Oct. 25, 1927. 1,646,815

C. E. GLASSEN

DUMPING APPARATUS

Filed Jan. 29, 1926 2 Sheets-Sheet 1

FIG. I

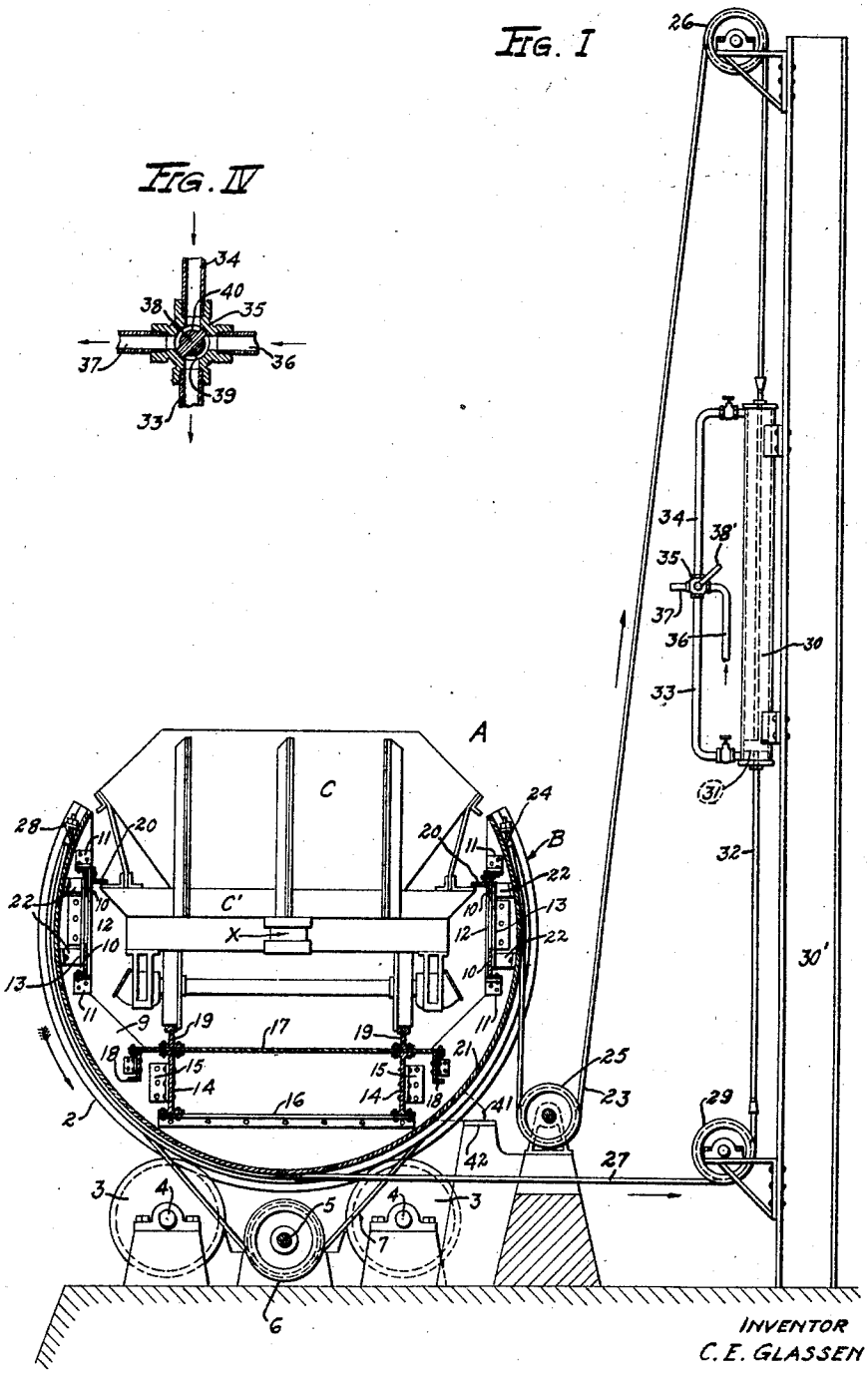


FIG. IV

INVENTOR
C. E. GLASSEN

BY Cook & McCauley
ATTORNEYS

Oct. 25, 1927. 1,646,815

C. E. GLASSEN

DUMPING APPARATUS

Filed Jan. 29, 1926 2 Sheets-Sheet 2

Fig. II

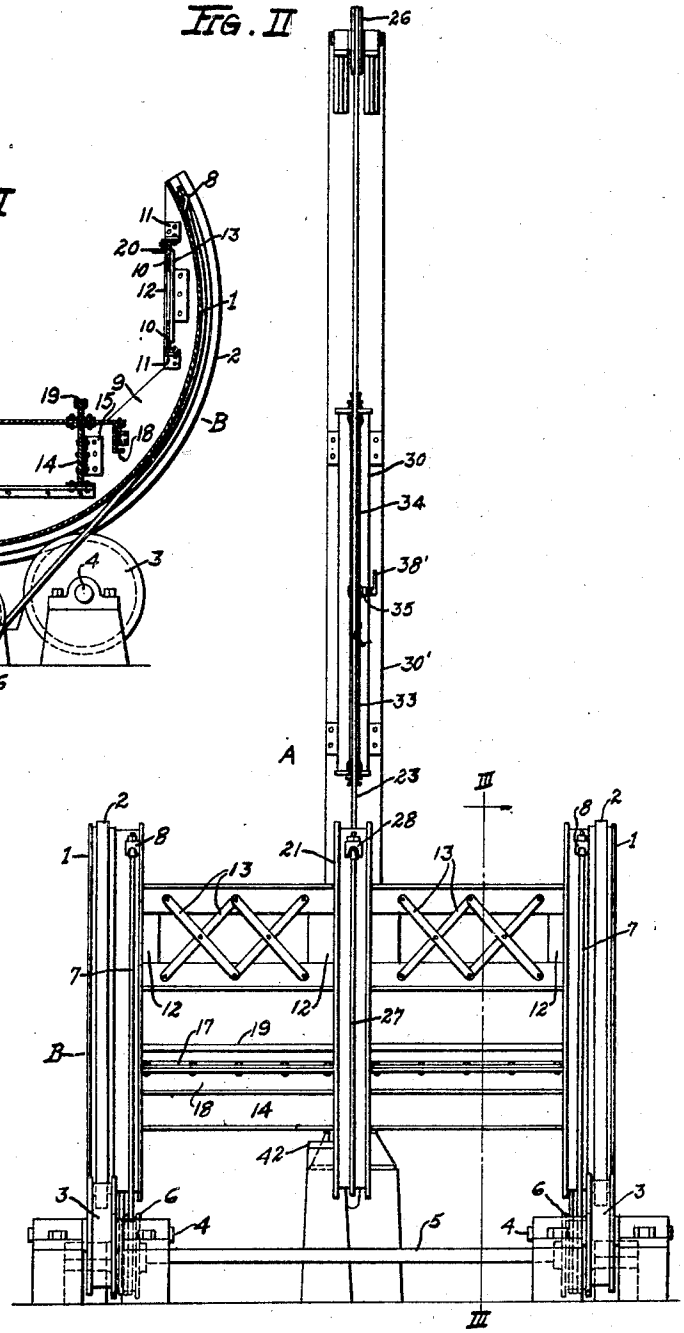
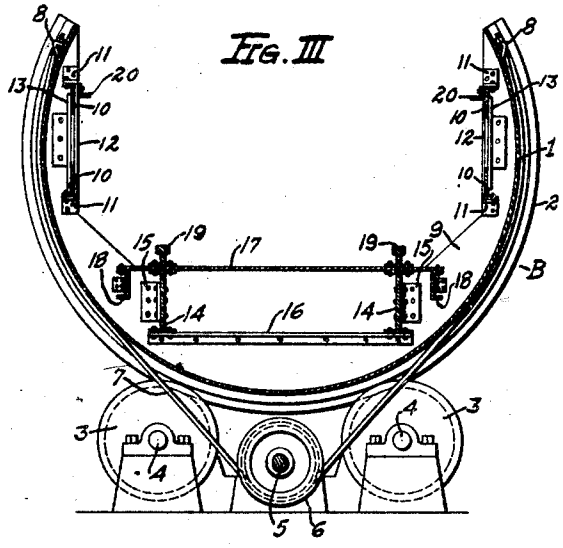


Fig. III



INVENTOR
C. E. GLASSEN

BY Cook & McCauley
ATTORNEYS

Patented Oct. 25, 1927. 1,646,815

UNITED STATES PATENT OFFICE.

CHARLES E. GLASSEN, OF COLUMBIA, ILLINOIS, ASSIGNOR TO COLUMBIA QUARRY COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF MISSOURI.

DUMPING APPARATUS.

Application filed January 29, 1926. Serial No. 84,584.

This invention relates generally to dumping apparatus, and particularly to a compressed air controlled dumping apparatus intended for use in dumping the contents of railroad cars therefrom, the main object of the invention being to produce a dumping apparatus so constructed and arranged that same may be operated to dump a very heavy railroad car by air pressure which would be insufficient to dump said railroad car in the absence of my improved arrangement.

With the foregoing and other objects in view, the invention comprises the novel construction, combination and arrangement of parts hereinafter more specifically described and illustrated in the accompanying drawings, wherein is shown the preferred embodiment of the invention. However, it is to be understood that the invention comprehends changes, variations and modifications which come within the scope of the claims hereunto appended.

Fig. I is a vertical section taken through my improved dumping apparatus showing a railroad car in place thereon, parts of the apparatus being shown in elevation.

Fig. II is a side elevation of my improved dumping apparatus.

Fig. III is a vertical section taken on the line III—III of Fig. II.

Fig. IV is a sectional detail illustrating the valve arrangement whereby the passage of compressed air to and from the air cylinder is controlled.

In the drawings A designates my improved dumping apparatus, which comprises a tiltable element B adapted to receive a railroad car C. The tiltable element B comprises a pair of arcuate members 1 which are arranged at opposite ends of said tiltable element, as shown in Fig. II, and each individual arcuate member is provided with a raised arcuate track 2 which extends from end to end of the arcuate member. Arranged at each end of the tiltable element B is a pair of idler rollers 3, said rollers each being mounted on a stud shaft 4 which is rotatably arranged in suitable bearings supported by the base of the apparatus. The idler rollers 3 are capable of independent movement, and each of said rollers is provided with an annular groove formed in the circumferential face thereof. The pairs of idler rollers 3 at the opposite ends of the tiltable element B are in vertical alinement with the arcuate members 1, and the raised tracks on said arcuate members extend into the annular grooves in the circumferential faces of said rollers whereby said tiltable element B is rotatably supported by said rollers.

5 designates a shaft which is extended longitudinally of the apparatus at the approximate transverse center thereof, said shaft being located immediately below the tiltable element B as shown in Figs. I and III. Fixed to the shaft 5 is a pair of pulleys 6, said pulleys being arranged below portions of the oppositely disposed arcuate members 1, as shown in Fig. II. 7 designates a pair of cables which are arranged at the opposite ends of the tiltable element B, as shown in Fig. II, the opposite ends of said cables being secured to clips 8 which are in turn attached to the arcuate members 1, and said cables are each wound at least once entirely around the associated pulley 6. Each of the cables 7 is secured at its approximate center to the associated pulley 6 and portions of said cables are in contact with arcuate faces of the arcuate members 1, as shown in Fig. II.

By referring to Figs. I and II it will be noted that each of the arcuate members 1 is provided with an end wall 9, and these oppositely disposed walls constitute the end walls of the tiltable element B. The end walls 9 just mentioned are cut away to permit the railroad car C to pass into and out of the tiltable element B, as shown in Fig. II.

Extended longitudinally of the tiltable element B of the apparatus at the opposite sides thereof are pairs of angle bars 10, said angle bars being secured to the oppositely disposed end walls 9 by means of suitable attaching plates 11. 12 designates vertically arranged plates, a plurality of which is associated with each pair of angle bars 10, said plates 12 being extended from the upper to the lower angle bar of each pair of angle bars to add rigidity to the structure. Also, the angle bar structure at the opposite sides of the tiltable element B are further strengthened by cross braces 13.

Extended longitudinally of the tiltable element B from one end wall 9 thereof to the opposite end wall is a pair of I-beams 14 which are secured to said end walls 9 by means of suitable attaching plates 15.

Also, the opposite end portions of the I-beams 14 rest upon and are secured to angle bars 16 which are in turn secured to the end walls 9. 17 designates a bed plate which is supported by the I-beams 14, said bed plate being extended longitudinally of the tiltable element B from end to end thereof and being extended transversely of said tiltable element a considerable portion of its width, as shown in Figs. II and III. Located beneath the opposite side marginal portions of the bed plate 17 is a pair of channel beams 18, which are secured to the opposite end walls 9 of the tiltable element. The side portions of the bed plate 17 are secured to the channel bars 18, whereby said channel bars aid in supporting said bed plate 17. 19 designates a pair of railroad rails which are supported by and are secured to the bed plate 17, said rails providing a trackway on which the railroad car to be dumped may be moved into the tiltable element B.

The railroad car C illustrated in Fig. I is of a type now in general use and said car is provided with sills C'. 20 designates angle members which are secured to the plates 13 at the opposite sides of the tiltable element B, said angle members being so arranged that the sills C' of the railroad car C will be located beneath said angle bars, as shown in Fig. I, hence when the tiltable element B is tilted to dump the contents of the railroad car, said angle members will prevent said railroad car from being displaced from the rails 19.

Located at the approximate longitudinal center of the tiltable element B is an arcuate member 21, approximately channel-shaped in cross section. When viewed in a direction longitudinal of the tiltable element the member 21 has the same shape as the arcuate members 1 already described, and said arcuate member 21 is rigidly fixed to the oppositely disposed angle bars 10 by means of suitable attaching plates 22, so that it will rotate as a part of the tiltable element. 23 designates a cable, one end of which is fixed to the arcuate member 21 at an end thereof by means of a clip 24. The cable 23 passes downwardly from its point of attachment to the member 21 and passes around a sheave 25, said cable then passing upwardly to and around a sheave 26 from which said cable passes downwardly. 27 designates a second cable which is secured to the arcuate member 21 at the end thereof opposite to the end at which the cable 23 is attached (Fig. I), said cable 27 being secured to said member 21 by means of a clip 28. The cable 27 passes downwardly around the arcuate member 21 from the point where it is attached thereto and then extends horizontally to and around the sheave 29 and upwardly therefrom. 30 designates a compressed air cylinder of ordinary construction within which is arranged for reciprocation a piston 31. The piston 31 is arranged intermediate the ends of an elongated piston rod 32, the arrangement being such that portions of said piston rod extend for considerable distances above and below the piston. The air cylinder is, of course, provided with usual stuffing boxes to prevent the escape of compressed air around the piston rod 32 at the opposite ends of said cylinder. The compressed air cylinder 30 and the sheaves 26 and 29 are supported by a suitable standard 30'. By referring to Fig. I it will be noted that the end of the cable 23 opposite to the end thereof which is secured to the arcuate member 21 is fixed to the upper end of the piston rod 32 in any suitable manner, and also the end of the cable 27 opposite to the end thereof which is secured to said arcuate member 21 is fixed to the lower end of said piston rod 32. 33 designates an air conductor which leads to the lower end of the air cylinder 30 below the piston 31, and 34 designates an air conductor which leads to the upper portion of the air cylinder above said piston 31.

35 designates a four-way valve adapted to be actuated to cause compressed air to be introduced either into the upper or lower portions of the air cylinder 30. Associated with the valve 35 is a compressed air inlet conductor 36, and 37 designates an air outlet conductor, said inlet conductor 36 being adapted to conduct compressed air to the housing of the valve 35 and the exhaust conductor 37 being intended to conduct compressed air away from said valve housing. By referring to Fig. IV it will be noted that the valve 35 includes a rotatable portion 38 having a pair of arcuate air passageways 39 and 40. The rotatable portion 38 of the member 35 is capable of being rotated by turning the handle 38' to a point where the arcuate air passageway 39 is in communication with the inlet conductor 36 and the conductor 33 and where the conductor 34 is in communication through the passageway 40 with the exhaust conductor 37. With the rotatable member arranged as described compressed air will be introduced into the lower end of the air cylinder 30 and will move the piston upwardly therein, at the same time causing the compressed air above the piston to be exhausted through the conductor 34, passageway 40 and exhaust conductor 37. It is plain, however, that the rotatable member 38 is capable of being rotated to cause the passageway 40 to communicate with the inlet conductor 36 and conductor 34, while the passageway 39 communicates with the conductor 33 and exhaust conductor 37 in which position compressed air will be introduced into the upper portion of the air cylinder 30, thereby moving the piston downwardly and causing the air below the piston to be ex-

hausted from the cylinder 30 through the conductor 33, passageway 39 and exhaust conductor 37.

In the operation of my improved dumping apparatus the car or other vehicle to be dumped is moved into the tiltable element B, the rails 19 within said tiltable element of course being alined with the rails along which the car travels. When the car is properly positioned within the tiltable element B the sills C' on said car will be located beneath the angle bars 20, as already described, and as shown in Fig. I. The valve 35 is operated by moving the handle 38' to cause the air passageway 39 in the rotatable member 38 of said valve to be placed in communication with the air inlet conductor 36 and the conductor 33, and as a result of this compressed air will pass into the lower end of the cylinder 30 and will force the piston 31 upwardly. When the piston moves upwardly as described, the cable 27 will be drawn in the direction indicated by the arrow in Fig. I, due to the fact that said cable is attached to the piston rod 32 which moves with the piston, and because the opposite end of the cable 27 is secured to the tiltable member B said tiltable member will be tilted in the direction indicated by the feathered arrow in Fig. I. When the rotatable member 38 of the valve 35 is moved to permit air to pass from the inlet conductor through the passageway 39 and conductor 33 to the lower portion of the cylinder 30 the passageway 40 will be moved into communication with the conductor 34 and exhaust conductor 37, and therefore air which is located within the cylinder 30 and above the piston will be exhausted from said cylinder by the upwardly moving piston. However, the passageway 40 provides a very restricted outlet for the air being exhausted, and as a result the air above the piston will be placed under some pressure by the upwardly moving piston, and because this air is being exhausted very slowly through the restricted passageway 40 the speed of movement of the piston will be greatly reduced. Due to the fact that the cable 23 is attached to the piston rod 32 and tiltable element B, the speed of said tiltable element will be controlled by the speed of the piston, hence the slow exhaust of air from above the piston will cause a braking action to be applied to the tiltable element and prevent the too rapid tilting thereof.

When the tiltable element has been tilted a sufficient distance to permit the contents of the car to be discharged therefrom the valve 35 will again be operated to cause compressed air to be introduced into the upper portion of the cylinder 30, whereby the piston will be moved downwardly, thus drawing the cable 23 in the direction indicated by the arrow in Fig. I and restoring the tiltable element B to its original position. It is apparent when the tiltable element is being restored that the air being exhausted from the lower portion of the cylinder will be compelled to pass through the restricted outlet 39, whereby the speed of the piston and consequently the speed of the tiltable element will be maintained comparatively low.

To provide positive means for compelling the tiltable element to stop in its proper position when it has been restored, I arrange a stop member 41 on said tiltable element which is adapted to contact with a stationary stop element 42.

A point of paramount importance in connection with my invention is that the arrangement is such that the air pressure which causes the car to be dumped need not be nearly as great as it would be if the loaded car were bodily moved by the compressed air. As a matter of fact the air pressure does move the car, but the arrangement is such that the air pressure is greatly assisted, hence, as already stated, the car may be dumped by the use of much less pressure than if the air pressure alone were relied upon to move and dump the car. To make the foregoing clearer, it is pointed out that the tiltable element B and the railroad car C rotate about an axis which is designated by the reference character X in Fig. I. When the tiltable element B is in the position in which it is shown in Fig. I and a loaded car is in place thereon, the load of material in said car is approximately balanced above said axis X. When now compressed air is introduced below the piston 31 all that said air need do is to move the tiltable element B until the load is off of balance, whereupon the weight of the load will cause the tiltable element to be rotated until said tiltable element reaches a position where the load of material will be discharged from the car. Also, when the contents of the car has been dumped the heavy plates and beams which support the railroad car are heavier than the empty car, and as this heavier portion of the tiltable element is elevated when the dumping takes place a relatively small amount of air pressure only is needed to aid gravity in restoring the tiltable element.

The purpose of the cables 7, the pulleys 6 and shaft 5 is to insure both ends of the tiltable element B moving at the same rate of speed, it being plain that because both ends of the tiltable element are connected together by the shaft 5, said opposite ends of said tiltable element will move at the same speed in spite of the fact that the load in the car may be heavier at one end than at the other.

While I have mentioned compressed air as the medium for actuating my improved dumping apparatus, it is apparent that I

may employ steam or any other medium for doing this work, and due to the fact that so little power is needed to effect the dumping operation I may do this work manually.

I claim:

1. A dumping apparatus comprising a tiltable element in the form of a receptacle adapted to receive a vehicle to be dumped, means whereby said tiltable element is rotatably supported, and means whereby said tiltable element may be moved from a load-receiving position to a dumping position, the last mentioned means including a compressed air cylinder, a piston arranged for reciprocation within said compressed air cylinder, flexible connectors movable with said piston and attached to said tiltable element, said piston being adapted to be moved in one direction to tilt said titlable element and in another direction to restore said tiltable element, and restricted passageways through which the compressed air passes whereby the speed of movement of said piston and said tiltable element is retarded.

2. A dumping apparatus comprising a tiltable element in the form of a receptacle having arcuate end portions and adapted to receive a vehicle to be dumped, means within said tiltable element adapted to engage the vehicle and prevent displacement thereof, means comprising rollers on which said tiltable element is mounted whereby said tiltable element is permitted to rotate, means whereby said receptacle may be moved from a load-receiving position to a dumping position, the last mentioned means including a fluid cylinder, a piston arranged for reciprocation within said cylinder, and connectors connecting said piston to said tiltable element, said piston being adapted to be moved in one direction to tilt said tiltable element to a dumping position and in another to restore said tiltable element to a load-receiving position, and means for compelling uniform speed of rotation of the opposite end portions of said tiltable element.

3. A dumping apparatus comprising a tiltable element in the form of a receptacle having arcuate end portions and adapted to receive a vehicle to be dumped, means within said tiltable element adapted to engage the vehicle and prevent displacement thereof, means comprising rollers on which said tiltable element is mounted whereby said tiltable element is permitted to rotate, means whereby said receptacle may be moved from a load-receiving position to a dumping position, the last mentioned means including a fluid cylinder, a piston arranged for reciprocation within said cylinder, and connectors connecting said piston to said tiltable element, said piston being adapted to be moved in one direction to tilt said tiltable element to a dumping position and in another to restore said tiltable element to a load-receiving position, and means for compelling uniform speed of rotation of the opposite end portions of said tiltable element, said means including a shaft extended longitudinally of said tiltable element and having pulleys mounted thereon, and cables secured to said tiltable element at the opposite ends thereof and secured to and passing around said pulleys.

In testimony that I claim the foregoing I hereunto affix my signature.

CHARLES E. GLASSEN.