J. W. WORTHAM.

COAL LOADING MACHINE.

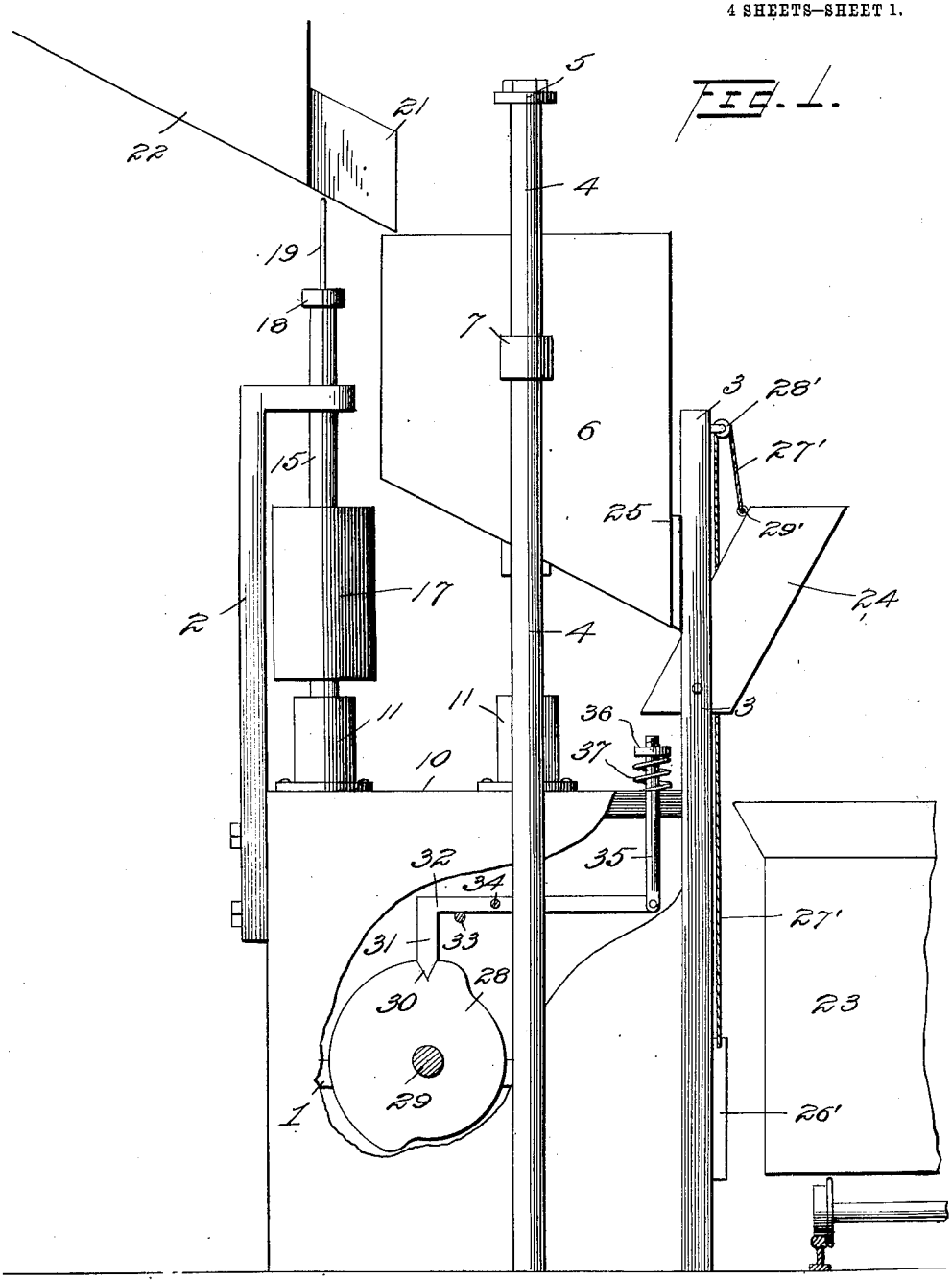
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1,066,566.

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4 SHEETS—SHEET 1.

FIG. 1.



WITNESSES

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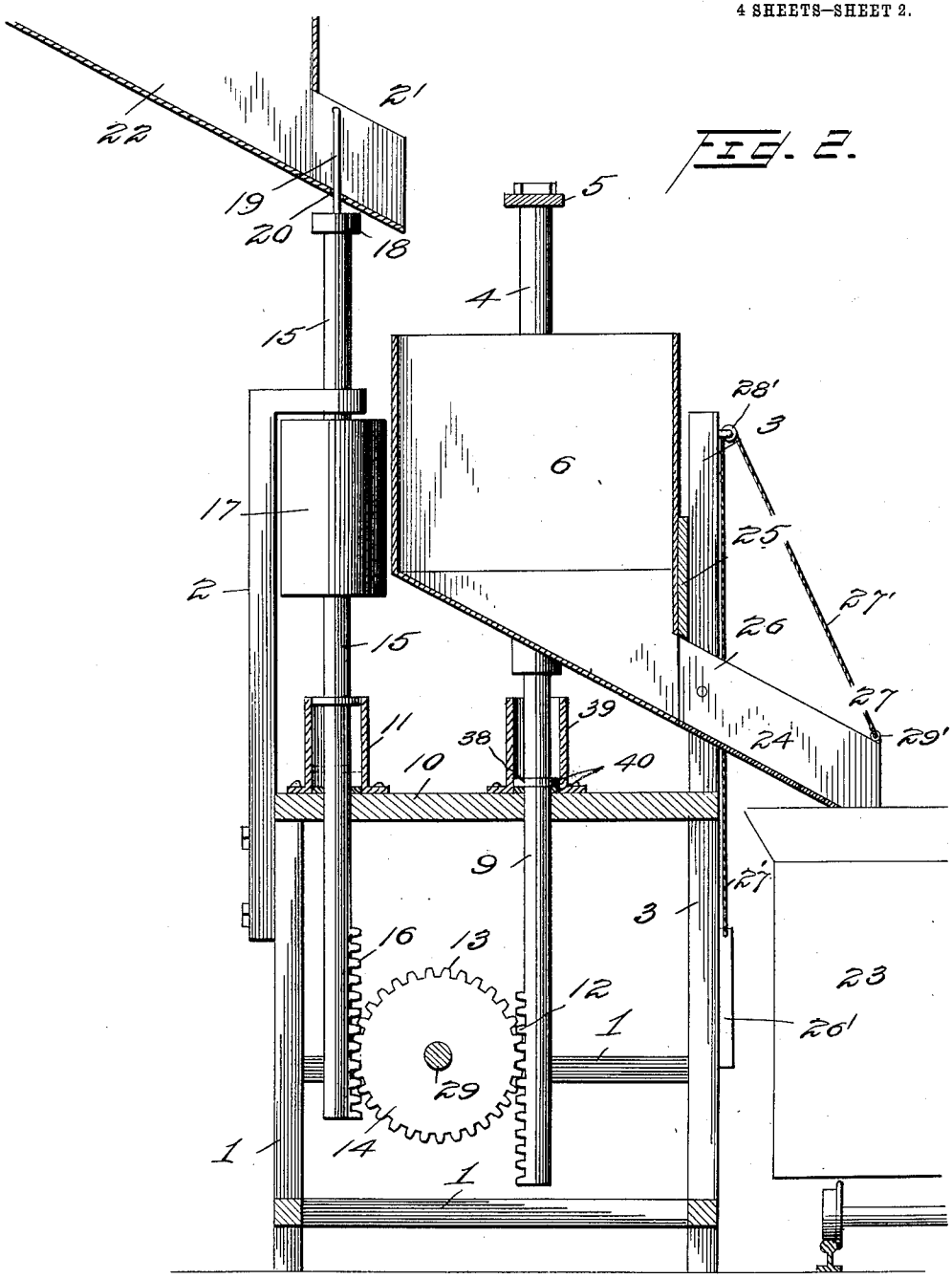
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4 SHEETS—SHEET 2.

FIG. 2.



WITNESSES

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4 SHEETS—SHEET 3.

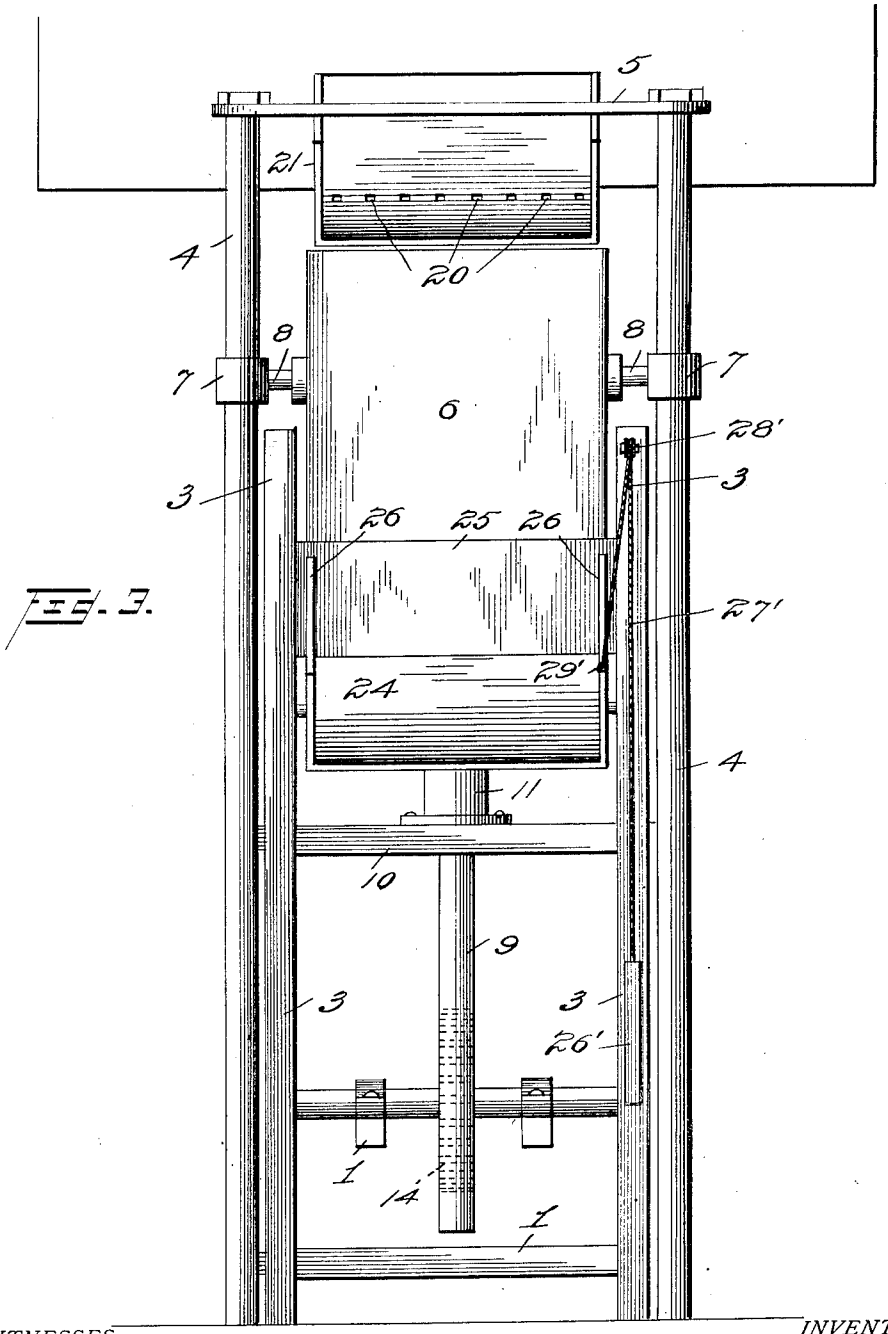


FIG. 3.

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4 SHEETS—SHEET 4.

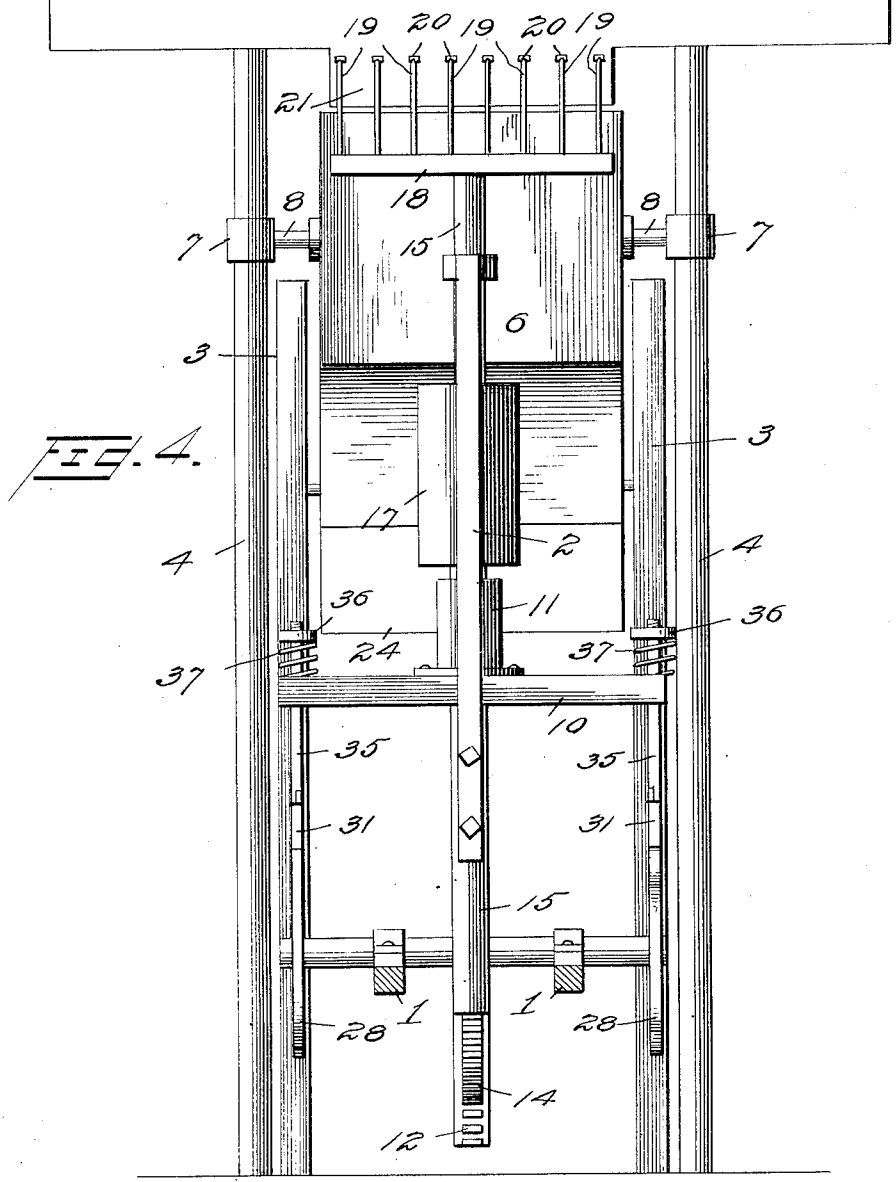


Fig. 4.

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UNITED STATES PATENT OFFICE.

JOHN W. WORTHAM, OF DECATUR, ALABAMA.

COAL-LOADING MACHINE.

1,066,566. Specification of Letters Patent. Patented July 8, 1913.

Application filed January 11, 1912. Serial No. 670,586.

To all whom it may concern:

Be it known that I, JOHN W. WORTHAM, a citizen of the United States, residing at Decatur, in the county of Morgan and State of Alabama, have invented certain new and useful Improvements in Coal-Loading Machines, of which the following is a specification.

This invention has relation to new and useful improvements in coal loading machines used primarily at railroad coal chutes, where the tenders of locomotives receive their coal. This work at present, on a number of railroads, is done by hand, that is, laborers shovel the coal into two-wheeled dump cars, holding approximately one ton, which cars are wheeled by hand and dumped into the locomotive tender, which method is a slow and laborious one.

My machine will expedite and facilitate the loading of the coal.

The main object of my invention is to provide a machine of the nature above indicated which will be efficient in operation, comparatively simple in construction and one which will be inexpensive to install.

With the foregoing and other objects in view my invention consists of the novel features of construction, combination and arrangement of parts as are described in this specification, illustrated in the accompanying drawings, forming a part thereof and particularly pointed out in the appended claims.

Reference being had to the drawings: Figure 1 is a side, elevational view of my invention, parts broken away, the bucket or receptacle being in raised position. Fig. 2 is a vertical, sectional view of the same, from front to rear, the bucket being in lowered position. Fig. 3 is a front, elevational view of my device, the bucket or receptacle being in raised position in readiness for the reception of coal. Fig. 4 is a rear, elevational view of the device, the bucket being in raised position.

Referring more particularly to the drawings, in which like numerals designate like parts throughout, my invention is described as follows:

The loader comprises the framework 1 and uprights 2 and 3. Extending vertically without the framework are a pair of vertical shafts 4, the upper ends of which shafts are connected together by means of a yoke 5. The bucket 6 is slidably mounted to said shafts 4 by means of collars 7 which encircle said shafts and connecting means 8 interposed between said collars and respective side walls of said bucket. The lower end of the bucket terminates in a rod 9, which rod extends downward through a platform 10, upon which platform are provided pneumatic cushions 11, which cushions will be described more fully hereinafter. Adjacent the lower end of the rod 9 is provided a plurality of teeth 12 which intermesh with the teeth 13 of the rear wheel 14.

Extending through the platform 10 is another rod 15, the lower end of which is also provided with a plurality of teeth, 16, which teeth intermesh with said teeth 13 of the gear wheel. Provided intermediate the center of the rod 15 and the upper end thereof is a weight 17, said weight being designed to overbalance the weight of the bucket or receptacle 6 by approximately a ratio of 2 to 1. A crossbar 18 is secured to the upper end of the rod 15, said cross bar having extending upward therefrom a plurality of prongs 19. Each one of said prongs is received by a respective perforation 20 in the chute 21 of the coal bin 22, and reciprocates therein, it depending upon whether or not it is desired for the coal to flow from the bin into the bucket or receptacle through said chute 21 or upon the relative positions of the bucket and weight 17.

When the bucket is in lowered position as in Fig. 2, the weight is necessarily in its upward position as illustrated in said figure, at which time the prongs 19 will cut off the flow of coal into said bucket. When the bucket is in its extreme raised position in readiness for reception of coal from the chute 21, the weight 17 is in lowered position, the prongs 19 having been sufficiently withdrawn from their respective perforations so as not to interfere with the ready flow of the coal from said bin 22 through the chute 21 into the receptacle 6. As the weight 17 overbalances the weight of the bucket 6, the bucket, when empty, will be in raised position. When the bucket has become filled with coal it will then descend from its raised position as illustrated in Fig. 1, to its lowered position, as illustrated in Fig. 2, at which time the weight 17 will ascend from its lowered position, as shown in Fig. 1 to its raised position as shown in Fig. 2, when the flow of the coal into the bucket 6 will be automatically cut off. As the bucket

6 descends, the coal will automatically flow therefrom into the tender 33 through a chute 24 which chute is pivotally held in position between the vertical standards 3.

When the coal has passed from the bucket 6 into the tender of the engine, the weight 17 being heavier, the bucket will necessarily ascend to its raised position, in a manner as explained, the weight 17 simultaneously assuming a lowered position. This alternate motion of the bucket 6 and the weight 17 and the loading and the unloading of the bucket 6, is continuous, as long as a supply of coal is in the bin or until the machine is stopped. The lower front of the bucket 6 is made open to permit the passage of said coal from said bucket into the tender when the bucket is in lowered position, but to prevent the coal from passing from the bucket when in raised position, a shield 25 is provided, which shield is supported by said standards 3. As the bucket assumes a raised position, shield 25 gradually closes the opening at the lower front part of the bucket which communicates with the chute 24 and obstructs the passage of coal from the bucket therethrough when in raised position. As the bucket assumes a lowered position from a raised one, the opening above mentioned, will gradually become unobstructed until the bucket is finally in its extreme lowered position, at which time the coal will have free passage from said bucket into the tender of the engine through said chute 24. Said chute 24 is maintained in raised position by means of a weight 26′, which is attached to the lower end of a rope or cable 27′, which rope or cable travels over a small pulley 28′ rotatably mounted adjacent the upper end of one of the standards 3, the opposite end of said rope or cable being attached to the forward end of said chute 29′ by suitable means. The weight 26 and said chute 24 are so equally balanced that friction will maintain said chute in either position when placed in such position. It is necessary to place said chute in a raised position after the loading of the tender of a locomotive or coal car has been accomplished to permit the free passage of a train or locomotive without obstruction therewith. It is pointed out that the time that the bucket 6 and said chute 24 are in lowered position, said chute is locked in such position against upward movement, thereby obviating any danger of the chute tending to assume a raised position from the passage of coal therethrough.

The loading and unloading of the bucket 6 is regulated by a device which will now be explained: Suppose, for example, the bucket weighs 500 pounds and the weight weighs 1,000 pounds. When the bucket is empty it will be in raised position, of course, while the weight is in lowered position, with coal passing from the bin into the bucket. Now, when more than 500 pounds of coal has passed into the bucket, it would descend and unload at once. 500 pounds of coal will only partially fill said bucket and to prevent the bucket from descending until it is completely filled with coal, I have provided the contrivance above mentioned to regulate the ascent and descent of said bucket. It will be seen that likewise when the bucket is in lowered position and part of the coal has passed therefrom leaving less than 500 pounds therein, the weight, overbalancing the combined weight of the bucket and the coal contained in the same, will cause the bucket to ascend. To prevent this, I have provided a disk 28 secured to the spindle 29 upon which said gear wheel 14 is keyed. Cut in said disk is a V-shaped notch 30, which notch is engaged by the downwardly extending portion 31 of the right-angular lever 32. A stop 33 is provided to prevent the lever contacting the cut away periphery of the disk 28, after being removed from the V-shaped notch 30. Said lever is fulcrumed at a point 34. Extending upward from the opposite end of the lever and pivoted thereto, is a rod 35 which extends through said platform 10, at the upper end of which rod is provided a hand wheel 36. A spring 37 is interposed between the hand wheel and said platform, the tension of the spring being regulated by the hand wheel. This device operates as follows: When the weight is down and the bucket is up, the notch 30 is engaged by the downwardly extending portion of the right-angle lever 32, which prevents the rotation of said disk, said disk in turn, preventing the rotation of the gear wheel 14, thereby preventing the descent of the bucket 6 until the member 31 is released from the V-shaped notch 30 in said disk. A second duplicate disk is employed which holds the bucket in lowered position until it unloads, when it is released. Therefore while one disk is being clutched by its device thereby preventing the rotation of the gear wheel 14, the other disk, which is arranged upon the opposite end of the shaft 29 is free to turn and does not become engaged until the bucket assumes an opposite direction. The object in cutting away part of the periphery of each disk, is to prevent contact of the downwardly extending portions 31 upon their respective disks during the rotation of the gear 14 which would tend to act as a brake. The machine requires only one attendant whose duty it is to release said disks from engagement with their respective levers at the proper intervals, by sufficiently reducing the tension of the spring 37 by turning the hand wheel 36 upward. As much leverage may be had as is necessary as the fulcrum 34 of the lever may be placed as far toward the downward extend-

ing portion 31 of the lever as is necessary. Or said springs 37 may be placed at such tensions as is necessary to permit the bucket 6 to automatically descend when approximately one ton of coal has been received thereby and will ascend, when in a lowered position, at such time as when the bucket has become emptied of its contents, it only being necessary to increase or diminish the tension upon said springs when it is desired to start or stop the operation of the device.

I will now explain the construction of the pneumatic devices 11 employed to break the fall of either the bucket 6 or the weight 17. when either of the disks 28 are released and a change of relative positions between said bucket and weight is had.

A piston 38 consisting of a ring encircles the vertical rod 9, said piston being received by a cylinder 39, which cylinder is constructed open at both ends and is provided with a flange at its bottom integral therewith so that it may be fastened or secured to the platform 10. A stuffing box 40 is provided at the point upon the platform where rod 9 passes therethrough. Two air cocks 41 are provided at the lower end of the cylinder. When the bucket is loaded it descends or drops. It drives rod 9 and piston 38 into the cylinder 39, compressing the air in the latter, hence checking or breaking the descent or fall of said bucket, the amount of which is regulated by said air cocks. The pneumatic cushion provided for the breaking of the fall or descent of the weight 17 operates in a similar manner and the same numerals have been applied to its parts as have been applied to the pneumatic cushion utilized to break the fall of the bucket.

Although I have specifically described the novel features of construction, combination and arrangement of the several parts of my invention, yet I do not confine myself to such construction but reserve and may exercise the right to make such changes therein as do not depart from the spirit of the invention or the scope of the appended claims.

Having described my invention, what I claim as new, is:

1. In a loading machine of the kind described, including a framework, and a pair of vertical shafts, the combination of a bucket with means to slidably mount said bucket upon said shafts, the lower end of said bucket terminating in a rod, which rod extends downward through a platform of the frame, a weight arranged to overbalance said bucket when empty, a rod extending downward from said weight, said rods each provided with teeth adjacent its lower end, a spindle on the framework, a gear wheel on said spindle intermeshing with said teeth, said gear wheel being for the purpose of transmitting power from one rod to the other, said rod to which the weight is secured also extending above said weight, a plurality of prongs provided upon the upper end of the last-mentioned rod, a chute having its delivery end disposed near said prongs, said prongs adapted to cut off the flow of coal through said chute into the bucket when said bucket is in lowered position, said bucket provided with an opening to allow the coal to pass out of the same into the tender of an engine, means to prevent the passage of coal therefrom when in raised position, and means to retard the rotation of said spindle upon which the gear wheel is mounted.

2. In a loading machine of the type described, including a frame work, a pair of vertical shafts, a bucket having a laterally discharging opening, means for slidably mounting said bucket upon said shafts for vertical movement, a rod extending downwardly from said bucket, through a member of said frame work, a reciprocally actuated weighted rod also extending through said frame work-member, the weight on the latter rod overbalancing the bucket when empty, said rods being equipped with teeth adjacent their lower ends, a rotatably mounted spindle having a gear wheel, said gear-wheel and teeth being intergeared, said weighted rod being provided with a plurality of prongs, a chute having its delivery end guarded by said prongs, means forming a closure for the discharging opening of said bucket, when the latter is in its elevated position, and means for retarding the rotation of said gear-wheel equipped spindle.

3. In a loading machine of the kind described comprising a framework and a pair of vertical shafts, the combination of a bucket with means to slidably mount said bucket upon said shafts for vertical movement, the lower end of said bucket terminating in a rod, which rod extends downward through a platform of the frame, a second vertical rod arranged to pass through said platform and operate reciprocally, a weight secured to the latter rod, said weight overbalancing the bucket when empty, said weight arranged intermediate the center and upper end of the rod, said rods each provided with a plurality of teeth arranged adjacent its lower end, a spindle rotatably mounted in the framework of the machine, a gear wheel on said spindle interposed between the lower ends of the rods and intermeshing with said teeth, said gear and teeth being for the purpose of transmitting power from one rod to the other, a chute, said rod to which the weight is secured being provided with a plurality of prongs which prongs are movable across the chute for the purpose of cutting off the flow of coal from the bin through the chute into the bucket when the latter is in lowered posi-

tion, said bucket provided with an opening in its front face adjacent its lower edge whereby the coal is allowed to pass therefrom into the tender of an engine, a pair of standards extending up from the framework of the machine, a shield secured to said standards, said shield being for the purpose of closing the opening in the bucket when the bucket is in raised position thereby obstructing the passage of coal therefrom, pneumatic devices arranged upon the platform, one provided for each vertical rod, one of said devices being for the purpose of breaking the fall of either the bucket or the weight, as the case may be, as either assumes a lowered position from a raised one, devices arranged within the framework of the machine to prevent the descent of the weight or bucket except when released by the operator and means to retard the rotation of said spindle upon which the gear wheel is mounted.

4. In a loading machine of the kind described including a framework and a pair of vertical shafts, a bucket slidably mounted upon the shaft for vertical movement, a weight to counterbalance the bucket, means for depositing coal from a bin into the bucket when in a raised position, means for cutting off the flow of coal automatically when the bucket is in a lowered position, said bucket provided with an opening through which coal is deposited into the tender of an engine when the bucket is in lowered position, means to automatically close the said opening when the bucket is in a raised position, means arranged in combination with the weight and bucket so that the weight and bucket will automatically counterbalance each other alternately, and means whereby the bucket may be retained in either raised or lowered position.

5. In a loading machine of the kind described, including a bucket and weight mounted on rods for vertical movement, means for depositing coal into the bucket when in a raised position, means arranged between the two rods so that the weight and bucket will automatically overbalance each other to alternately raise and lower the bucket, means whereby the supply of coal is automatically cut off and turned on with the lowering and raising of the bucket respectively, and means whereby the bucket may be retained in either lowered or raised position.

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

JOHN W. WORTHAM.

Witnesses:
R. R. DUFFIE,
N. E. GARNER.