

(No Model.)

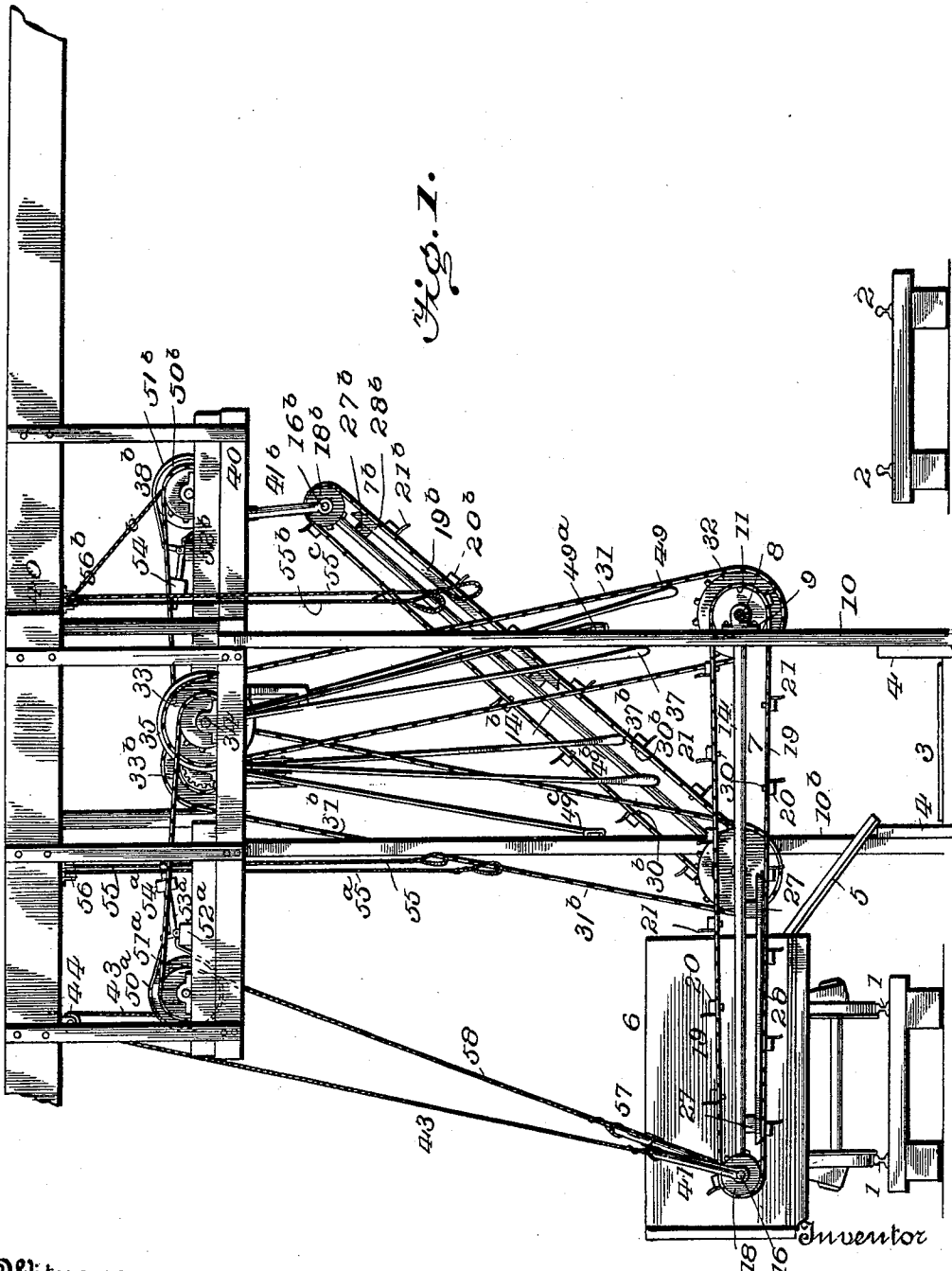
3 Sheets—Sheet 1.

J. MALLON.

AUTOMATIC MECHANISM FOR UNLOADING AND FEEDING SUGAR CANE.

No. 583,408.

Patented May 25, 1897.



Witnesses

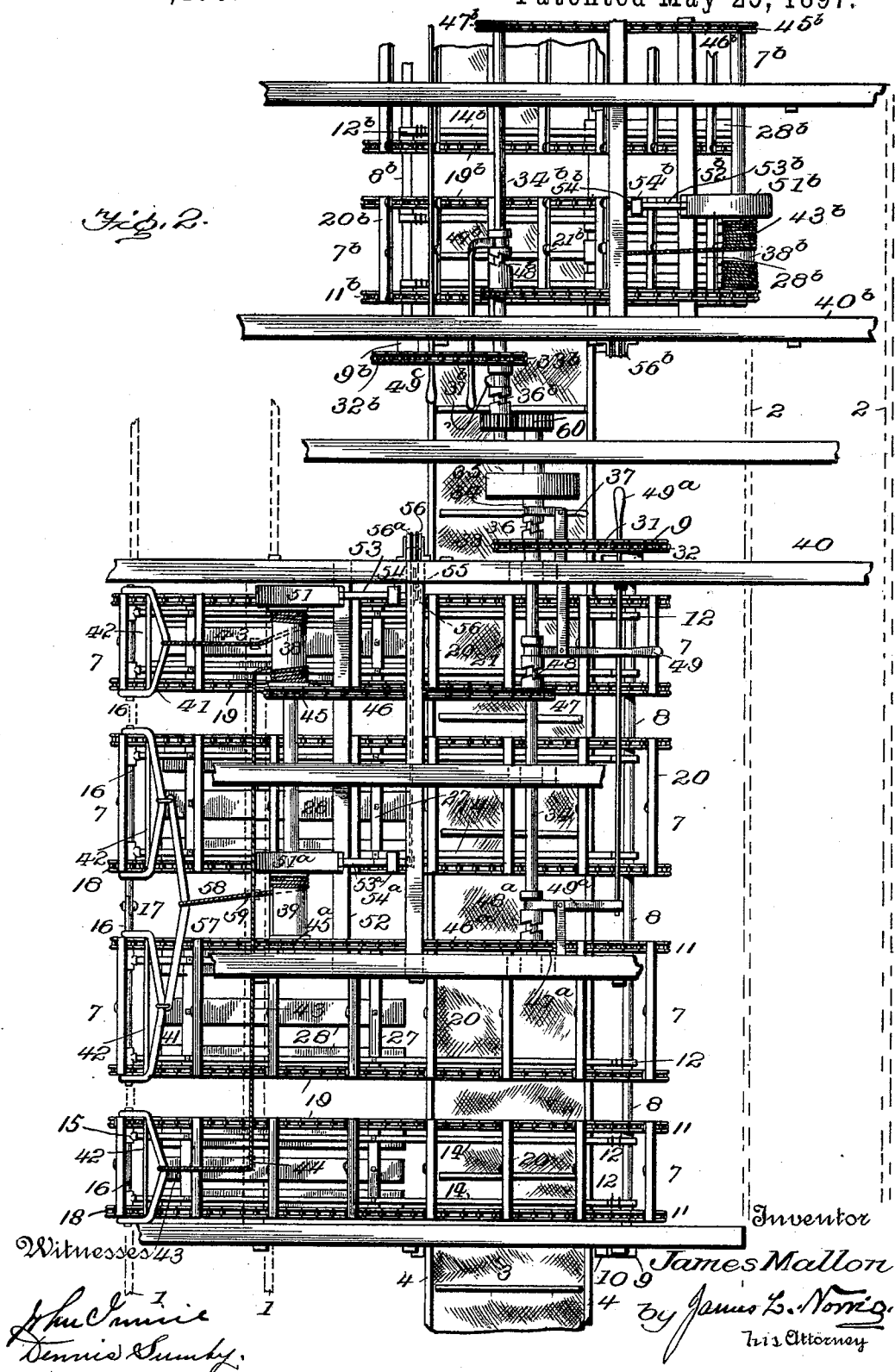
John Christie
Dennis Lundy.

James Mallon
by James B. Norris
His Attorney

8 Sheets—Sheet 2.

AUTOMATIC MECHANISM FOR UNLOADING AND FEEDING SUGAR CANE.

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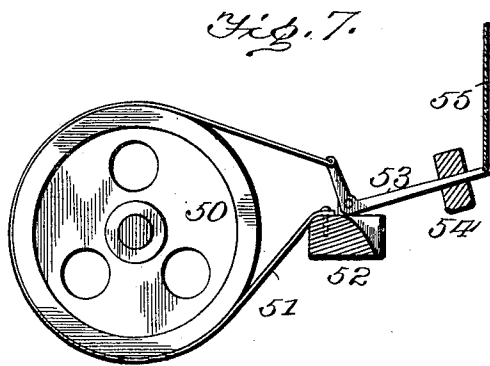
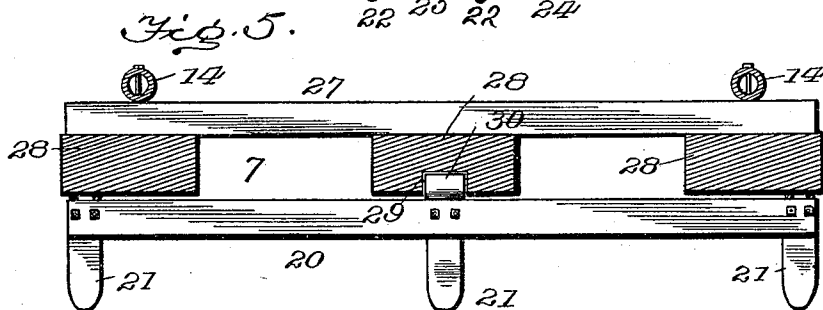
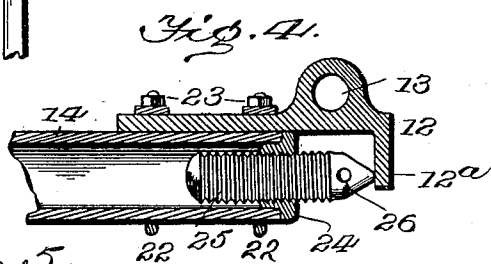
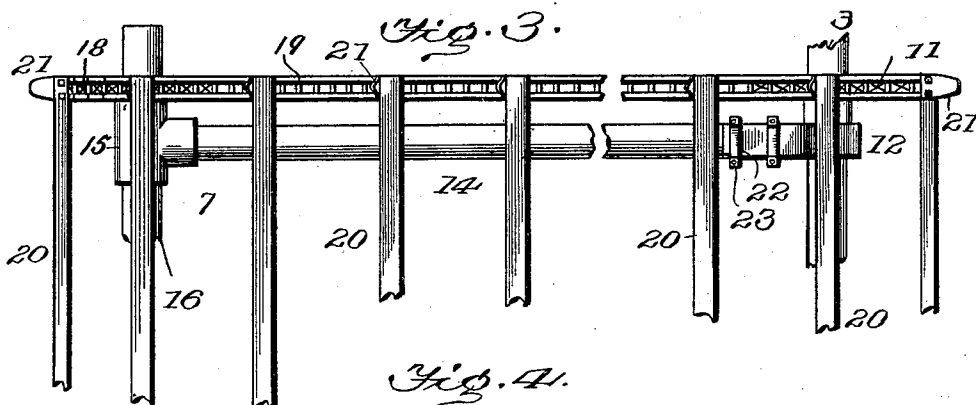
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AUTOMATIC MECHANISM FOR UNLOADING AND FEEDING SUGAR CANE.

No. 583,408.

Patented May 25, 1897.



Witnesses
John C. Smith
Dennis C. Smith

Inventor
James Mallon
by *James L. Norris*
his Attorney

UNITED STATES PATENT OFFICE.

JAMES MALLON, OF NEW ORLEANS, LOUISIANA, ASSIGNOR OF ONE-HALF
TO JAMES W. BODLEY, OF STAUNTON, VIRGINIA.

AUTOMATIC MECHANISM FOR UNLOADING AND FEEDING SUGAR-CANE.

SPECIFICATION forming part of Letters Patent No. 583,408, dated May 25, 1897.

Application filed February 20, 1897. Serial No. 624,412. (No model.)

To all whom it may concern:

Be it known that I, JAMES MALLON, a citizen of the United States, residing at New Orleans, in the parish of Orleans and State of Louisiana, have invented new and useful Improvements in Automatic Mechanism for Unloading and Feeding Sugar-Cane, of which the following is a specification.

This invention relates to automatic mechanism for unloading and feeding sugar-cane, and has for its object to provide novel, simple, and reliably efficient means by which a car-load or successive car-loads of sugar-cane may be unloaded with required rapidity and delivered with substantial uniformity to a cane-carrying apparatus, by which it is continuously transported to the mill to be crushed, or to any other point.

It is a principal purpose of my invention to provide a mechanism or apparatus of the character described which shall have automatic operation and be capable of such control as may be necessary by a single attendant, who need have no special experience or skill. Beside the economy resulting from this diminution in the manual labor required prior to my invention, from eight to fifteen men having been necessary heretofore to do the same work, I also aim to perform the work with much greater rapidity and to enable the unloading of a plurality of cars to go on continuously, or practically so—that is, without frequent intermissions due to the time that would be required for the removal of an empty car and bringing up the next loaded car—whereas my present invention provides effective means whereby one car can be brought up on one side of a cane-carrier and opened at either side ready for unloading while cane is being removed from a car on the other side of the carrier, thus rendering the work practically continuous.

It is another purpose of my invention to so construct and arrange the cane-unloading mechanism that it will require the supervision or attention of but one man from the moment of its starting to the time when it removes the last portion of cane from the floor or bottom of a car. If desired, the car-unloading mechanism may be driven from the same source of power that actuates the cane-car-

rier or apparatus for conveying cane to the mill, so that the unloading of cane from a car or cars onto the cane-carrier may be automatically regulated according to the working requirements of the mill where the cane is delivered by the carrier, whereby a temporary stoppage of the carrier-driving mechanism will cause a corresponding cessation in the operation of the car-unloading mechanism, so that the cane-carrier will not be permitted to become overloaded at any point by the unloading mechanism continuing to operate while the carrier stands still.

My invention consists in certain features of construction and novel combinations of parts and devices in a car-unloading apparatus, as hereinafter more particularly described and claimed.

In the annexed drawings, illustrating the invention, Figure 1 is an end elevation of my improved automatic mechanism for unloading cane from cars. Fig. 2 is a plan of the same. Fig. 3 is a detail view of a portion of one of the operative raking-sections of the automatic car-unloading mechanism. Fig. 4 is an enlarged sectional detail view at the adjustable end of one of the stretcher-bars or tubular rods for imparting rigidity and tautness to the endless raking-sections. Fig. 5 is an enlarged transverse section of a portion of one of the raking or unloading sections. Fig. 6 is an enlarged side edge view of one of the grabbers or rake-teeth, with its supporting-bar in transverse section. Fig. 7 is an enlarged side view of a brake.

Those who are acquainted with the cultivation, harvesting, and milling of sugar-cane are aware that by reason of its physical characteristics there are serious difficulties met with in handling it which are not usually encountered in the handling of other material. The cut cane varies in length from three feet to six and seven feet, or more. The stalks are extremely slippery and very heavy, rendering it impossible to handle them except in very small quantities and even then slowly and with much difficulty owing to the readiness with which they slip from the grasp or from the bundle in which they lie. The cane after it is cut is usually piled in box-cars for transportation, the stalks lying lengthwise of

the car, and for the sake of convenience and rapidity in unloading the sides of the car should be so constructed that either side may be turned down and outward upon its hinged lower edge and brought into the same plane with the car-floor or inclined downward therefrom at any suitable angle, so that it will form a support or chute for the cane as it is raked out and removed from the car. It is also desirable that while one car is thus being unloaded onto an endless and continually-moving cane-carrier for conveying the cane into the mill another car may be brought up to the other side of the cane-carrier and made ready for unloading by the time the first-named car is emptied. It is therefore preferable to construct the automatic car-unloading mechanism in duplicate to operate in opposite directions and successively on opposite sides of the cane-carrier, and it is with an apparatus of this character that my invention is more particularly concerned, thereby effecting the greatest economy of time and labor. As sugar-cane is seldom packed into a car with any degree of uniformity or regularity in the arrangement of the stalks, it is desirable that an independently operative sectional construction of the unloading devices or mechanism should be provided, so that portions of the cane may be first removed from the ends of a car or from its center, as the case may be, thereby facilitating removal of the remainder.

In Figs. 1 and 2 of the drawings the reference-numerals 1 and 2 designate railway-track rails parallel with and adjacent to opposite sides of an endless conveyer or carrier 3 for transporting sugar-cane to a mill or other required point. The endless cane-carrier 3 may have any suitable or preferred construction and is shown as provided with vertical sides 4, on either of which the hinged side 5 of an open-top freight-car 6 will rest when said car is brought into proper position and its side let down, as represented in Fig. 1.

The automatic car-unloading mechanism comprises a pivotally-supported endless rake or series of such rake-sections, as designated by the reference-numeral 7, adapted to be lowered onto the cane in a car whose hinged side is open, so that by continuously operating the endless rake the sugar-cane will be pulled off onto the endless traveling carrier 3 with substantial regularity in the lengthwise arrangement of the cane-stalks on the said carrier, to be thereby continuously transported to the sugar-mill or other desired place. For the unloading of a single car it is preferable to provide a series of endless rake-sections 7, say four in number, as shown, capable of being operated simultaneously and parallel with each other, but at the same time so constructed and arranged that either the two end rake-sections or the two central rake-sections may be lowered onto the cane in a car and operated independently of the other two sections, if so desired. In the unloading

of sugar-cane from cars it is often found that by reason of the varying lengths of the stalks and their uneven or irregular disposition in the car the central portion of the load may be bound down by stalks at or toward the ends of the car, or the end portions of the load may be bound down by the central portion. Therefore it is often necessary to first remove either the end portions of the car-load or the central portion, as the case may be, and thus facilitate a rapid and regular unloading of the remainder. Thus by the provision of independently-operative endless rake-sections 7 the work of unloading sugar-cane from a car or cars can be readily and quickly accomplished according to varying requirements and with no labor other than the very little that is required for a proper supervision and adjustment of the automatic unloading mechanism, which is easily done by one person.

The several endless rake-sections 7 for unloading cane from one car are arranged to pivot on a horizontal shaft 8 that is common to all. This horizontally-arranged shaft 8 is mounted in bearings 9, secured to uprights 10, Fig. 1, erected on the side of the endless cane-carrier 3 opposite that side where is to be located the car to be unloaded. To this shaft 8 is keyed a series of sprocket-wheels 11, arranged in pairs. Between each pair of sprocket-wheels 11 on the shaft 8 is arranged a pair of boxes 12, Figs. 3 and 4, each having an eye 13 loosely embracing said shaft, so as to be capable of turning thereon. The pivotal boxes 12 are constructed to receive and adjustably hold the ends of preferably tubular stretcher-rods 14, Figs. 1, 2, and 3, that will extend across the cane-carrier 3 when the rake-sections 7, of which said stretcher-rods form a part, are lowered into operative position. The outer ends of each pair of stretcher-rods 14 are provided with supports 15 for a short fixed shaft 16, one for the outer end of each rake-section 7, except that the two central rake-sections may have the adjacent ends of their shafts 16 connected by a pivotal joint 17, Fig. 2, for the purpose of connecting the outer ends of the two central rake-sections to operate in perfect unison and yet allow a degree of flexibility at this point that will permit the rake-sections to more readily conform to any irregularity on the surface of the car-load. Each shaft 16 has loosely mounted thereon a pair of idler sprocket-wheels 18, connected by endless chains 19 with the sprocket-wheels 11 on the shaft 8 that is common to all the rake-sections. There is secured to each pair of endless chains 19 at suitable intervals a number of transversely-arranged bars 20, to each of which is bolted a series of slightly-curved rake-teeth or grabbers 21, Figs. 1, 3, 5, and 6, for pulling off the stalks contained in a car-load and feeding them onto the cane-carrier 3, that conveys them into the sugar-mill or elsewhere, as required.

For the purpose of imparting suitable extension and tautness to the endless rake-sections 7 there is provided an adjustable connection between the stretcher-rods 14 and the boxes 12 on the shaft 8. The stretcher-rods 14 are preferably made tubular for the sake of lightness and may be formed from pieces of gas or steam pipe. At one end they carry the supports 15 for the fixed shafts 16, and their other ends are adjustably connected, by means of clips 22 and nuts 23, Figs. 3 and 4, to shank portions of the boxes 12, each of which may be provided with a shoulder 12^a, Fig. 4, at its pivotal end. In order to provide for adjusting the stretcher-rods 14, the under side of each box 12 is made sufficiently open to permit the introduction of a flanged bushing or thimble 24, Fig. 4, into the end of the tubular stretcher-rod, as shown. This thimble or bushing 24 is provided with internal screw-threads engaging a screw-plug 25, one end of which may be arranged to have a bearing against the inner side of the shoulder 12^a of the box. A perforation 26 in the outer end of the screw-plug will permit the insertion of a pin or other suitable lever to turn the screw-plug. By loosening the clips 22 and then turning the screw-plug 25, one end bearing on the shoulder 12^a, the stretcher-rod 14 may be adjusted, as required, to give the endless rake-sections the requisite tautness. The clips 22 will then be again secured, whereupon, without disturbing the attachment of the rod 14, the screw-plug 25 may be moved back from the shoulder 12^a sufficiently to permit disengagement of the screw-plug and its bushing 24 and enable them to be used for effecting adjustment of another stretcher-rod. While the means of adjustment described are simple and effective, it will be understood that other adjusting and fastening devices may be employed for the stretcher-rods, if preferred. Ordinarily an adjustment of the stretcher-rods 14 may only be required once or twice in a season.

To the under side of the stretcher-rods 14 are secured cross-bars 27 for attachment of longitudinally-arranged boards 28, Figs. 1 and 5, preferably three in number, one arranged at each side of a rake-section and one centrally. The under faces of the outside boards 28 afford bearings for the under portions of the endless chains 19, sliding thereon. These boards also prevent the cane-stalks from becoming tangled in the links of the chains. They also enable the chains 19 and attached cross-bars 20 to move evenly and cause the grabs or rake-teeth 21 to be held down to their work. In the under side of the centrally-placed board 28 there is preferably provided a longitudinally-arranged gain or groove 29, Fig. 5, adapted to serve as a guide for projections 30 on the central portions of the cross-bars 20, to which the grabs or teeth 21 are attached. The guide-groove 29 and projections 30, engaged therein, will prevent any lateral

movement of the grabs 21 or any side slipping thereof on the cane.

The endless rakes or rake-sections 7 may be driven from any convenient source of power applied, say, through an endless chain or belting 31 to a sprocket-wheel or pulley 32 on the shaft 8, that is common to all the rake-sections for a single car. This chain or belting 31 may take its motion from a sprocket-wheel or pulley 33 on an overhead shaft 34, provided with a pulley or band-wheel 35, to be driven, preferably, from the same power that actuates the endless cane-carrier 3, the engine or motor (not shown) being conveniently located at the mill.

For the purpose of making the gear or sprocket wheel 33 either fast or loose on the shaft 34 there is provided a suitable clutch device 36, Fig. 2, controlled by a lever 37, so that the endless rake-sections 7 can be set in motion or stopped at will without stopping the overhead shaft 34, from which they are driven.

In order to lower the endless rake-sections 7 into operative position for use in unloading cane from a car and then to lift them away from the emptied car, there is provided a hoisting-drum 38 for the two outside rake-sections and a hoisting-drum 39, Fig. 2, for the two central rake-sections. These hoisting-drums are mounted in the lower part of a suitable overhead framework 40, that may be supported in any convenient manner. This frame 40 will also support all the necessary overhead shafting, as shown. To the ends of the fixed shafts 16, in the outer ends of the several endless rake-sections 7, are attached bails 41, that may be provided with cross-braces 42, if desired. The bails of the two outside endless rake-sections afford attachment for hoisting and lowering ropes or chains 43, that are carried upward over pulleys 44, disposed at suitable points on the upper portion of the overhead frame 40, and from these pulleys the said ropes 43 are carried to the hoisting-drum 38, which is preferably located above one of the outside endless rake-sections, as shown. For the purpose of rotating the drum 38 in the proper direction to wind the ropes or chains 43 thereon for hoisting the outside rake-sections 7 away from a car there is provided on one end of said drum 38 a sprocket-wheel 45, that is geared by a chain 46 to a sprocket-wheel 47 on the shaft 34, the said wheel 47 being made fast or loose on said shaft 34 by means of a clutch device 48, controlled by a lever 49, so that the two outside rake-sections 7 can be hoisted at will. The hoisting-drum 38 is provided with a brake-wheel 50, over which is passed a brake-band 51, having one end secured to a fixed support 52, as shown in Fig. 7, and its other end fastened to the short arm of an angle-lever 53, to the long arm of which is attached a weight 54 to hold the brake-band in close frictional engagement with the periphery of

the brake-wheel. A cord 55 is extended from the weighted arm of the brake-lever 53 upward and across over pulleys 56 and thence downward to hang within reach of an attendant, so that by pulling on said cord he can release the brake and permit the two outside rake-sections 7 to lower by gravity, the wheel 47 being, of course, unclutched.

The bails 41 at the outer ends of the two central rake-sections 7 are connected by an additional bail 57, to which is attached a hoisting rope or chain 58, extended up over a pulley 59, if desired, and thence carried to and secured onto the hoisting-drum 39, Fig. 2. This drum 39 for hoisting the two connected central rake-sections 7 is rotated for winding the hoisting-rope 58 by means of gearing similar to that already described for the other hoisting-drum, there being on the drum 39 a sprocket-wheel 45^a, connected by chain or belting 46^a to a sprocket-wheel 47^a on the shaft 34, made fast or loose thereon by a clutch device 48^a, controlled by lever mechanism 49^a, for use in causing the central rake-sections to be hoisted at will and independent of the outside or end rake-sections. The hoisting-drum 39 is provided with brake appliances similar to those for the drum 38 and designated by the same reference-numerals (50 to 56) distinguished by the addition of the letter *a* in Figs. 1 and 2.

The car-unloading mechanism having been hoisted out of the way a loaded car may be brought up on one side of the endless and continuously-traveling cane-carrier 3, say on the track 1, Figs. 1 and 2. By now releasing the brakes of either or both hoisting-drums either the central or outside rake-sections 7, or all together, may be lowered onto the cane in the open-top car, the hinged side of which has been let down onto the side wall 4 of the cane-carrier. The endless rake-sections being in operation, driven from the shaft 8, the sugar-cane will be raked or pulled off over the lowered car side 5 onto the carrier 3 and be thereby transported into the mill. As the load in the car diminishes the rake-sections 7 will gradually descend farther, keeping the teeth or grabs 21 in a plane that will enable them to easily engage the cane and pull it off, the brakes of the drums 38 and 39 being controlled by the attendant, as required.

It is preferable to arrange railway-tracks 1 and 2 on opposite sides of the carrier 3 with provision of a duplicate unloading mechanism, so that while one car is being unloaded another can be brought up on the opposite side of the cane-carrier 3 and be made ready for unloading without delay or as soon as the first car is unloaded.

The duplicate automatic car-unloading mechanism has the same features of construction as already described, the parts being designated in Figs. 1 and 2, so far as there shown, by the same reference-numerals distinguished by addition of the letters *b* and *c*. This duplicate unloading mechanism is oper-

ated from a side of the cane-carrier 3 opposite to the location of the track 2 for the car to be unloaded. For the purpose of providing means for operating the hoisting-drums of the duplicate unloading mechanism there is arranged a shaft 34^b, Fig. 2, to be driven from the former-described shaft 34 through intermediate gears 60, Fig. 2, the shaft 34^b being offset from the shaft 34 and revolving in an opposite direction.

The car on the track 1 having been emptied the unloading mechanism first described will be hoisted out of the way to permit the removal of the empty car and the bringing up of a loaded one. Meanwhile the duplicate automatic unloading mechanism will be lowered into operative position with relation to the car previously brought onto the track 2 in readiness for unloading.

It will be seen that the two automatic unloading mechanisms are arranged in succession, but on opposite sides of the endless cane-carrier, and that they are operated alternately under supervision and control of a single attendant. There is thus avoided the large waste of time and labor that would be incurred in removing an unloaded car, bringing up a full car on the same track, opening it, and making all other preparations between each operation of unloading. By doing all this work on one car concurrently with the discharge of cane from another I avoid the loss of this time, which amounts in the aggregate to a very considerable item. One man, or at most two, will be sufficient to exercise all necessary control of this duplicate-arranged automatic unloading mechanism, whereas by means formerly employed in the unloading of sugar-cane from eight to fifteen men have been required to do the same work.

What I claim as my invention is—

1. In automatic mechanism for unloading and feeding sugar-cane from cars, an endless rake, or rake-section, pivotally supported at one end and adapted to be lowered into position to engage the cane in a car and to be hoisted away from the emptied car, the said rake, or rake-section, comprising stretcher-rods, shafts at the ends of said rods, sprocket-wheels on said shafts, endless chains connecting said sprocket-wheels, and cross-bars provided with rake-teeth and carried by said chains, in combination with driving mechanism for said endless chains, and means for hoisting and lowering the said rake or rake-section, substantially as described.

2. The combination with the stretcher-rods, a rotary shaft on which said rods are pivotally mounted, and a fixed shaft carried by said rods, of sprocket-wheels on said shafts, endless chains on said sprocket-wheels, cross-bars carried by said chains and provided with rake-teeth, a board or boards secured to the under sides of the stretcher-rods for the under portions of the endless chains to slide on, means for preventing lateral movement of the chains, driving mechanism for the chains,

and mechanism for hoisting and lowering the stretcher-rods and connected rake mechanism, substantially as described.

3. The combination with a rotary shaft, 5
stretcher-rods pivotally mounted at one end on said rotary shaft and carrying at the other end a fixed shaft, sprocket-wheels on said shafts, endless chains connecting the sprocket-wheels of said shafts, cross-bars secured to 10
said chains, and rake-teeth carried on said bars, of boards connected with the under sides of the stretcher-rods, one on each side and one centrally, the boards at the sides being arranged for the under portions of the 15
endless chains to slide on and the central board being provided with a groove to receive projections on the tooth-carrying cross-bars and prevent lateral movement of the endless chains and connected rake-teeth, substantially as described. 20

4. The combination of a rotary shaft having sprocket-wheels keyed thereon, boxes pivotally supported on said shaft, stretcher-rods having a longitudinally-adjustable connection with said pivotal boxes, a fixed shaft carried at the outer or free ends of the stretcher-rods, sprocket-wheels on said shaft, endless chains connecting the sprocket-wheels of the fixed shaft with the sprocket-wheels on the 30
rotary shaft, cross-bars carried by said chains and provided with rake-teeth, and mechanism for hoisting and lowering the stretcher-rods and connected rake devices, substantially as described. 35

5. The combination of a series of endless rake-sections adapted and arranged to be capable of operation side by side, each rake-section comprising endless chains, cross-bars secured to said chains and provided with rake-teeth, sprocket-wheels supporting the said 40
endless chains, mechanism for driving the endless rake-carrying chains, a hoisting-drum to which is secured a rope for raising and low-

ering the two outside rake-sections, another hoisting-drum to which is attached a rope for 45
raising and lowering the central rake section or sections, clutch-controlled driving mechanism for operating said hoisting-drums independently or simultaneously, and brakes for said drums, substantially as described. 50

6. The combination with an endless cane-carrier, of automatic mechanism for unloading sugar-cane, or the like, from a car and feeding it onto said carrier, the said mechanism comprising a series of endless rake-sections adapted and arranged to be capable of 55
independent or joint operation side by side, driving mechanism for the said rake-sections, and means for raising and lowering the said rake-sections independently or together, substantially as described. 60

7. The combination with an endless carrier arranged to have a loaded car brought up into unloading position on each side of said carrier, of duplicate automatic mechanism for 65
unloading sugar-cane, or the like, from a car and feeding it onto said carrier, one of said unloading mechanisms being located on one side of the cane-carrier and the other on the opposite side and each composed of a series 70
of endless rake-sections, driving mechanism for the rake-sections, and hoisting devices to raise and lower the rake-sections, whereby they may be operated independently or together and the unloading mechanism on one 75
side of the carrier be operated alternately with the corresponding unloading mechanism on the other side of said carrier, substantially as described.

In testimony whereof I have hereunto set 80
my hand in presence of two subscribing witnesses.

JAMES MALLON.

Witnesses:

F. B. KEEFER,

HOWARD M. NORRIS.