M. B. JENNINGS.

CAR UNLOADING MACHINE.

APPLICATION FILED APR. 14, 1914.

1,140,461.

Patented May 25, 1915.

4 SHEETS—SHEET 1.

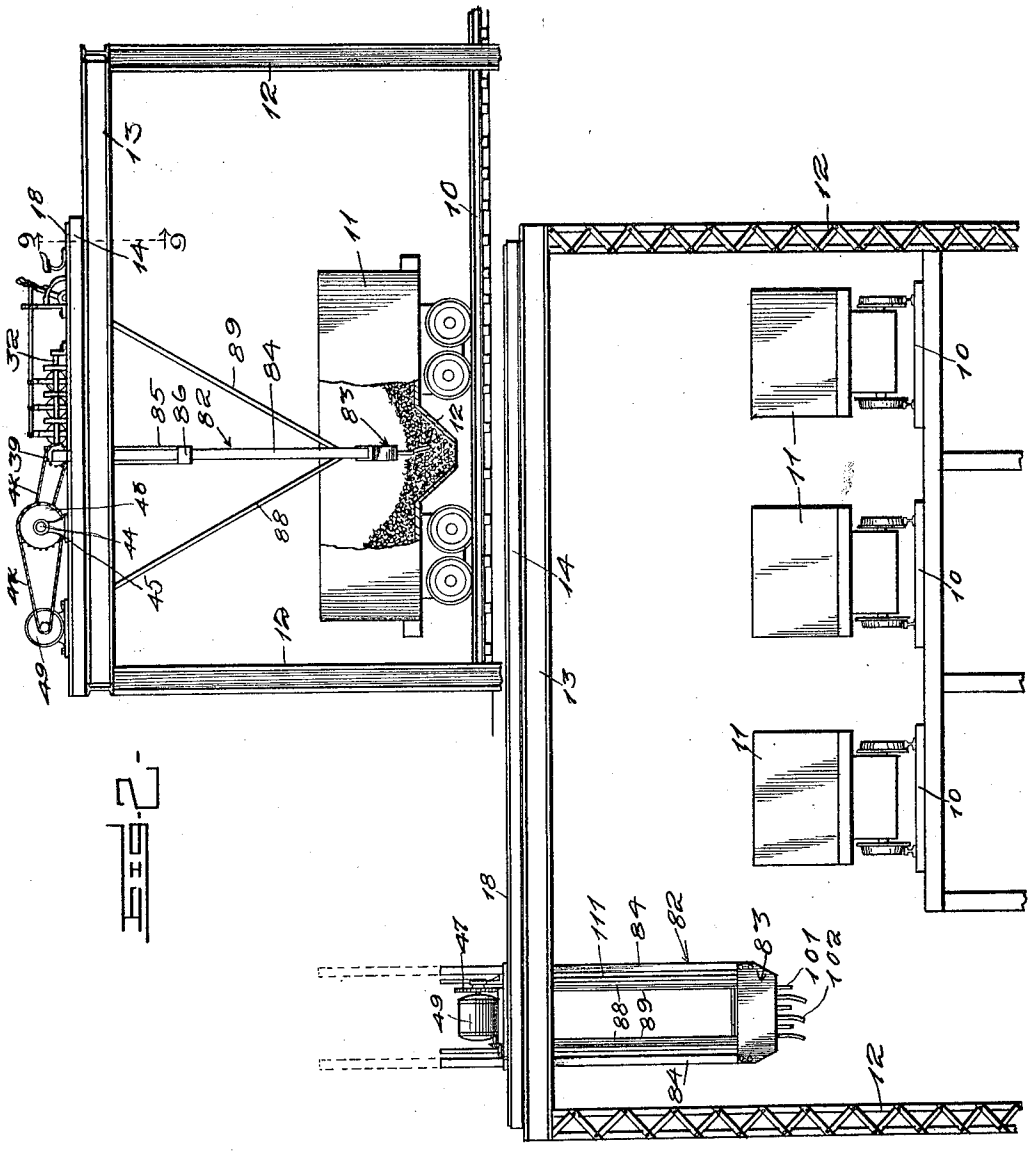


FIG. 2.

FIG. 1.

Witnesses

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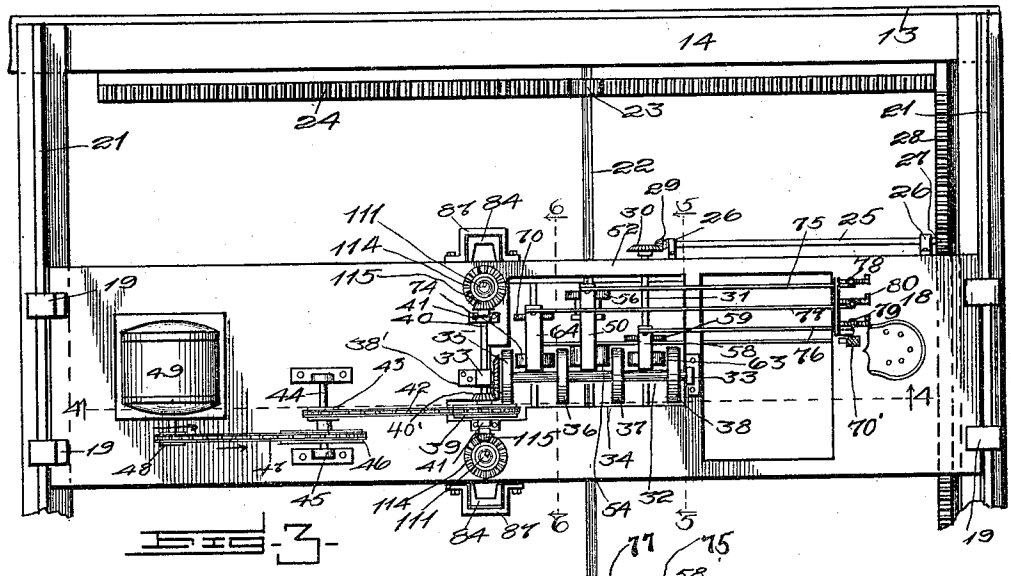


Fig. 3.

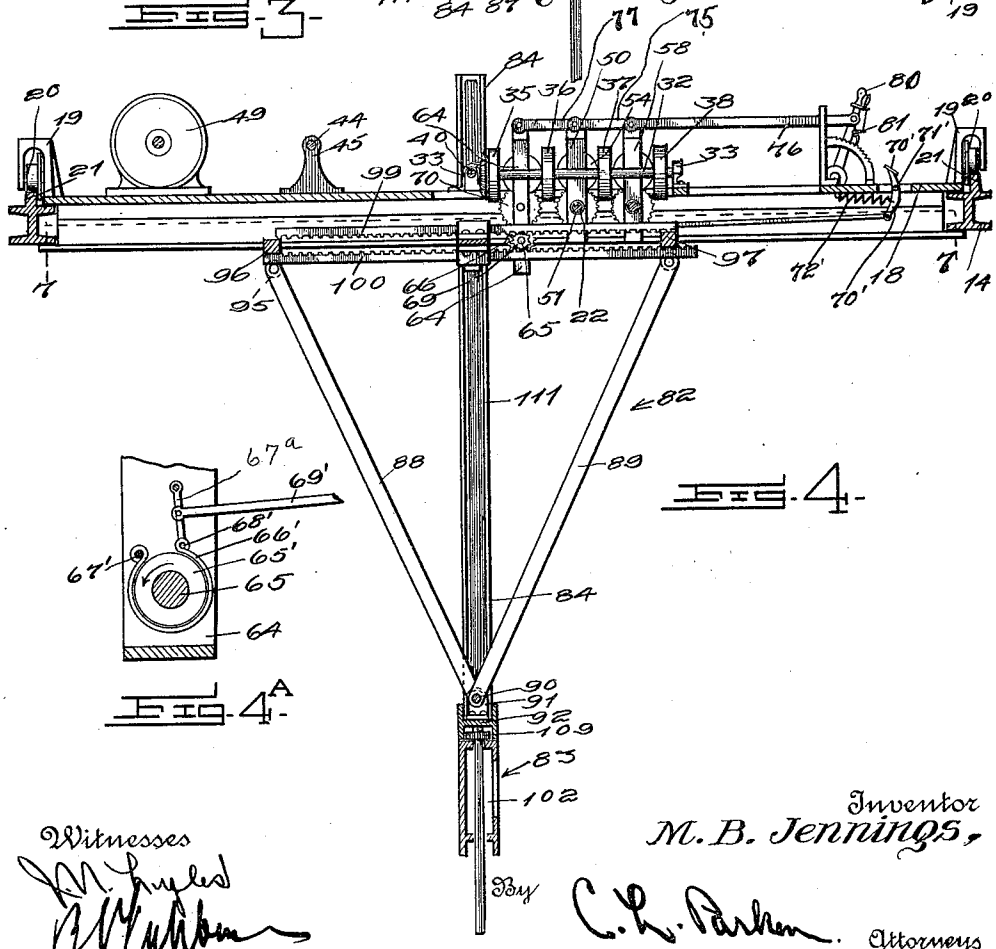


Fig. 4.

Fig. 4A.

Witnesses

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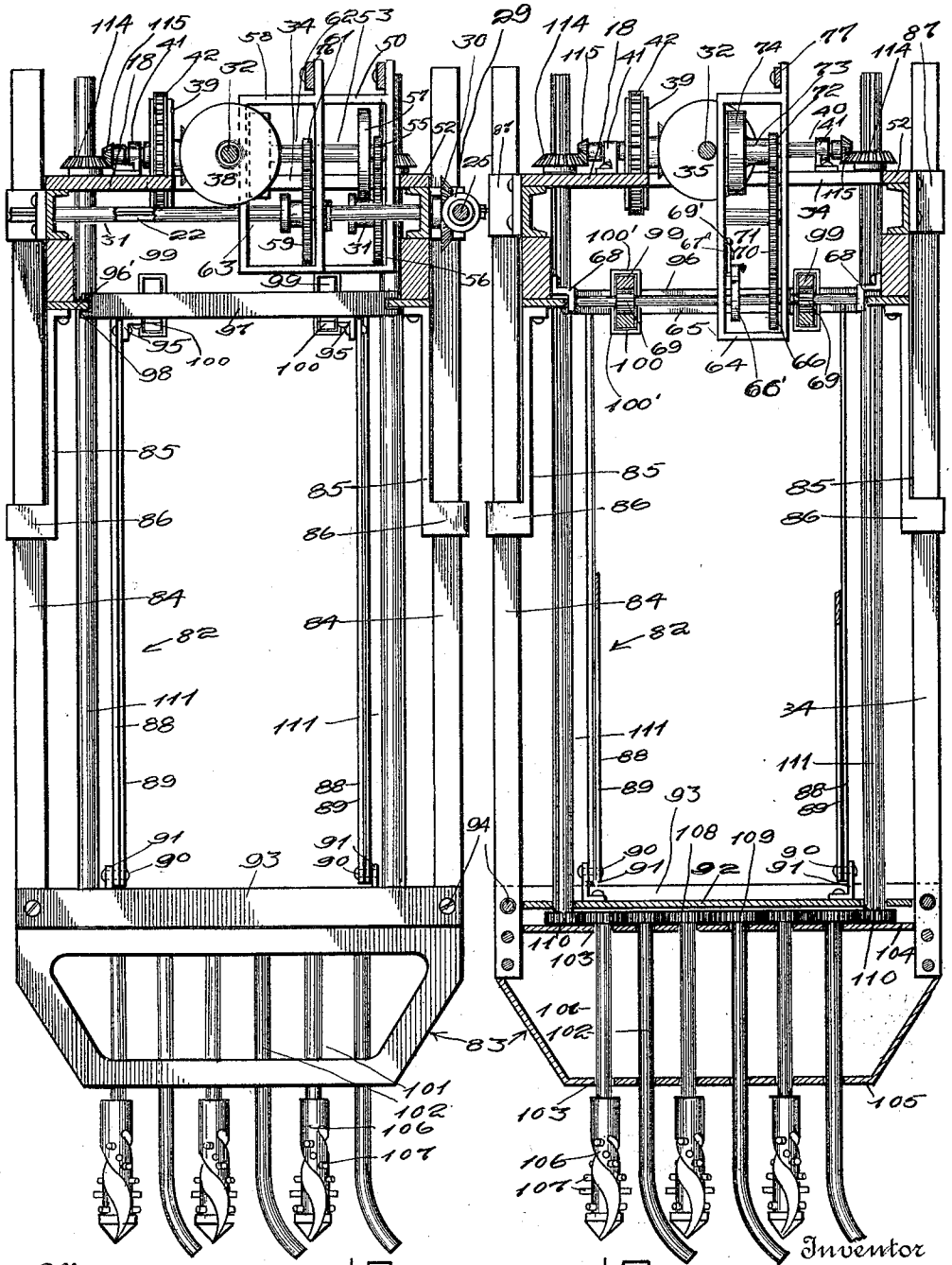
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4 SHEETS—SHEET 3.



Witnesses

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Fig. 5.

Fig. 6.

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4 SHEETS—SHEET 4.

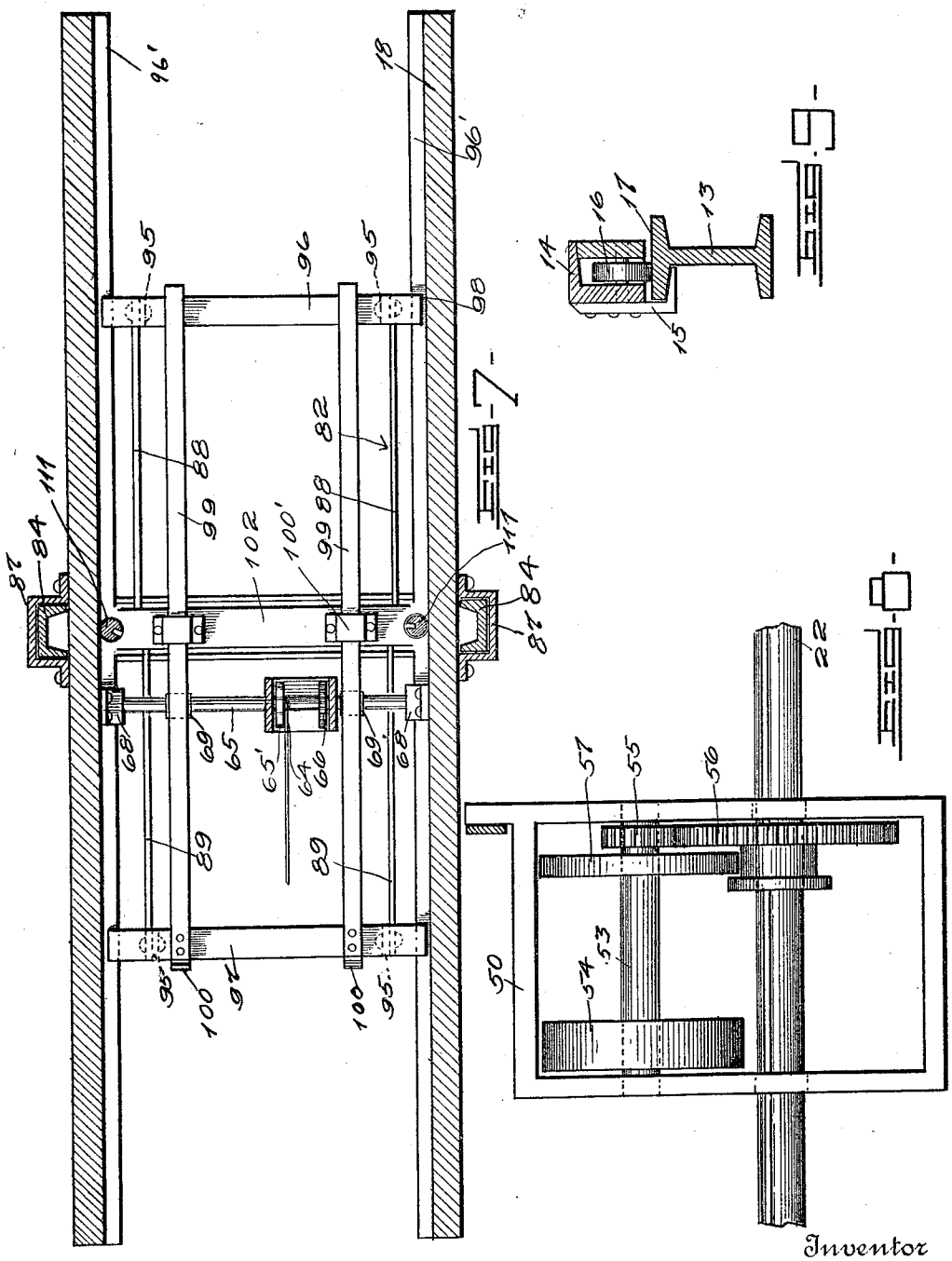


FIG. 1.

FIG. 7.

Witnesses

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UNITED STATES PATENT OFFICE.

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CAR-UNLOADING MACHINE.

1,140,461. Specification of Letters Patent. Patented May 25, 1915.

Application filed April 14, 1914. Serial No. 831,881.

To all whom it may concern:

Be it known that I, MARVIN B. JENNINGS, a citizen of the United States, residing at Omaha, in the county of Boone and State of Arkansas, have invented certain new and useful Improvements in Car-Unloading Machines, of which the following is a specification.

My invention relates to apparatus for removing clogged or caked material from railway cars or other vehicles, particularly coal, coke, or other material from railway cars of the dump type ordinarily having a hopper formed in, adjacent, or near the bottom thereof.

An important object of the invention is to provide apparatus of the above mentioned character, which may be conveniently used in connection with a number of cars, arranged near each other, more or less.

A further object of the invention is to provide apparatus of the above mentioned character, which is comparatively simple in construction, strong, and durable.

A further object of the invention is to provide means for agitating or breaking up the clogged or caked material within a vehicle, dump car, or hopper thereof which will operate in a highly efficient manner.

A further object of the invention is to provide a novel and simple form of transmission gearing for controlling the operation of the different parts of the apparatus.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawings, forming a part of this specification and in which like numerals are employed to designate like parts throughout the same, Figure 1 is a front elevation of apparatus embodying my invention, Fig. 2 is a side elevation of the same, Fig. 3 is a plan view of the same, Fig. 4 is a longitudinal sectional view taken on line 4—4 of Fig. 3, Fig. 4ª is a side elevation of a friction brake included in the apparatus, Fig. 5 is an enlarged transverse sectional view taken on line 5—5 of Fig. 3, Fig. 6 is a similar view taken on line 6—6 of Fig. 3, Fig. 7 is a horizontal sectional view taken on line 7—7 of Fig. 4, Fig. 8 is an enlarged detail elevation of one pivoted frame and associated elements, and, Fig. 9 is an enlarged detail section through one side of the longitudinally movable frame and stationary frame, associated elements being in section, taken on line 9—9 of Fig. 1.

My apparatus embodies a suitable number of upstanding beams or posts 12, to the upper end of which is secured a preferably horizontal relatively stationary main frame 13. Mounted upon this relatively stationary main frame, to move longitudinally thereof, is a frame 14. This longitudinally movable frame or carriage preferably carries brackets 15, (see Fig. 9), rigidly connected therewith to engage with and below the longitudinal sides or beams 17 of the stationary frame 13. Wheels or rollers 16 are carried by the frame or carriage 14 and engage the beams 17, as shown.

As more clearly shown in Figs. 3 and 4, the numeral 18 designates a carriage, mounted upon or within the longitudinally movable frame or carriage 14, to move transversely thereof. This carriage is provided with brackets 19, carrying preferably flanged wheels 20, engaging rails 21 secured to or formed upon the transverse ends of the longitudinally movable frame or carriage 14, as more clearly shown in Fig. 4.

Means are provided to effect the longitudinal movement of the frame or carriage 14, comprising a transverse rotatable shaft 22, which is journaled through the transversely movable carriage 18 and the longitudinal sides of the longitudinally movable frame or carriage 14, as shown. This transverse shaft 22 has pinions or gears 23, rigidly connected with its opposite ends, which are arranged to engage with longitudinal rack-bars 24, arranged within and secured to the longitudinal sides of the relatively stationary frame 13, as shown. It is thus seen that by rotating the shaft 22 in the proper direction, the longitudinally movable frame 14 may be made to travel in the desired direction.

Means are provided (see Fig. 3) to effect the transverse movement of the carriage 18 in either direction comprising a rotatable shaft 25, journaled through bearings 26 secured to the carriage 18. The outer end of the shaft 25 has a pinion or gear 27 rigidly connected therewith, which engages a transverse rack-bar 28, arranged upon the inner side of and secured to the transverse end of the longitudinally movable frame 14, as shown. At its inner end, the shaft 25 is provided with a bevel gear 29, to drive the

same, which is engaged by a bevel gear 30, rigidly mounted upon a transverse shaft 31, as shown in Figs. 3 and 5. This transverse shaft 31 is suitably journaled through portions of the carriage 18, and is arranged below the top of the same.

Arranged above the carriage 18 is a longitudinally extending power distributing shaft 32 (see Figs. 3 and 4), journaled within upstanding bearings 33, rigidly secured to the carriage 18, there being an opening 34 in the carriage below the shaft. Rigidly mounted upon the longitudinal power distributing shaft 32 are friction disks 35, 36, 37, and 38, for a purpose to be described. The shaft 32 is rotated by a bevel gear 38′, driven by a bevel-gear 40′, rigidly secured to a transverse power distributing shaft 40, as shown. A sprocket wheel 39 is secured to the shaft 40, to rotate the same. The sprocket wheel 39 is engaged by a sprocket chain 42, engaging a sprocket wheel 43, rigidly mounted upon a transverse shaft 44. This transverse shaft is journaled through upstanding bearings 45, mounted upon the carriage 18. Rigidly mounted upon the shaft 44 is a large sprocket wheel 46, engaged by a sprocket chain 47, engaging a small sprocket wheel 48, driven by a motor 49, rigidly mounted upon the carriage 18. For the purpose of illustration, I have shown an electric motor, but it is to be understood that any other form of prime mover may be employed, such as an internal combustion engine, steam engine, or the like. The electric motor 49 may be started and stopped by the usual means and receives its current from a suitable source, (not shown).

The numeral 50 (see Figs. 3, 4, 5 and 8), designates an upstanding preferably rectangular frame provided near its lower end with openings to loosely receive the transverse shaft 22, whereby the frame is capable of being swung upon the shaft 22 and of being moved longitudinally thereof, as will be explained. The upstanding rectangular frame 50 is arranged within the opening 34, and is adapted to be engaged upon one side by a portion 52 of the carriage and upon its opposite side by the shaft 32, (see Fig. 3), whereby this frame is moved longitudinally of the shaft 22, when the carriage 18 is moved transversely of the longitudinally movable frame or carriage 14, the shaft 22 being incapable of partaking of longitudinal movements. Rotatably mounted within the upper portion of the frame 50 is a stub-shaft 53, upon which is rigidly mounted a friction disk 54, disposed between the friction disks 36 and 37, and adapted to be moved out of engagement with both of them at the same time and alternately into engagement with either of them, when it is desired to rotate the shaft 22 in either direction, as is obvious. Rigidly mounted upon one end of this stub-shaft is a small pinion 55, engaging a large pinion 56, which is splined upon the shaft 22. The stub-shaft 53 is preferably provided adjacent the pinion 55 with a disk 57, rigidly mounted thereon and slidably engaging one face of the pinion 56, whereby this pinion 56 is made to travel longitudinally upon the shaft 22, when the carriage 18 is moved back and forth.

As more clearly shown in Figs. 3, 4, and 5, the numeral 58 designates an upstanding preferably rectangular frame, apertured near its lower end for receiving the shaft 31, to be pivotally mounted thereon. The frame 58 extends through the opening 34 and has a large pinion 59 arranged therein and rigidly mounted upon the shaft 31, said pinion serving to prevent the longitudinal movement of the frame 58 upon the shaft 31, in one direction, such longitudinal movement of the frame 58 in a reverse direction being prevented by the longitudinal shaft 32 (see Fig. 3). The pinion 59 is engaged by a small pinion 61 rigidly mounted upon a stub-shaft 62, which is journaled through the upper portion of the frame 58. This stub-shaft has a friction disk 63 rigidly mounted thereon, adapted to be moved at the same time out of engagement with both friction disks 37 and 38 and to be alternately moved into engagement therewith, when desired. It is thus seen that the shaft 31 may be rotated in opposite directions.

As more clearly shown in Figs. 3, 4 and 6, the numeral 64 designates an upstanding preferably rectangular frame, arranged within the opening 34, and provided near its lower ends with apertures for receiving a transverse shaft 65, said frame 64 being pivoted thereto, and prevented from moving longitudinally thereon in one direction by a pinion 66 rigidly secured to the shaft 65, the movement of the frame 64 in the opposite direction being prevented by the shaft 32. The shaft 65 (see Fig. 6), is journaled through bearings 68 secured to the carriage 18 and the shaft 65 has pinions 69 rigidly connected therewith, for a purpose to be hereinafter explained. The pinion 66 is driven by a large pinion 70, carried by a stub-shaft 71, which is journaled in the frame 64, this large pinion being driven by a small pinion 72, rigidly mounted upon a stub-shaft 73, journaled through the upper portion of the frame 64. Rigidly mounted upon the stub-shaft 73 is a friction disk 74, arranged between the friction disks 35 and 36, and adapted, at the same time, to be moved out of engagement with both of these friction disks, and to be alternately moved into engagement with either of them to rotate the shaft 65 in the desired direction. The pivoted frames 50, 58 and

64, are shifted by rods 75, 76 and 77 respectively, pivotally connected with the upper ends thereof, said rods preferably extending to one end of the carriage 18, where they are pivotally connected with vertically swinging levers 78, 79, and 80 respectively. These levers are provided with latch means 81, whereby they may be locked in the desired angular position, for retaining corresponding friction disks in driving engagement.

As more clearly shown in Figs. 1, 5 and 6, the numeral 82 designates a depending U-shaped frame, which is connected with the carriage 18 to be raised and lowered with relation thereto. This U-shaped frame embodies a transverse housing 83, to which are connected upstanding arms 84, slidably engaging depending arms 85 disposed inwardly of the same and rigidly connected with the carriage 18. At their lower ends the arms 85 carry guide sockets 86, and the arms 84 also operate within guide sockets 87, secured to the sides of the carriage 18, as shown. The means to raise and lower the depending U-shaped frame 84, comprises pairs of diagonal arms or bars 88 and 89, disposed upon opposite sides of the same, as clearly illustrated in Fig. 1. At their lower end, these pairs of arms 88 and 89 are pivotally connected, as shown at 90, with brackets 91, secured to a transverse strip 92, arranged between and rigidly connected with side strips 93, which are in turn rigidly connected with the arms 84, as shown at 94. The strip 92 is thus movable toward and away from the housing 83. The pairs of diagonal arms 88 and 89 diverge upwardly, and are pivotally connected with brackets 95, secured to transverse slides 96 and 97 (see Figs. 4, 5, 6 and 7), provided at their ends with grooves 98, (see Fig. 5), to receive rails 96′, rigidly secured to the lower portion of the carriage 18. Connected with the slides 96 and 97, by any suitable means, to move the same, are pairs of longitudinal rack-bars 99 and 100, the rack bars 99 being arranged above the pinions 69 and engaging therewith while the rack-bars 100 are arranged below the pinions 69 to engage therewith, these rack-bars operating in stationary guides 100′, carried by a strip 101′, as shown. It is thus seen that the rotation of the pinions 69 will move the upper ends of the arms or bars 88 and 89 outwardly elevating their lower ends, whereby the U-shaped frame 82 will be elevated. By arranging the arms 88 and 89 diagonally upon opposite sides of this U-shaped frame, these arms or bars serve as a brace to rigidly hold the U-shaped frame against perceptible improper lateral movements.

Means are provided, (see Figs. 3, 4, 4ª, and 7,) to lock the shaft 65 against rotation, whereby the frame 82 may be held in the desired vertical position when moved thereto. Such means is preferably in the form of a friction brake, including a friction pulley or wheel 65′, rigidly mounted upon the shaft 65. Surrounding this friction pulley or wheel is a brake band 66′, one end of which is connected with a portion of the frame 64 by means of a bolt 67′, while the opposite end thereof is connected with one end of a pivoted lever 67ª as shown at 68′. This pivoted lever is adapted to be swung in a vertical plane and has its upper portion pivotally connected with a longitudinally extending rigid rod 69′, pivotally connected with the lower end of a pedal lever 70′. As more clearly shown in Fig. 4, this pedal lever is pivoted at 71′, and is arranged near the operator's seat in proximity to the levers 78, 79, and 80. The brake is normally retained set by a retractile coil spring 72′, as shown. From the foregoing it is thus seen that before the frame 82 is raised or lowered, the operator forces the pedal lever 70′ forwardly, to release the shaft 65, the brake mechanism automatically locking this shaft against rotation, when the pedal lever is released.

The housing 83 carries the separating or agitating mechanism, comprising a plurality of alternately arranged rotatable elements 101 and 102, operating within apertures 103 formed through strips or webs 104 and 105. These rotatable agitating elements are placed in their operative position prior to the movement of the strip 92 toward the housing. The rotatable agitating elements 101 may preferably have their lower ends provided with spiral bits 106, having spiral sets of pins 107, as shown. The agitating elements 102 preferably have their lower ends extending downwardly beyond the corresponding ends of the elements 101 and are laterally curved or bent, as shown. Rigidly connected with the upper ends of the agitating elements 101 and 102 are pinions 108 and 109, which are in mesh, and are arranged within the space occurring between the strips 92 and 104, as shown. The outer pinions 108 and 109 are driven by pinions 110, rigidly secured to the lower ends of upstanding drive shafts 111, the pinions 110 being also arranged between the strips 92 and 104, as shown. It is obvious that these drive shafts 111 move longitudinally with the U-shaped frame 82, but not with relation thereto. Splined upon the vertical drive shafts 111 are bevel gears 114, arranged upon the carriage 18, as shown. These bevel gears are engaged and driven by bevel gears 115, rigidly mounted upon the transverse power distributing shaft 40. It is thus seen that when the motor 49 is operating, the drive shafts 111 will be continuously rotated, which rotation will be imparted through the medium of pinions 110, 108 and 109, to the agitating elements 101

and 102, the rotation of these elements not being interfered with by the raising or lowering of the same, or their longitudinal or transverse movement with respect to the relatively stationary frame 13.

The operation of the apparatus is as follows: The depending U-shaped frame is first properly elevated whereby the elements 101 and 102 will clear the cars 11 when being shifted to positions over them, which elevation is accomplished by the operator swinging the lever 80 to the right, whereby disk 74 will engage disk 36. The shaft of the motor 49 is rotating in the direction of the arrow, whereby pinions 69 will move rack-bars 99 and 100 outwardly in opposite directions, spreading the upper ends of arms 88 and 89, as is obvious. This operation may be continued for the proper length of time, and is stopped by swinging the lever 80 forwardly so that disk 74 will again disengage disk 36. The pedal lever 70′ which has been forced forwardly is now released, whereby the friction brake will automatically lock the shaft 65 against rotation. If it be necessary to move the longitudinally movable frame or carriage 14 to the right, the operator swings the lever 78 to the right, to bring disk 54 into engagement with disk 37, whereby shaft 22 is rotated clock-wise, and the pinions 23 correspondingly rotated in engagement with the rack-bars 24, whereby the frame or carriage 14 is moved longitudinally to the right. It is obvious that the frame or carriage 14 may be moved longitudinally in an opposite direction by swinging lever 78 to the left whereby disk 54 will engage disk 36. When it is desired to move the carriage 18 transversely to the right, the lever 79 is swung to the right, bringing disk 63 into engagement with disk 38, whereby the pinion 27 is rotated clock-wise in engagement with the rack-bar 28. The transverse movement of the carriage 18 in an opposite direction is effected by swinging the lever 79 to the left, for bringing the disk 63 into engagement with the disk 37. The agitating elements 101 and 102 being now positioned above a car, such elements being continuously rotated, the same are lowered into the car to engage with the material therein, by swinging the lever 80 forwardly whereby the disk 74 engages disk 35. When the disk 74 is moved out of engagement with disk 75, friction clutch is again set to hold the shaft 65 against rotation. It is obvious that while these agitating elements 101 and 102 are being continuously rotated, they may be lowered or raised, or shifted longitudinally or transversely of the car.

It is to be understood that the form of my invention herewith shown and described is to be taken as a preferred example of the same, and that various changes in the shape, size, and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

Having described my invention, I claim:—

1. In a machine of the character described, a supporting frame arranged near and extending above and across a track adapted to receive a car thereon to be unloaded, a carriage mounted upon the supporting frame to travel longitudinally thereof, a supplemental carriage mounted upon the first named carriage to travel transversely thereof, a vertically movable frame depending from the supplemental frame, guide means secured to the supplemental carriage and engaging the vertically movable frame, a plurality of substantially vertical agitator elements connected with the lower end of the vertically movable frame and rotatable with relation to the same, means to rotate the agitator elements, downwardly converging angularly arranged arms pivotally connected near their lower ends with the vertically movable frame, and means to move the upper diverging ends of the arms toward and away from each other.

2. In a machine of the character described, a vertically movable frame, a plurality of rotatable agitator elements connected therewith and rotatable with relation thereto, means to rotate the agitator elements, downwardly converging arms arranged upon opposite sides of the vertically movable frame and pivotally connected near their lower ends with the same to raise and lower the frame and to hold the same against improper lateral movements, and means including substantially horizontally movable members connected with the upper diverging ends of the arms to move the same toward and away from each other.

3. In a machine of the character described, a vertically movable frame, a plurality of substantially vertical agitator elements connected therewith rotatable with relation thereto and adapted to be forced into material held in the car to break up the same, means to rotate the agitator elements, downwardly converging arms arranged upon opposite sides of the frame and connected therewith to raise and lower the same and prevent improper lateral movements, substantially horizontally movable members connected with the upper diverging ends of the arms, and means to move the members.

4. In a machine of the character described, a vertically movable frame, a substantially vertical rotatable agitator element connected with the vertically movable frame and rotatable with relation thereto, means to rotate the agitator element, downwardly converging arms arranged upon opposite sides of the frame and pivotally connected near their lower ends with the frame to raise and

lower the same and prevent improper lateral movements, substantially horizontally movable members embodying superposed rack-bars pivotally connected with the upper diverging ends of the arms, a drive shaft extending between the superposed rack-bars, and pinions carried by the drive shaft and engaging the superposed rack-bars to simultaneously move the same in opposite directions.

5. In a machine of the character described, a substantially horizontally movable carriage, a vertically movable frame connected therewith and provided near its lower end with a housing, a train of substantially horizontal gears mounted within the housing, substantially vertical agitator elements attached to certain of the gears and depending therefrom to extend beyond the housing, substantially vertical rotatable shafts extending longitudinally of the vertically movable frame and connected with the outer gears to drive the same, driving gears arranged upon the carriage and splined upon the substantially vertical shafts, means to rotate the driving gears, and means to raise and lower the vertically movable frame.

6. In a machine of the character described, a substantially horizontally movable carriage, a vertically movable frame connected therewith and provided near its lower end with a housing, a train of substantially horizontal gears mounted within the housing, substantially vertical agitator elements attached to the inner gears and depending therefrom to extend beyond the housing, substantially vertical rotatable shafts extending longitudinally of the vertically movable frame and connected with the outer gears to drive the same, driving gears arranged upon the carriage and splined upon the substantially vertical shafts, means to rotate the driving gears, apparatus to raise and lower the vertically movable frame, and means to lock the vertically movable frame in the desired vertical position.

7. In a machine of the character described, the combination with a main support, of a vertically movable support connected with the main support, a diagonal arm connected with the vertically movable support, means to move the upper end of the diagonal arm laterally, an agitating element connected with the vertically movable support and movable with relation thereto, and means to move the movable agitating element.

8. In a machine of the character described, the combination with a main support, of a vertically movable support connected with the main support, reciprocatory rack-bars connected with the main support, gears engaging the rack-bar to move the same, diagonal arms connected with the vertically movable support and with the rack-bars, an agitating element connected with the vertically movable support and movable with relation thereto, and means to drive the movable agitating element.

9. In a machine of the character described, a main support, a vertically movable support connected therewith, upwardly diverging angularly arranged arms disposed upon opposite sides of the vertically movable support and connected therewith to raise and lower the same, means to move the upper ends of the arms toward and away from each other, and agitating mechanism connected with the vertically movable support and movable with relation thereto.

10. In a machine of the character described, a supporting structure, a vertically movable support mounted thereon, means to raise and lower the vertically movable support, a friction brake to lock the vertically movable support in adjustment at a desired vertical position, movable agitating elements carried by the vertically movable support, and means to move the agitating elements with relation to the vertically movable support.

11. In a machine of the character described, a substantially horizontal support, a vertically movable frame extending downwardly below the support, agitating mechanism carried by the vertically movable frame, downwardly converging arms disposed upon opposite sides of the vertically movable frame and connected with the same to raise and lower it and to hold the frame against improper lateral movement, a plurality of members mounted upon the substantially horizontal support to move longitudinally thereof and connected with the upper diverging ends of the arms, and means to move the members.

12. In a machine of the character described, a substantially horizontal support, a vertically movable frame connected therewith and depending therefrom, agitator mechanism carried by the vertically movable frame, a plurality of members mounted to reciprocate upon the support, means to reciprocate the members, apparatus to lock the means against improper movement, and angularly arranged arms connected with the reciprocatory member and with the vertically movable frame.

In testimony whereof I affix my signature in presence of two witnesses.

MARVIN B. JENNINGS.

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C. E. Middleton.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."