

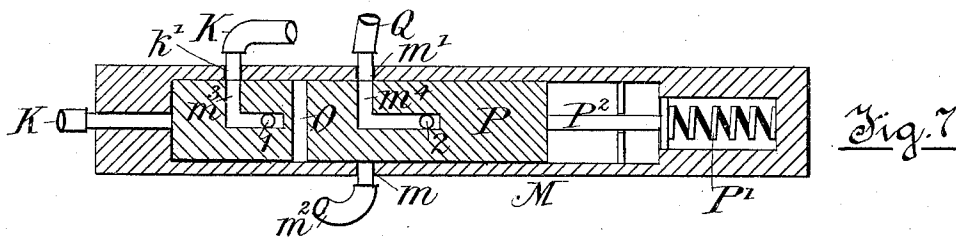
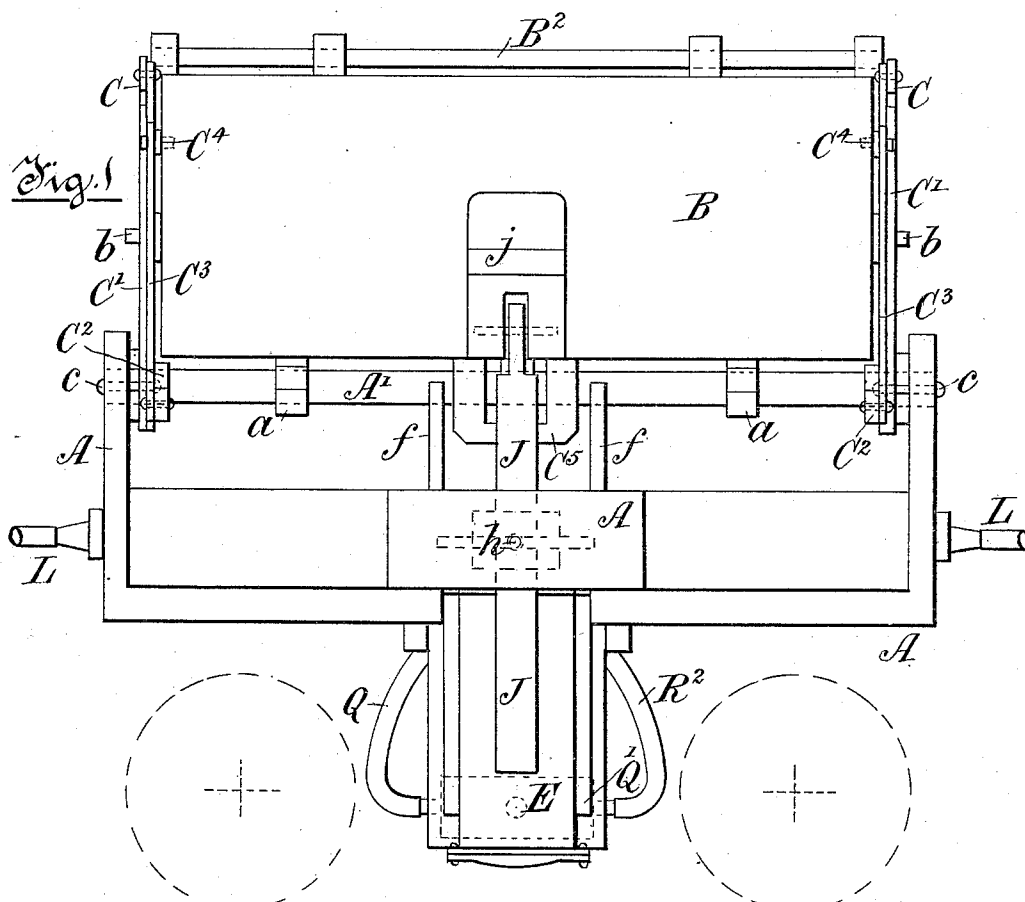
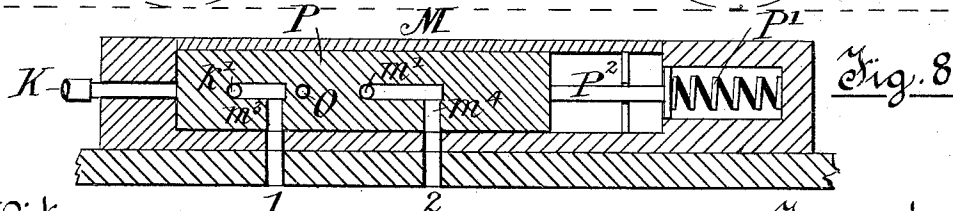
(No Model.)

4 Sheets—Sheet 1.

J. DUFF.
DUMPING CAR.

No. 409,394.

Patented Aug. 20, 1889.



Witnesses:

J. M. E. Pullen
A. Pauverou

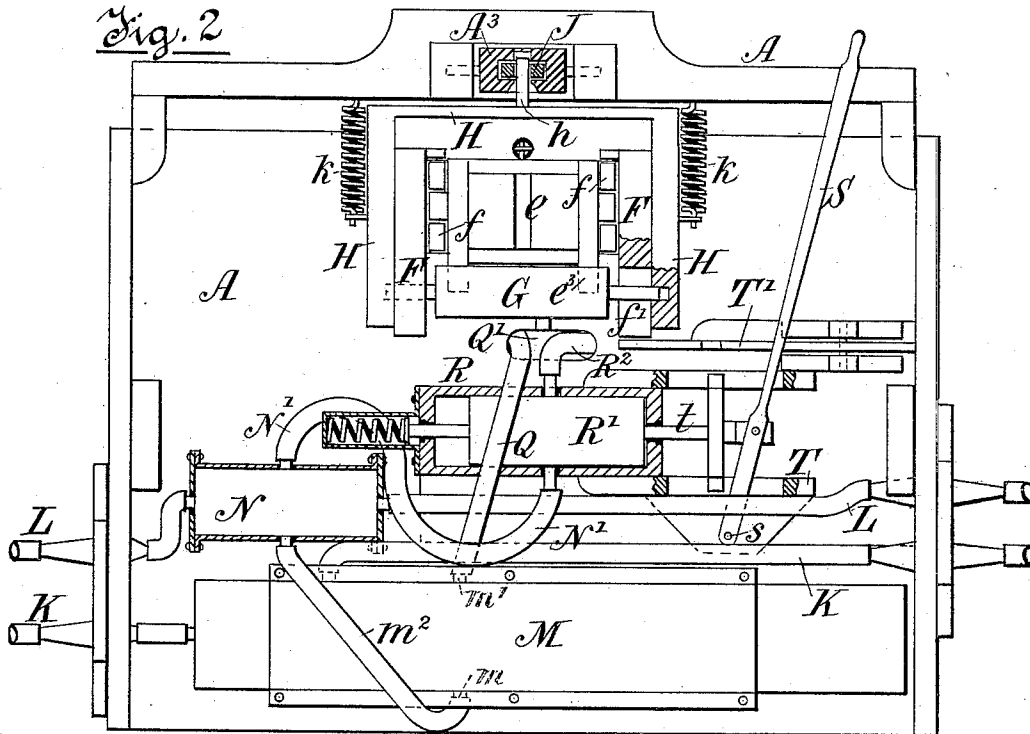
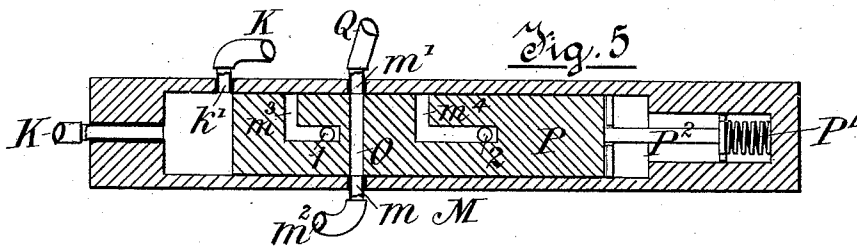
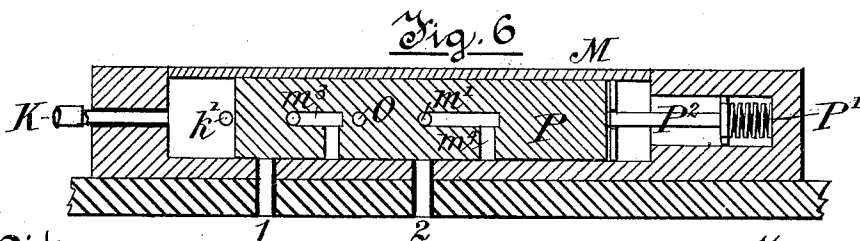
Inventor.

Per Joseph Duff
Reynolds & Kellogg
Attys.

J. DUFF.
DUMPING CAR.

No. 409,394.

Patented Aug. 20, 1889.



Witnesses:

J. M. L. Kelly &

A. J. Pannou,

Inventor.

Joseph Duff.
Per Reynolds & Kellogg.
Attys.

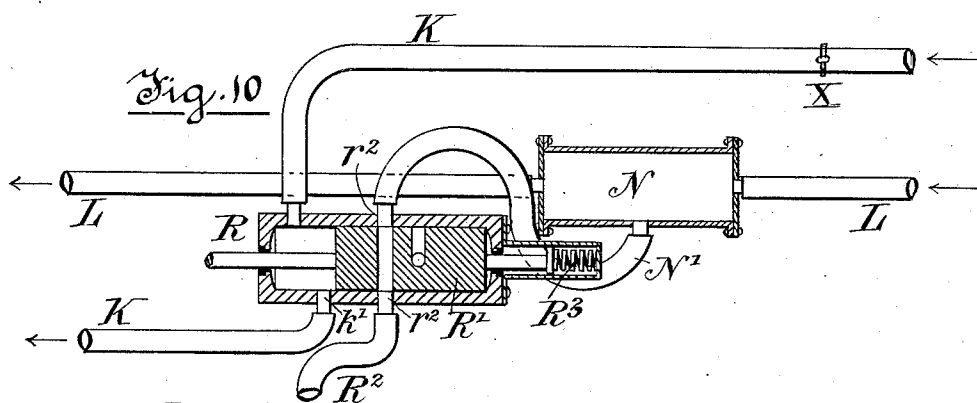
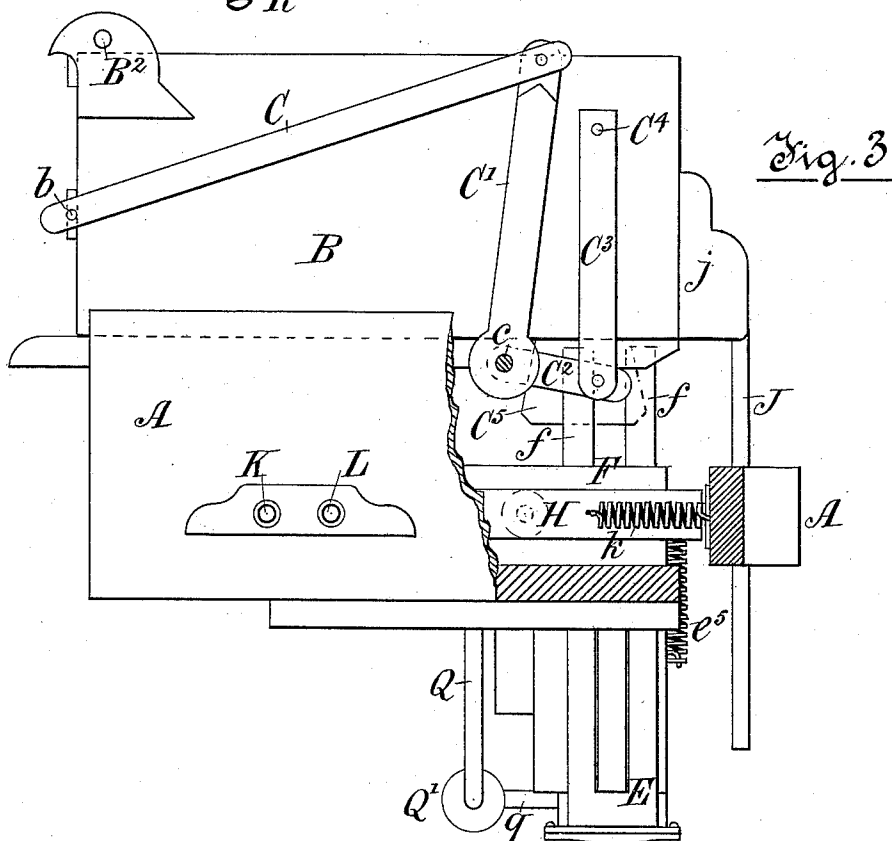
(No Model.)

4 Sheets—Sheet 3.

J. DUFF.
DUMPING CAR.

No. 409,394.

Patented Aug. 20, 1889.



Witnesses:

J. M. C. Kellond
R. Pauveron

Inventor.

Joseph Duff
Per Reynold Kellond
Atty.

J. DUFF.
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No. 409,394.

Patented Aug. 20, 1889.

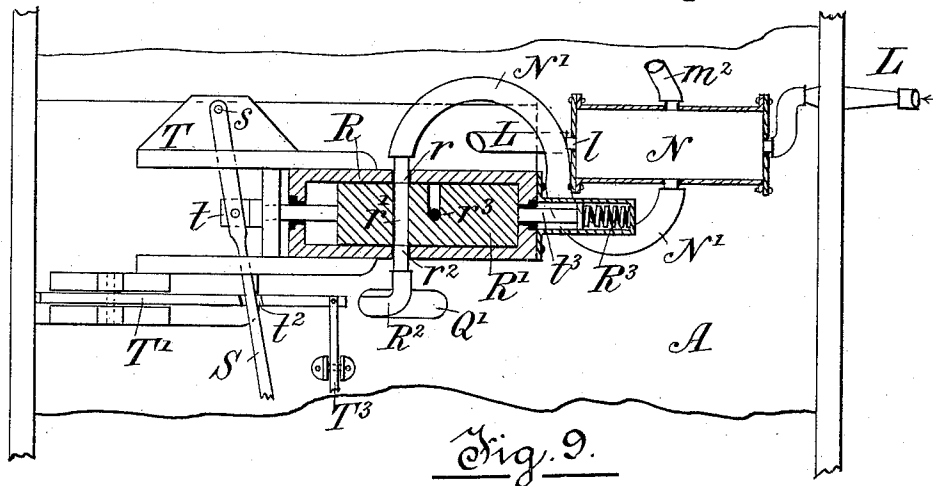


Fig. 9.

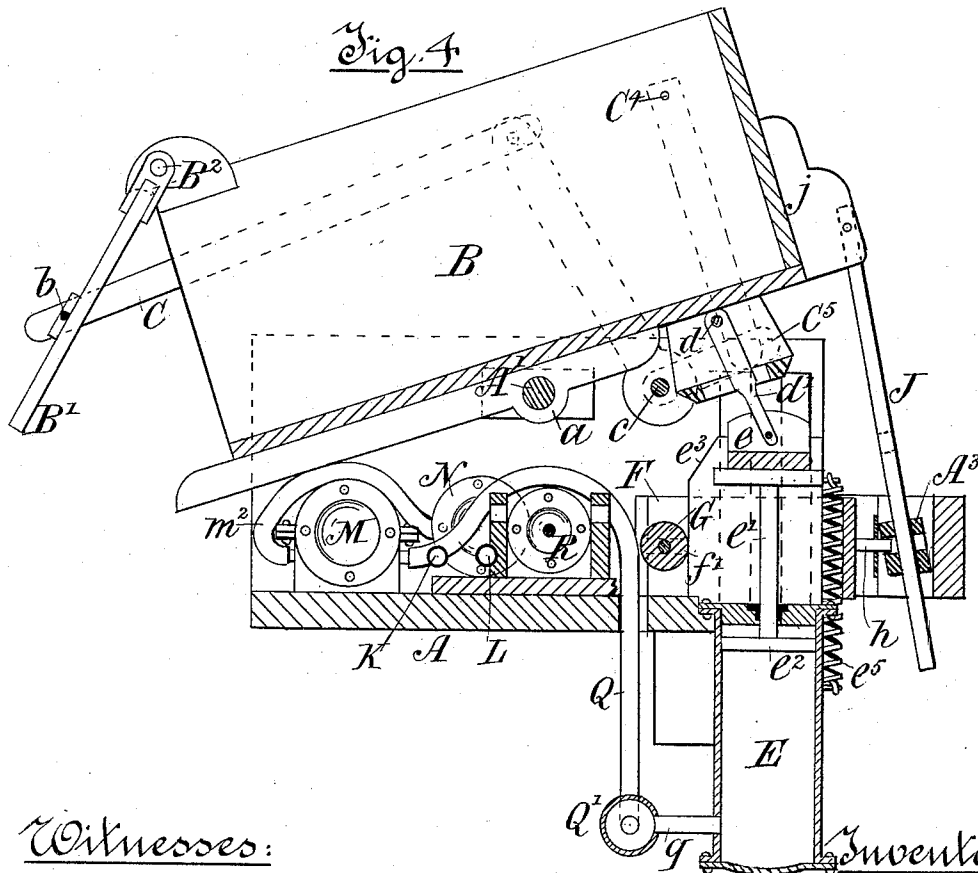


Fig. 4.

Witnesses:

J. M. E. Kellogg
H. Cassin

Inventor.

Per

Joseph Duff
Reynolds & Kellogg
Attys.

UNITED STATES PATENT OFFICE.

JOSEPH DUFF, OF LANSING, ONTARIO, CANADA.

DUMPING-CAR.

SPECIFICATION forming part of Letters Patent No. 409,394, dated August 20, 1889.

Application filed December 17, 1888. Serial No. 293,785. (No model.) Patented in Canada January 16, 1889, No. 30,568.

To all whom it may concern:

Be it known that I, JOSEPH DUFF, gentleman, of Lansing, in the county of York and Province of Ontario, Canada, have invented certain new and useful Improvements in Dumping-Cars; and I do hereby declare that the following is a full, clear, and exact description of the same.

This invention has been patented to me by Canadian Letters Patent No. 30,568, dated January 16, 1889.

This invention relates to dumping-cars, such as are used in constructing and ballasting railroads, excavating and filling in, canal and dock building, for carrying ores, mining coal, and like purposes.

Dumping-cars constructed according to my invention are applicable for use either singly or in a train, and the main feature is the tilting of the car (thus discharging the contents) by means of compressed-air arrangements connected with each car, and with a suitable compressor located upon the engine, tender, or upon any special car or van included in the train.

A convenient arrangement of apparatus for carrying out my invention is shown in the accompanying drawings forming part of this specification, and for full comprehension of the principles and details of construction reference must be had thereto, similar letters of reference indicating like parts.

In said drawings, Figure 1 is a side view of a dumping-car constructed according to my invention, the view being taken from that side which is opposite to the discharge-door, the tilting body being in place upon the car-frame. Fig. 2 is a plan view of the car-frame and bed or platform with the tilting body removed. Fig. 3 is an end view, partly in section, showing the body in position before it is tilted. Fig. 4 is a vertical sectional elevation looking at the same end, but with the tilting body in the position it occupies while the load is being discharged. Fig. 5 is a sectional plan showing the main compressed-air cylinder and valves, such as are attached to the car; and Fig. 6 is a vertical section of the same, both views representing the sliding valve in the position it occupies under pressure from the main air-pipe—*i. e.*, with the ports thrown

into connection with the pipe leading from the reserve cylinder and that communicating with the tilting-cylinder, and also with the main pipe leading to the next car in the train. Figs. 7 and 8 are similar views and of the same parts as Figs. 5 and 6, but with the sliding valve in its forward or normal position—*i. e.*, with its "operating" ports closed and waste-ports open to carry off the "back-pressure" air from the pipe connected with the tilting-cylinder and the main or trunk air-pipe. Fig. 9 is a sectional plan showing the cylinder and apparatus employed for tilting a single car, the sliding valve having its ports in connection with the reserve cylinder and tilting-cylinder. Fig. 10 is a sectional plan of a modification, whereby the operating handle of the extra cylinder is replaced by the main air-pipe.

To avoid complication I have not shown the truck or wheels of the car, but simply indicate their general position by dotted lines in Fig. 1, these being of any suitable construction and connected with the platform or car-frame in the usual or any approved manner.

A represents the main platform, bed, or frame, of any suitable configuration adapted to carry the apparatus which is employed for tilting the box and also affording bearings for the axle thereof. A' represents such axle, the same passing through proper bearings *a a* upon the bottom of the tilting body or box B. This box is provided at one side with a door B', the same extending, preferably, entirely across the side thereof, so as to give free egress to the load. Said door is hung from a bar B², supported at the upper corners of the side walls of the box at one side, so that when it swings outward said door will fall away from the floor or bottom of the box. Suitable projections *b b* are affixed to said door, and to these are pivoted levers C C, extending along close to the end walls of the car, and again pivoted to the upper ends of vertical swinging levers C' C', the lower ends of which move upon pivot pins or bolts *c c*, carried by the main frame of the car, the same being also in connection with pivoted levers C² C³, the latter of which is hung from a rigid pin or pivot C⁴ upon the tilting box, as shown in Fig. 3 and in dotted lines in Fig. 4.

C³ is a boxing attached to the lower side of the tilting box B, adapted to receive the cross-head *d* of a short lever *d'*, which is in turn pivoted to a cross-head *e* of a piston-rod *e'*, carrying a piston *e²*, working in the tilting-cylinder E. Said tilting-cylinder is preferably vertical and carried below the main bed-plate A, although in such manner that it will properly clear the car-truck. The cross-head *e* works in suitable guides *f f*, attached vertically to a small frame F, mounted upon the bed-plate, and this frame is slotted longitudinally, as seen at *f'* in Figs. 2 and 4, so as to receive the journals of a roller G, against which one or more inclined surfaces *e³* of the cross-head *e* will impinge as the piston of the tilting cylinder moves upward, said roller being then forced outward, (its journals moving in the slots,) and these latter have their outer ends connected with a three-sided frame H, surrounding the frame F in such manner that that side of it which is parallel with the roller G (but on the opposite side of the cross-head *e*) will carry a locking bolt or pin *h*, which snaps into a perforation in a swinging block A³, journaled in the frame A, and also extending into a perforation in the locking-bar J, which passes through a vertical opening in said swinging block, said locking-bar being free at its lower end but pivoted to suitable lugs *j*, affixed to the box B at or near the side which is opposite to the discharge-door B'. When the piston *e²* is at the upper end of its stroke or in the position shown in Fig. 4, the upper end of the short lever *d'* bears against the bottom of the tilting box B, it having forced the latter into the position for discharging, as shown in said figure, and the air-pressure holds same up while the load is being discharged, and the door B' is held sufficiently open to allow the load to escape by means of the levers C C', which have been actuated by the levers C³ through the levers C², these also serving to subsequently draw the door back to a closed position. Springs *k k* (or cords and weights) attached to the three-sided frame H and to the main frame A serve to return said frame H to its first position and throw the pin *h* into the perforation in the locking-bar J, and the air-pressure being simultaneously withdrawn from the cylinder E, as will be hereinafter explained, the box B will fall back by its own weight, its door being closed by the levers C C', and the other parts return to their normal position, the cross-head *e* being assisted to return by means of a spring *e⁵*, attached thereto and to the cylinder, or any other point below.

I must now explain that the compressed air is brought from the compressor (not shown) through two pipes K and N, the connections of which between the cars are flexible and arranged in any of the well-known methods, such as those in use with air-brakes. The first of these pipes K enters the main cylinder M, which is arranged, by preference, upon the main frame or bed-plate A, and the latter

pipe L enters a reserve cylinder N, placed in juxtaposition to the cylinder M, and a pipe *m²* (flexible, if desired) connects these two cylinders together, as shown in Fig. 2, it being understood that the cylinder N will be always charged when the connection with the air-pipe L is open, and another pipe (also marked L, as it is a continuation of that formerly mentioned) leads out from the cylinder N at the port 1, (shown in detail in Fig. 9,) and thence along to the next car. In this cylinder M there are two other ports *m m'*, that marked *m* being fed by the pipe *m²*, and this port connects with a passage-way O, leading through a combined sliding valve and piston P, and the port *m'* opens into a pipe Q, which extends downward through the floor of the car and enters one end of a larger pipe or chamber Q', connected to the tilting-cylinder E by a short pipe *q* near the lower end of said cylinder, thus acting to supply the same with compressed air for raising the piston *e²*, as shown in Figs. 3 and 4, the continuation of pipe K (to the next car) being fed from the port *k'*, which is opened by the motion of the sliding valve, as shown clearly in Fig. 5. The sliding valve P is returned to its normal position when the air-pressure is withdrawn by a spring P', contained in the end of the cylinder M, and acting upon a short bar P², connected to the valve.

m³ and *m⁴* are passages in the valve for connecting with the usual waste-ports 1 2 and ports *k'* and *m'*.

The above-described arrangement illustrates my method of tilting a number of cars connected together by the main air-pipes K and L.

In order to permit any one of the cars being emptied at any particular point without affecting the others in the train, I supply each car with an extra or individual cylinder R, having a sliding piston-valve R', (of somewhat similar construction to P,) as shown in Fig. 9, and the compressed air is supplied to this by a pipe N', leading from the reserve cylinder or reservoir N, the air entering by a port *r* and passing through a passage *r'* in the sliding piston-valve R' and out through a port *r²* to a pipe R², leading down to the pipe or chamber Q', and from thence finding its way into the tilting-cylinder E in the same manner as that described by the pipe Q in connection with the cylinder M. The piston or valve R' is not operated by the air from the main compressor; but is thrown from the position shown in Fig. 2 to that shown in Fig. 9 by a hand-lever S, extending to the side of the car, and pivoted at *s*, at its inner end, to a frame T, mounted on the bed-plate A, this lever being also pivoted to the end of a bar or rod *t*, projecting from the piston-valve R' out through one end of the cylinder R, and this lever S is adapted to be locked, and thus retain the piston-valve R' in the position shown in Fig. 9, with its ports open, (and in connection with the pipes N' and R².) by passing

along and into a notch t^2 in a pivoted catch-bar T' , extending alongside of the frame T . The unlocking is effected by depressing the outer end of said catch-bar by a cross-lever T^3 , suitably pivoted, and also extending within reach of the operator's hand, as shown in Fig. 9. The other end of the piston-valve R' has a bar t^3 (similar to t) extending outward from the cylinder R into a spring-casing attached to the end of such cylinder, the spring R^3 in which serves to return the piston-valve R' to its first position, (or that shown in Fig. 2,) and thus close the ports r and r^2 directly the handle-lever S is released from the locking-bar T' , thus shutting off the air from the pipe R^2 and tilting cylinder E and allowing the tilting box B to resume its horizontal position, in the same manner as before described.

r^3 is the usual waste-port in the valve R' and its cylinder, which will allow the air to escape from the pipe N' when this part of the apparatus is put out of operation, as just described.

In Fig. 10 I illustrate as a modification an arrangement whereby I do away with the main cylinder M and use the so-called "extra cylinder" R , for the purpose of simultaneously tilting all of the cars in a train, as well as any single car when desired, and this will be well understood when it is remembered that there will be a complete system of cocks at the proper points throughout the different air-pipes. In this case, supposing there is a cock at X in the main air-pipe K , and this is open, the air passes into the end of the cylinder R and forces back the sliding valve R' to the position shown until the ports r^2 r^3 are in connection with the pipes N' (leading from the reserve cylinder N) and R^2 , (going to the tilting-cylinder E), and the operation of the tilting-cylinder proceeds as before described, the continuation pipe K , leading to the next car, being also supplied in the same manner from the port k' , and the continuation pipe L leading as before from the reservoir to the next car. By closing the cock X , I cut off the air from the pipe K and rely upon that coming from the reserve cylinder N to tilt that particular car, using of course the handle-lever S , before described, for throwing back the valve R' , and the spring R^3 returns said valve and thus closes the ports and cuts off the air from the pipe R^2 and the tilting-cylinder.

The system of cocks before alluded to will be employed in any well-known manner and according to the judgment of the builder, and therefore it is not necessary that I should illustrate or explain their arrangement; and, furthermore, I do not limit myself to the various details of construction, nor to the general plan of compressed-air pipes, cylinders, and connections shown, as these may be varied without departing from the essential principles of my invention.

What I claim, and desire to secure by Letters Patent, is as follows:

1. A dumping-car consisting of a main frame, and a tilting body or box journaled therein, a compressed air-cylinder (carried by said frame) the piston of which causes said body or box to tilt, and an automatic catch for locking the latter in position, substantially as set forth and described.

2. In a dumping-car, the combination, with a main frame or platform, and a tilting box journaled therein, of a compressed-air cylinder the piston of which causes the box to tilt, a second cylinder having a sliding valve operated from an ordinary compressor and adapted to automatically supply the tilting-cylinder when the air-pressure is put on, and suitable connecting-pipes, substantially as described.

3. In a dumping-car, the combination, with a main frame or platform, and a tilting box journaled therein, of a compressed-air cylinder the piston of which causes the box to tilt, a second cylinder having a sliding valve and a reservoir, said second cylinder and reservoir being supplied with air from an ordinary compressor, a connection between the tilting-cylinder and the second cylinder, and also between the said second cylinder and the reservoir and pipes leading to a second car, substantially as and for the purpose specified.

4. In a dumping-car, the combination, with main frame or platform and a tilting box journaled therein, of a compressed-air cylinder, the piston of which causes the box to tilt, a cylinder having a sliding valve and a reservoir, both supplied with air from an ordinary compressor, pipes connecting same together and with the tilting-cylinder, and an extra cylinder having a sliding valve, a handle for moving same in one direction and a spring for retaining it, said extra cylinder being also connected to the tilting-cylinder, whereby one particular car may be dumped, substantially as described.

5. In a dumping-car, the combination, with the frame and tilting box journaled therein, of the compressed-air cylinder E , having piston e^2 , rod e' , and cross-head e , and lever d' , pivoted to said cross-head and adapted to operate the tilting box, substantially as described.

6. The combination, with the frame and tilting box and with the tilting-cylinder, and means whereby said box is caused to tilt by the operation of its piston, of the frame H , carrying a locking-pin h , said frame and pin being drawn backward by the upward movement of the piston, the locking-bar J , pivoted to the box, and a spring for causing said locking-pin to engage with said locking-bar, substantially as and for the purpose specified.

7. The combination, with the frame A , box B , and tilting-cylinder E , the piston-rod of which has cross-head e , having inclines e^3 , of the frame H , having locking-pin h and roller G , impinged upon by said inclines so as to force back said frame and pin, springs k , and

the locking-bar J, all arranged and operated substantially as and for the purpose specified.

8. The combination, with the frame A, of
5 the tilting box B, having swinging door B',
and a system of levers connected to said door
and to the frame and box to operate said door
when the box is tilted, substantially as shown
and described.

10 9. The combination, with the cylinder M,
having an air-pipe connected thereto, and
having ports k' , m , and m' , and waste-ports 1

2, of the sliding piston-valve P, having pas-
sage O, and waste-openings m^3 and m^4 , and a
spring for moving said piston-valve in one di- 15
rection, the reservoir n , pipes L and m^2 , the
tilting-cylinder, the piston therein, and the
tilting box, substantially as described.

Toronto, Ontario, 9th day of October, 1888.

JOSEPH DUFF.

Witnesses:

R. A. KELLOND,
T. R. CAMERON.