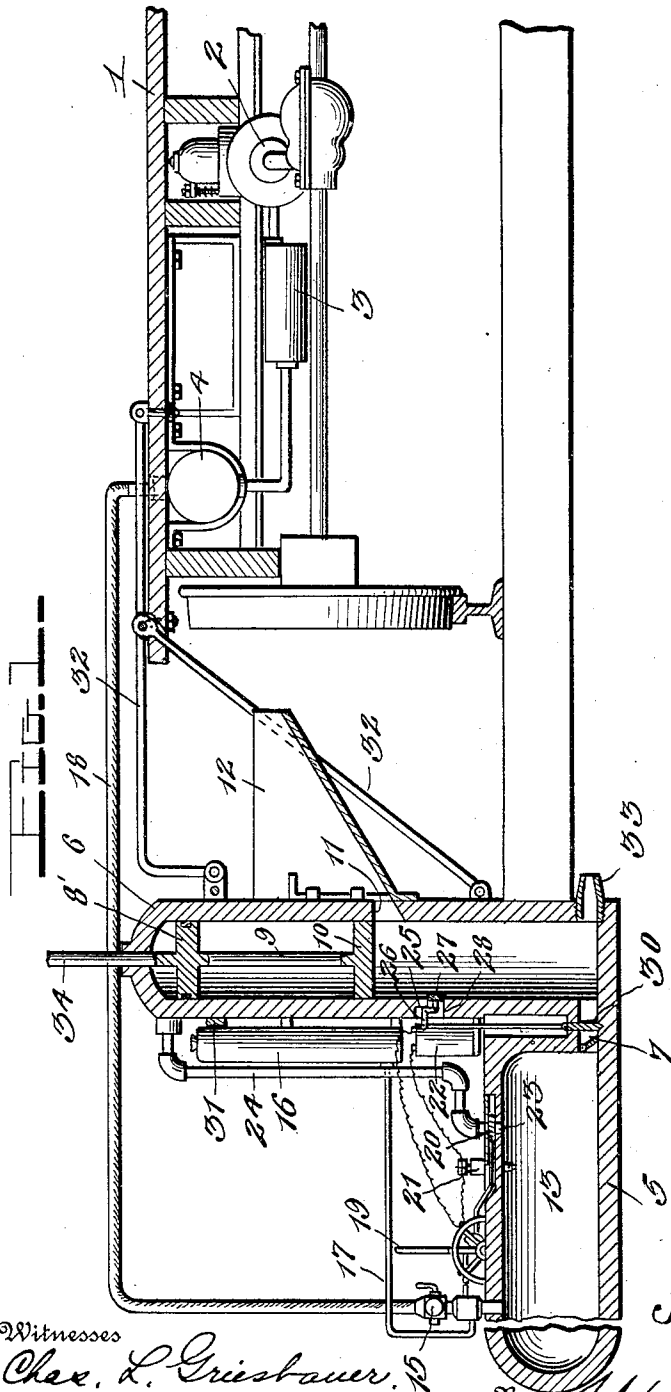


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BALLAST INJECTING APPARATUS.  
APPLICATION FILED FEB. 19, 1912.

1,041,878.

Patented Oct. 22, 1912.

2 SHEETS—SHEET 1.



Witnesses

Chas. L. Griesbauer.

G. B. Norton.

Inventor

J. A. Royal,

Watson E. Coleman.

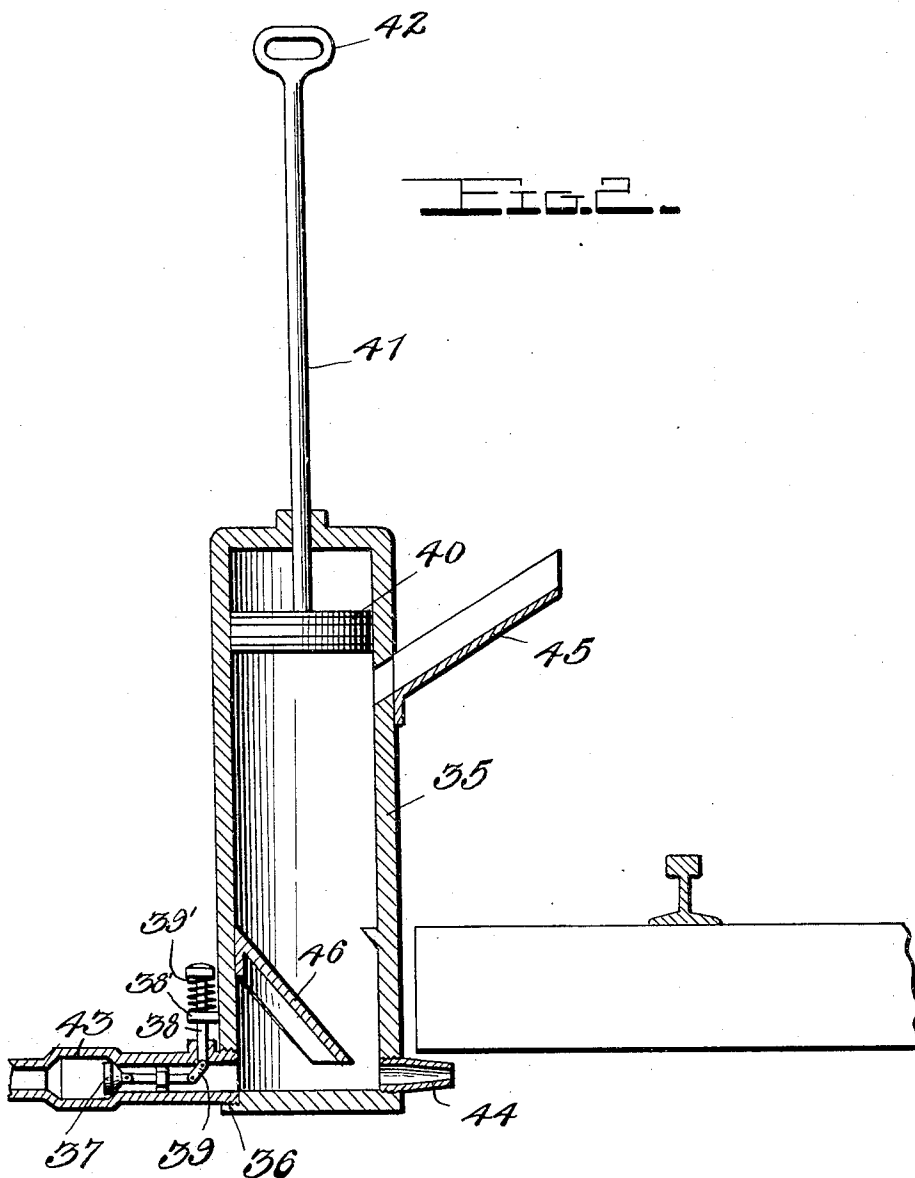
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A. B. Norton.

By

Watson E. Coleman.

Attorney

# UNITED STATES PATENT OFFICE.

JAMES A. ROYAL, OF STRATHCONA, ALBERTA, CANADA.

## BALLAST-INJECTING APPARATUS.

1,041,878.

Specification of Letters Patent.

Patented Oct. 22, 1912.

Application filed February 19, 1912. Serial No. 678,717.

*To all whom it may concern:*

Be it known that I, JAMES A. ROYAL, a citizen of the United States, residing at Strathcona, in the Province of Alberta, and Dominion of Canada, have invented certain new and useful Improvements in Ballast-Injecting Apparatus, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to an apparatus for injecting ballast in any form beneath a railway tie after the same has been raised a sufficient distance from the road bed.

The invention has for its object to produce a device of this type which is mounted upon a motor propelled truck and one which may be easily and quickly swung to its operative position.

A further object of the invention is to produce an apparatus of this character for utilizing the spent gases of an exploded charge of compressed air and gas to inject the ballast material beneath the tie.

Other objects of this invention will appear as the same is more fully disclosed in the following specification.

With the above and other objects in view, the invention resides in the novel features of construction, combination and arrangement of parts as will be fully described, and claimed hereinafter and illustrated in the accompanying drawings, in which,

Figure 1 is a sectional view of the device shown in its operative position; Fig. 2 is a sectional view of a modified form of the invention.

Referring to the drawings, the numeral 1 designates a car, the same being supported upon a suitable running gear. The car 1 is propelled from place to place by a gas engine 2 of any well known type. Mounted upon the running gear is an air compressor 3, the same being operated by the engine 2 and is adapted, when operated, to supply the tank 4 with compressed air, the object of which will be hereinafter described.

The apparatus consists of a pair of angularly arranged cylinders 5 and 6, the inner end of the cylinder 5 being in communication with the lower end of the cylinder 6 by a port 7. The cylinder 5 may be secured to the cylinder 6 in any suitable manner which will provide a compartment 8, the purpose of which will be hereinafter described.

Adapted for reciprocatory movement

within the cylinder 6 is a piston head 8' to which is secured the upper end of a rod 9. To the lower end of the rod 9 is suitably connected a tamping head 10, said head being normally positioned above the feed opening 11 formed in the cylinder 6 and through which the ballast material is fed from a hopper or chute 12 to the cylinder 6.

The interior of the cylinder 5 constitutes an explosion chamber 13, the diameter of said chamber being greater than the compressing chamber 14 of the cylinder 6. Having communication with the explosion chamber 13 and mounted upon the upper side of the cylinder 5 is a carbureter 15, the same being of any well known construction and is supplied with fuel from a tank 16, said tank being supported by the cylinder 6, the fuel feeding through the pipe 17. Air under pressure is admitted to the carbureter 15 through a flexible pipe 18, one end of which is connected to the compressed air tank 4.

Mounted upon the cylinder 5 is the hand lever 19, the same being adapted, when operated in one direction, to open the carbureter 15, thereby permitting the air and gas under pressure to enter the explosion chamber 13. Upon moving the lever 19 in the opposite direction the slide valve 20 is operated at the same time the explosion takes place in the chamber 13 upon ignition thereof by the spark plug 21. The plug 21 is caused to spark upon the lever 19 being operated in the direction to open the valve 20, which operation of the lever closes the circuit to the spark plug through batteries contained in the casing 22, said casing being mounted upon the cylinder 6. Leading from the valve port 23 is a pipe 24, the upper end of which is in communication with the extreme upper end of the cylinder 6, the purpose of which will be hereinafter described.

An opening 25 is formed in the cylinder 6, and in which is pivotally mounted a bell crank lever 26, to one arm of which is pivotally connected a button 27, said button being adapted for movement within the recess 28. Pivottally connected to the other arm of the bell crank lever 26 is the upper end of a rod 29, said rod being adapted to pass through the compartment 8, and has its lower end pivotally connected to a slide valve 30, said slide valve being operable to open and close the port 7, so that com-

munication may be had from the explosion chamber 13 to the compressing chamber 14.

Surrounding the cylinder 6 are a pair of spaced bands 31 and to which are pivotally connected the ends of links 32 the inner ends of said links being pivotally connected to the body of the car 1, whereby the cylinders 5 and 6 and their mechanism may be swung upwardly upon the car body. If desired the car body may be provided with a rotating platform into which the inner ends of the links 32 may be connected so that the apparatus may be used at either end of the ties.

After the desired amount of ballast has been fed to the compressing chamber 14 the lever 19 is moved in the direction to open the carbureter to permit a charge of compressed air and gas to enter the same, and upon operation of the lever 19 in the opposite direction the valve 20 will be operated to open the port 22 simultaneously with the closing of the circuit of the plug 21, whereupon the charge is exploded and the gas then passes through the pipe 24 and forces the tamping head 10 downwardly until the head 10 engages the button 27, which rocks the bell crank lever 26, raises the slide valve 30, so that a portion of the burnt gas passes through the port 7 to eject the ballast through the nozzle 33 and beneath the tie. After this operation it is necessary that the tamping head 10 be moved to its inoperative position, this being accomplished by a rod 34, which passes through the upper end of the cylinder 6 and may be raised in any suitable manner.

In the modified form of the invention a cylinder 35 is provided and is formed with a port 36 at the bottom thereof, said port being opened by the valve 37. This valve is operated by means of a foot lever 38 having its lower end pivotally connected to a connecting link 39, said connecting link in turn is connected to the valve stem of the valve 37. A coil spring 39' is disposed between the head of the foot lever and the guide member 38' to keep the valve closed at all times when not in use.

A plunger head 40 is adapted to be reciprocated within the cylinder 35 by a rod 41, the upper end of which is provided with a handle 42, leading to the port 36 is a pipe 43, the other end of which is connected to a supply of air under pressure, and upon opening the valve 37 by means of pressure upon the foot lever 38 air is ejected into the cylinder 35 and forces the ballast through a nozzle 44 and beneath the tie. The cylinder 35 is provided with a feed chute 45, and from which the ballast is entered into the cylinder. An inclined guide member 46 is secured to the interior of the cylinder to guide the ballast directly into the nozzle 44.

Having thus described the invention, I claim:

1. In an apparatus of the class described, the combination of a pair of angularly arranged cylinders, said cylinders being in communication with each other, one of said cylinders having an explosion chamber and the other a compressing chamber, means for feeding ballast to the compressing chamber, whereby when the explosion takes place the ballast will be forced from the compressing chamber and beneath the railway tie.

2. In an apparatus of the class described, the combination of an explosion cylinder and a compressing cylinder, means for feeding ballast to the compressing cylinder, a tamping head having reciprocatory movement in the compressing cylinder whereby when gas under pressure is exploded in the explosion cylinder the tamping head will be reciprocated, an automatically operated valve for permitting communication between said cylinders, which when operated forces the ballast from the compressing cylinder and beneath the tie.

3. In an apparatus of the class described, the combination of a pair of cylinders, one of which constitutes an explosion chamber and the other a compressing chamber, a tamping head operable in the compressing cylinder when an explosion takes place in the explosion cylinder, a port forming a communication between said cylinders, a valve operated by the tamping head to permit gas from the explosion cylinder to pass through said port to force ballast from the compressing cylinder and beneath a tie.

4. In an apparatus of the class described, the combination of a pair of cylinders having communication with each other, a valve for cutting off communication between said cylinders, a tamping head having reciprocatory movement in one of the cylinders and adapted to operate said valve after an explosion has taken place in the other cylinder, whereby the gas resulting from the explosion forces ballast from the other cylinder and beneath the railway tie.

5. In an apparatus of the class described, the combination with a railway track, of a cylinder adapted to contain ballast, a valve mounted upon said cylinder and adapted to cut off communication between said cylinder and a compressed air supply, a head operable in said cylinder, said head being adapted to operate said valve, whereby ballast contained in the cylinder will be ejected under the ties of the track.

6. In an apparatus of the class described, the combination with a pair of angularly arranged cylinders, one of which constitutes an explosion chamber and the other a compressing chamber, means for feeding ballast to the compressing chamber, a tamping head operable in the compressing cylinder, an au-

tomatically operated valve mounted in the last named cylinder, and means for charging the explosion chamber with gas and air under pressure, means for exploding said  
5 air and gas, said valve being operable after the explosion has taken place, whereby communication is had between said cylinders to force ballast from the compressing chamber and beneath the tie.

10 7. In combination with a railway car, of an apparatus for injecting ballast beneath a tie, a pair of cylinders having communication with each other, means for cutting off the communication between said cylinders, means for exploding the charge of compressed air and gas in one of the cylinders whereby ballast contained in the other cyl-

inder is injected beneath a railway tie, links pivotally connected to one of said cylinders and car, whereby said cylinders may be  
20 swung upon the body of the car.

8. In an apparatus of the class described, the combination of a compressing cylinder, means for feeding ballast to said compressing cylinder, a tamping head having recip-  
25 rocatory movement in said cylinder, and means for forcing the ballast from the cylinder and beneath the tie.

In testimony whereof I hereunto affix my signature in the presence of two witnesses. 30

JAMES A. ROYAL.

Witnesses:

T. PAPILLON,

JOHN K. FISHER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."