

(No Model.)

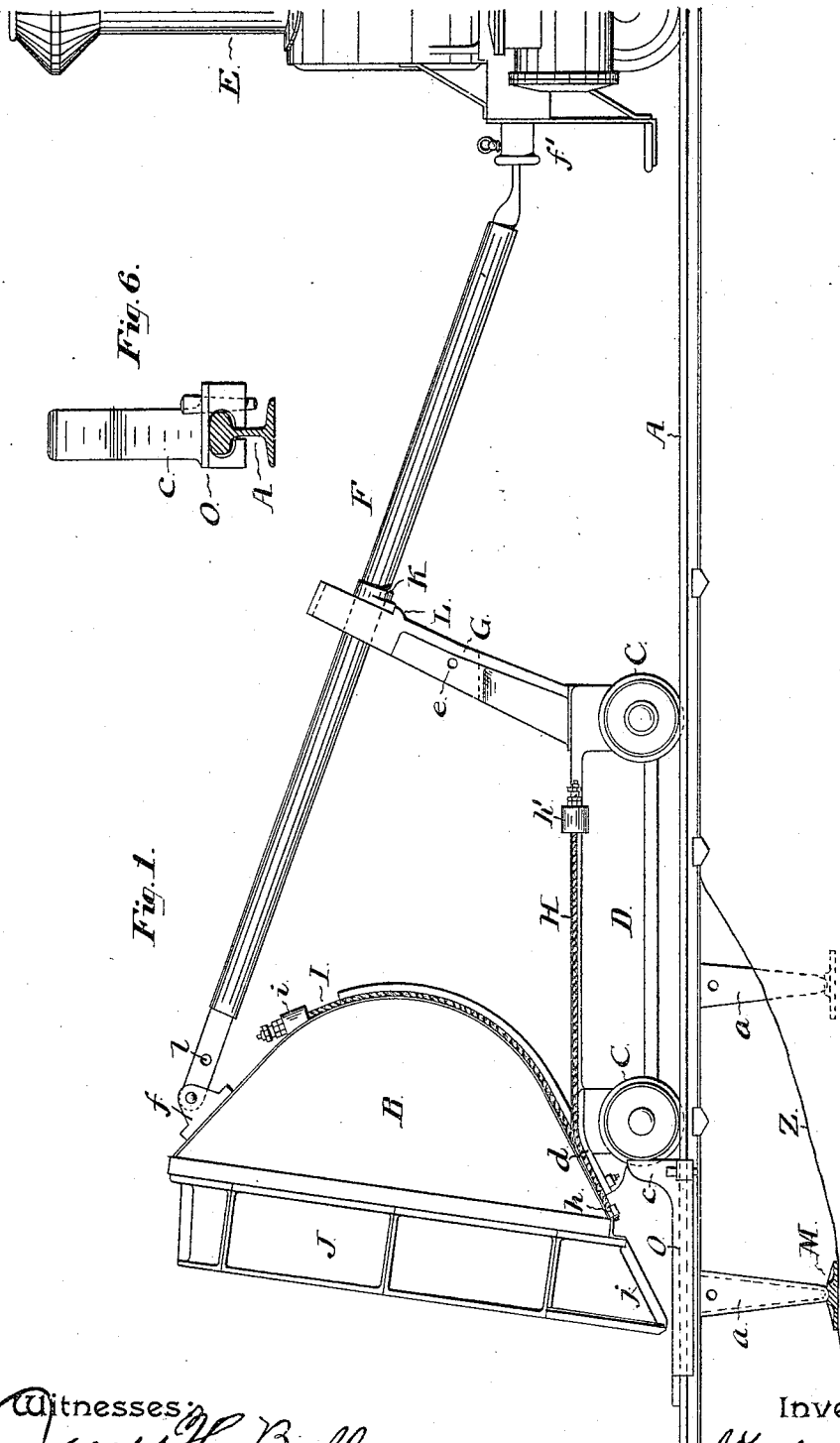
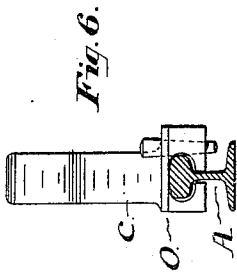
3 Sheets—Sheet 1.

J. M. HARTMAN.

APPARATUS FOR TRANSPORTING AND DUMPING CINDERS.

No. 443,574.

Patented Dec. 30, 1890.



Witnesses:
James H. Bell
A. E. Paige

Inventor
John M. Hartman,
By Collins Smith & May,
Attorneys.

(No Model.)

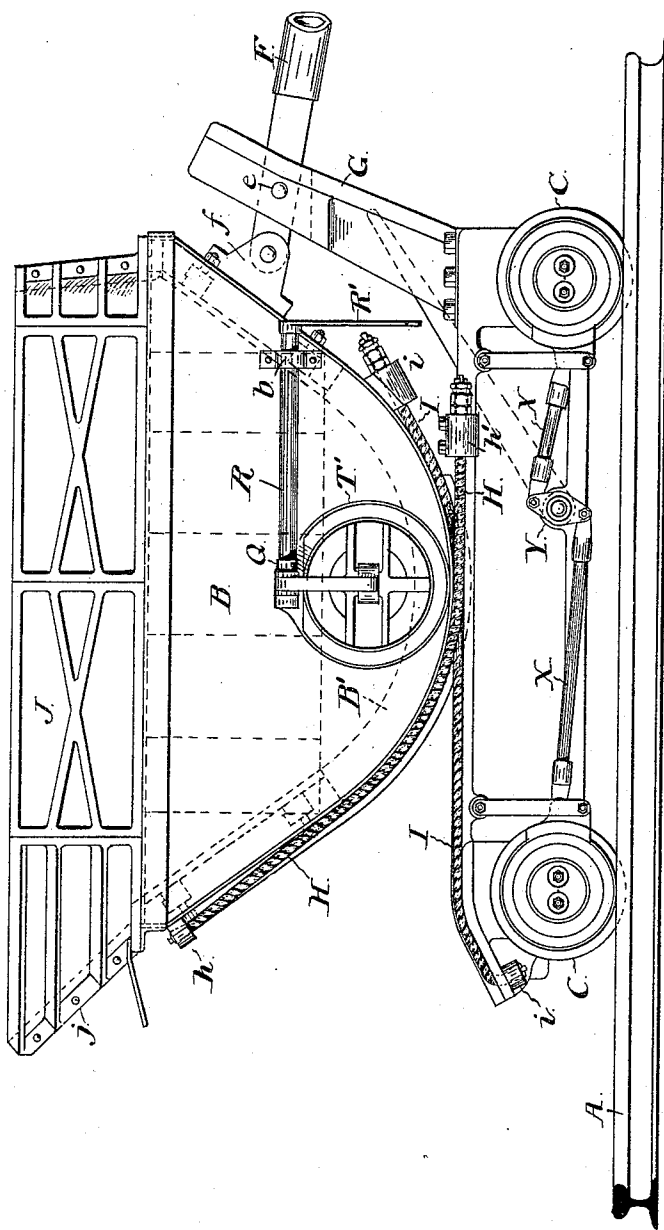
3 Sheets—Sheet 2.

J. M. HARTMAN.

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WITNESSES:

WITNESSES:
James H. Bell
A. E. Paige

INVENTOR

Wm. M. Hartman,
By Hellmuth, Obata & Kassabaum
Attorneys,

J. M. HARTMAN.

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Fig. 3.

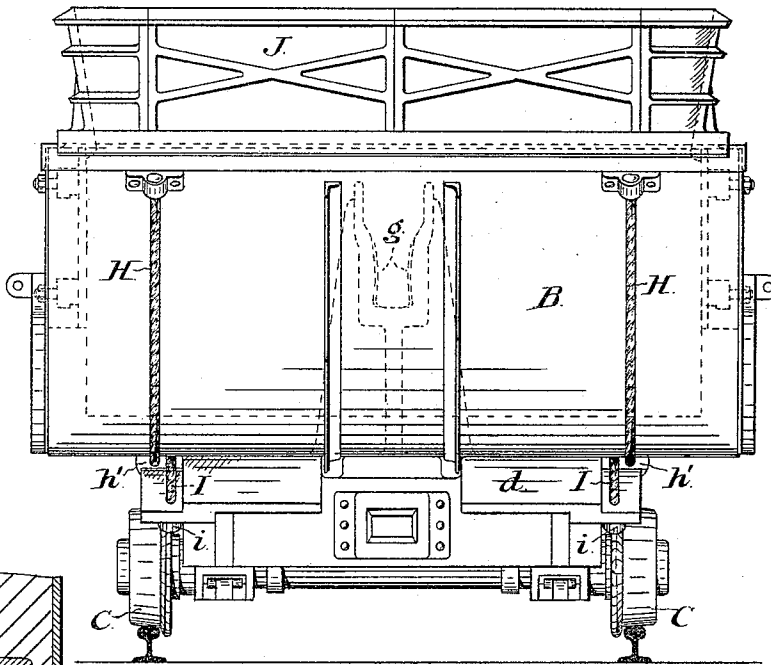


Fig. 4.

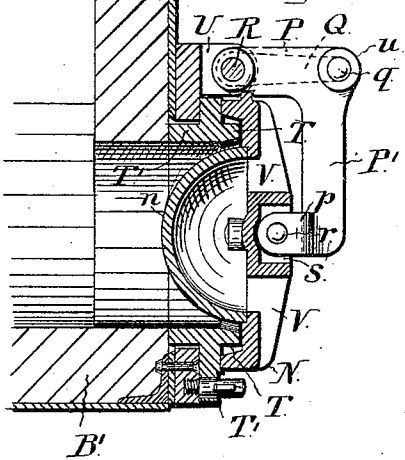
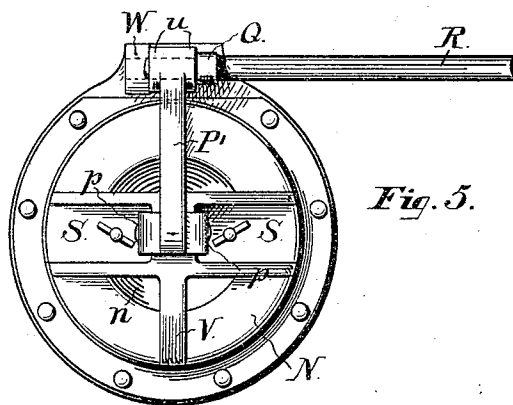


Fig. 5.



Witnesses:

James H. Bell
A. E. Paige

Inventor

John M. Hartman
By Hollingsworth & Bailey
Attorneys

UNITED STATES PATENT OFFICE.

JOHN M. HARTMAN, OF PHILADELPHIA, PENNSYLVANIA.

APPARATUS FOR TRANSPORTING AND DUMPING CINDERS.

SPECIFICATION forming part of Letters Patent No. 443,574, dated December 20, 1890.

Application filed March 21, 1890. Serial No. 344,848. (No model.)

To all whom it may concern:

Be it known that I, JOHN M. HARTMAN, of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for Transporting and Dumping Cinders from Blast or other Furnaces.

The following is a specification of my said improvements, reference being had to the accompanying drawings, wherein—

Figure 1 represents a general exterior side view of the apparatus with its motor, track, &c., without, however, showing all the details. Fig. 2 is an exterior side elevation on an enlarged scale and showing the details. Fig. 3 is a front view of the same, and Figs. 4 and 5 (on a still more enlarged scale) are respectively a vertical central section through the lateral door for discharging the cinder and a front view of said door.

Apparatus of this kind, commonly known as "cinder-cars," have usually been constructed by suspending a tank or car-body upon trunnions mounted upon a suitable truck, and providing the tank with dumping or tipping mechanism attached thereto. In other cases the trunnions have been dispensed with and the tank mounted upon pivoted segments engaging with racks upon the truck. These devices are not only cumbersome and are liable to be deranged by the liquid cinder accidentally flowing over or splashing back upon them, but as heretofore constructed they required a height in the car which is objectionable, both because it throws the center of gravity of the apparatus too high and because furnaces do not usually have their cinder-trough arranged at a sufficient distance from the ground to readily fill the tank. By my improvements these objections are dispensed with and other valuable features are added, as will be hereinafter more particularly explained.

In the drawings, A represents the track, the method of laying and extending which will be hereinafter described.

B is the tank or body of the car, lined with fire-brick B' and supported on a truck D, whose wheels C run upon said track, and may be provided with a brake mechanism X Y, which latter, however, forms no part of my invention.

The top or upper portion of the tank B consists of series of iron plates J J, constructed in removable sections, as shown, the front section J being inclined at a sharp angle to form a spout. The bottom of said tank is curved so as to rock freely backward and forward upon the top surface of the truck D, and is only connected to said truck by means of the flexible attachments H H I I, which are formed of wire rope or chain. One pair of attachments I I are secured at their rear ends to the tank and at their front ends to the truck, as shown at *i i'*, respectively. The other pair of attachments H H are attached at their front ends to the tank and at their rear ends to the truck, as shown at *h h'*, respectively. The pairs of attachments thus always cross one another and maintain the parallelism of the rolling tank in all positions.

At the front end of the truck D the upper surface thereof is inclined, as shown at *d*, so as to throw the front end of the tank well forward and dump the cinder clear of the track. At the rear end of the tank I provide a pair of lugs *f*, to which one end of a long link F is pivoted, the other end being coupled at *f'* to the locomotive E. Upon the rear end of the truck is an upright G, having a forked upper end, whose opening *g* receives said link F and allows some vertical play thereof. A swivel draw-head can be attached to the lugs *f*, if desired. Near the bottom of the forked portion of the upright G is a transverse opening *e*, and a similar opening *l* is formed near the front end of the link F. When the tank is in its normal position, as shown in Fig. 2, the holes *l e* are opposite to one another, and a pin pushed through the same secures the link rigidly to the upright, so that the truck will be bodily shifted along the track by any movement of the locomotive. When, however, this pin is removed, the forward movement of the locomotive will tip the tank forward, as shown in Fig. 1, so as to dump its contents.

The link F is provided with a transverse stop-piece K, which brings up against the rear side of the forked upright G, when the link is in a position corresponding with the extreme forward position of the tank, and thus prevents the tank from being tipped too far.

To prevent the truck from being bodily lifted when the stop-piece abuts against the upright G, I provide upon said upright lugs L, upon which the under side of the stop-piece K strikes just as its front face comes in contact with the rear of the upright G, and thus the strain is prevented from tending to lift the truck.

In the side of the tank, and preferably upon both sides, I provide openings for removing the cinder laterally without tipping the car, which openings are closed by doors mounted as follows: The door proper consists of a hollow hemispherical piece *n*, mounted in an annular flanged piece N, which fits over a projecting annular flange T upon the ring T', surrounding the opening. The flanged rim N closes against the face of the ring T' back of the edge of the annular flange T. This projection of the flange T discharges the cinder beyond the face and prevents the hot cinder from destroying it, thus maintaining a tight joint at the door at all times. The rear of the flanged rim N is provided with bridge-pieces S S V V, at whose central meeting-point the structure is suspended by means of a transverse pivot *r*, supported in the forked arms *p* of an overhanging bell-crank lever P P'. The horizontal arm P of this lever is freely hung upon a transverse rod R, suspended in lugs U U upon the side of the tank. Said rod R is provided with a head W at one end to prevent it from slipping out of the lugs U U, and has a shifting-lever R' at its other end, near which a second bearing *b* is provided for it upon the side of the tank. A lever-arm Q is rigidly attached to the rod R alongside of the bell-crank arm P, and is pivoted to the center of the latter at *q*. It will thus be seen that the shifting of the lever-arm R' will, by turning the rod R, raise or lower the bell-crank P P' and open or close the door N *n*, swinging it clear of the opening so as to be out of contact with the cinder.

The method of projecting the track for extension conformably with the growth of the cinder-pile constitutes an important feature of my invention, which will now be described.

A A represent the rails, which are secured together by metal ties at the proper distance. The cinder flowing from the car forms a long talus somewhat inclined, as shown at Z. As the track has to be laid in advance of the car, I support the rails upon tapered iron posts *a*, which in turn rest upon metal plates M laid upon the talus at the proper distance from the top or level portion of the pile. As the dumping progresses cinder flows back and envelops said plates together with the posts, which latter, however, being tapering, are readily withdrawn as soon as the rail has a sufficient support from the cinder alone, and thus may be used again. The plates M of course remain permanently embedded in the cinder.

In front of the car-truck I secure upon each rail a curved metal shield O, having at its

rear end a projection or stop *c*, the object being to afford protection for the rails as the dumping occurs, and thus prevent them from being warped by the cinder. The stop *c* is a convenient adjunct to arrest the motion of the truck at any desired point where the dumping is to take place.

The operation of the shifting and tipping device is obvious. When the car is to be moved bodily into position, the link F is secured by means of the pin passing through the holes *e l*, so that the movement of the locomotive E draws or pushes the car, as may be desired, and as soon as said pin is withdrawn the dumping operation takes place, as illustrated in Fig. 1.

Among the advantages not before enumerated of this improved construction are the following: The method of tipping the car from the locomotive by means of a long link obviates the danger to which the workmen are often exposed when the car is tipped by mechanism arranged upon the truck itself, since the hot cinder is liable to splash back and burn them. The incline *d* at the front end of the truck, acting in combination with the curved bottom of the car, enables the cinder to be thrown well forward and clear the truck. So, also, the peculiar construction of the side openings and doors not only projects the issuing cinder clear of the face or seat against which the door closes, but permits the door to accommodate itself to the face, thus insuring tightness of the joint instead of warping or twisting out of contact, as a rigidly-supported door would be liable to do. The inwardly-projecting portion *n* also affords a very extended surface for the cooling circulation of the air, and thus tends to prolong the life of the door.

At times it is found that a furnace will make a thick sticky cinder, which chills on the lining of the tank and is difficult to dump out clean. After two or three flushes have been drawn off the cinder is often found chilled to such an extent that it has to be pried off from the fire-brick lining with bars, an operation which generally results in injury to the lining. I have found, however, that in the bottom of the car where the heat is greatest the cinder will remain in a fluid state long after the upper strata have adhered to the sides. To obviate this objection I construct the upper portion of the tank with a series of unlined metal plates J, as described. These plates, being near the top, are not liable to be melted away, as the heat is much less great than at the bottom, and the cinder when chilled in contact with them can readily be detached, since it does not adhere to the metal with any great tenacity.

I have described the method of connecting the rolling tank to the truck by the flexible attachments as the best mode now known to me for embodying my invention; but it must be understood that certain features claimed

are entirely independent of this particular device. Hence in using the words "rolling tank" to describe the car-body I do not limit myself to such device, but intend to include
 5 any tank which is capable of being rolled or tilted upon the car-truck. Furthermore, it must be understood that in mentioning a locomotive-engine as an element of certain combinations, claimed I do not limit myself to the
 10 use of that particular motor, since other devices will readily suggest themselves as equivalents for the purpose mentioned.

Having thus described my invention, I claim—

15 1. The combination of the car-truck, the rocking tank mounted thereon, a locomotive-engine, a link connecting said engine directly with said tank, and a stop mounted upon said truck for securing said link rigidly thereto,
 20 whereby the same motive power can be applied to shifting the car bodily or tilting the tank thereof, substantially as set forth.

2. The combination, with the car-truck, the rocking tank mounted thereon, and the locomotive-engine, of a link pivotally secured to
 25 said tank and to said engine, a forked upright mounted on said truck and adapted to receive said link within its forked portion, a pin or stop for securing said link rigidly to said upright, a stop-piece upon said link adapted to
 30 engage with the rear side of the upright, and a lug or lugs upon said upright adapted to engage with the under side of said stop-piece, whereby the tilting of the tank is permitted, but the lifting of the car-body is prevented,
 35 substantially as set forth.

3. The combination, with the car-truck having an incline at its front end, of the tank having a curved bottom adapted to rock on
 40 said truck and incline and means for tilting

said tank, substantially as set forth, whereby the projection of the cinder beyond the end of the truck is insured.

4. The combination, with the truck and the rocking tank mounted thereon, of the pairs of
 45 flexible attachments H H I I, connecting the tank and truck and arranged substantially as set forth, whereby the parallelism of the tank is maintained in all its positions.

5. The combination, with the tank having
 50 a lateral discharge-opening, of a seat surrounding said opening, an annular lip between said opening and said seat, said lip projecting beyond the face of the seat, and a swinging door having a detachable hollow
 55 hemispherical central portion projecting into the opening out of contact with its sides, and an annular rim surrounding said central portion and provided with a flange adapted to close against said seat, the depth of said flange
 60 being greater than the projection of said lip, whereby an open space is left between the end of the lip and the proximate surface of the door, substantially as set forth.

6. The combination, with the tank having
 65 a lateral opening, of a door adapted to close said opening, a bell-crank lever pivotally connected with said door and freely suspended at its inner end upon a rod supported in suitable lugs upon the tank-body, and a lever
 70 arm rigidly attached to said rod and pivotally attached to said bell-crank-lever arm, whereby said door may be swung clear of the opening and is permitted to adjust itself to its seat upon closing, substantially as set forth.
 75

JOHN M. HARTMAN.

Witnesses:

HENRY N. PAUL, Jr.,
 E. REESE.