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FEEDING AND CONVEYING APPARATUS.

APPLICATION FILED JAN. 4, 1919.

1,409,695.

Patented Mar. 14, 1922.

2 SHEETS—SHEET 1.

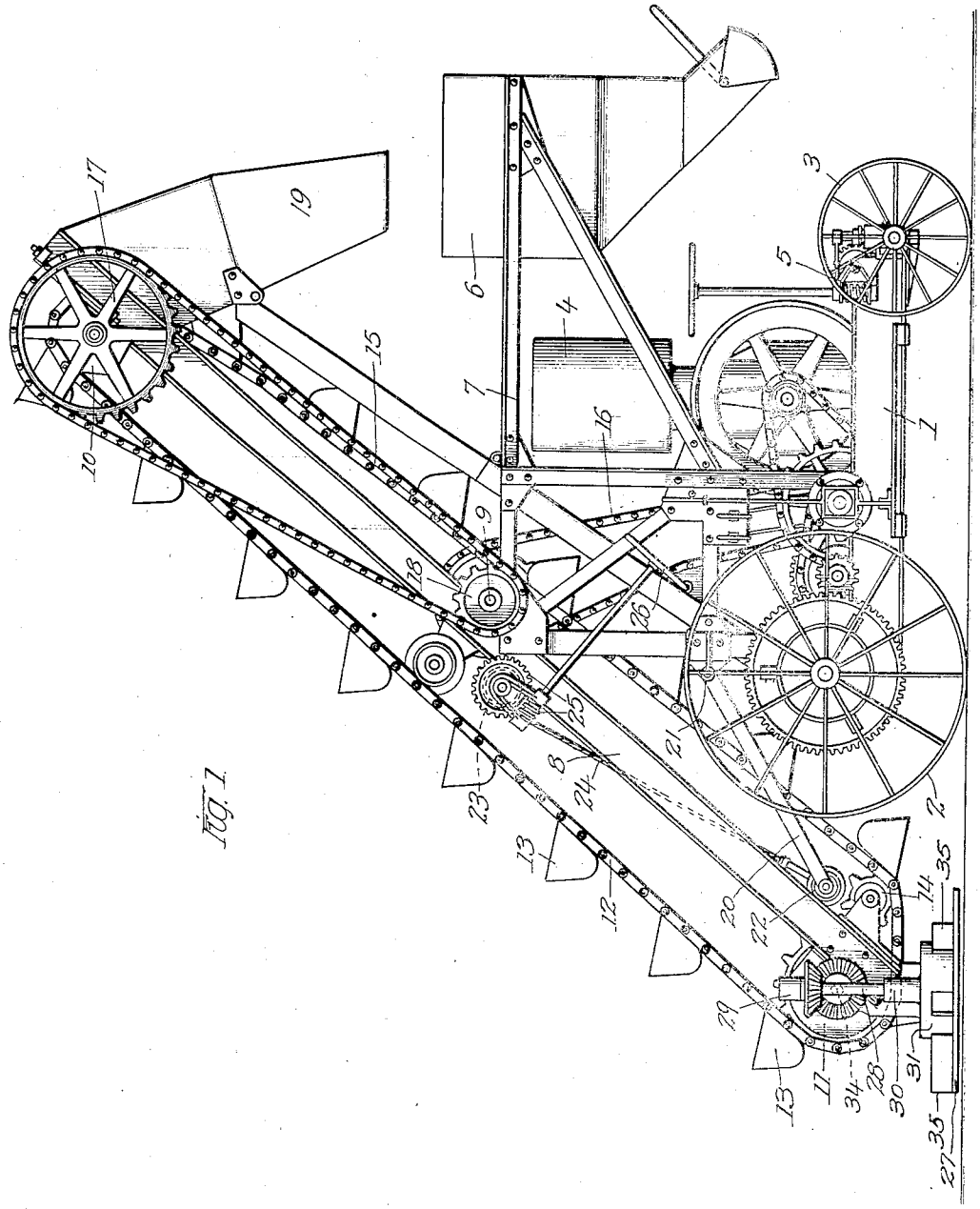


Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 3.

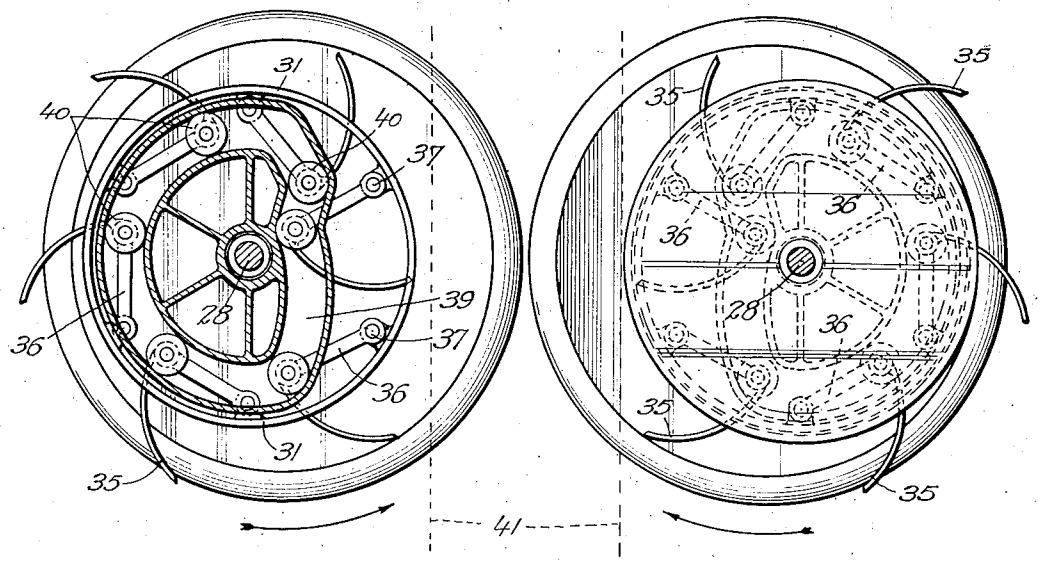
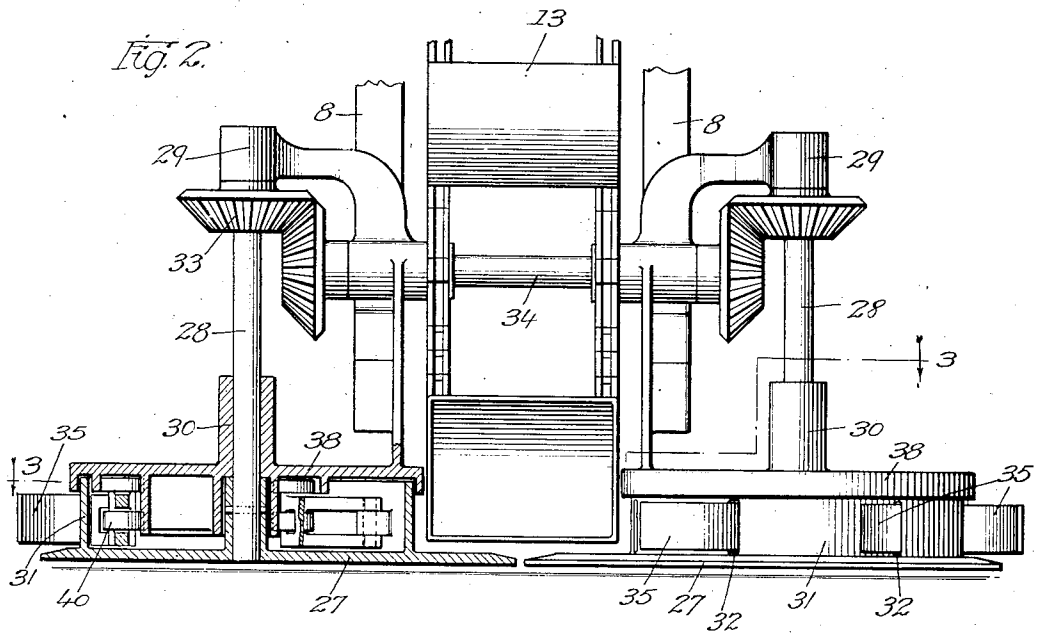


Fig. 2.



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FEEDING AND CONVEYING APPARATUS.

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To all whom it may concern:

Be it known that I, JAMES C. FRENCH, a citizen of the United States of America, and a resident of Chicago, Illinois, have invented a certain new and useful Improvement in Feeding and Conveying Apparatus, of which the following is a specification.

This invention relates to conveyers of the kind which are employed for delivering sand or gravel or other materials from the ground to a point above, for example, into the hopper of a loader of the kind used in connection with a mixer. For this purpose, an endless chain of buckets is ordinarily employed, arranged to scoop up the sand or gravel or other materials from the ground, or from the surface of the street, and to then carry the materials upward to the point where they are then discharged into the hopper. A machine of this kind, ordinarily, is of a portable nature, and is self-propelled, whereby the lower end of the conveyer can be pushed forward into the mass of materials and thereafter moved forward from time to time, so that by shifting the machine forward the entire mass of materials will finally be carried upward and delivered to the hopper. The shifting of the entire machine, however, is not sufficient to conveniently and efficiently bring the materials within reach of the lower end of the bucket conveyer or elevator, and in some cases workmen are employed with shovels to deliver the sand or gravel and other materials to the lower end of the conveyer, and also devices have been employed for mechanically feeding the materials to the lower end of the conveyer or elevator.

Generally stated, therefore, the object of the invention is to provide a novel and improved feeding device for efficiently and continuously throwing the sand or gravel or other materials into the buckets of the conveyer or elevator, so that each bucket will be fully loaded before it starts upward, as will hereinafter more fully appear.

It is also an object to provide certain details and features of construction and combinations tending to increase the general efficiency and the serviceability of feeding and conveying devices and apparatus of this particular character.

To these and other useful ends the invention consists in matters hereinafter set forth and claimed, and shown in the accompanying drawings, in which—

Fig. 1 is a side elevation of a portable loader provided with a conveyer or elevator having its lower end equipped with feeding mechanism embodying the principles of the invention, and having a hopper for discharging the materials into a wagon or a wheel-barrow, or into the hopper of a mixer.

Fig. 2 is a rear elevation of said conveyer and feeding mechanism, on a larger scale, showing a portion of the feeding mechanism in vertical section.

Fig. 3 is a horizontal section on line 3—3 in Fig. 2.

As thus illustrated, the invention comprises a frame or body 1 of any suitable character mounted on rear driving wheels 2 and front steering wheels 3, the driving wheels being propelled by power communicated thereto from the engine 4 in any suitable or desired manner, and the steering wheels being controlled by a steering gear 5 of any suitable character. As a whole, the machine is a loader, being provided with a hopper 6 for discharging materials into a wagon or into a wheel-barrow, or into the hopper of a mixer, in the usual or well known manner. For the purpose of delivering the sand or gravel or other materials to the hopper 6, which latter is supported in an elevated position by the frame 7 which overhangs the front end of the machine, a conveyer or elevator is employed, comprising a tilting frame or beam 8 which tilts about a horizontal axis provided by the driving shaft 9 mounted in suitable bearings on the frame 7 above the rear driving wheels 2 of the vehicle. Said conveyer or elevator also comprises the upper and lower sprocket wheels 10 and 11 which are suitably mounted at the upper and lower ends of the frame or beam 8, and upon which are supported the parallel endless belts 12, the latter having elevator buckets 13 by which the two belts are connected together and spaced apart the desired distance. It will be seen that these buckets are upside down as they travel downwardly below the inclined frame or beam 8, and are right side up while traveling upwardly above said frame or beam, whereby each bucket is adapted to be filled and to receive its load as it passes under the lower sprocket wheels

11 at the lower end of the conveyer or elevator. In order to give the buckets a short path of travel in a substantially horizontal plane immediately above the surface of the ground or street, idlers 14 are preferably mounted on the under side of the frame or beam 8 near the lower end thereof, and adapted to engage the link belts 12, whereby each bucket travels straight ahead for a short distance after terminating its downward movement and before beginning its upward movement. The conveyer or elevator thus constructed is driven by sprocket chains and sprocket wheels 15, 16, 17 and 18, which are in turn driven by suitable connection with the engine 4 previously mentioned. The upper end of the conveyer or elevator has a spout 19 to receive the sand or gravel or other materials from the buckets when they turn upside down at the upper end of the elevator, and said spout will discharge said materials into the hopper 6 previously described. For the purpose of tilting the conveyer or elevator about its axis 9, a swinging arm 20 is pivoted at 21 to the frame 7 of the machine, and provided with a roller 22 which engages the under side of the frame or beam 8, so that by pulling upward on this arm 20 the lower end of the conveyer or elevator will be raised from the ground, which is necessary, for example, in transporting the machine from one place to another. A drum 23 is suitably mounted near the axis 9 and provided with a rope or other flexible connection 24 which extends to the lower end of the arm 20, so that by rotating this drum, said arm will be pulled upward; and, for this purpose, suitable worm gearing 25, operated by a hand wheel 26, is employed for rotating said drum.

The feeding mechanism by which the materials are thrown into the buckets at the lower end of the conveyer or elevator is as follows: Rotary disks 27 are arranged to rotate in a horizontal plane immediately below the lower end of the elevator, close to the horizontally moving buckets, and are driven by vertical shafts 28 supported in bearings 29 and 30 which are rigidly connected to the sides of the frame or beam 8, so that the disks 27 will be maintained in a horizontal plane close to the surface of the street. It will be seen that these disks have upstanding circular flanges 31 which are provided with vertically disposed slots 32, and which are concentric to the vertical axes provided by the shafts 28, so that a fixed distance is maintained between the two flanges 31 when the mechanism is in operation. The shafts 28 are driven by bevel gear connections 33 with the lower shaft 34 upon which the previously mentioned sprocket wheels 11 are mounted, so that each disk 27 rotates in the direction indicated by the arrows in Fig. 3, and any sand or gravel carried on the disks will be thrown into the mouths of the buckets. Blades 35 extend through the slots 32, each blade being curved in a direction to throw the sand or gravel toward the buckets 13, and each blade being rigid with an arm 36 which is pivoted at 37 to the inner surface of the flange 31, and each blade being curved about the axis provided by the pivotal point 37, whereby each blade is adapted to withdraw through its slot 31 in the flange. Each bearing 30 is integral with a circular head 38 upon the under side of which is a cam groove 39, and the blades are provided at their inner ends and at the free ends of the arms 36 with rollers 40 which travel in said cam groove; and it will be seen that the two cam grooves thus provided are concentric at their outer sides to the vertical axes provided by the shafts 28, but are flattened at their inner sides, whereby the blades 35 are withdrawn endwise within the flanges 31 as they approach the buckets, so that the blades will not strike the buckets while passing the latter; for it will be seen that the sides of the buckets pass close to the flanges 31, along the dotted lines 41, indicated in Fig. 3, and that for this reason the blades must be withdrawn to pass the buckets, as the blades and buckets are traveling in opposite directions. Furthermore, it will be seen that the disks 27 are not concentrically mounted, but are eccentrically mounted, so that they are close together at one time, as shown in Fig. 3, but are farther apart when rotated half-way around from these positions, whereby the edges of the disks which are farthest from the vertical axes provided by the shafts 28 will reach out into the mass of the sand or gravel or other materials and take on a load and carry it around to the buckets. The blades 35, of course, help to carry the materials around and serve to throw them into the mouths of the buckets, each bucket passing just above the upper surfaces of the two disks.

With this arrangement, therefore, and by crowding the machine forward into a mass or heap of sand or gravel or other materials, the feeding mechanism comprising the disks 27 and the blades 35 will deliver the materials practically continuously to the buckets, and the materials on the street can be taken upwardly to the spout 19, as previously described. The feeding mechanism thus constructed and automatically operated by the conveyer or elevator itself, serves to insure a full loading of the buckets, and expedites the transferring of the materials from the street to the mixer, or to wagons or other receptacles for any desired purpose. The disks 27 are preferably keyed on the lower ends of the shafts 28, so that they can be removed, and for this purpose the shafts 28 may be detachably connected with the bevels

33, by set screws or other means, so that each shaft can be dropped downwardly endwise to disengage the blades from the cam groove 39, and so that the disks 27 can be detached from the two vertical shafts, when such is necessary or desirable. The cam grooves 39 are preferably of the shape shown in Fig. 3, so that the blades 35 will be drawn into the housing provided by the flanges 31 as they approach the buckets, and so that each blade will be projected outwardly again as soon as it is sufficiently in rear of the buckets, or has passed the latter, and each blade is fully extended or projected for practically one half of a revolution while passing around at the outer sides of the two rotary feeders thus provided. In this way the blades and disks cooperate to practically continuously scrape or throw the sand or gravel or other materials around in a direction toward the mouths of the oncoming buckets.

While the feeding mechanism thus constructed and operated is shown in connection with the elevator of a loader of a certain type, it will be understood that the invention is not limited to a machine of this particular character, but may be used in conjunction with conveyers or elevators for any desired purpose.

With the construction shown and described, the blades 35 are, of course, wiped clean of any mud or dirt when they slide inwardly through the slots 32 in the manner described. In this way, therefore, the flanges 31 serve as cleaners for the blades.

Each blade 35, of course, is in the nature of a shovel-like member for sweeping the materials from the heap or mass on the ground toward the mouths of the oncoming buckets. Each said member 35 has a vertical axis 37 about which it operates, having swinging movement about this axis, and in addition means are provided, as explained, whereby this vertically disposed axis 37 has a shifting movement during the operation of the feeder thus provided for facilitating the loading of the buckets. Each shovel-like member, of course, by reason of the character of the mechanism shown and described, has a non-circular path of travel during the operation of the feeder—that is to say, the member does not travel around in a true circle. Each shovel-like member, of course, is arranged to operate in the horizontal plane in which the buckets of the elevator are compelled to move forward a distance toward the heap or mass of materials, whereby in this way the shovel-like member digs into the heap or mass of materials and sweeps a shovelful thereof directly into the mouth of an oncoming bucket, so that the latter are properly filled before they travel upwardly toward the top of the elevator.

From the foregoing it will be seen that feeding means are provided, in the form of shovel-like blades, which are movable in a horizontally disposed plane, thereby to sweep the materials out of the mass toward the oncoming empty bucket, the latter being movable into said plane to receive the materials, so that the bucket and the feeding means travel toward each other in the same plane to load the bucket.

What I claim as my invention is:—

1. In a wagon loader, the combination of an elevator extending upwardly and provided with an endless series of buckets, and feeding mechanism comprising an eccentrically mounted disk arranged to rotate about a vertically disposed axis to carry the materials around to the buckets, thereby to facilitate the loading of the buckets from a heap or mass of materials.

2. In a wagon loader, the combination of an elevator extending upwardly and provided with an endless series of buckets to carry the materials, and feeding mechanism comprising one or more pivoted blades arranged to operate horizontally in the plane in which the buckets travel forward while loading at the lower end of the elevator, thereby to shovel the materials into the mouths of the oncoming buckets, to facilitate the loading thereof from a heap or mass of said materials.

3. A structure as specified in claim 1, in combination with a plurality of blades cooperating with said disk to deliver the materials to the buckets, and a cam groove for controlling said blades to cause each blade to withdraw in passing the buckets.

4. A structure as specified in claim 2, in combination with a disk below said blade or blades, and a cam groove for controlling the pivoted action of said blade or blades, thereby to prevent the blade or blades from entering the path of the oncoming buckets.

5. A structure as specified in claim 1, in combination with a similar disk, the two disks being disposed at opposite sides of the buckets, and each disk extending under the buckets.

6. A structure as specified in claim 2, in combination with another feeding mechanism of similar character, one mechanism being disposed at one side of the path of travel of the buckets, and the other mechanism being disposed at the opposite side thereof, so that the blades at opposite sides all operate in the same plane in which the buckets move forward while filling and thus cooperate to shovel the materials into the buckets.

7. In mechanism for feeding and conveying materials, the combination of a disk mounted to rotate about a vertical axis, a stationary head disposed over said disk, said head having a cam groove on its under side, blades pivotally mounted on the disk, means on said blades to engage said cam groove,

and carrying means to receive the materials carried around by the disk and blades, said cam groove being concentric at the outer side and flattened at its inner side to cause the blades to withdraw while passing said carrying means.

8. A structure as specified in claim 7, said disk having an upstanding concentric flange provided with slots through which said blades project and through which the blades are withdrawn into the housing formed by the flange and head.

9. A structure as specified in claim 7, in combination with a similar disk and blade mechanism, one mechanism being disposed at one side of the path of travel of said carrying means, and the other mechanism being disposed at the other side of said path of travel, whereby the two oppositely arranged disks and the two oppositely arranged sets of blades cooperate to deliver the materials from a mass or heap to the carrying means.

10. A structure as specified in claim 1, in combination with devices which are operable to maintain said mechanism in operative position close to the surface of a street, so that the heap or mass on the ground may be reached thereby, or to cause the mechanism to rise from the street, and for pushing the mechanism forward into said mass.

11. A structure as specified in claim 2, in combination with instrumentalities for tilting the elevator to vary the height of said mechanism above the surface on which the heap or mass is supported, and for thus tilting the plane in which said blades operate.

12. A structure as specified in claim 7, in combination with instrumentalities for moving said mechanism up and down, so that said disk can be maintained in operative position close to the surface of the street, and whereby the entire mechanism can be raised a distance above the street.

13. A structure as specified in claim 1, in combination with means whereby said disk is driven by the elevator to cause the disk to swing eccentrically below the buckets.

14. A structure as specified in claim 2, in combination with means whereby said mechanism is operated continuously by power communicated thereto by said elevator.

15. A structure as specified in claim 2, in combination with means for wiping the blade or blades clean while passing the buckets.

16. In a wagon loader, the combination of an elevator having buckets arranged to travel downward and then forward and then upward to carry materials upward from a heap or mass on the ground, and a pivoted shovel-like member disposed in position to operate in the horizontal plane in which the buckets travel forward, said member being mounted to operate about a vertically disposed axis, and mechanism for causing the operation of said member to sweep the materials from the heap or mass into the mouths of the oncoming buckets.

17. A structure as specified in claim 16, said member being disposed at one side of the lower end of said elevator, in combination with a similarly operated shovel-like member at the other side of said elevator, the two members having movement toward each other in said horizontal plane to cooperate in feeding the forwardly moving materials to the elevator buckets.

18. A structure as specified in claim 16, comprising means whereby said vertical axis has a shifting movement horizontally during the operation of feeding the materials to the elevator buckets.

19. A structure as specified in claim 16, comprising means whereby said shovel-like member has a non-circular path of travel in said horizontal plane during the operation thereof.

20. In combination, a conveyer bucket, driving means whereby said bucket moves forward toward the mass of materials to be conveyed away, rotary feeding means for throwing the materials into the oncoming bucket, said feeding means having movement toward the bucket in a horizontally disposed plane, and said bucket having substantial horizontal movement in said plane to receive the materials from said feeding means, so that said bucket and feeding means move toward each other in the same horizontal plane while the bucket is loading, and means for controlling the operation of said feeding means to cause the latter to avoid the path of said buckets.

21. In combination, a conveyer bucket, driving means whereby said bucket moves forward toward the mass of materials to be conveyed away, and feeding means for throwing the materials into the oncoming bucket, said feeding means having movement toward the bucket in a horizontally disposed plane, and said bucket having movement into said plane to receive the materials from said feeding means, so that said bucket and feeding means move toward each other while the bucket is loading, said feeding means comprising a pivoted blade adapted to shovel the materials from said mass into the bucket.

22. In combination, a conveyer bucket, driving means whereby said bucket moves forward toward the mass of materials to be conveyed away, rotary feeding means for throwing the materials into the oncoming bucket, said feeding means having movement toward the bucket in a horizontally disposed plane, and said bucket having movement in said plane to receive the materials from said feeding means, so that said bucket and feeding means move toward each

other in the same horizontal plane while the bucket is loading, means being provided whereby said bucket moves in a straight line for a distance in said plane while receiving the materials from said feeding means, and means for controlling the operation of said feeding means to cause the latter to avoid the path of said buckets.

23. In combination, a conveyer bucket, driving means whereby said bucket moves forward toward the mass of materials to be conveyed away, and feeding means for throwing the materials into the oncoming bucket, said feeding means having movement toward the bucket in a horizontally disposed plane, and said bucket having movement into said plane to receive the materials from said feeding means, so that said bucket and feeding means move toward each other while the bucket is loading, said feeding means comprising blades disposed at opposite sides of said bucket and operating in said plane to cooperate with each other in loading the bucket.

24. In combination, horizontally mounted rotary feeding means for moving materials in a horizontally disposed plane, by movement therewith in said plane, and conveying means movable a distance in the same horizontal plane toward said feeding means to receive the materials.

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