

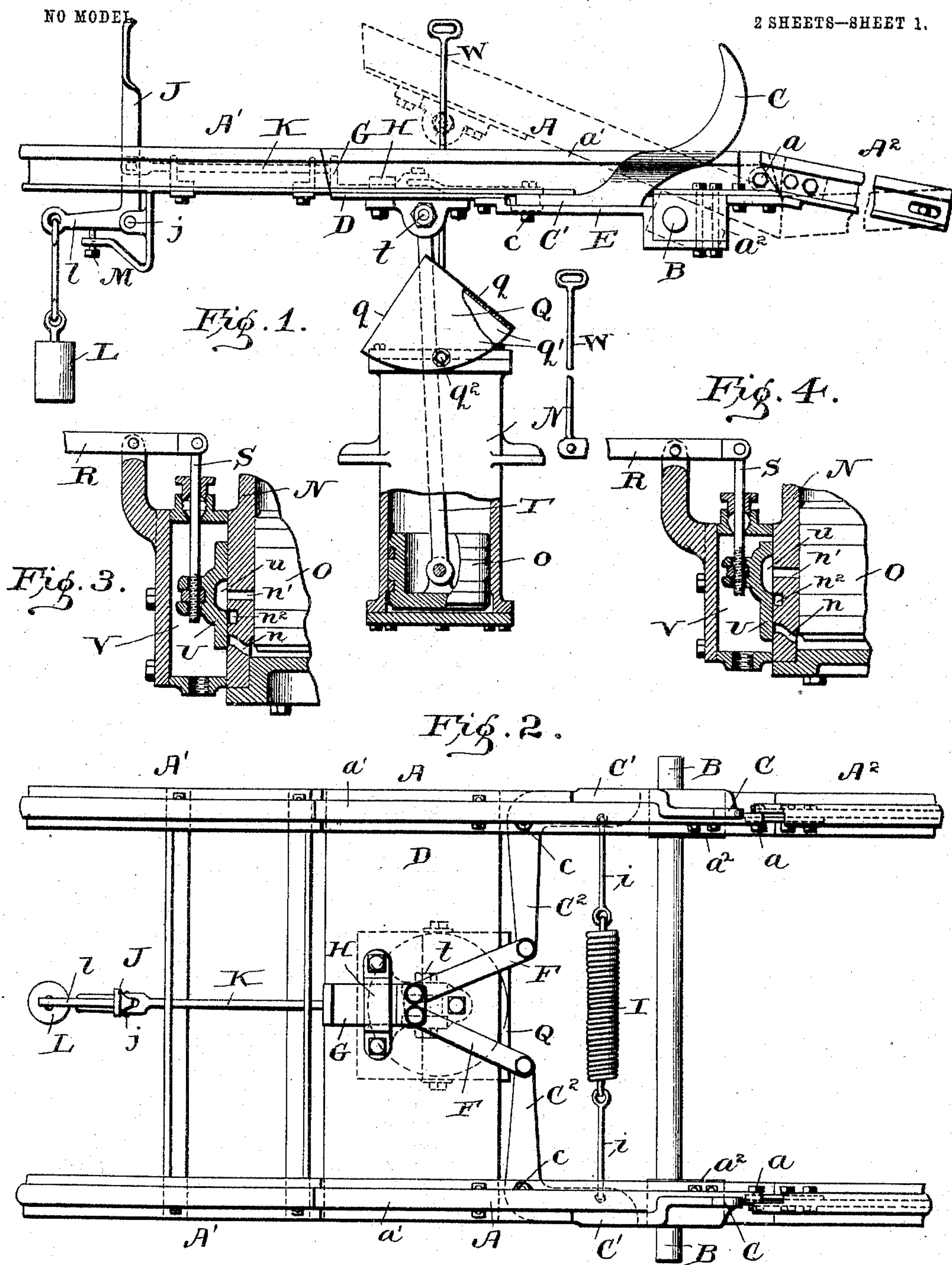
No. 776,009.

PATENTED NOV. 29, 1904.

H. H. BIGHOUSE.
CAR DUMPING APPARATUS.

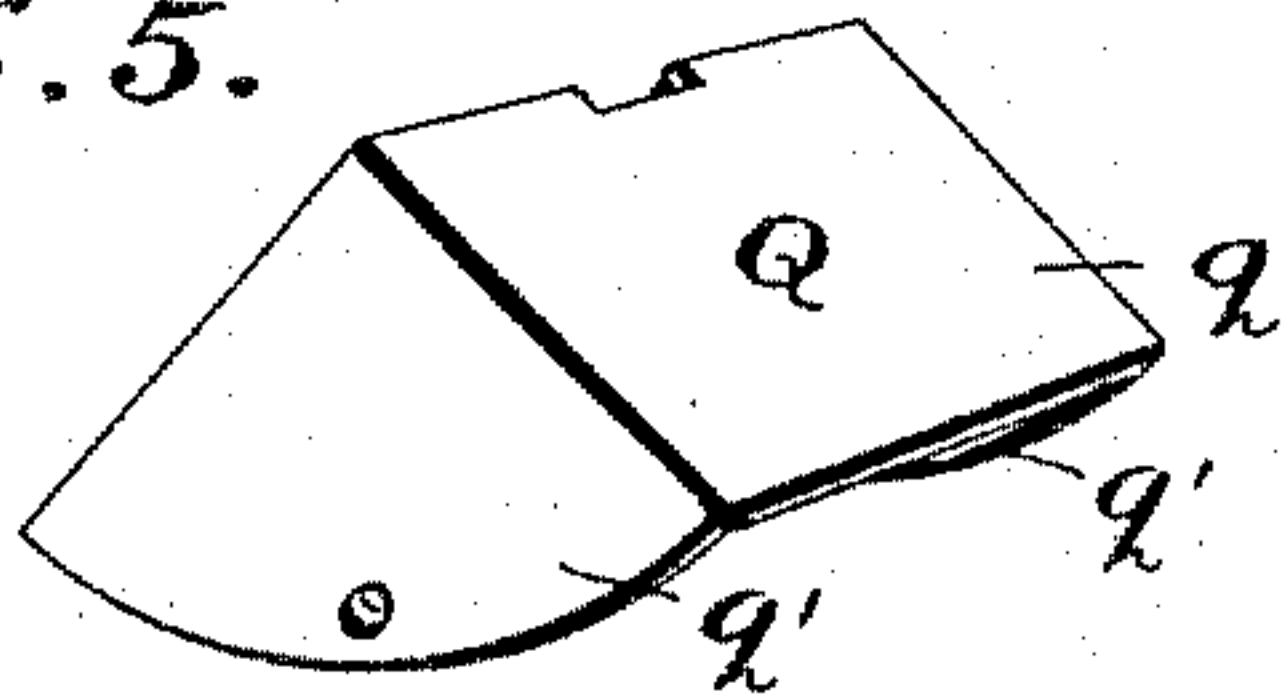
APPLICATION FILED NOV. 30, 1897.

2 SHEETS—SHEET 1.



Witnesses
Albert Spinden.
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Fig. 5.



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NO MODEL.

2 SHEETS—SHEET 2.



Fig. 6.



Fig. 7.

Fig. 10.

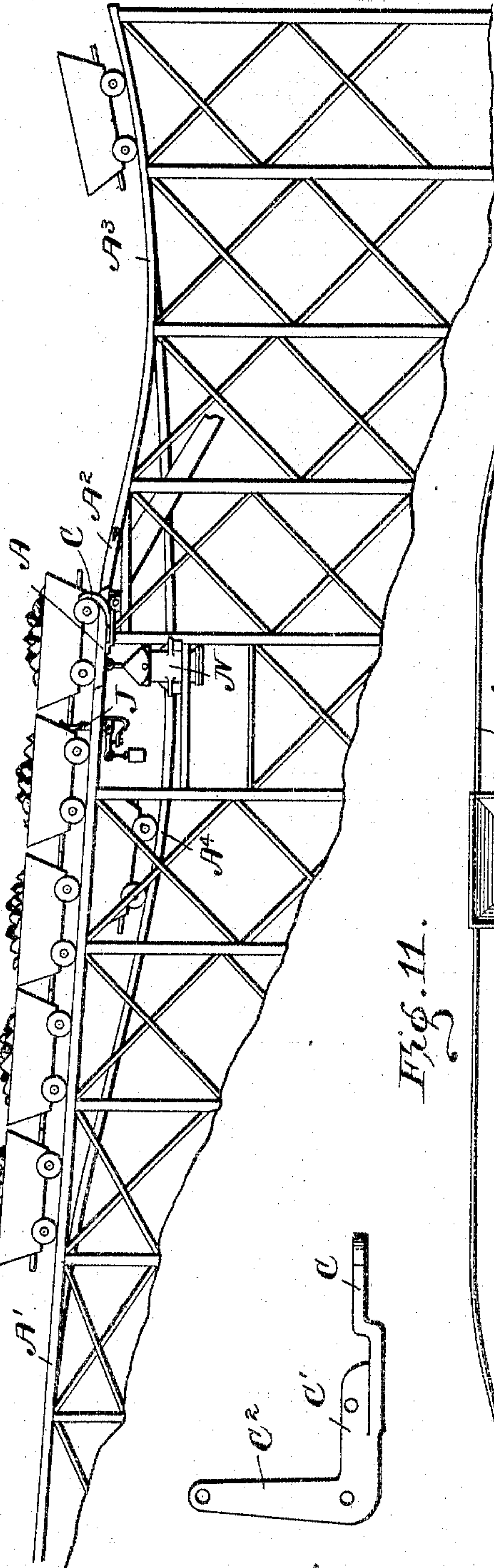


Fig. 11.

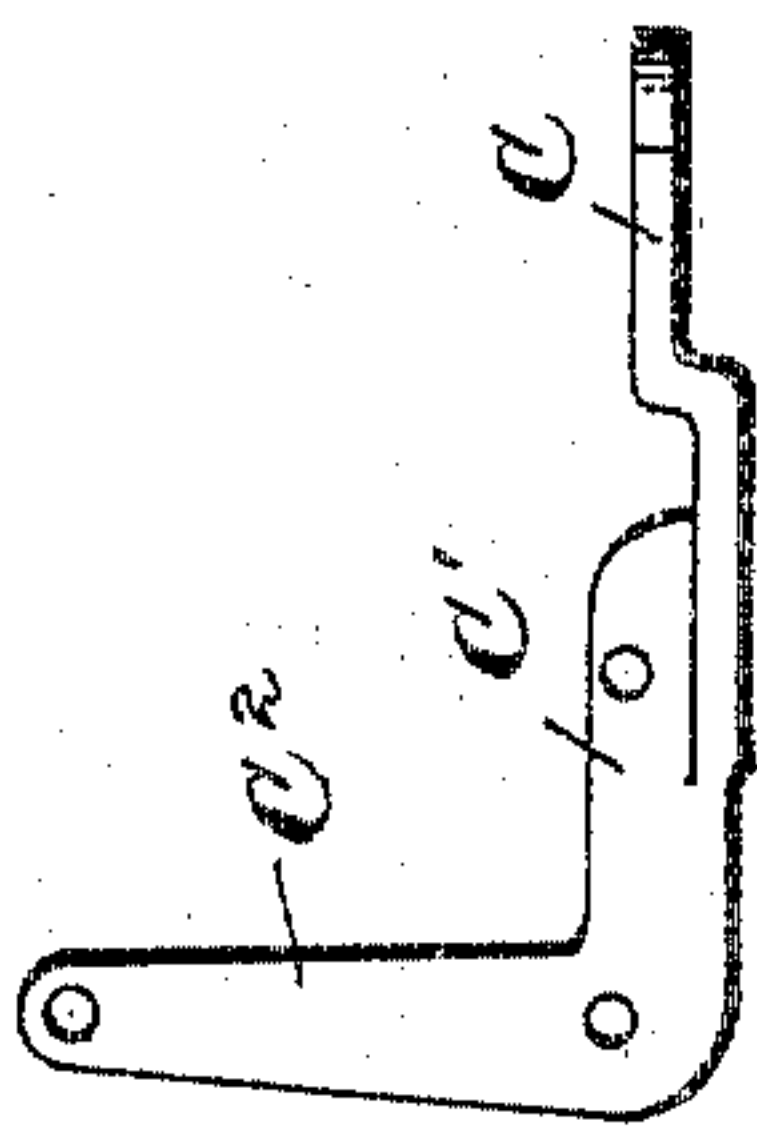


Fig. 8.

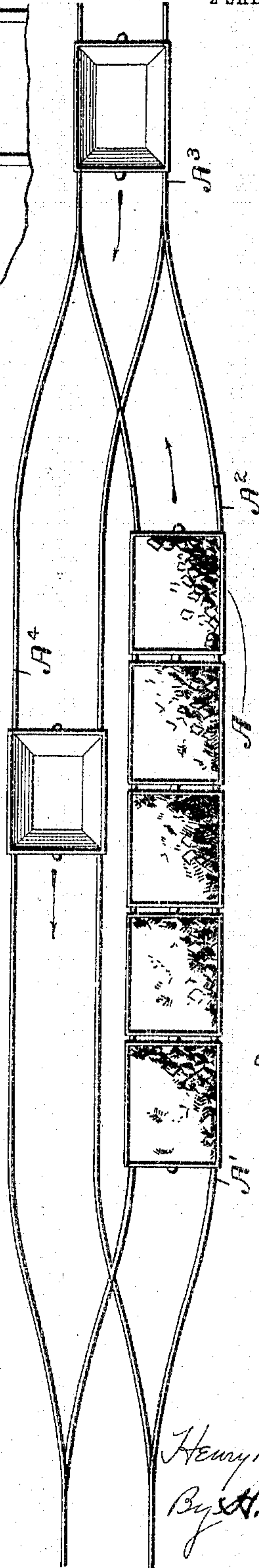
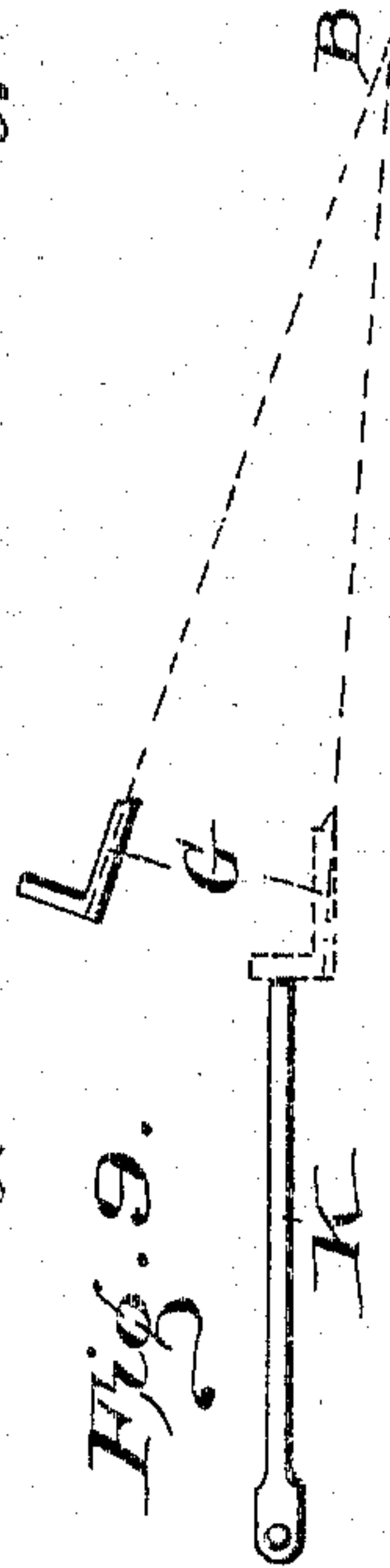


Fig. 9.



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UNITED STATES PATENT OFFICE.

HENRY H. BIGHOUSE, OF COLUMBUS, OHIO, ASSIGNOR TO THE JEFFREY MANUFACTURING COMPANY, OF COLUMBUS, OHIO, A CORPORATION OF OHIO.

CAR-DUMPING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 776,009, dated November 29, 1904.

Application filed November 30, 1897. Serial No. 660,279. (No model.)

To all whom it may concern:

Be it known that I, HENRY H. BIGHOUSE, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Car-Dumping Apparatus; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

Figure 1 is a side elevation of part of an apparatus having my improvements. Fig. 2 is a top view. Fig. 3 shows part of the cylinder and valve-chest. Fig. 4 is a section of the same parts slightly modified. Fig. 5 shows the engine-shield. Figs. 6 and 7 are views of a tilting rail. Fig. 8 is a plan of one of the car-stops. Fig. 9 shows the separable parts of the stop-operating mechanism. Fig. 10 is a side elevation, conventionalized, of a track system. Fig. 11 is a top view of the same.

The track over which the cars travel is made up of several sections, one indicated by A, another by A', and a third by A². The section A' is stationary, it, in fact, constituting merely the terminal part of a more or less prolonged railway.

The present invention pertains more particularly to the apparatus for unloading coal-mine cars as they are brought out from the mine to the tippie for screening and storing or reloading in larger cars, and therefore the track-section A' may be regarded as part of the ordinary mine-track. That at A is a tilting track-section, it having a hinge B secured to the main framework. This hinge, unlike those heretofore commonly used for supporting the tilting track-sections of mine-car-dumping mechanism, is situated at the front end of the section A. Heretofore the hinge has been located on such line remote from the front end that it would lie in the rear of the center of gravity of the track-section and the loaded car thereon, and consequently the car could be dumped by the action of gravity; but in the present construction this hinge-line

is, as aforesaid, at the front end of the tilting track, I meaning thereby that it is at a line in front of the center of gravity of the total load upon the hinge. This arrangement is employed for important reasons to be presented below. In front of the tilting section A is the section A², which receives the cars from the tilting section A after they have been emptied. For some purposes it may be stationary relatively to the part A; but I prefer to connect the two sections together pivotally, as by hinge-bolts, at *a*. The track-section A² is also pivoted at its front end, and the slight amount of vertical play of this track-section is provided by hinging the front and the rear.

While the car is upon the tilting track-section A, at least until after it has been emptied, it is held by means of a movable stop. This preferably consists of one or more horns or upwardly-extending curved projections C C, adapted to lie in front of and engage with the front wheel or wheels of the car. The tilting track-section has the rails *a' a'*. These are placed upon and fastened to bearing-pieces *a*², which are mounted on the aforesaid hinge B. At their rear ends the rails are secured to a cross-plate D or equivalent framework, which joins and holds them rigidly together.

E is a brace-bar extending from the lower side of the bearing-blocks *a*² backward and extending to the cross plate or frame D.

The stops C are formed with or secured to plate portions C', lying horizontally, fitting and movable in the space between the bars E and the bottom of the rails *a'*. They are held by vertical pivots at *c* and are rigid with lever-arms C². At their inner ends these lever-arms are connected by links F to a slide-plate G, held in any suitable manner, as by a guide H, secured to the cross-plate D. If the slide G be pushed forward, it will in turn throw the links F, push forward on lever-arms C², and throw outward the stops C C; but the stops are normally held inward in position to engage with the wheels of a car by a spring or equivalent I, which is connected by links *i* to the plates C', and this spring consequently also holds the slide-plate G in its rear normal po-

sition, which position is near the transverse line of the rear ends of the tilting track-rails. The described parts C', C², F, and G constitute the one part or element of a two-part operating mechanism for the stop, which part, as will be seen, is connected to the tilting track-section. These in turn are operated by the other element of said two-part mechanism, this second element or part consisting mainly of a tripper J and means for connecting it detachably with the first element or part. The tripper J is preferably of the nature of a lever. It is shown as pivoted at *j* and as having connected to it a push-rod K, adapted to detachably engage with the slide-plate G. The pivot *j*, and consequently the tripper J, are supported stationarily relatively to the tilting track-section. The tripper is held in its normal position by mechanism independent of the spring I, that holds the stops C. This mechanism consists of a weight L, attached to an arm Z, connected to the tripper.

At M there is an adjusting-screw or other suitable adjusting device for setting and holding the tripper at the proper point.

When the mechanism is in use, a train of loaded cars is behind the tripper J, each ready to be in turn moved forward to the tilting track-section and there emptied. As soon as one is emptied the next loaded one is pushed forward. It instantly strikes the tripper J, pushes it forward, and through that pushes the push-rod K, the slide G, the links F, and the levers C² and opens the stops C, and as this loaded car tends to move forward toward and upon the tilting section it strikes and advances the previously-emptied car. Just as the rear end of the loaded car passes over the tripper the weight L draws backward the latter and the push-rod K, and then the spring I is free to instantly close the stops C to catch and stop the loaded car, although the previously-emptied one has had time to escape and advance onto the receiving track-section A².

An examination of the drawings in connection with the above description will disclose a number of peculiarities incident to the construction and arrangement of parts above referred to. First, it will be seen that I hinge the tilting track-section in the manner above described at a line relatively near the receiving track-section A². Secondly, it will be seen that the tilting track-section is relatively very short, much shorter than has been heretofore customary, the rear ends of the rails *a* extending but a short distance behind the rear wheels of the car. Third, it will be seen that the next loaded car is ready to trip the stops before it reaches the tilting track-section, the stop-operating mechanism being, as aforesaid, in two parts detachably connected. Fourth, I dispense entirely with the complicated and cumbersome mechanism heretofore used for controlling the movements of the tilting track and dumping-car, such as long

curved friction-bars, together with friction-shoes, levers, links, &c., to operate the same. Fifth, I obviate the necessity of dropping the hinged end of the receiving track-section A² and the tilting track-section A through the several feet that must be traveled by these ends in the earlier constructions. The present arrangement only necessitates the movement of a very few inches of the receiving track-section A². By dispensing with friction controlling devices heretofore in use I am enabled to shorten the tilting track-section in the way described. Considerable length was required for this section when such controlling means were employed, as it was necessary to assist them with as long a leverage as possible to attain a satisfactory holding and controlling of the car. After doing away with them the tilting part can be shortened, as aforesaid, and as a consequence of this the forward car of a train of loaded ones can be brought close up to the position of dumping, so that at the instant after the emptying of one car has occurred the next loaded one is so close that it can be advanced to the dumping position without the loss of time; but in the earlier constructions a period of time, which was not only appreciable, but was a cause of great loss, elapsed with the advance of each loaded car. This will be understood when it is remembered that at some mines several thousand cars a day must be dumped.

Immediately after a car is emptied it is advanced to the track A², the present arrangement of devices not requiring that it should be carried backward at all, and in this respect the apparatus is distinguished from those heretofore in use, in which after the car was tilted it had to be carried backward for a considerable distance over the same track upon which it was brought forward.

At A³ there is a supplemental track provided with a switch by which the car is so guided that it can return over a track A⁴ independent of the parts above described and by which it can be taken to a place for reloading.

Having placed the hinge at the front end of the tilting track-section and near the receiving-section A², I dispense with the long drop of the front end of the car and on the contrary depend upon elevating the rear end for the purpose of dumping the contents. This elevating I accomplish by a positively-acting power mechanism, and by preference the latter consists, essentially, of a cylinder containing a piston adapted to receive steam or an equivalent agent, the piston being connected with the tilting track by a suitable mechanism for transmitting power. I am aware that cylinders for the purpose of elevating a car platform or track have been used; but I believe myself to be the first to have employed a cylinder which could be firmly

and rigidly fastened in place and to have connected its piston by a single rod to the tilting track. To suitably arrange these elements, I prefer to have the upper end of the cylinder more or less open, at least not steam-tight, and to connect the car-track and the piston by means of a vibrating rod extending directly from one to the other. This avoids the necessity of guides and also obviates the hinging of the cylinder either at one end or upon trunnions intermediate of its ends. By employing a rigidly-mounted cylinder and a single piston-rod or a power-rod I not only simplify the apparatus, but make it very compact, as the cylinder can be placed at a point very near to the track-section and the power applied thereto immediately.

In the drawings the cylinder is indicated by N. Preferably I arrange it directly below the tilting track A. Within it there is fitted the cup-shaped piston O. This piston is connected to the track by the rod T, pivoted directly to the piston and also joined by a hinge at t to a suitable part of the track-section, such as the plate D. The rod T vibrates somewhat, and to permit this the upper end of the cylinder is left more or less open. This end can be closed by a slide-plate or other suitable device. To prevent the entrance of coal or other foreign material to the interior of the cylinder, I provide the latter with a shield or guard Q. This may be of several forms. That shown consists of a hollow shell having plates q q at an angle to each other to readily throw the material toward one side or the other from the cylinder and end plates q' . The latter are pivotally connected to the cylinder at q^2 . This permits a relative movement between the cylinder and the piston-rod T. The operator standing on any suitable plane or platform adjacent to the tilting track-section is able to control the action of the piston by means of the lever R, which is connected to the valve-stem S, that passes through a gland into the valve-chamber V. U is the valve. The cylinder has two ports extending to or from its interior chamber, as at n n' . These are so arranged that that at n can be used as an inlet-port. n^2 is the exhaust-port. The valve U has a port u . In operation the operator first draws the valve U up far enough to permit steam to pass through the port n into the cylinder-chamber below the piston. Thereupon the piston moves upward and through the rod T raises the rear end of the track A and the car. After the car is emptied the operator by an opposite movement of the lever pushes down the valve U, bringing the port u into such a position as to connect the ports n' n^2 , which permits steam to exhaust from below the piston, and the latter moves down until it passes the bottom of port n' . From below that line it is cushioned by the steam still remaining in the cylinder-chamber. Such cushioning can be maintained normally, if desired; but if the

operator desires to entirely exhaust the cylinder-chamber he pushes the valve farther down until the valve-port u connects the cylinder-ports n n^2 , which allows the steam from the lower end of the cylinder to entirely exhaust. Thus he provides for a positive cushioning of the piston when he desires or for an entire and complete exhaust, if necessary; but the valve and other parts can be so arranged as to positively insure that the piston shall always be cushioned, which can be done by making them as shown in Fig. 4, in which case the valve is arrested by a suitable stop, such as the lower end of the valve-casing, before moving down so far as to connect the valve-port u with the cylinder-port n .

With this simple power device the operator is enabled to delicately and completely control the movements of the track-section and of the car thereon, and I dispense entirely with the friction mechanism that has been heretofore necessitated in order to provide such control. A construction of the character of that herein is superior to those in which the parts are so made and related as to have the axis of the front car-wheels serve as the axis of oscillation around which the car is tilted. For instance, if the car itself be lifted up at its rear end away from the track-rails and caused to tilt around the front axle it is necessary to build the hoppers, the chutes, &c., up to a higher plane, and there is necessitated a corresponding increase in height along the entire trestle-work and platform. This enlarges the expense of the apparatus very considerably, because of the relatively high position of the axis of tilting. In the present construction this axis is brought to or below the top line of the tracks, and consequently there can be considerable saving in material and expense in the construction of the trestle-work, the frames, the platform, the hopper, and other parts.

In the present case the elevating of the car is effected not by lifting it directly, but by carrying it up on the track-rails, and the latter are made to swing or tilt, as well as the car, and consequently the axis of swinging can be relatively lowered. Again, I obviate the liability of any blows to the car-axle or the car-body, and when compared with the "gravity-dump" tipples that have been heretofore used there is a marked advantage incident to one of this character, growing out of the fact that the operator has complete control of the car at all points of its travel while tilting. When a gravity-dump is in use the load escapes very rapidly from the car to the chutes and screens below, generally leaving it in a unitary mass. The discharge is not distributed uniformly over the entire period of each discharge interval, and consequently the larger blocks or lumps of coal, the intermediate-sized particles, and the slack are apt to pass downward in a mingled mass, and it

is not possible to effect a perfect separation of the finer from the coarser; but with a mechanism like mine it is possible for the operator to allow the discharge to commence gradually and after the bulk of the load has escaped to allow the remainder to follow gradually and yet not consume any more time for each interval of unloading. This is due to having a power mechanism (supplemental to the action of gravity) for lifting the track on which the wheels rest, and in this respect there can be numerous modifications, for while I have above described a steam or equivalent engine for applying such power, yet it will be understood that the essential features of the invention can be maintained if other power devices be substituted, so long as the receiving-track is in front of the tilting track and the other requisite devices are retained.

It will be understood that where details of construction are not shown use may be made of any of those well known to engineers. The cars may be provided with swinging doors or end-gates, and automatically-acting door-opening devices of any of the well-known forms can be combined with the mechanism illustrated and described. Again, while I prefer to have the tripping mechanism, as at J, situated on the stationary track and the stops, as at C, connected to the tilting track it will be seen that here also there can be modification and that the stops C and tripper J can be permanently connected by a train of united devices instead of having the trip mechanism in two elements in the way illustrated.

When an engine of the character shown is used, the operator can control the valve by any suitable device—as, for instance, by a rod or lever, such as indicated at W.

What I claim is—

1. In a car-dumping apparatus, the combination of a stationary track-section for delivering loaded cars, a second track-section of substantially the length of a car for temporarily holding each car while dumping, a fixed hinge for the second track-section, power devices in the rear of the said hinge for positively lifting said second track-section and the car to empty it, and a third track-section hinged to the front end of the second track-section to receive the emptied cars successively therefrom, substantially as set forth.

2. In a car-dumping apparatus, the combination of a main support, a track-section hinged at its front end to the said support, a power mechanism for positively moving the said track-section around said hinge, a movable stop adapted to engage with and hold a car upon said hinged track-section, mounted on a vertical pivot and having a laterally-extending arm C², tripping mechanism for said stop, connected with said arm and a track-section in front of the aforesaid section to receive therefrom the emptied cars, substantially as set forth.

3. In a car-dumping apparatus, the combination of a tilting track-section, a hinge therefor at its front end, a removable stop device for temporarily holding a car thereon, a power mechanism for positively lifting the rear end of said track-section, and a track-section in front of the aforesaid section, and connected thereto by a hinge, adjacent to the aforesaid hinge, substantially as set forth.

4. The combination in a car-dumping apparatus of a tilting track-section, a movable stop for temporarily holding a car thereon, a hinge at the front end of the said track-section, a track-section in front thereof for receiving the emptied cars, a power mechanism for positively elevating the tilting track-section, a stationary track-section for holding loaded cars, operating mechanism for removing the said stop, and a trip for the stop-operating mechanism located in the rear of the front end of the stationary track-section, substantially as set forth.

5. In a car-dumping apparatus a stationary track-section in combination with a tilting track-section, a car-receiving section in front of the tilting section, a movable stop for holding the car on the tilting track-section, and a two-part operating mechanism for moving the said stop, one part being connected to the tilting track-section, and the other part separable therefrom and connected with the stationary track-section, substantially as set forth.

6. In a car-dumping apparatus, the combination of a tilting track-section, a movable stop for holding a car on said section, operating mechanism for moving the stop away from the car, and swinging with the tilting track-section, and the tripper for said operating mechanism supported stationarily relatively to the moving section, substantially as set forth.

7. In a car-dumping apparatus, the combination of the tilting track-section, the movable stop, means for holding the movable stop in position to engage the car, a tripper for the said stop, and means independent of the aforesaid parts for holding the tripper in normal position, substantially as set forth.

8. In a car-dumping apparatus, the combination of a tilting track-section, the movable stop for the car, means for holding the stop in normal position, and a two-part operating mechanism for said stop, the first part connected with the tilting track-section, and the second being relatively stationary and detachable from the first part, substantially as set forth.

9. In a car-dumping apparatus, the combination of the tilting track-section, the movable stop for the car, the two-part operating mechanism for the said stop, the first part being connected to and moving with the tilting track-section, and the second part being detachable from the first part and supported stationarily

tionarily relatively thereto, and means independent of said first part for holding the second part in normal position, substantially as set forth.

5 10. In a car-dumping apparatus, the combination of the tilting track-section, the movable stop for the car, the two-part operating mechanism for said stop, the first part being connected to the tilting track-section, and having
10 the spring I, and the second part being detachable from the first part and consisting of a trip-lever, as J, and a weight for holding the trip in normal position, substantially as set forth.

15 11. In a car-dumping apparatus, the combination of the tilting track-section, the hinge at the front end thereof, the cylinder for steam or equivalent, the piston therein, means for connecting the piston with the tilting track-
20 section for elevating it, two outlet-ports from the cylinder-chamber, an exhaust-port, and a valve adapted to alternately connect said outlet-ports with the exhaust-port, substantially as set forth.

25 12. In a car-dumping apparatus, the combination of the tilting track-section, the cylinder for steam or equivalent, the piston therein, means connecting the piston with the track-
30 section, a steam-inlet port to the cylinder-chamber, an outlet-port from the cylinder-chamber, an exhaust-port, and means for connecting the exhaust-port with said outlet-port and then with said inlet-port, substantially as set forth.

35 13. In a car-dumping apparatus, the combination with the tilting track-section, of the cylinder, the piston, means connecting the piston with the track-section, an inlet-port to the cylinder-chamber, an outlet-port from the

cylinder-chamber, an exhaust-port, and a 40 valve adapted to first connect said outlet-port with the exhaust-port and then connect the inlet-port with the exhaust-port, substantially as set forth.

14. In a car-dumping apparatus, the combi- 45 nation of the tilting track-section, the cylinder for steam or equivalent, the piston therein, the piston-rod, and the shield for the cylinder movable relatively thereto, substantially as set forth.

15. In a car-dumping apparatus, the combi- 50 nation of the tilting track-section, the cylinder, the piston therein, the vibrating piston-rod, and the vibrating shield for the cylinder, substantially as set forth.

16. The combination with the tilting track- 55 section, of stops thereon for the car, a movable part or trip held in supports stationary relative to the tilting section, and a movable part on the tilting section connected with and
60 adapted to operate said stops arranged to come into line with and be operated by said trip when the section is not tilted and separable therefrom when tilting.

17. In a car-dumping apparatus, the combi- 65 nation with the car, the track-section at the point of tilting, the cylinder, the piston therein and the piston-rod adapted to tilt the car, of the shield for the cylinder, adapted to protect it from dust and dirt, substantially as set
70 forth.

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

HENRY H. BIGHOUSE.

Witnesses:

F. E. COLTON,
A. D. SHAW.