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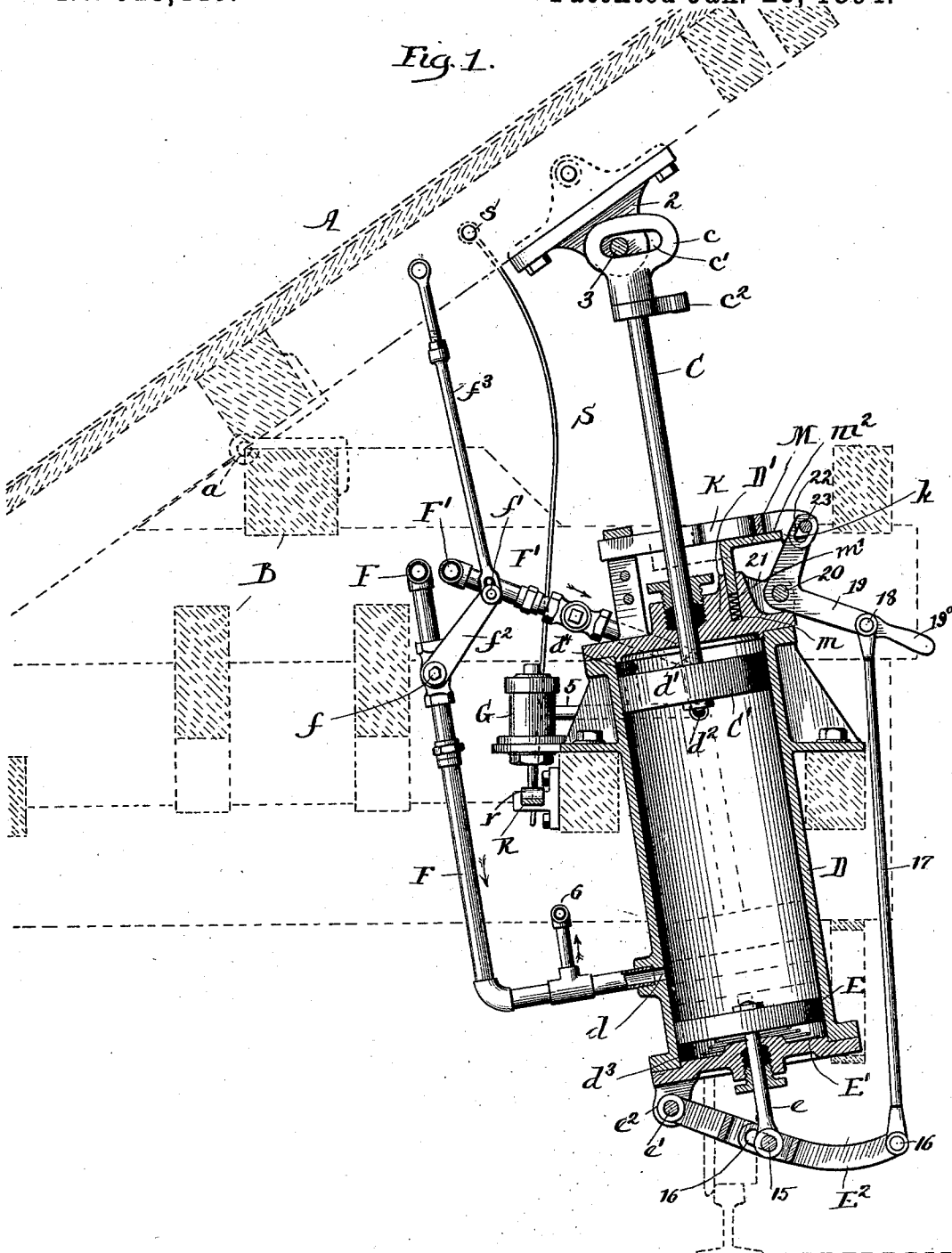
2 Sheets—Sheet 1.

E. A. TRAPP.
DUMPING CAR.

No. 513,446.

Patented Jan. 23, 1894.

Fig. 1.



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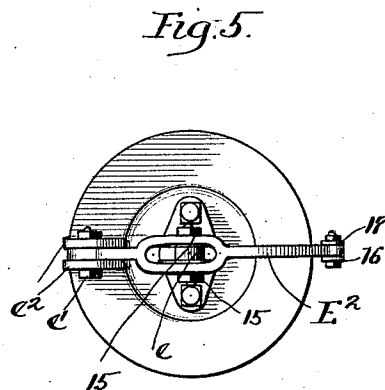
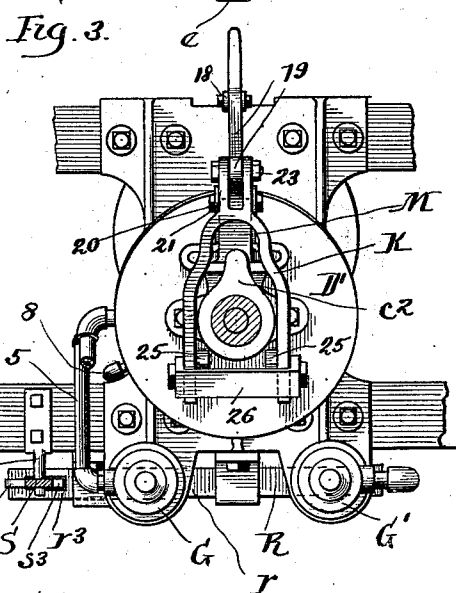
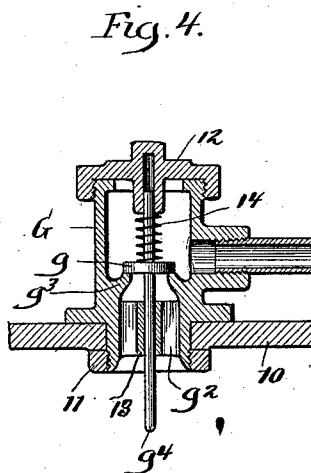
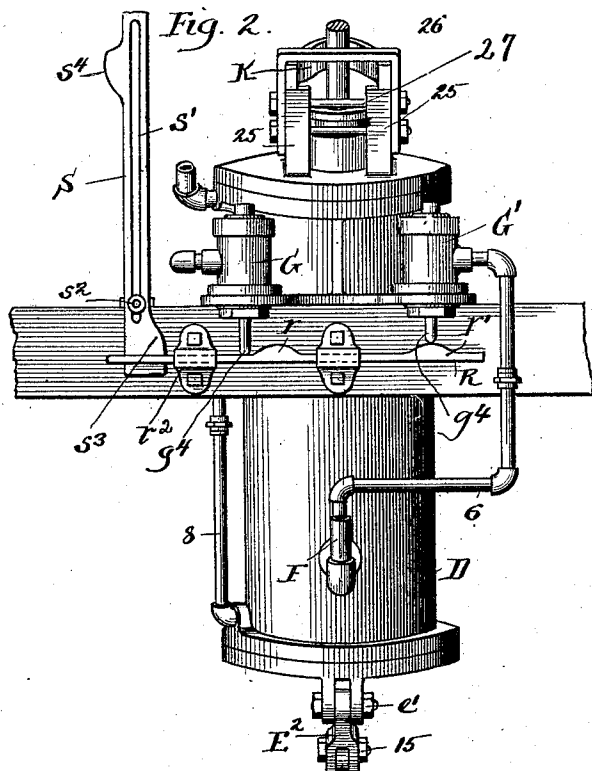
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2 Sheets—Sheet 2.

E. A. TRAPP.
DUMPING CAR.

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UNITED STATES PATENT OFFICE.

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DUMPING-CAR.

SPECIFICATION forming part of Letters Patent No. 513,446, dated January 23, 1894.

Application filed August 25, 1893. Serial No. 484,015. (No model.)

To all whom it may concern:

Be it known that I, EDWARD A. TRAPP, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Apparatus for Dumping Cars and other Purposes, of which I do declare the following to be a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My present invention has for its object to provide a simple, cheap, durable and effective construction of apparatus whereby the contents of railway cars may be dumped or discharged by the action of compressed air or other suitable fluid delivered from the locomotive and under control of the engineer. An example of the type of dumping cars to which my invention more particularly relates is set forth in Letters Patent of the United States, granted to me March 14, 1893, No. 493,317, the car shown in such patent being provided with a pivoted body, the tilting of which serves to discharge the load. It will be seen however, that features of my invention are applicable as well also to dumping cars of that class in which the discharge of the load is effected by opening doors or gates for such purpose; an example of this latter type of car being illustrated in Letters Patent No. 490,324, granted to me January 24, 1893.

My invention consists in the various features hereinafter described, illustrated in the accompanying drawings and particularly pointed out in the claims at the end of this specification.

Figure 1 is a view partly in elevation and partly in vertical section through my apparatus for effecting the dumping of the car-bodies. Fig. 2 is a view in side elevation looking from the center toward the outside of the car, parts being broken away. Fig. 3 is a plan view of a dumping cylinder and adjacent parts. Fig. 4 is a view in vertical central section through one of the exhaust valve cylinders. Fig. 5 is an inverted plan view of a dumping cylinder and parts connected thereto.

The body of the car A may be of any suitable construction such for example as that illustrated in my Letters Patent No. 493,317,

dated March 14, 1893, this body being pivotally mounted as at *a*, upon a suitable sustaining truck B, so that the body may be tilted as indicated in Fig. 1 of the drawings, in order to discharge its load.

To the under side of the body A, of the car, is conveniently connected, as by a hanger 2, the head *c* of the piston rod C, the piston C' of this rod being held in manner free to move within the dumping cylinder D. Preferably, the head *c* of the piston rod C is furnished with the slot *c'* through which passes the pin 3 of the hanger 2, the purpose of this slot being to allow a freedom of movement for the pin 3 as the car body is tilted, while at the same time permitting a right-line movement of the piston rod C, as in the construction defined in my hereinbefore mentioned Letters Patent. Within the lower end of the dumping cylinder D is held in manner free to move a dogging piston E which serves to operate the mechanism whereby the piston rod C is locked when the car-body is in horizontal position, this piston E resting preferably upon a coil-spring E' that serves to counterbalance the weight of the piston and of the parts connected thereto.

In the cylinder D are formed the ports *d* and *d'*, these ports having connected thereto respectively, pipes F and F' that are suitably joined to the pipe system that extends throughout the train and receives its supply of compressed air from a suitable reservoir on the engine. The port *d* serves both for admission and exhaust, while the port *d'* is for admission only. The exhaust of compressed air from the upper portion of the cylinder D is effected through the exhaust port *d''* which is connected by a pipe 5 with the casing G of the exhaust valve *g* (see Fig. 4), the construction and mode of operation of which will be hereinafter more fully defined. When the exhaust occurs from the lower part of the cylinder D the air passing through the port *d* will be delivered by the branch pipe 6 into an exhaust valve chamber G' corresponding in construction and mode of operation with the chamber G and containing a valve *g* similar to the valve *g* illustrated in Fig. 4. In the extreme ends of the cylinder D are formed the ports *d'''* and *d''''* that are connected together by a pipe 8 (see Figs. 1 and 2), this pipe 8 serving to deliver

and to exhaust air to and from the under side of the dogging piston E. Each of the exhaust casings G and G' is preferably sustained upon a web or plate 10 cast with the cylinder D, a threaded collar 11 serving to engage the end of each casing where it projects through an appropriate opening formed in the web or plate 10 in order to retain the casing securely in position. Each of the exhaust valve casings G and G' is provided with an escape port or ports g^2 above which is formed a seat g^3 whereon will rest the valve g , the upper end of the stem g^4 of this valve extending into the cap 12 of the casing, while the lower end of this stem g^4 extends through a perforation formed in the transverse web 13 of the casing in order to accurately guide the valve. By preference, a coil-spring 14 encircles each of the valve stems g^4 in order to insure the return of the valve g to its seat.

By reference more particularly to Fig. 2 of the drawings it will be seen that beneath each of the exhaust valve casings G and G' extends a releasing bar R, the upper face of which is formed with the cams or ribs r and r' adapted to engage the stems g^4 of each of the exhaust valves g , this releasing bar R being held in manner free to slide within the brackets r^2 attached to one of the beams of the car-truck as seen in Figs. 1 and 2. The end of the releasing bar R is formed with a long slot r^3 through which passes the shifting bar S, the upper end of this bar being connected as at s to the pivoted car-body. (See Fig. 1.) Preferably the shifting bar S is formed with a long slot s' through which passes a guide pin or stud s^2 that projects from the adjacent beam of the car truck (see Figs. 2 and 3), and serves to insure the accurate movement of the shifting bar. The lower end of the shifting bar S is formed with a cam or extension s^3 while the opposite edge of this shifting bar is formed with a similar extension s^4 . The extension s^3 of the shifting bar serves to shift the releasing bar R to the position illustrated in Fig. 2 of the drawings, thereby causing the cam r' of the releasing bar to engage the lower end of the stem g^4 of the exhaust valve g and raise this valve from its seat in order to permit at such time the free exhaust of compressed air from the casing G'; and in like manner the cam s^4 of the shifting bar S when it strikes the releasing bar R will shift such bar from the position illustrated in Fig. 2 and cause the cam r of the releasing bar to engage the stem g^4 of the exhaust valve g within the casing G thereby permitting the free exhaust of air from the casing G at such time. It will be seen that when the releasing bar R is in such position that its cam r' is holding open the exhaust valve g within the casing G', the valve within the casing G will be closed, while on the other hand, when the cam r of the releasing bar is retaining the valve g within the valve casing G in open position, the exhaust valve within the casing G' will be in closed

position. Inasmuch, as the shifting bar S is connected to and moves with the pivoted car-body it will be seen by reference more particularly to Figs. 1 and 2 of the drawings that when the car-body has been tilted upward, the shifting bar will so move the releasing bar R as to cause the exhaust valve within the casing G' to be held open in readiness to permit the free exhaust of air when the piston C' is to be forced downward; and it will be seen also that when the car-body has been restored to horizontal position, the shifting bar will reverse the shift of the releasing bar R so as to cause its cam r to open the exhaust valve within the casing G and thereby provide a free escape for the air when the piston C' is to be moved upward to again effect the dumping of the car-body.

Within the air pipe F at some suitable point, is interposed the cut-off valve f' , this valve being connected to a lever f^2 , the end of which lever is attached by an adjusting rod f^3 with some part of the tilting car-body. The construction and mode of operation of the cut-off valve f are substantially the same as in my Letters Patent No. 493,317, and need not, therefore, be fully described, it being sufficient to observe that this valve cuts off the supply of air at a pre-determined point thereby permitting the air within the cylinder D to complete the operation of tilting the car-body by its expansive action.

The dogging piston E has connected thereto, a rod or stem e that extends through the lower end of the cylinder D, the end of this rod or stem e being perforated to receive a through-bolt 15 that extends through a slot 16 formed in the yoked portion of a lever E² that is pivoted as at e' to lugs e^2 formed upon the lower head or end of the cylinder D. The opposite end of the lever E² is pivotally connected as at 16 to a rod 17, the upper end of which is pivoted as at 18 to an elbow lever 19 that is pivoted as at 20 to suitable lugs 21 formed upon the upper head D' of the cylinder D. The upper end of the elbow lever 19 is formed with a slot 22 through which passes a pin 23 whereby this lever is connected to the bifurcated end of the locking bar K, the expanded arms of this locking bar extending through suitable guides, preferably, being suitably guided and sustained as illustrated in the drawings; that is to say, the ends of the locking bar K resting upon the upper ends of the brackets 25 that rise from the head D' of the cylinder, a suitable strap or yoke 26 extending over the arms of the locking bar K and being united together and to the brackets 25 by means of the through-bolts 27. (See Fig. 2.) Upon the head D' of the cylinder D is mounted a trigger M that serves to hold the locking bar temporarily out of action until the car-body has been restored to horizontal position. Preferably, the trigger M is of the angular shape shown in Fig. 1, the lower section of this trigger M extending into a slot or opening m

formed in the cylinder head D' and resting upon a coil-spring m' therein contained which serves to force the trigger upward and in position to insure the engagement of the end m² of the trigger with a shoulder k formed upon the locking bar as shown in Fig. 1 of the drawings. To the upper end of the piston rod C is connected an arm c² that will be engaged by the locking bar K when the piston is in its lowest position, in order to securely lock the piston rod against movement until compressed air has again been admitted into the dumping cylinder for the purpose of again tilting the car body, as will presently more fully appear.

The operation of my improved apparatus will be seen to be as follows: Assuming the parts to be in the position illustrated in Figs. 1 and 2 of the drawings, it is manifest that if compressed air be admitted to the upper end of the dumping cylinder D through the air pipe F' and port d', the piston C' will be forced downward, a free escape of air from the exhaust side of the piston C' will occur through the port d, by branch pipe 6 into the exhaust valve casing G' and through the port g² of this casing to the open air. As the piston C' is thus forced downward its rod C will retract the pivoted car body to a horizontal position, and during this downward movement of the piston rod C the arm or extension c² on the head of this rod will depress the trigger plate M thereby causing the end m² of this plate to pass from engagement with the shoulder k of the locking bar K, thus leaving the locking bar free to be moved by the dogging piston E and intermediate mechanism so that this bar shall engage the extension c² of the piston rod head. Inasmuch as the opposite ends of the dumping cylinder D are connected by the pipe 8 (see Fig. 2), it is manifest that when air is thus admitted into the upper end of the cylinder D in order to force downward the piston C', air will at such time pass by the pipe 8 to the lower end of the cylinder D and beneath the dogging piston E, thereby exerting an upward pressure upon this dogging piston so that as soon as the trigger M is released by the downward movement of the extension c², the pressure of air within the cylinder D and beneath the piston E will force the locking bar K into engagement with the extension c² of the piston rod in order to securely lock this rod. If, now, after the car body A has been brought to horizontal position, it is desired to again tilt this body to discharge its load, compressed air will be admitted by the pipe F through the port d into the lower portion of the cylinder D between the pistons C' and E, which at such time will occupy the position shown by dotted lines in Fig. 1 of the drawings. As air thus enters between the pistons C' and E, it will force downward the piston E, thereby causing this piston to rock the lever E² and through the medium of the rod 17 and elbow lever 19 to release the lock-

ing bar K from engagement with the extension c² of the head of the piston rod C. When the piston rod C is thus released, the pressure of air upon the lower face of the piston C' will force the piston and its rod in upward direction in order to tilt the car body, and during this upward movement of the piston C' the air upon the exhaust side of the piston will escape through the port d², by pipe 5, into exhaust valve chamber G, whence it will pass by escape port g² to the open air. It will be observed that as the car-body completes its movement in upward direction, the extension s³ upon the shifting rod S will contact with the releasing bar R and so shift this bar as to cause the cam r to pass from beneath the exhaust valve in casing G, through which the escape of air has occurred during the upward movement of the car-body, thereby permitting the valve g in the casing G to close, and will cause the cam r' of the releasing bar R to engage the stem g⁴ of the valve g within the valve casing G' (see Fig. 2), thereby opening this valve g in readiness for the escape of compressed air from the lower end of the dumping cylinder when the car-body is to be turned to horizontal position. It is obvious that when the shifting bar R is moved either by the extension s³ or by the extension s⁴ of the shifting rod S, it will remain in the position to which it has been forced by one of the extensions until it is reversely shifted therefrom by the other extension; that is to say, when the releasing bar R is forced, for example, to the position shown in Fig. 2, it will remain in such position, and will retain the valve within the casing G' open until the extension s⁴ of the shifting bar S contacts with the bar R in order to bring the cam r beneath the stem g⁴ of the releasing valve within the casing G. By preference the elbow lever 19 is provided at its outer end with a handle 19^a whereby the backward movement of the locking bar K can be effected in order to release the piston rod C and permit the car-body A to be tilted by hand, when desired.

By arranging the dogging piston E at the lower end of the dumping cylinder, as shown, this piston receives the full force of the air supply admitted to the dumping cylinder and thus insures the unlocking of the piston rod C when the car-body is to be tilted; and it is manifest that the supply of air thus admitted to the dumping cylinder serves not only to effect the operation of the dogging piston but is utilized also in lifting the piston C' whereby the tilting of the car-body is effected. My purpose in locating the releasing port d² at some distance from the end of the dumping cylinder is to insure the closing of this port before the piston C' completes its stroke, thereby leaving sufficient air within the upward end of the cylinder to form a cushion and prevent the violent striking of the car-body as it is dumped.

It is manifest that the details of construction above set out may be varied without de-

parting from the spirit of the invention and that certain features of the invention may be employed without its adoption as an entirety. So also it is obvious that my improved apparatus may be used for other purposes than the specific one of operating dumping cars although it is to this class of work that the invention is more especially designed.

Having thus described the invention, what I claim as new, and desire to secure by Letters Patent, is—

1. An apparatus of the character described, comprising a cylinder provided at one end with a piston and piston rod and provided at the other end with a movable rod and means for shifting said rod by the fluid within the cylinder, and locking mechanism arranged to be controlled by said movable rod, substantially as described.

2. An apparatus of the character described, comprising a cylinder having suitable ports for delivery and exhaust of fluid, a piston within said cylinder provided with a rod and a dogging piston within said cylinder provided with a rod, and locking mechanism operatively connected to said dogging piston rod, substantially as described.

3. An apparatus of the character described, comprising a cylinder having suitable ports for delivery and exhaust of fluid and having at one end a piston provided with a rod and having at its opposite end a movable rod extending outside of the cylinder, means for shifting said movable rod by the fluid in the cylinder and means for locking the rod of the piston, operatively connected to said movable rod, substantially as described.

4. An apparatus of the character described, comprising a cylinder and two pistons therein and a locking mechanism for arresting one of said pistons, the rod of one of said pistons being operatively connected to said locking mechanism in order to operate the same, substantially as described.

5. An apparatus of the character described, comprising a dumping cylinder having therein a dumping piston and a dogging piston and having a fluid delivery port arranged between the said pistons, whereby when fluid under pressure is forced into said cylinder between said pistons, a shift of both of said pistons is effected, substantially as described.

6. An apparatus of the character described, comprising a dumping cylinder having a dumping piston therein, said cylinder being provided with ports for delivering fluid to each side of said piston and having an escape port at a distance from the end of the cylinder and within the path of travel of the piston, whereby a portion of the fluid is retained within the cylinder to cushion the piston, substantially as described.

7. An apparatus of the character described, comprising a cylinder having a rod in combination with suitable locking mechanism for

engaging the rod of the piston and compressed air mechanism for operating said locking mechanism, substantially as described.

8. An apparatus of the character described, comprising a cylinder, and two pistons within said cylinder, the ends of said cylinder being connected together by a suitable pipe or channel, said cylinder being provided intermediate its ends with suitable ports for the delivery and discharge of fluid, substantially as described.

9. An apparatus of the character described, comprising a cylinder, a piston within said cylinder having a rod, a locking bar for engaging said rod, a trigger for holding said locking bar temporarily out of action and another piston connected to said locking bar for shifting the same, substantially as described.

10. An apparatus of the character described, comprising a dumping cylinder having a piston rod provided with an extension, a dogging piston having a rod, a locking mechanism for locking the rod of said dumping piston, said locking mechanism being operatively connected to the rod of the dogging piston, and a trigger for temporarily holding said locking mechanism out of action, said trigger extending into the path of travel of the extension of the dumping piston rod, substantially as described.

11. An apparatus of the character described, comprising a dumping cylinder having a dumping piston therein and having suitable ports for the admission and exhaust of fluid from opposite sides of the piston, exhaust valve chambers connected with the ports of said dumping cylinder, exhaust valves within said chambers and suitable mechanism connected with a moving part for alternately opening said valves to permit the exhaust of air from the cylinder, substantially as described.

12. An apparatus of the character described, comprising a dogging piston and a suitable cylinder wherein said piston is held, suitable locking mechanism operatively connected to said dogging piston and a spring within said cylinder and whereon said dogging piston will rest, substantially as described.

13. In apparatus of the character described, the combination with the cylinder having suitable admission and exhaust ports of a check valve casing connected with the exhaust port, said cylinder having an exhaust port, a valve within said casing for controlling its exhaust port and a releasing device for raising said valve from its seat to permit the exhaust from said casing, substantially as described.

14. In apparatus of the character described, the combination with a cylinder having suitable admission and exhaust ports of exhaust valve casings connected with the exhaust ports of said cylinder, valves within said casings and having stems extending outside

thereof and a releasing cam bar for engaging said valve stems, and means for operating said releasing bar, substantially as described.

15. In apparatus of the character described, 5 the combination with a cylinder having suitable admission and exhaust ports of exhaust valve casings connected with the exhaust ports of said cylinder, valves within said casings and having stems extending outside 10 thereof and a releasing cam bar for engaging said valve stems, and a shifting bar provided with cams or extensions to operate said releasing cam bar, substantially as described.

16. An apparatus of the character described, 15 comprising a dumping cylinder, a dumping piston within said cylinder, a dogging piston within said cylinder, the rod of said dogging

piston being operatively connected to said locking bar and a suitable handle whereby said locking bar may be released by hand, 20 substantially as described.

17. In apparatus of the character described, the combination with the car-body and its dumping cylinder and piston, of locking 25 mechanism, a piston and rod for operating said locking mechanism by compressed air, and suitable means connected to said locking mechanism whereby it may be operated by hand, substantially as described.

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