in any desired position relatively to the slot 37—that is to say, the limiting-stop may be moved upward within the slot 37 by merely loosening the thumb-nut 39, pushing the limiting-stop 38 upward to the point desired, and tightening the thumb-nut 39. By this means the bars 29 may be given any desired degree of inclination.

A platform 40 is mounted upon trunnions 41 and is provided with a lever 42 and a brace 43, as shown more particularly in Fig. 3. Upon the lower end of the lever 42 is an iron

hood 44, which is engaged by a chain 45. This chain passes over pulleys 46 47 48 and chain-wheel 49 and is thereby connected with a gearing 50, controllable by a hand-wheel 51.

5 It will be seen from Fig. 3 that by turning the hand-wheel 51 to the right or to the left the lever 42 may at will be drawn from its position shown in full lines to that shown in dotted lines. The platform 40 is provided with
10 rails 52, upon which the cane-car 53 is supported. Mounted upon the side of the car 53 is a cleat 54. This cleat is detachably engaged by a hook 55, provided with a turnbuckle 56 and revoluble head 57, mounted upon the shaft
15 58, which rests in bearings 59. The shaft 58 is provided with a fork 60, which may be turned within certain limits by lowering the hook 55 to a substantially horizontal position. A hasp 61 is secured fixedly in position by
20 means of bolts 62. When the operator desires to dump cane from the car 53, he raises the hook into the position indicated in Figs. 3 and 5, thereby causing the hook to engage the cleat 54. By manipulating the hand-wheel as above
25 described the car may be dumped, as indicated by dotted lines in Fig. 3. The hook 55 by binding firmly upon the cleat 54 prevents the car from leaving the rail. The car being dumped and restored to the position indicated
30 in full lines in Fig. 3, the hook 55 is detached from the cleat and is lowered to a horizontal position, thereby causing the fork 60 to assume a vertical position, one of the forks, 60^a, being thereby carried directly beneath the
35 hasp 61 and preventing the platform 40 from being tilted at an inopportune moment so as to dump the car. The hasp 61 is mounted upon a stationary flooring 63. A fender 64 depends from the platform, and a bevel 66 is provided
40 for the purpose of facilitating the sliding of the cane downward upon the carrier 17. The door of the car is shown at 65 and also constitutes an inclined surface over which the cane may travel freely. If desired, however, the
45 car 53 need not be used for dumping the cane, which step may be performed by hand or by an unloading-machine.

It will be seen from Fig. 4 that the traveling apron 17 is somewhat broader than the
50 traveling apron 8. By this means the distribution of the cane is rendered somewhat more effective, because as the cane passes from the upper apron to the lower one the tendency is to make the layer of the cane slightly deeper
55 upon the lower traveling apron. It will be also noted that the guard 67, which is provided with mutilations 68, serves as a fender for preventing the cane from being drawn out beneath the endless apron 17. A somewhat
60 similar guard is shown at 13^a. The purpose of this guard is to prevent cane from passing over the cutters 14. By its use cane is fed beneath the cutter. In all cases the cutters have a higher speed than the speed of the
65 traveling cane.

The operation of my device is as follows: After the cane is dumped by hand or by an unloading-machine it is merely thrown evenly upon the carrier 17. If, however, it is de-
70 sired to dump the cane by the mechanism described, the car 53 is moved out upon the rails 52, the hook 55 is placed upon the cleat 54, and the hand-wheel 51 is manipulated for the purpose of dumping the cane upon the carrier 17. This manipulation dispenses with all the
75 laborers heretofore used on the carrier and unloading-machines. Of course some care must be exercised in manipulating the hand-wheel 51, so that the cane is dumped with considerable uniformity. The fingers 19, together
80 with the motion of the carrier 17, tends to distribute the cane still more equally. The cane is now carried up the incline represented by the upper surface of the carrier 17, and any excess of cane resting upon the carrier is vig-
85 orously manipulated by the fingers 33 upon the belt 32 and also by the knives 34 upon this belt. The fingers 33 and knives 34 have a motion contrary to that of the belt 17 and also have greater rapidity. Should a large mass
90 of cane chance to lodge upon any given portion of the carrier 17, the mass upon reaching the outer or free end of the belt 32 and being operated upon by the fingers and knives 33
95 34 is thrown backward, and thus partially scattered down the inclined surface of the carrier 17. Normally this is all that occurs in case of a large pile of cane coming up at the
100 same time to the fingers and knives. Occasionally it may happen, however, when such a gorge of cane occurs that the fingers and knives are unable to scatter the accumulation, and in this event the mass of cane causes the
105 roller 31 to be lifted bodily, thereby preventing breakage of the knives and fingers and allowing the excess of cane to pass. The cane passes from the upper or left-hand end of the carrier 17 to the lower end of the carrier-belt 8,
110 from which it is conveyed upward to the chute 4. Just before passing into the chute, however, the cane is subjected to a second manipulation by the revoluble knives 14, which travel in the same direction to that of the cane and
115 render the distribution of the cane still more effective. It will be understood, of course, that all of the knives used have a sufficient speed to cut projecting stalks of cane and that independently of their cutting function they serve as distributors. The cane next passes
120 into the chute 4, entering at the larger upper end thereof, and is thus delivered to the crusher.

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

1. The combination of a traveling endless
125 apron, a frame mounted adjacent thereto and free to swing, a belt movable relatively to said frame, knives mounted upon said belt, and means for actuating said belt.

2. In a cane-carrier for sugar-mills, the com-
130

5 combination of a member for conveying cane from one point to another, a frame mounted there-
over and free to swing relatively thereto, revo-
luble members mounted upon said frame,
means for actuating said revoluble members,
a belt mounted upon said revoluble members
and driven thereby, and knives mounted upon
said belt and provided with edges directed
against the flow of the cane.

10 3. In a cane-carrier for sugar-mills, the com-
bination of an endless traveling apron, means
for actuating the same, mechanism mounted
adjacent to said endless traveling apron and
provided with knives having edges disposed
15 in a direction opposite the general direction
of travel of said apron for the purpose of mu-
tilating cane resting thereupon, and means for
automatically allowing said mechanism to
move relatively to said apron under the pres-
20 sure of an excess of said cane.

4. In a cane-carrier for sugar-mills, the com-
bination of a member for conveying cane from
one point to another, mechanism provided with
active members for mutilating said cane, said
25 mechanism being free to swing, means for ac-
tuating said mechanism so that said members
travel in a direction contrary to that of said
cane, and a limiting-stop controllable at will
for governing the amount of swing of said
30 mechanism.

5. In a cane-carrier for sugar-mills, the com-
bination of an endless traveling apron, a belt
mounted thereover, cutting-knives mounted
upon said belt for the purpose of mutilating
35 the cane resting thereupon and also for ex-
erting a raking action upon the cane, said
knives being provided with edges directed
contrary to the general direction of travel of

said cane, fingers mounted upon said belt in-
termediate of said cutting-knives and also 40
adapted to exert a raking action upon the
cane, and means for actuating said endless
traveling apron and said belt.

6. In a cane-carrier for sugar-mills, the com-
bination of an endless traveling apron, a belt 45
mounted thereover, cutting-knives mounted
upon said belt for the purpose of mutilating
the cane resting thereupon and also of exert-
ing a raking action upon the cane, said knives
being provided with edges directed contrary 50
to the general direction of travel of said cane,
and means for actuating said endless travel-
ing apron and said belt.

7. In a cane-carrier for sugar-mills, the com-
bination of mechanism for conveying the cane 55
from one point to another, a table disposed
adjacent to said mechanism and free to tilt
relatively thereto, a vehicle mounted upon
said table and free to receive and discharge
cane relatively to said mechanism for convey- 60
ing the same, means controllable at will for
causing said table to tilt, a shaft journaled
upon said table, a hook connected with said
shaft and adapted to engage said vehicle for
holding the same upon said table, while said 65
table is tilted, a fork connected with said shaft
and free to turn therewith, and a stationary
fastening for engaging said fork and tempo-
rarily preventing said table from tilting.

In testimony whereof I have signed my name 70
to this specification in the presence of two sub-
scribing witnesses.

HENRY FROELICH.

Witnesses:

H. D. WISHARD,
ERNST CROPP.