

No. 806,803.

PATENTED DEC. 12, 1905.

W. E. HAMILTON.
LOADING MACHINE.

APPLICATION FILED MAY 16, 1904.

4 SHEETS—SHEET 1.

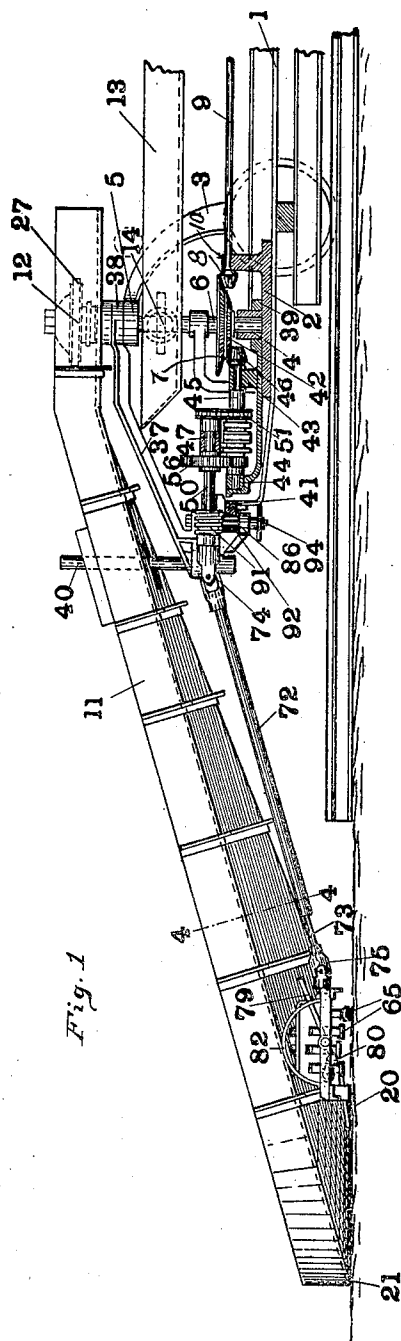


Fig. 1

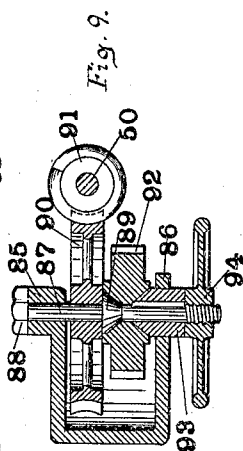


Fig. 9.

Witnesses:

W. D. Hamilton
Fred F. Reeves

Inventor:

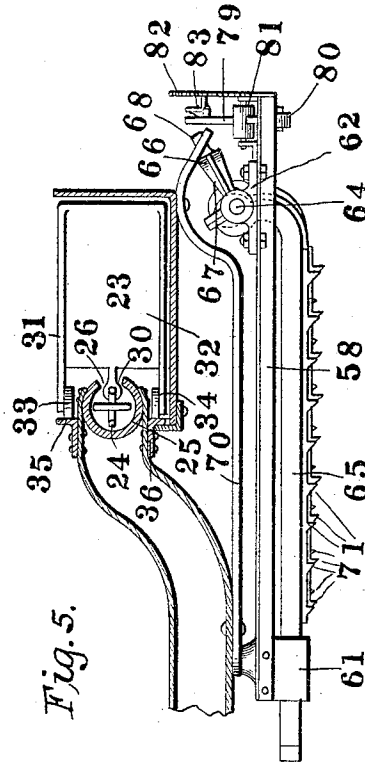
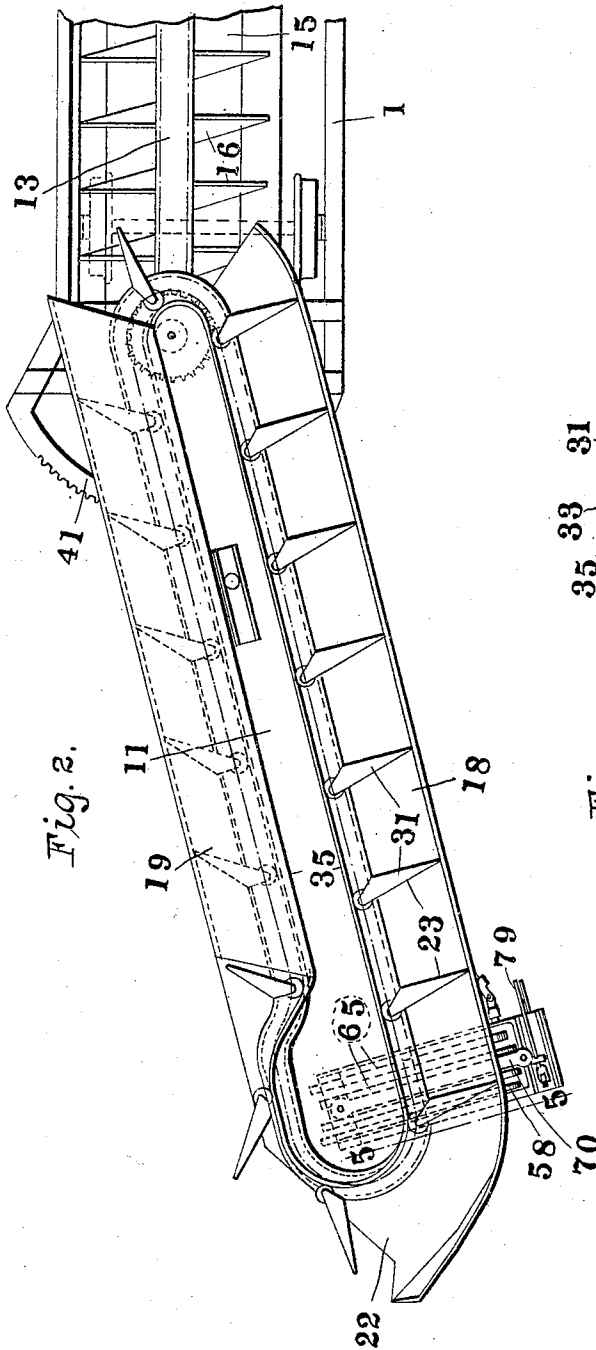
William Edward Hamilton
By *Carroll & Carr*,
Attorneys.

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4 SHEETS—SHEET 2.



ATTEST
a. J. McCauley
Prof. R. Reimer.

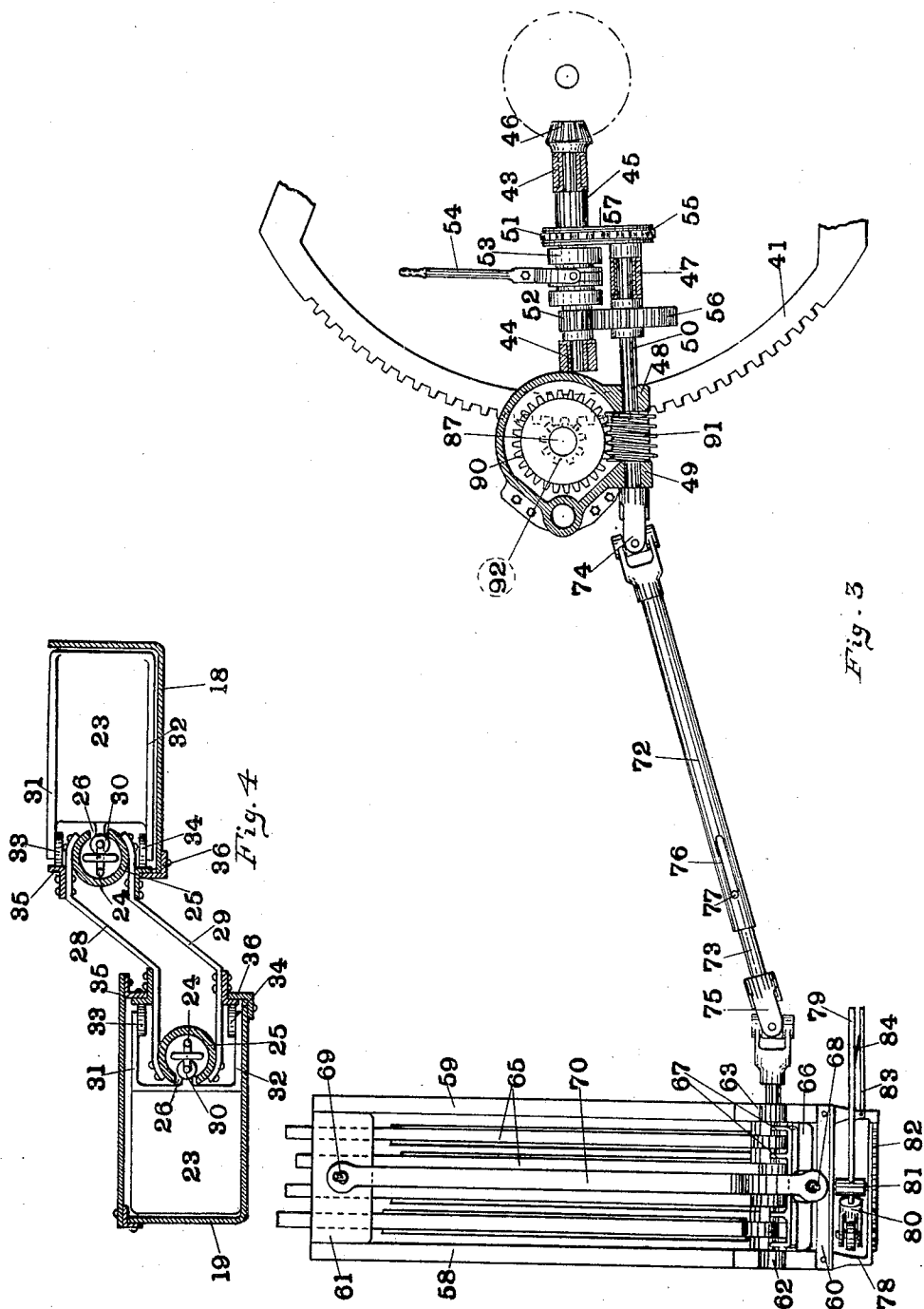
INVENTOR:-
William E. Hamilton,
BY *Cambridge*,
ATTORNEYS.

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4 SHEETS—SHEET 3.



Witnesses:

W. D. Hamilton.

Wm. F. Ruess.

Inventor:

William Edward Hamilton.

By

Attorneys.

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4 SHEETS—SHEET 4.

Fig. 6

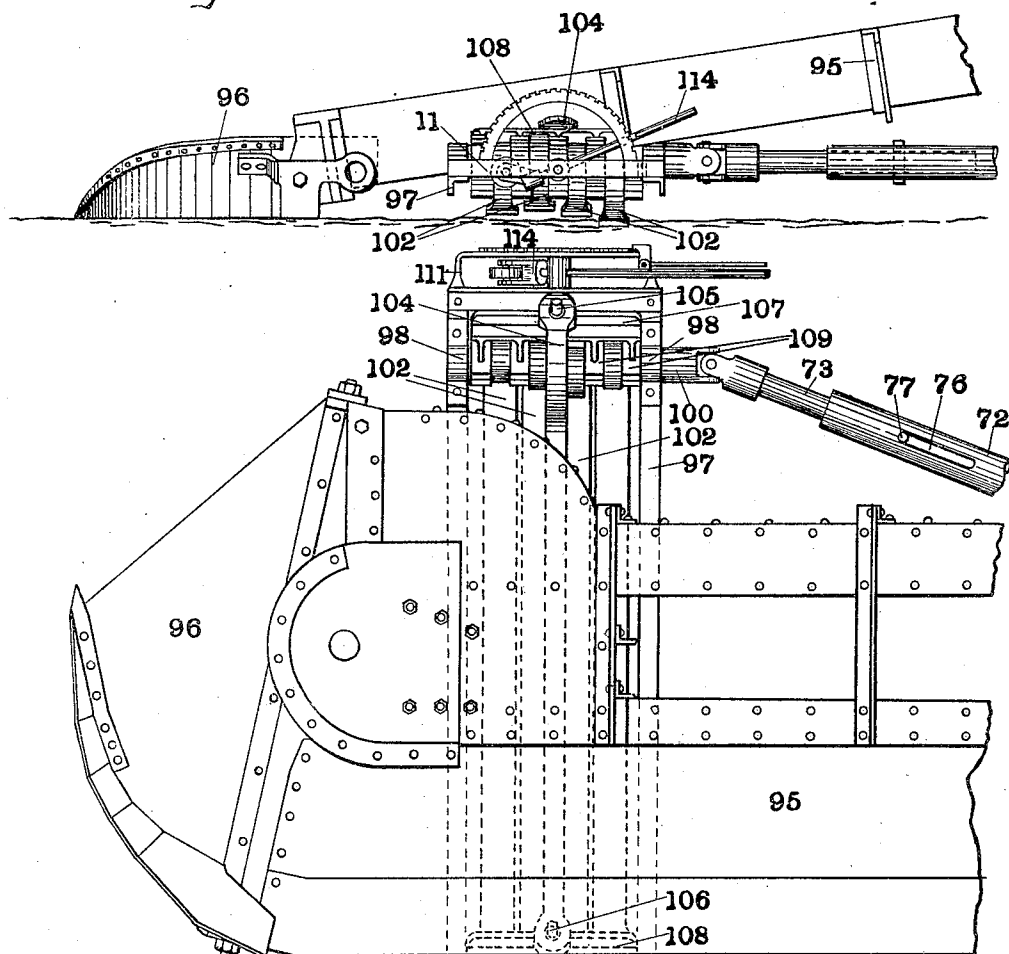


Fig. 7

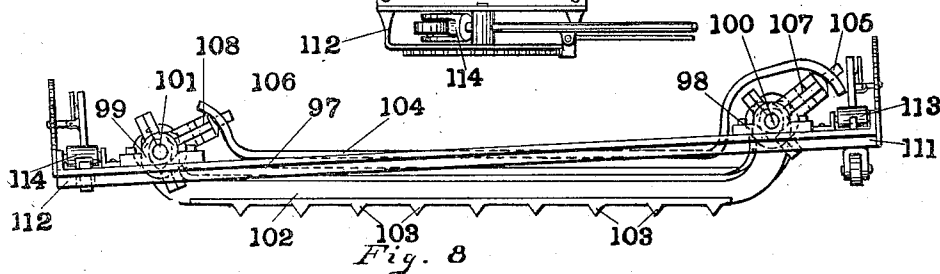


Fig. 8

Witnesses:

W. D. Hamilton

Fred F. Reind

Inventor:

William E. Hamilton.

By Camx Carr

Attorneys.

UNITED STATES PATENT OFFICE.

WILLIAM EDWARD HAMILTON, OF COLUMBUS, OHIO, ASSIGNOR TO THE
HAMILTON MANUFACTURING COMPANY, OF COLUMBUS, OHIO, A COR-
PORATION OF OHIO.

LOADING-MACHINE.

No. 806,803.

Specification of Letters Patent.

Patented Dec. 12, 1905.

Application filed May 16, 1904. Serial No. 208,180.

To all whom it may concern:

Be it known that I, WILLIAM EDWARD HAMILTON, a citizen of the United States, and a resident of the city of Columbus, county of Franklin, and State of Ohio, have invented a new and useful Improvement in Loading-Machines, of which the following is a specification.

My invention relates to loading-machines, and has for its principal objects to improve the conveyer-troughs, to make the conveyer-trough of such shape that it can be made of pressed metal, to drive the flights of the conveyer by means of a chain flexible in all directions, to control the inclination of the flights throughout their travel by a cam-guide, to incline the flights so that they will enter the material to be loaded with a gouging action instead of with a sweep action simply, to provide improved feed mechanism, to provide feed mechanism bearing upon the ground, to provide feed mechanism so arranged that its traction effort will be increased by the load on the conveyer, to provide feed mechanism for the gathering mechanism comprising a feeding means located at the forward end of the gathering mechanism and a second feeding means auxiliary thereto, to provide feed mechanism having frictional connection with the driving means, to provide improved means for reversing the direction of rotation of a shaft driven from a shaft continuously rotating in one direction, to provide a novel reversible gear for transmitting motion to the feed mechanism, and other objects hereinafter more fully appearing.

My invention consists in the parts and in the arrangements and combinations of parts hereinafter described and claimed.

In the accompanying drawings, forming a part of this specification, and wherein like symbols refer to like parts wherever they occur, Figure 1 is a side view, partly in section, of my improved machine, the rear portion of the truck and picking-table being broken off. Fig. 2 is a top view of the parts shown in Fig. 1. Fig. 3 is a top view of the driving mechanism separated from the remainder of the machine. Fig. 4 is a sectional view of the gathering mechanism on the line 4 4 of Fig. 1. Fig. 5 is a view of the creepers and frame detached. Fig. 6 is a side view,

and Fig. 7 is a top view, of the forward end of a modified gathering mechanism comprising a pivoted gathering-scoop, the creeper feed mechanism being modified to suit. Fig. 8 is a view of the creepers and frame shown in Figs. 6 and 7. Fig. 9 is a vertical sectional view through the booster-pinion and connected parts.

My improved loading-machine is mounted upon a truck 1, the front end of which is shown. A base-plate 2 and a bracket 3 are mounted on the truck. The base-plate is provided with a step-bearing 4, and the bracket 3 is provided with a vertical bearing 5 in alignment with the step-bearing. A head-shaft 6 is journaled in said bearings projecting above the vertical bearing 5. Near the lower end of the head-shaft it is provided with a bevel-gear 7, meshing with a bevel-gear 8 on a shaft 9. The shaft 9 is journaled in a bearing 10 on the base-plate 2 and is connected to a motor (not shown) mounted on the truck. This shaft 9 is hereinafter referred to as the "main" shaft.

The loading-machine comprises an initial conveyer or gathering mechanism and final conveyer or delivery mechanism. The former comprises a conveyer 11, universally mounted at one end upon the upper end 12 of the head-shaft. The delivery mechanism comprises a conveyer 13, universally mounted at one end upon the head-shaft at a point 14 intermediate of the two bearings therefor. The details of the universal connection are shown, respectively, in my Patent No. 740,559, issued October 6, 1903, and my Patent No. 736,846, issued August 18, 1903. The conveyer 13 comprises a trough 15, having flights 16 moving therein. The flights are mounted on a conveyer-chain. The going and return sections of the chain and flights are in the same plane. This conveyer is so located that the gathering mechanism will discharge the materials carried up by it thereinto. This conveyer is hereinafter referred to as the "picking-table."

The initial conveyer comprises an ascending trough 18 and a descending casing 19. The ascending trough is open at the top or substantially U-shaped in cross-section. It is straight from its point of contact with the ground to a point near its connection with the head-shaft, where it is bent and assumes

a horizontal direction. The descending casing is closed all around to prevent interference with the flights. It is narrower than the ascending trough. The descending casing is more sharply inclined than the ascending trough, and its point of contact 20 with the ground is back of the point of contact 21 of the latter with the ground. The gathering edge 22 is in contact with the ground from the point 20 to the point 21. Thus as the conveyer sweeps about its pivot-point the gathering edge 22 scoops up the material to be loaded.

The flights 23 are secured to an endless chain 24. This chain travels in a guide 25, consisting of a pipe provided with a longitudinal slit 26 on the side adjacent to the ascending trough and descending casing. The chain is driven by a sprocket 27 upon the shaft 6. Plates 28 29 are riveted above and below said guide, respectively, and thus form the frame of the conveyer, to which the ascending trough and descending casing are attached. Each of the flights is provided with an integral eye 30 near the middle of its width, by means of which it is attached to a link of the chain 24, the eye passing through the slit 26. At its upper and lower edges, respectively, each flight has rearwardly-extending ears 31 32 substantially triangular in shape. Rollers 33 34 are mounted on the ears 31 32, respectively. Cam-guides 35 36 are mounted on the frame of the conveyer and form a track upon which the rollers 33 34 bear. The cam-guides vary in lateral position relative to the chain-guide 24, and thus the inclination of the flights may be varied. Along the ascending trough 18 the cam-guides are substantially straight and parallel with the chain-guide, the flights being thus sustained in a position perpendicular to the length of the trough. Along the descending casing the cam-guides are arranged back of the chain-guide and permit the flights to be inclined by contact with the outer wall of the casing. Just beyond the casing the cam-guides are so arranged as to incline the flights into such a position that the flights will enter the material to be loaded point foremost, and from that point each flight will move substantially parallel with itself until the material in front of it is swept upon and scooped up by the scoop end of the ascending trough.

A substantially V-shaped crane 37 is provided with bearings 38 39 in its separated ends. The bearings embrace the head-shaft 6 and the step-bearing 4, respectively. The apex of the crane extends forwardly and supports a standard 40, which extends through an opening in the frame of the initial conveyer. An arcuate rack 41 is secured to the frame of the truck 1. The forward end of the crane slides upon this rack.

In its operation the gathering mechanism

sweeps about on its pivot, describing the sector of a circle. To propel it during this sweep movement, two feed mechanisms are employed. One is located at the forward end of the gathering mechanism and is the principal feed mechanism. The other drives the gathering mechanism by means of the arcuate rack 41, the crane 37, and standard 40 and is an auxiliary or "booster" feed mechanism.

Upon the head-shaft 6 a second bevel-gear 42 is rigidly mounted. Bearings 43 44 are provided on the lower member of the crane 37, and in them is journaled a shaft 45, carrying a bevel-gear 46, meshing with the bevel-gear 42 on the head-shaft. Bearings 47, 48, and 49 are also provided on the lower member of the crane, and in them is journaled a shaft 50, parallel to the shaft 45. From this latter shaft both the feed mechanisms are driven, and hence it is desirable to reverse the direction of its rotation. The shaft 45 continuously rotates in one direction. Means for reversing the direction of rotation of shaft 50 are provided.

Upon the shaft 45 a sprocket-wheel 51 and a gear-wheel 52 are loosely mounted. Between them a disk friction-clutch 53 of known construction is mounted and keyed to the shaft. By means of a lever 54 the clutch may be shifted so as to operatively connect either the gear-wheel 52 or the sprocket-wheel 51 with the shaft 45. Upon the shaft 50 a complementary sprocket-wheel 55 and complementary gear-wheel 56 are fixed. A sprocket-chain 57 connects the sprocket-wheels 51 and 55, and the gear-wheels 52 and 56 mesh together. When the sprocket-wheel 51 is clutched to the shaft 45, the shaft 50 will be caused to rotate in the same direction as the shaft 45, because the chain-connected sprocket-wheels rotate in the same direction. When, however, the gear-wheel 52 is clutched to the shaft 45, the shaft 50 rotates in a direction opposite to the direction of rotation of the shaft 45, for the meshing gear-wheels rotate in opposite directions. Thus the shaft 50 can be driven in either direction from the shaft 45.

The main feed mechanism is mounted near the forward end of the initial conveyer or gathering mechanism as possible. It comprises a substantially rectangular frame having side bars 58 59 and end pieces 60 61. The side bars are provided with bearings 62 63 near the end piece 60, and in these bearings an eccentric-shaft 64 is journaled. The eccentric-shaft is provided with four eccentrics set at angular intervals of ninety degrees about the shaft. The end piece 61 is a thick block provided with four slideways. Creeper-bars 65 are mounted at one end on the eccentrics on the eccentric-shaft 64 and at the other end extend through the slideways in the end piece 61. A yoke 66 is provided with downwardly-

extending arms 67, provided with bearings for the eccentric-shaft. Pins 68 69 extend upwardly from the yoke 66 and the end piece 61, respectively. A bar 70 is rigidly secured on the conveyer-frame by rivets, as indicated in Fig. 5, and provided at its opposite end with eyes which are engaged by said pins. The creepers are thus secured to the conveyer-frame in a manner that will permit the slight relative movement of the conveyer-frame and the creeper-frame. This is desirable, for the scoop may pass over ground differing in level from the part upon which the creepers travel. The creeper-bars are provided with teeth 71 on the side toward the ground, the teeth increasing in length from the sliding end toward the revolving end. It is apparent that the teeth describe ovoid curves and that the teeth of no two bars are at similar points in their respective paths at once. Each bar as it passes through the lowest portion of its path engages the ground and pushes the conveyer forward. At the same time the end of the conveyer is slightly raised and lowered. This effect is desirable, for this oscillation works the scoop end under the material to be loaded just as a workman works his shovel under material.

The eccentric-shaft 64 is connected with the driving-shaft 50 by means of a tumbler-shaft having telescoping sections 72 73 connected at their ends by universal joints 74 75 to the shafts 50 and 64, respectively. The section 72 has a slot 76, and the section 73 has a pin 77 entering said slot. Thus relative longitudinal movement of the sections is permissible while they are compelled to rotate together.

To support the forward end of the gathering mechanism when it is desired to move the same longitudinally, a caster is provided. A frame 78 is mounted on the end of the creeper-frame. The end piece 60 and the frames 78 are provided with alined bearings. A handle 79, having a caster 80 journaled on its lower end in the usual manner, is provided with trunnions 81, which are journaled in said bearings. A toothed arc 82 is mounted on the frame 78. A detent 83 is pivoted on the handle 79 and held in engagement with said arc by a spring 84. In grasping the handle the detent is released, and then the handle may be moved on its trunnions to bring the caster in contact with the ground, raising the creepers off the ground. When not in use, it is thrown back in the position shown in the drawings.

Vertical bearings 85 86 are provided on the crane, and in them a shaft 87 is journaled. This shaft is provided with a head 88, which rests on the top of the bearing 85, and it is screw-threaded on its lower end. Intermediate of the bearings it is provided with a conical shoulder 89. Above said shoulder is fixed a worm-wheel 90, which meshes with a worm 91, fixed on the driving-shaft 50. Be-

low the conical shoulder a pinion 92, having a hole conically counterbored on both sides, is loosely mounted. This pinion meshes with the arcuate rack 41. A sleeve 93, having a conical end fitting into the lower conical counterbore of the pinion, is keyed to the shaft 87, so that relative longitudinal movement is permissible. This sleeve rests upon a hand-wheel 94 upon the screw-threaded end of the shaft 87, by means of which it may be raised and lowered. The pinion 92 may thus be frictionally held to rotate with the shaft, and the force with which it is held may be varied.

In operation the gathering mechanism is caused to sweep about its pivot-point by the feed mechanisms. The two feed mechanisms usually coöperate in feeding the gathering mechanism in this sweep movement. If, however, the main feed mechanism should feed faster than the booster feed mechanism, the booster-pinion will simply be caused to slip on the shaft 87. If in its sweep movement the gathering mechanism should encounter an unusual resistance, the effectiveness of the main feed mechanism may be reduced or destroyed if the floor on which the creepers are moving is soft and may be torn away. Then the booster feed mechanism will move the gathering mechanism forward unless the obstacle encountered is immovable or offers a resistance so great as to render breaking of the machine likely. In the latter cases the booster-pinion will slip on its shaft and the sweep movement of the gathering mechanism will stop. It is to be noted, however, that the chain and flights continue to run. Hence if the unusual resistance is due to a slide of the material to be loaded the sweep movement will be interrupted only until the conveyer can carry the material away. Then the sweep movement of the gathering mechanism will begin again automatically. As soon as the creepers are carried past the hole dug up by them when their advance was stopped they again begin to feed the gathering mechanism forward.

The creeper feed mechanism is not limited in its application to a gathering mechanism having the gathering-scoop rigid with the ascending trough of the conveyer. In Figs. 6, 8 the creeper-feed is shown applied to a gathering mechanism 95, having a pivoted gathering-scoop 96. A gathering mechanism of this type is disclosed in my copending application for patent on loading-machines filed October 20, 1903, Serial No. 177,750. A substantially rectangular creeper-frame 97 is provided with bearings 98 99 for the eccentric-shafts 100 101, of which there are two in this case. One is connected to the tumbler-shaft in the same manner as before. The other is driven by the creeper-bars from the first. Creeper-bars 102 are mounted at their opposite ends upon the eccentric-shafts. These

crawler-bars are provided with teeth 103 on their lower sides. The teeth differ from those of the crawlers described above in having their opposite sides equally inclined. They are thus equally efficient in feeding in either way. A bar 104 is secured to the frame of the conveyer. At its opposite ends it is provided with eyes which receive pins 105 106 on yokes 107 108, provided with downwardly-extending arms 109 110, having bearings in which the eccentric-shafts are journaled. A floating connection of the conveyer with the crawlers is thus provided. At its opposite ends the frame 97 is provided with extensions 111 112, in which casters 113 114 are pivoted in the manner described in detail in connection with the previous form of conveyer. The crawler-teeth in this form of crawler feed mechanism describe circular curves; but otherwise this form operates in the same manner as the form described above.

Obviously my machine is capable of considerable modification within the scope of my invention, and therefore I do not wish to be limited to the specific construction shown and described.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A loading-machine comprising gathering mechanism arranged to gather material from the ground and feed mechanism connected to said gathering mechanism and having independent engagement with the ground whereby it is adapted to feed said gathering mechanism in its gathering movement.

2. A loading-machine comprising a gathering mechanism arranged to gather material from the ground and feed mechanism mounted at the gathering end of said gathering mechanism and in engagement with the ground.

3. A loading-machine comprising a pivotally-mounted gathering mechanism and feed mechanism mounted upon said gathering mechanism and arranged to engage the ground.

4. A loading-machine comprising pivotally-mounted gathering mechanism and feed mechanism arranged to cause said gathering mechanism to sweep about its pivot-point and to vibrate the gathering end of said gathering mechanism.

5. A loading-machine comprising gathering mechanism and feed mechanism connected thereto comprising crawlers arranged to successively engage the ground, and means to actuate said crawlers.

6. A loading-machine comprising gathering mechanism, and feed mechanism therefor comprising a frame, an eccentric-shaft journaled in said frame, crawlers connected to said eccentric-shaft, means to rotate said shaft, and means connecting said feed mechanism to said gathering mechanism.

7. A loading-machine comprising a truck,

a main shaft thereon, gathering mechanism pivoted on said truck and arranged to rest on the ground at its forward end, feed mechanism for said gathering mechanism connected near the forward end thereof and comprising crawlers arranged to successively engage the ground and means operatively connecting said main shaft and said crawlers to actuate the same.

8. A loading-machine comprising a truck, a main shaft thereon, gathering mechanism pivoted thereon and arranged to rest on the ground at its forward end, feed mechanism connected near the forward end of said gathering mechanism and arranged to engage the ground, and means operatively connecting said main shaft and said feed mechanism and comprising a tumbler-shaft having relatively longitudinally movable sections.

9. A loading-machine comprising a truck, gathering mechanism pivoted thereon arranged to rest on the ground at its forward end, feed mechanism mounted near the forward end of said gathering mechanism and arranged to engage the ground and means on said mechanism to raise said feed mechanism from the ground at will.

10. A loading-machine comprising a truck, gathering mechanism pivoted thereon and arranged to rest on the ground at its forward end, feed mechanism mounted near the forward end of said gathering mechanism and arranged to engage the ground and means comprising a roller mounted on said feed mechanism and arranged to support said feed mechanism out of engagement with the ground at will.

11. A loading-machine comprising a truck, gathering mechanism pivoted thereon and arranged to rest on the ground at the forward end, feed mechanism mounted near the forward end of said gathering mechanism and arranged to engage the ground, means comprising a roller mounted on said feed mechanism and arranged to support said feed mechanism out of engagement with the ground and means to hold said means in any position of adjustment.

12. A loading-machine comprising a truck, gathering mechanism pivotally mounted at one end on said truck and arranged to rest upon the ground at the other end, a main feed mechanism and a booster feed mechanism to cause said gathering mechanism to sweep about its pivot.

13. A loading-machine comprising a truck, gathering mechanism pivoted thereon, a main shaft, main feed mechanism and booster feed mechanism for said gathering mechanism, said feed mechanisms being both driven from said main shaft.

14. A loading-machine comprising a truck, gathering mechanism pivoted on said truck, a main feed mechanism and a booster feed mechanism for said gathering mechanism

said feed mechanisms being yieldingly connected.

15. A loading mechanism comprising a platform, an arcuate feed-rack thereon, gathering mechanism pivoted on said truck, feed mechanism comprising a shaft, a pinion in engagement with said feed-rack held to rotate with said shaft by friction, means to adjust the force of friction, a main shaft and means operatively connecting said main shaft and said first-mentioned shaft.

16. A loading-machine comprising a platform, an arcuate feed-rack thereon, a main shaft, a shaft provided with a conical shoulder and operatively connected with said main shaft, a pinion loosely mounted on said second-mentioned shaft in engagement with said shoulder and meshing with said feed-rack, a sleeve slidingly mounted on said second-mentioned shaft and provided with a conical portion arranged to engage said pinion, and a hand-wheel in screw-threaded engagement with said second-mentioned shaft and arranged to adjust said sleeve.

17. A loading-machine comprising gathering mechanism, a main shaft, feed mechanism for said gathering mechanism and operative connections between said feed mechanism and said main shaft comprising a shaft continuously rotating in one direction, a sprocket-wheel and a gear-wheel loosely mounted on said shaft, and a clutch between said wheels having a portion secured to said shaft to rotate therewith and arranged to clutch either of said wheels, a parallel shaft provided with a sprocket-wheel and a gear-wheel secured thereto, said sprocket-wheels being connected by a sprocket-chain and said gear-wheels meshing with each other.

18. A loading-machine comprising a conveyer-frame having a chain-guiding channel, an endless chain in said channel and guided thereby, a sprocket to drive said chain, said chain being guided only by said channel and said driving-sprocket, a conveyer-trough and flights connected to said chain and projecting into said trough.

19. A loading-machine comprising a conveyer-frame having a chain-channel, a chain confined in said channel, a sprocket to drive said chain, flights pivotally connected to said chain and outwardly projecting therefrom, and an endless cam-guide arranged to control the angular position of said flights.

20. A loading-machine comprising a conveyer-frame, a trough, an endless chain provided with pivotally-mounted flights extending into and cooperating with said trough, and an endless cam-guide arranged to be engaged by said flights and hold them perpendicular to said trough when ascending, permitting the retreat of the free ends of said flights when descending and advancing the free ends of said flights beyond the ends connected to said chain when approaching the receiving end of said conveyer.

21. A loading-machine comprising a conveyer-frame having a chain-channel, a chain confined therein, a sprocket to drive said chain, a conveyer-trough, flights pivotally connected to said chain and outwardly projecting therefrom, and an endless cam-guide arranged to be engaged by said flights and hold them perpendicular to said trough when ascending, permitting the free ends of said flights to retreat in descending, and advancing the free ends of said flights when approaching the receiving end of said conveyer.

22. A loading-machine comprising a conveyer arranged to rest on the ground at one end, the opposite sides of said conveyer vertically diverging from each other, said sides being connected at the gathering end by a gathering-plate parallel with the ground.

23. A loading-machine comprising a conveyer having an ascending trough and a return-casing, having their longitudinal axes in different vertical planes, said return-casing being more sharply inclined than said ascending trough.

24. A loading-machine comprising a conveyer arranged to rest on the ground at one end, and comprising an ascending trough terminating at the gathering end of the conveyer in a gathering edge and a descending casing more sharply inclined than said ascending trough, the bottom plate of said casing descending to the rear end of said gathering edge.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 14th day of May, 1904, at Columbus, Franklin county, Ohio.

WILLIAM EDWARD HAMILTON.

Witnesses:

W. D. HAMILTON,
J. F. GINTON.