April 20, 1926. 1,581,685

F. OLDROYD

LOADING MACHINE

Filed August 15, 1923 5 Sheets-Sheet 1

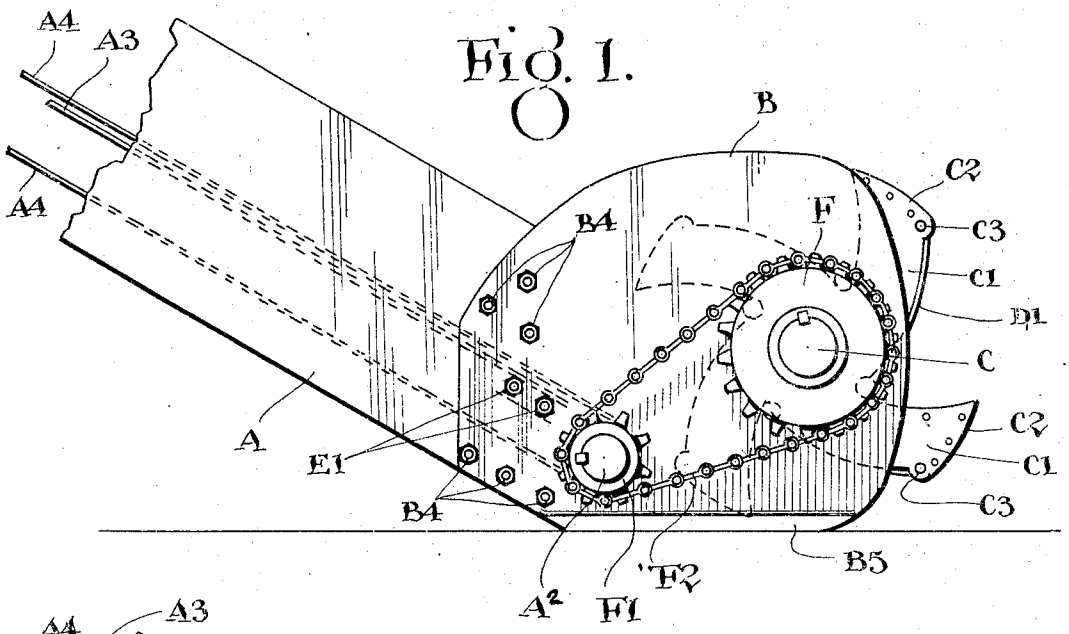


FIG. 1.

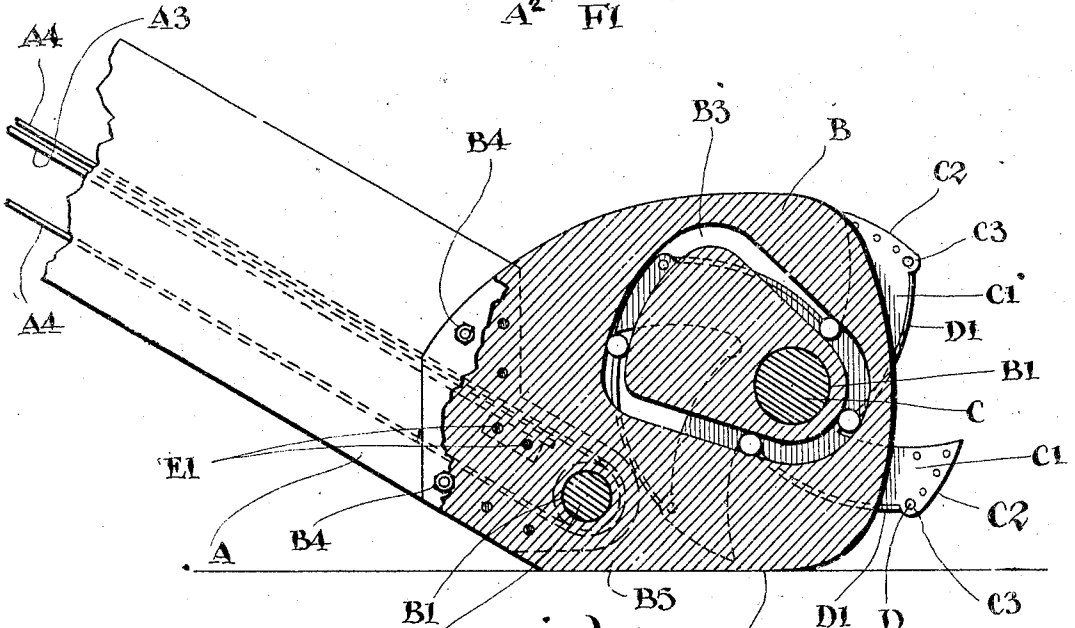


FIG. 2.

Inventor

Fred Oldroyd

By Cyrus Keller

Attorney

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Fig. 3.

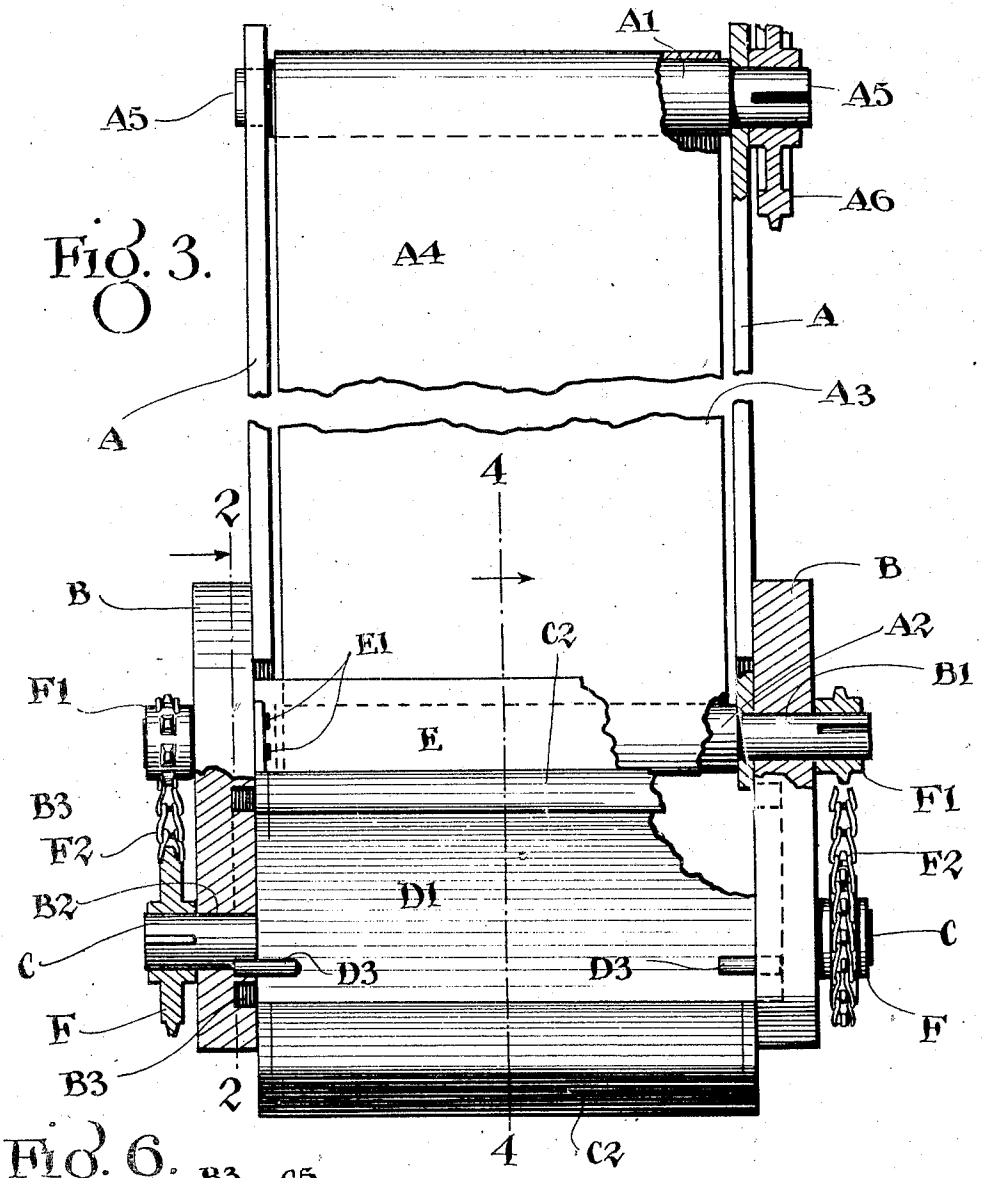
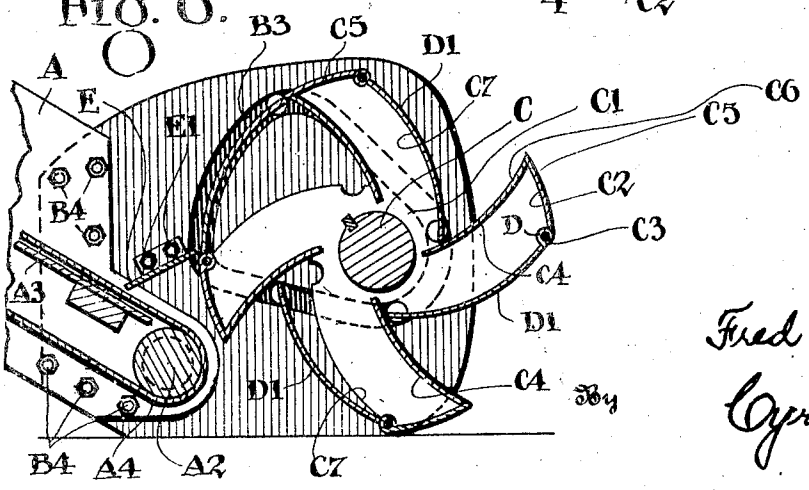


Fig. 6.



Inventor

Fred Oldroyd

By Cyrus Keller

Attorney

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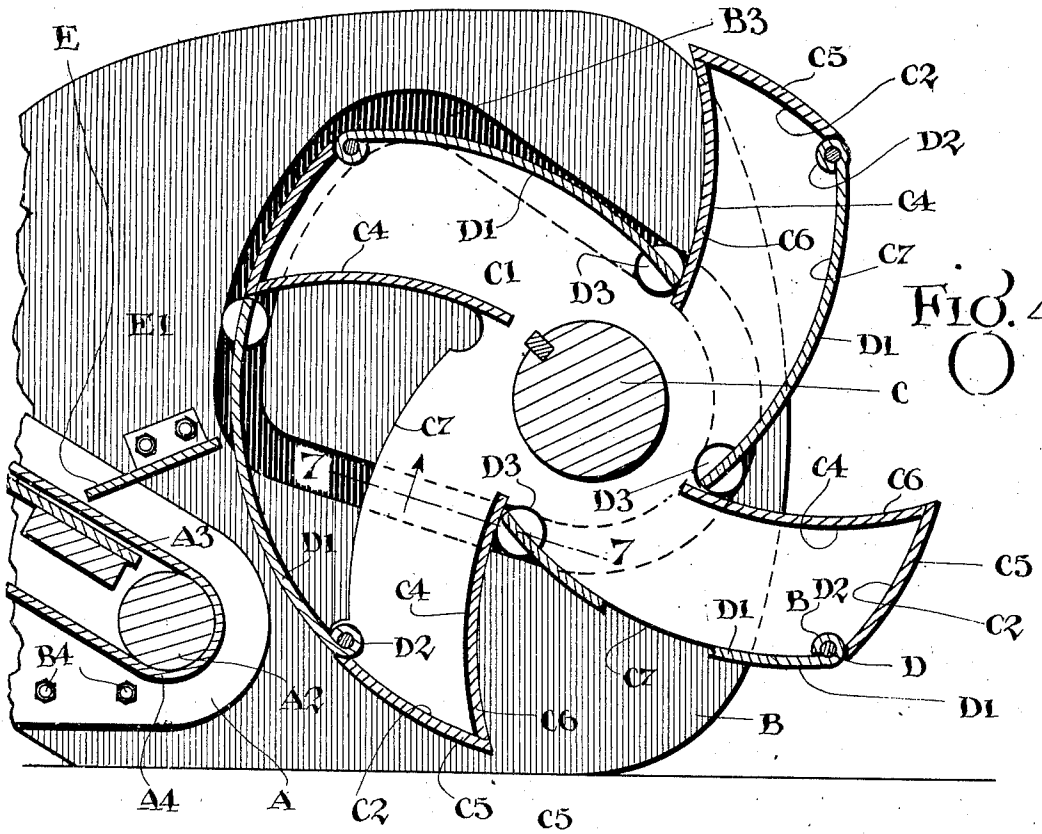


FIG. 4.

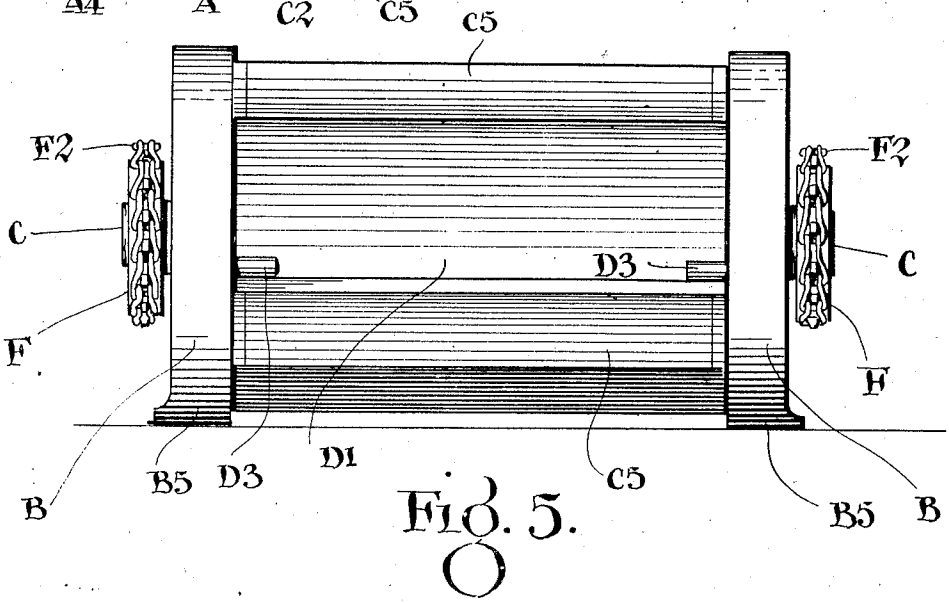


FIG. 5.

Inventor

Fred Oldroyd

By Cyrus Keller

Attorney

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LOADING MACHINE

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Fig. 12.

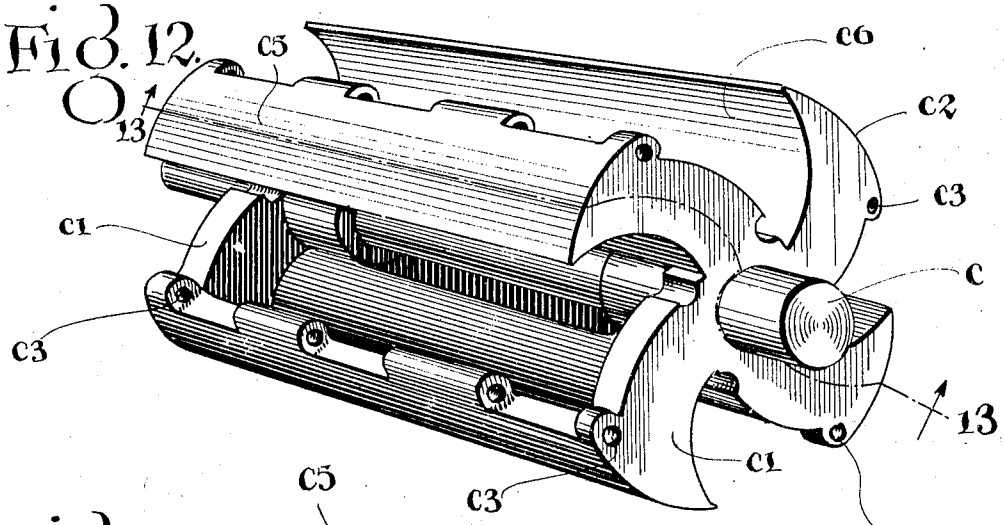


Fig. 13.

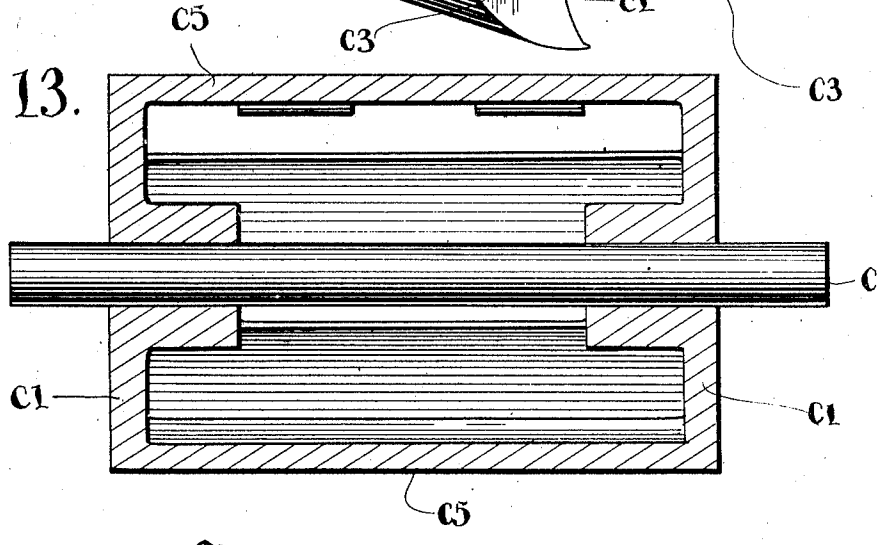
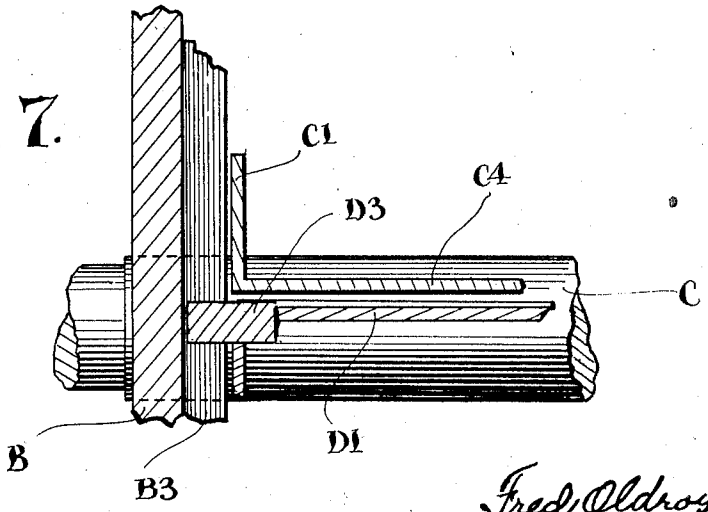


Fig. 7.



Inventor

By Fred Oldroyd
Cyrus Keller
Attorney

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Fig. 8.

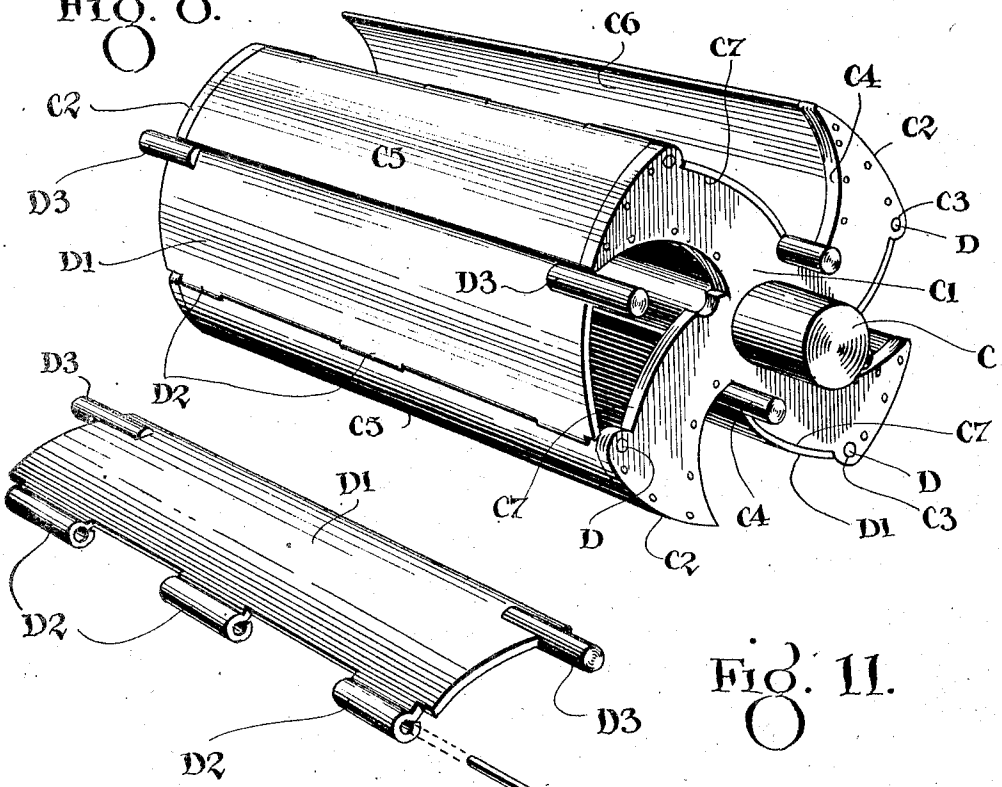


Fig. 11.

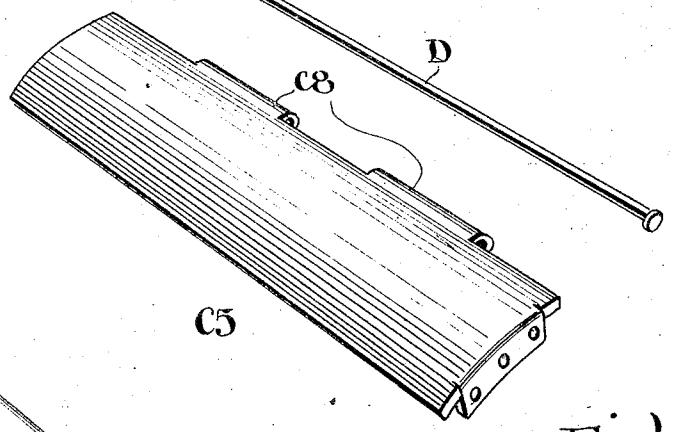


Fig. 10.

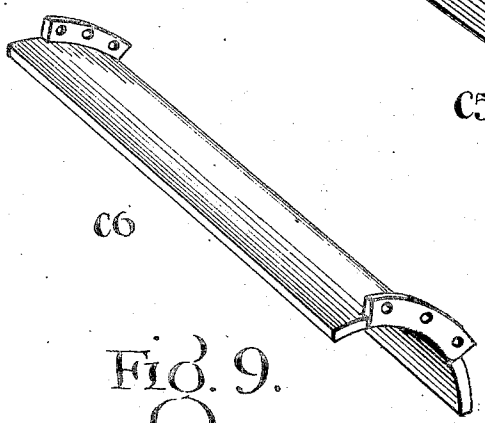


Fig. 9.

Inventor

Fred Oldroyd

By Cyrus Keller

Attorney

Patented Apr. 20, 1926. 1,581,685

UNITED STATES PATENT OFFICE.

FRED OLDROYD, OF CINCINNATI, OHIO.

LOADING MACHINE.

Application filed August 15, 1923. Serial No. 657,600.

To all whom it may concern:

Be it known that I, FRED OLDROYD, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented a new and useful Improvement in Loading Machines, of which the following is a specification, reference being had to the accompanying drawing.

My improvement relates particularly to that type of loading machines wherein a relatively long conveyor frame is supported by wheels adapted to travel on track rails or on a floor, the forward end of the conveyor projecting forward of the supporting wheels and being inclined downward so as to reach to or nearly to the floor level. The conveyor of such machines usually comprises an endless apron or belt upon which the material is deposited at the forward end of the conveyor and then carried rearward upon and discharged from the rear end of said apron. In some cases the endless apron comprises buckets or flights adapted to take material from the floor. In other cases the apron is constructed merely to adapt it to carry material deposited thereon by extraneous means. My improved loading machine belongs to this latter type. That is to say, my machine embodies an elevator having an endless apron which is constructed specially for carrying material deposited thereon, and at the forward end of the conveyor I have provided improved means for taking material from the floor and depositing the same on the forward end of the conveyor apron. The object of my invention is to produce a new conveyor structure comprising efficient conveying means and efficient and effective means at the front of the conveyor structure for taking material from the floor and transferring such material rearward and depositing it upon the conveyor.

In such machines there is usually a truck or body comprising the above-mentioned supporting wheels, and the conveyor structure is hinged to said truck or body on an axial line which is horizontal and transverse to the length of the conveyor; and usually the conveyor structure is also hinged to the truck on an axial line which is upright and cuts the middle longitudinal line of the conveyor structure, the conveyor structure being thus made tiltable in the upright plane on said horizontal axial line and being also adapted to swing horizontally on said upright axial line. Usually, in machines of this general type, the conveyor structure is supported entirely from the truck, the forward end of the conveyor structure being above and clear of the floor. Under those conditions, downward stresses exerted upon the forward end of the conveyor structure cause large strains on the connections between the conveyor structure and the truck. In my improved machine, provision is made for allowing the forward part of the conveyor structure to bear upon the floor when strong stresses are applied in the downward direction to the forward part of the conveyor structure. When the forward end of the conveyor structure thus bears upon the floor, strains are not transmitted from said end to the connections between the conveyor structure and the truck, although the transferring mechanism may be lifting blocks of material weighing hundreds of pounds.

In the accompanying drawings,

Fig. 1 is a side elevation of a structure embodying my improvement;

Fig. 2 is an upright section on the line, 2—2, of Fig. 3, looking toward the right;

Fig. 3 is a plan of the same structure, the upper or rear part of the conveyor being added, and some of the lower parts being broken away;

Fig. 4 is an upright, longitudinal section on the line, 4—4, of Fig. 3, looking toward the right;

Fig. 5 is a front elevation of the structure shown by the preceding figures;

Fig. 6 is a view similar to Fig. 4, the rotary structure having been turned into a different position;

Fig. 7 is a nearly horizontal section on the line, 7—7, of Fig. 4, looking upward;

Fig. 8 is a perspective of the rotary structure;

Fig. 9 is a perspective of one of the inner or concave plates of the rotary structure;

Fig. 10 is a perspective of one of the outer plates of the rotary structure;

Fig. 11 is a perspective of one of the floating plates and the shaft wherewith said plate is hinged;

Figs. 12 and 13 illustrate another form of the rotary structure, Fig. 13 being a section on the line, 13—13, of Fig. 12.

Referring to said drawings, A, A are side walls of the conveyor structure. A^2 is the lower roller. A^3 is the floor extending from one side wall to the other between said rollers. A^4 is the endless apron extending around said rollers and floor. Said apron is to be driven by applying power to the upper roller through the wheel, A^6, on one of the journals, A^5, of the roller, A^1. Said apron may be of any ordinary construction which will afford the strength and durability required for conveying coal and similar materials and for transmitting power to the rotary structure.

To the forward end of the side walls, A, are applied plates, B, which over-lap the side walls, A, and are secured thereto by bolts, B^4. In said walls and plates are bearings, B^1, for the lower roller, A^2.

In the forward part of each of said plates is a bearing, B^2, said bearings being on the same horizontal axial line and receiving the ends of the shaft, C, of the rotary structure which is located between said plates and in front of the apron.

The ends of the shaft, C, project through the bearings, B^2, and support sprocket wheels, F, which are fixed to said shaft. The journals of the roller, A^2, are similarly extended and similarly support sprocket wheels, F^1. Sprocket chains, F^2, are applied to said wheels, so that when the apron is driven power is transmitted through said chains to the rotary structure.

Said rotary structure has at each end a spider, C^1, fixed on the shaft, C. The arms of said spiders are directed forward (relative to movement), the rotary structure turning contra-clockwise as viewed from the right hand side of the machine. The arms of one spider are in alignment with the corresponding arms of the other spider. The outer end of each arms has an edge, C^2, which is concentric to the shaft, C, and all of the arms are of equal length, so that said edges on the same spider travel in the same circular path. At the rear of each edge, C^2, is a bearing, C^3. The forward edge, C^4, of each arm is curved to make it substantially concentric with the bearing, C^3, of the preceding arm.

An outer metal plate, C^5, extends from the edge, C^2, of one arm horizontally across to the corresponding edge of the corresponding arm of the other spider, and said plate is suitably attached to each of said edges. An inner concave plate, C^6, similarly extends from the forward edge, C^4, of one arm to the same edge of the corresponding arm of the spider, and said plate is suitably secured to said edges and also to the forward edge of the plate, C^5. The plates, C^5 and C^6, may be made integral if so desired. These plates together form a structure similar to an angle bar or an angle beam, and this structure has the great strength of an angle bar, each of these plates reinforcing the other, the same as the two flanges of an angle bar or beam reinforce each other. Thus these plates and the spider arms to which they are attached make strong wings adapted to lift heavy masses or lumps of material. Furthermore, these plates are curved in such manner and meet each other in such manner as to form a cutting edge which is adapted to scrape forward on the floor and to cut in a pile of material against which the machine is working. It is to be observed that this cutting edge is well supported, as is needed for the work to be done. It is also to be observed that the hinged edge of the floating plate, D^1, is at the rear of and within the orbital path traversed by said cutting edge and shielded by the wing.

From each bearing, C^3, a rod, D, extends horizontally to the bearing of the corresponding arm in the other spider. In the form shown in the drawings, the ends of said rod extend into bearings and are fixed therein. The functions of said rods are to support the floating plates, D^1, and to join the spiders. Each of said plates is of the form of a rectangular parallelogram and has at each corner and at the middle, on the same side, an ear, D^2, through which the rod, D, extends. By this means said plate is hinged to the rod, D. And in the spaces between the ears, D^2, the plate, C^5, has ears, C^8, through which the rod, D, also extends. Said plate is of sufficient width to bring its free edge close to the adjacent concave plate, C^6. In the form shown in the drawings, the floating plate is curved to conform to the adjacent edges, C^7, of the adjacent spider arms. Said floating plate is adapted to turn on its hinges to move its free edge from the outer edge of the curved plate, C^6, to the inner edge of said plate. At each outer corner of the floating plate is a wrist, D^3, arranged parallel to the rod, D, and projecting into a cam groove, B^3, formed on the inner face of the plates, B, and around the bearing, B^2. During the rotation of the rotary structure, said wrists travel in said groove and thereby rock the floating plate on its hinge.

The distance of said cam groove from said bearing is made such as to cause the wrists, D^3, to lift the free edge of each floating plate to the height of the outer edge of the adjacent plate, C^6, when said floating plate is in the upper part of its orbital path, and to turn each floating plate inward against the spider arms to which it is hinged when said plate is in the lower part of its orbital path and begins its upward movement. Thus, during their upward movement in the orbital path, each pair of spider arms and the outer metal plate and the inner metal

plate on said arms form a working wing or blade which is exposed or uncovered and adapted to scoop material from the floor and carry it upward and rearward across the rotary structure. When, as above stated, the rearward movement of the upper part of the orbital path of the exterior of the wing or blade begins, the free edge of the floating plate is pushed upward and outward, whereby material deposited upon said floating plate will be raised and allowed to slide by gravity toward the apron. In this respect, the floating plate acts first to receive relatively small material and then assume an inclined position for the dumping of said material. While assuming such inclined position, the free edge of the floating plate serves as a wiper for the inner plate, C^6.

Large pieces of material may be engaged and drawn backward toward and upon the apron without being deposited upon the floating plate. For example, one of the wings may engage the under face of a long block of coal at one end of said block and lift said end and draw the entire block toward the conveyor a distance approximately equaling the space between two wings, the next wing then engaging the under face of said block and carrying said block still further, and then the next wing engaging said block and carrying it still further, and so on until the center of gravity of the block is at the side of the rotary structure which is toward the apron, whereupon the apron will also engage the adjacent end of said block, while each succeeding wing will support and move the block still further until the block is fully engaged and carried by the apron. In such a case, while the floating plates do not engage the large block, they receive and discharge smaller pieces of material taken at the same time by the rotary structure.

It is to be observed that the floating plates have two movements, (1) a rocking or oscillating movement on the hinges of the plates, and (2) a bodily movement through an orbital path around the axis of the rotary structure, the oscillating or rocking movements taking place during the movement in the orbital path.

During the operation of the machine as above described, the lower edges, B^5, of the plates, B, may bear upon the ground or floor to take the downward strain exerted by the material handled by the rotary structure.

A fixed chute, E, is shown located between the rotary structure and the apron in such position as to receive material from the rotary structure and deliver it by gravity downward and rearward to the apron, the ends of said chute being secured to the plates, B, by means of bolts, E^1.

In Figs. 12 and 13, the plates, C^5 and C^6, are shown as being cast integral with each other and with the adjacent spider arms, the two spiders and said plates becoming a unitary structure.

I claim as my invention,

1. In a conveyor structure for machines of the nature described, the combination of means on said structure for conducting material rearward lengthwise on said structure, a rotary structure located on the forward end of the conveyor structure and including wings having an outer working edge and floating plates, one floating plate being hinged at the outer part of each wing and within the orbital path traversed by said edge and occupying the space between said wing and an adjacent wing and adapted to be turned on its hinge in said space, and means for turning the floating plates, substantially as described.

2. In a conveyor structure for machines of the nature described, the combination of means on said structure for conducting material rearward lengthwise on said structure, a rotary structure located on the forward end of the conveyor structure and including wings having an outer working edge and floating plates, one floating plate being hinged at the rear of the outer part of each wing and within the orbital path traversed by said edge and occupying the space at the rear of said wing and adapted to be turned on its hinge in said space, and means for turning the floating plates, substantially as described.

3. In a conveyor structure for machines of the nature described, the combination of means on said structure for conducting material rearward lengthwise on said structure, a rotary structure located on the forward end of the conveyor structure and including wings having an outer working edge and floating plates, every wing having a concave face and one plate being hinged at the outer part of each wing and within the orbital path traversed by said edge and opposite the concave face and occupying the space between its hinge and the concave face of an adjacent wing and adapted to be turned on its hinge in said space, and means for turning the floating plates, substantially as described.

4. In a conveyor structure for machines of the nature described, the combination of means on said structure for conducting material rearward lengthwise on said structure, a rotary structure located on the forward end of the conveyor structure and including wings having an outer working edge and floating plates, every wing having its forward face concave and one floating plate being hinged at the rear of the outer part of each wing and within the orbital path traversed by said edge and occupying the space between its hinge and the next following concave face and adapted to be turned

on its hinge in said space, and means for turning the floating plates, substantially as described.

5. In a conveyor structure for machines of the nature described, the combination of means on said structure for conducting material rearward lengthwise on said structure, a rotary structure located on the forward end of the conveyor structure and including wings having an outer working edge and floating plates, every wing having at its outer part and within the orbital path traversed by said edge a rod and one floating plate being hinged to every such rod and occupying the space between its hinge and an adjacent wing and adapted to be turned on its hinge in said space, and means for turning the floating plates, substantially as described.

6. In a conveyor structure for machines of the nature described, the combination of means on said structure for conducting material rearward lengthwise on said structure, a rotary structure located on the forward end of the conveyor structure and including wings having an outer working edge and floating plates, one floating plate being hinged at the outer part of each wing and within the orbital path traversed by said edge and occupying the space between said wing and an adjacent wing and adapted to be turned on its hinge in said space, and cam mechanism for turning the floating plates, substantially as described.

7. In a conveyor structure for machines of the nature described, the combination of means on said structure for conducting material rearward lengthwise on said structure, a rotary structure located on the forward end of the conveyor structure and including wings having an outer working edge and floating plates, one floating plate being hinged at the rear of the outer part of each wing and within the orbital path traversed by said edge and occupying the space at the rear of said wing and adapted to be turned on its hinge in said space, and cam mechanism for turning the floating plates, substantially as described.

8. In a conveyor structure for machines of the nature described, the combination of means on said structure for conducting material rearward lengthwise on said structure, a rotary structure located on the forward end of the conveyor structure and including wings having an outer working edge and floating plates, every wing having a concave face and one floating plate being hinged at the outer part of each wing and within the orbital path traversed by said edge and opposite the concave face and occupying the space between its hinge and the concave face of an adjacent wing and adapted to be turned on its hinge in said space, and cam mechanism for turning the floating plates, substantially as described.

9. In a conveyor structure for machines of the nature described, the combination of means on said structure for conducting material rearward lengthwise on said structure, a rotary structure located on the forward end of the conveyor structure and including wings having an outer working edge and floating plates, every wing having its forward face concave and one floating plate being hinged at the rear of the outer part of each wing and within the orbital path traveresd by said edge and occupying the space between its hinge and the next following concave face and adapted to be turned on its hinge in said space, and cam mechanism for turning the floating plates, substantially as described.

10. In a conveyor structure for machines of the nature described, the combination of means on said structure for conducting material rearward lengthwise on said structure, a rotary structure located on the forward end of the conveyor structure and including wings having an outer working edge and floating plates, every wing having at its outer part and within the orbital path traversed by said edge a rod and one floating plate being hinged to every such rod and occupying the space between its hinge and an adjacent wing and adapted to be turned on its hinge in said space, and cam mechanism for turning the floating plates, substantially as described.

11. In a conveyor structure for machines of the nature described, the combination of means on said structure for conducting material rearward lengthwise on said structure, side plates located on the forward end of the conveyor structure and having cam faces adapted for successively turning the below-mentioned floating plates, a rotary structure located between said side plates and including wings having an outer working edge and floating plates, one floating plate being hinged at the outer part of each wing and within the orbital path traversed by said edge and occupying the space between said wing and an adjacent wing and having on its free edge wrists adapted to make engagement with said cam faces during the rotation of the rotary structure, substantially as described.

12. In a conveyor structure for machines of the nature described, the combination of means on said structure for conducting material rearward lengthwise on said structure, side plates located on the forward end of the conveyor structure and having cam faces adapted for successively turning the below-mentioned floating plates, a rotary structure located between said side plates and including wings having an outer working edge and floating plates, one floating plate being hinged at the rear of the outer part of each wing and within the orbital path traversed

by said edge and occupying the space at the rear of said wing and having on its free edge wrists adapted to make engagement with said cam faces during the rotation of the rotary structure, substantially as described.

13. In a conveyor structure for machines of the nature described, the combination of means on said structure for conducting material rearward lengthwise on said structure, side plates located on the forward end of the conveyor structure and having cam faces adapted for successively turning the below-mentioned floating plates, a rotary structure located between said side plates and including wings having an outer working edge and floating plates, every wing having a concave face and one floating plate being hinged at the outer part of each wing and within the orbital path traversed by said edge and opposite the concave face and occupying the space between its hinge and the concave face of an adjacent wing and adapted to be turned on its hinge in said space and having on its free edge wrists adapted to make engagement with said cam faces during the rotation of the rotary structure, substantially as described.

14. In a conveyor structure for machines of the nature described, the combination of means on said structure for conducting material rearward lengthwise on said structure, side plates located on the forward end of the conveyor structure and having cam faces adapted for successively turning the below-mentioned floating plates, a rotary structure located between said side plates and including wings having an outer working edge and floating plates, every wing having its forward face concave and one floating plate being hinged at the rear of the outer part of each wing and within the orbital path traversed by said edge and occupying the space between its hinge and the concave face of the next following wing and adapted to be turned on its hinge in said space and having on its free edge wrists adapted to make engagement with said cam faces during the rotation of the rotary structure, substantially as described.

15. In a conveyor structure for machines of the nature described, the combination of means on said structure for conducting material rearward lengthwise on said structure, side plates located on the forward end of the conveyor structure and having cam faces adapted for successively turning the below-mentioned floating plates, a rotary structure located between said side plates and including wings having an outer working edge and floating plates, every wing having at its outer part and within the orbital path traversed by said edge a rod and one floating plate being hinged to every such rod the outer part of each wing and opposite the concave face and occupying the space between its hinge and an adjacent wing and adapted to be turned on its hinge in said space and having on its free edge wrists adapted to make engagement with said cam faces during the rotation of the rotary structure, substantially as described.

16. In a conveyor structure for machines of the nature described, the combination of means on said structure for conducting material rearward on said structure, a rotary structure located on the forward end of the conveyor structure and including wings of triangular cross section and having an outer working edge and floating plates, one floating plate being hinged at the outer part of each wing and within the orbital path traversed by said edge and said plate occupying the space between said wing and an adjacent wing and adapted to be turned on its hinge in said space, and means for turning the floating plates, substantially as described.

17. In a conveyor structure for machines of the nature described, the combination of side plates, a rotary structure located on the forward end of the conveyor structure and including wings having an outer working edge and floating plates, one floating plate being hinged at the outer part of each wing and within the orbital path traversed by said edge and occupying the space between said wing and an adjacent wing and adapted to be turned on its hinge in said space, and means for turning the floating plates, substantially as described.

In testimony whereof I have signed my name, this 31st day of July, in the year one thousand nine hundred and twenty-three.

FRED OLDROYD.