D. E. ROSS.

SYSTEM FOR CONTROLLING MOTORS.

APPLICATION FILED MAY 18, 1907.

905,589.

Patented Dec. 1, 1908.

2 SHEETS—SHEET 1.

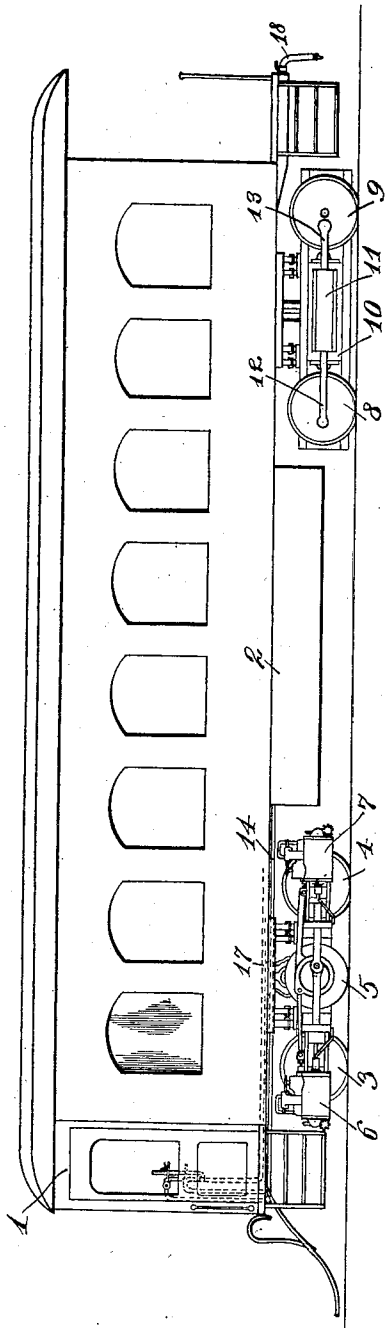

FIG. 1

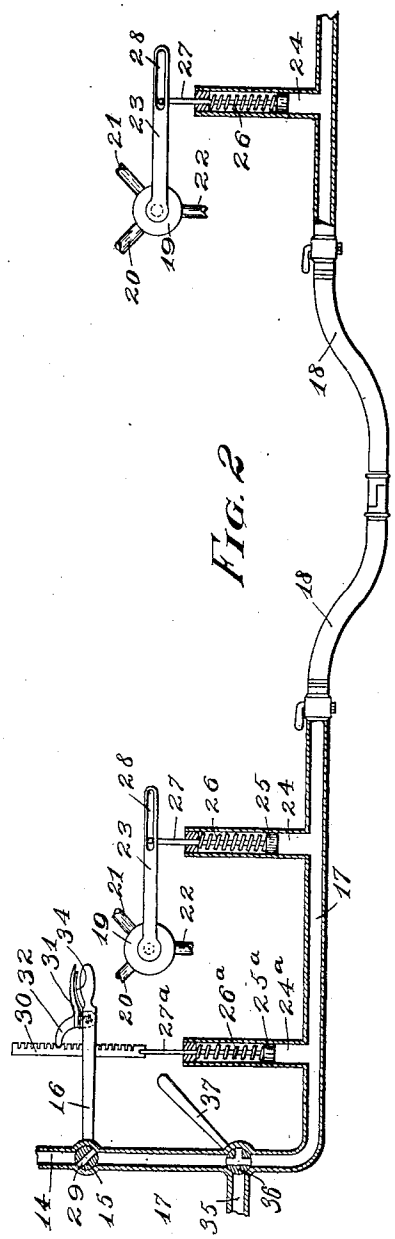

FIG. 2

WITNESSES:

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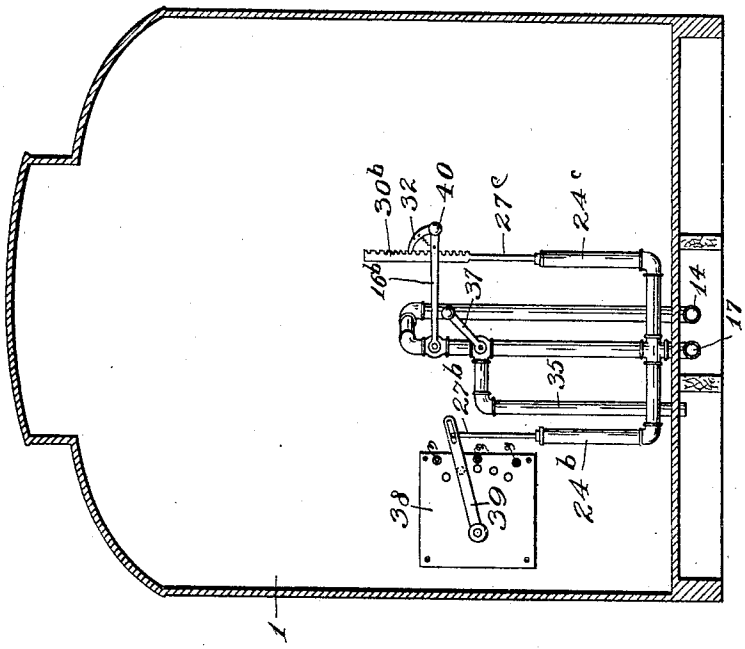

FIG. 4

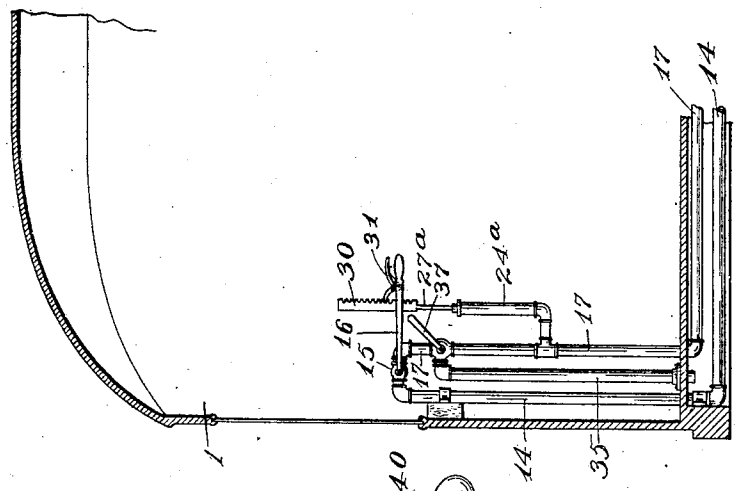

FIG. 3

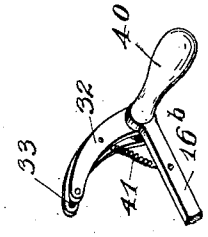

FIG. 5

WITNESSES:

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UNITED STATES PATENT OFFICE.

DAVID E. ROSS, OF BROOKSTON, INDIANA.

SYSTEM FOR CONTROLLING MOTORS.

No. 905,589. Specification of Letters Patent. Patented Dec. 1, 1908.

Application filed May 18, 1907. Serial No. 374,386.

To all whom it may concern:

Be it known that I, DAVID E. ROSS, a citizen of the United States, residing at Brookston, in the county of White and State of Indiana, have invented a certain new and useful Improvement in Systems for Controlling Motors, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to devices for simultaneously controlling from one source the various driving motors in cars or in a train of cars. These motors may be of almost any character, such, for example, as electric motors, explosive engines or steam engines.

In the operation of cars, and especially in the operation of cars in trains of two or more, it is, under many conditions, preferable to employ a number of driving motors, instead of a single motor, as in the case of a single locomotive drawing the train.

When a plurality of motors is employed, means must be provided for simultaneously starting and stopping the same, and it is also desirable that all of the motors should be controlled alike and at the same instant. This is the result that it is the object of my invention to attain.

In case a number of steam engines are employed, the controller would consist in operating simultaneously and to the same extent the different throttle valves. If explosive engines are used, preferably the carbureters would be likewise simultaneously operated and to the same extent, although the control may also be extended to the sparking devices; while if electric motors are employed, the various controllers therefor would be operated together and to the same extent.

In the drawings, Figure 1 is a side elevation of a car driven by a plurality of explosive engines, the same showing the general arrangement and location of the controlling devices. Fig. 2 is a diagrammatic view illustrating the main controlling device and two auxiliary controlling devices, the said auxiliary controlling devices being indicated as located on different cars. Fig. 3 is a side elevation of the main controlling device, the same being shown as located in the front vestibule of a car. Fig. 4 is a rear view of the main controlling devices, showing the same applied to an electric controller, and Fig. 5 is a view of a detail of construction that is somewhat modified from that shown in Figs. 2 and 3.

Taking up a more detailed description of the invention shown in the drawings, in which the same reference characters designate the same parts throughout the several views, 1 represents the front vestibule of a car, which may be the front car of a train, and 2 represents a cylinder or tank for compressed air or other fluid, which cylinder may be located on any convenient part of the car. Preferably the air in the cylinder will be compressed while the car is in motion, although this is not necessary, as the cylinder may be charged at points along the railway, if desired.

In Fig. 1, I have shown two trucks for the car, the front truck having the flanged wheels 3 and 4, and the drive wheel 5, the latter wheel being plain on its perimeter so that it may have a slight lateral movement on the rails. The drive wheels 5 are turned by explosive engines 6 and 7 which are arranged on opposite sides of the drive wheels, those shown being connected to a single crank pin carried by the shaft on which the wheels 5 are mounted. This arrangement of truck is not claimed herein so that further description thereof is not deemed necessary. The rear truck carries two pair of drive wheels 8 and 9, the same being driven by a single explosive engine 10 located between said pairs of drive wheels. The single piston of this engine is connected to a cross-head 11, the cross head driving the wheels 8 and 9 through the medium of connecting rods 12 and 13. This arrangement of truck and engine is not claimed herein, and further description thereof is not deemed necessary.

In Figs. 1, 2 and 3, I have shown my invention as adapted to control a series of explosive engines, and I will describe this system of control first. The compressed fluid, which is preferably air, is conducted from the cylinder 2 to the front vestibule 1 through the pipe 14, said pipe being turned upwardly in the front part of the vestibule and being provided, at a height convenient for the operator, with a valve 15, said valve having attached thereto a hand lever 16. From the valve 15, I extend a pipe 17, said pipe running beneath the car, and being con-

nected between the cars by a form of hose coupling 18 similar to the couplings now employed in air brakes on trains.

Each of the explosive engines is provided with a carbureter, said carbureter having an air inlet, a fluid inlet, and an outlet for the explosive mixture. In Fig. 2, I have indicated the carbureters at 19, and the respective air, fluid and mixture connections at 20, 21 and 22. Within the carbureter is a valve mechanism, not specifically illustrated, by operating which the proportions of air and gas can be controlled. These carbureter valves are automatically controlled by levers 23 in a manner now to be described.

Connected with the pipe 17 near each of the carbureters is a cylinder extension 24, within which there is mounted a piston 25, that is normally pressed toward the pipe 17 by a coil spring 26. This spring is shown in the drawings as being located within the cylinder, although this is obviously not necessary. The piston rod 27 of each of these cylinders is connected to the respective levers 23 of the carbureter valves, said levers being slotted at 28 so that a straight-line movement of the piston rod may rock the valve levers. From this description, it will be seen that the valves in the carbureters are under control of the pressure fluid in the pipe 17. The various springs 26 are all of the same size and strength so that the same pressure against the various springs will compress the springs to equal degree. Various means, not shown, may be employed for regulating the tension of said springs so as to secure the proper initial adjustment.

As appears from Fig. 2, the valve 15 is provided with a comparatively small port 29 therethrough, that is adapted to be brought into line with the passage through the pipes 14 and 17, so that the compressed fluid from the reservoir 2 may pass into the pipe 17. A slight movement, however, of the hand lever 16 will close the valve 15, and I have provided means for automatically closing said valve whenever the pressure in said pipe 17 has reached the desired point. This means consists of a cylinder 24^a connected with the pipe 17 and being of the same character as the cylinders 24 heretofore described. This cylinder is provided with a piston 25^a, a spring 26^a and a piston rod 27^a, said parts being the same as the corresponding parts in the other cylinders. The piston 25^a and its connections control the valve 15, the piston rod 27^a being connected to the lever 16 by means of a rack bar 30, that is carried by the piston rod, and a grip lever 31 that is carried by the valve lever 16. The grip lever, as appears most plainly from Fig. 5 of the drawing, preferably has a pair of parallel arms 32 which project toward the rack bar 30 and said arms are connected by a pin 33 that is adapted to lie between the teeth of the rack bar so that whatever movement is imparted to the rack bar will transmit a corresponding movement to the lever 16. The grip lever is normally held in engagement with the rack bar by means of a spring 34 in a manner well understood.

Connected with the pipe 17 is an exhaust pipe 35, said pipe being adapted to be brought into communication with the pipe 17 through a rocking valve 36. As shown in Fig. 2 of the drawings, the valve is turned in such position as will permit the air to flow through the pipe 17; but when the valve is turned by means of the hand lever 37, the valve will shut off the air from above the same and will permit the air that is in the pipe 17 and the cylinders to escape.

The operation of the device is as follows: We will assume that the car or the train of cars is at rest, under which conditions, the explosive engines will also be at rest and the valves in the carbureters will be closed. In order to attain these conditions, the valve 36 is turned so as to exhaust the pressure fluid from the pipe 17, whereupon the springs 26 and 26^a will force downwardly the pistons 25 and 25^a to their fullest extent. It will be remembered that the valve 36, at the instant of opening the exhaust from the pipe 17, will close the passage through the pipe from above so that the air from the cylinder or tank 2 will not be needlessly wasted. The downward movement of the piston 25^a will rock the valve 15 so as to open the same to its widest extent; but as this air cannot pass the valve 36, no action takes place as a result of the opening of the valve 15.

I contemplate using the compressed fluid in the cylinder or tank 2 for starting the car or cars, said fluid acting upon the gas engines in the same manner as steam acts upon the pistons of the cylinders of steam engines; but as this is not part of my invention herein described, I have not deemed it necessary to show the same. It will be understood, however, that it is desirable that some means be provided for starting the cars in order that the explosive engines may operate when the carbureters are again made active. Assuming therefore that the car is placed under some headway by some suitable means, the operator opens the valve 36 by turning the lever 37, when the fluid will rush through the valve 15 and fill the pipe 17 and the various cylinders 24 and 24^a. When the pressure in the pipe 17 and cylinders has reached a certain degree, the port 29 through the valve 15 will be cut off, so that the pistons will not rise further, and the carbureters will be maintained in the conditions in which they have thus been placed as long as the pressure in the pipe 17 is maintained. If there should be a leak-

age at any point along the system so that the pressure falls, the piston 25^a, will move so as to open slightly the valve 15, and in this way the pressure will again be established. It will be seen therefore that all of the various carbureters will be simultaneously operated to the same extent and will be maintained in their operated positions unless the operator desires to give additional motion to the carbureter valves, which he may do in the following manner: If air has been exhausted from the pipe 17, the various pistons will be in their inner positions, and the valve 15 will be open, as hereinbefore described. If the operator wishes to open the carbureter valves more widely, he can, by simply depressing the grip lever 31, disengage the same from the rack 30 and then reengage the grip lever and rack at a point further down the rack. This will turn the valve 15 so that the port 29 therethrough will not be closed so early as the piston 25^a rises. In Fig. 2, the port 29 has just closed, but the piston 25^a has been pushed upward a comparatively slight distance. If the grip lever 32 were connected with the lower notch or tooth in the rack 30, it will be seen that the piston 25^a would necessarily have to be lifted a much higher distance than that shown before the valve 15 will close; and as the various springs 26 and 26^a are adjusted to the same pressure, the various pistons 25 will be correspondingly lifted. By simply engaging the grip level 32 with the rack at the proper points, the various carbureters will be caused to operate in the manner desired.

In Fig. 4, I have shown my system of control as applied to an electric controller 38 having a controller lever 39 that is adapted to be moved by a piston rod 27^b, said piston rod being connected with a piston within a cylinder 24^b, which corresponds in function and operation with the piston rod and cylinder 27 and 24 hereinbefore described. It will be understood that there will be a controller box suitably located for each of the various motors, or sets of motors, in the car or train, and that each controller box will have its individual cylinder 24^b under control of the fluid pressure pipe 17. The main valve in the pipe 17 is controlled by a lever 16^b which is adapted to engage with a rack bar 30^b that is under control of the piston rod 27^c of the cylinder 24^c. As shown in Fig. 4, the grip lever is of somewhat different construction from that heretofore described, being like that shown in Fig. 5, and consisting of the parallel arms 32 and a hand grip 40 projecting from the lever 16^b at substantially right angles, which, by being grasped and rotated by the hand, will throw the grip lever out of engagement with the rack bar. A spring 41 that is connected with the arms 32 and the lever 16^b draws the grip lever into engagement with the rack and holds the same under normal conditions, as has been heretofore described.

While I have shown and described a form of apparatus for effecting the objects of my invention, the same may be embodied in a somewhat different form without departing from the spirit of my invention, and I desire it to be understood that the following claims are not intended to be limited to the precise details shown and described any further than is made necessary by the specific terms employed therein.

Having thus described my invention, I claim:

1. In a system for controlling motors on cars, a source of compressed fluid, a pipe connected with said source and adapted to be supplied with fluid under pressure therefrom, an auxiliary controlling device for each of the said motors, a rocking lever connected with each of said auxiliary controlling devices, a piston connected with each of said rocking levers, a cylinder for each of said pistons, said cylinders being connected with the said pipe, means for forcing the pistons against the pressure of the fluid in the pipe whereby, as the pressure varies, the pistons will be moved and the rocking levers of the auxiliary controlling devices will also be moved, and a main controlling device for regulating the pressure of the fluid within the pipe.

2. In a car system, a source of compressed fluid, a pipe connected with said source and adapted to be supplied with fluid under pressure therefrom, a controlling device for each of the said motors, a rocking lever connected with each of said controlling devices, a piston connected with each of said rocking levers, a cylinder for each of said pistons, said cylinders being connected with the said pipe, means for forcing the pistons against the pressure of the fluid in the pipe whereby, as the pressure varies, the pistons will be moved and the rocking levers of the controlling devices will also be moved, a valve for admitting the fluid to the pipe, and means whereby said valve is controlled by the pressure of the fluid in the pipe.

3. In a system for controlling motors on cars, a plurality of driving motors, a source of compressed fluid, a pipe connected with said source and supplied with fluid under pressure therefrom, a controlling device for each of the motors, a rocking lever connected with each of said controlling devices, a piston connected with each of the rocking levers, a cylinder for each of the pistons, said cylinders being connected with the said pipe, means for forcing the said pistons against the pressure of the fluid in the pipe, whereby, as the pressure varies, the pistons will be moved and the controller levers will be operated, a valve for the pipe, a main controlling cylinder connected with the said pipe, a piston in the said cylinder, said piston moving

with the pistons of the controlling devices, means for connecting the piston in the main controlling cylinder with the said valve, whereby, when the fluid passes through said valve and raises the pressure in the pipe, said valve will be automatically closed.

4. In a system for controlling motors on cars, a plurality of driving motors, a source of compressed fluid, a pipe connected with said source and supplied with fluid under pressure therefrom, a controlling device for each of the motors, a rocking lever connected with each of said controlling devices, a piston connected with each of the rocking levers, a cylinder for each of the pistons, said cylinders being connected with the said pressure pipe, means for forcing the said pistons against the pressure of the fluid in the pipe, whereby as the pressure varies the pistons will be moved and the controller levers will be operated, a main valve in the pressure pipe, a main controlling cylinder connected with the said pipe, a piston in the said cylinder, said piston moving with the pistons of the controlling devices, means for connecting the piston in the main controlling cylinder with the said main valve, whereby, when the fluid passes through said valve and raises the pressure in the pressure pipe, said valve will be automatically closed, and a second valve for exhausting the fluid from the pipe and thereby stopping the motors.

5. In a system for controlling motors on cars, a plurality of driving motors, a source of compressed fluid, a pipe connected with said source and supplied with fluid under pressure therefrom, a controlling device for each of said motors, a cylinder connected with said pipe, a piston movable in said cylinder, a notched bar connected with said piston and movable therewith, a valve in said pipe, a lever connected with said valve, hand operated connections between said lever and said bar so that the lever may be connected with any portion of the bar, whereby, as the said piston is moved by the pressure within the pipe, the valve will be opened or closed, and means connecting each of the controlling devices with the pipe so that the said devices are controlled as the said valve is operated.

6. In a system for controlling motors on cars, a plurality of driving motors, a source of compressed fluid, a pipe connected with said source and supplied with fluid under pressure therefrom, a controlling device for each of said motors, a cylinder connected with said pipe, a piston movable in said cylinder, a notched bar connected with said piston and movable therewith, a valve in said pipe, a lever connected with said valve, hand operated connections between said lever and said bar so that the lever may be connected with any portion of the bar, whereby, as the said piston is moved by the pressure within the pipe, the valve will be opened or closed, means connecting each of the auxiliary controlling devices with the pipe so that the said devices are controlled as the said valve is operated, and means for exhausting the fluid from the pipe.

7. In a car system for controlling motors on cars, a plurality of carbureters for explosive engines, a source of compressed fluid, a pipe connected with said source and supplied with fluid under pressure therefrom, means for varying at will the pressure within said pipe, cylinders connected with said pipe, there being one cylinder for each carbureter, a piston movable within each of the cylinders by the fluid pressure therein, and connections between the pistons and the carbureters whereby, as the pressure within the pipe is varied, the carbureters will be simultaneously and correspondingly regulated.

8. In a car system for controlling motors on cars, a plurality of carbureters for explosive engines, a source of compressed fluid, a pipe connected with said source and supplied with fluid under pressure therefrom, means for predetermining and maintaining the pressure within said pipe, cylinders connected with said pipe, there being one cylinder for each carbureter, a piston movable within each of the cylinders by the fluid pressure therein, and connections between the pistons and the carbureters whereby, as the pressure within the pipe is varied, the carbureters will be simultaneously and correspondingly regulated.

9. In a system for controlling motors on cars, a plurality of carbureters for explosive engines, a source of compressed fluid, a pipe connected with such source and supplied with fluid under pressure therefrom, cylinders connected with said pipe, there being one cylinder for each of the carbureters, a piston movable within each of the cylinders, a spring for each of said pistons, said springs pressing the pistons against the fluid pressure, an arm connected with each of the carbureters, said arms being connected with their corresponding pistons, a valve in said pipe, a main controller cylinder connected with the pipe, a piston in said cylinder, a spring for forcing said piston against the pressure of the fluid in the cylinder, the springs for all of said pistons being of the same strength so that they will be moved equal distances when subjected to the same pressure, a notched bar connected with the piston in the main controller cylinder, a lever for turning the said valve, and means for connecting said lever with the said notched bar at any of the notches thereof, the construction being such that as the pistons are pushed upwardly by the fluid pressure, the carbureters will be regulated and the valve will be moved toward its closing position, and as the pressure in the pipe

lowers, the said valve will be moved toward its open position for reëstablishing the pressure in the pipe.

10. In a system for controlling motors on cars, a plurality of carbureters for explosive engines, a source of compressed fluid, a pipe connected with such source and supplied with fluid under pressure therefrom, cylinders connected with said pipe, there being one cylinder for each of the carbureters, a piston movable within each of the cylinders, a spring for each of said pistons, said springs pressing the pistons against the fluid pressure, an arm connected with each of the carbureters, said arms being connected with their corresponding pistons, a valve in said pipe, a main controller cylinder connected with the pipe, a piston in said cylinder, a spring for forcing said piston against the pressure of the fluid in the cylinder, the springs for all of said pistons being of the same strength so that they will be moved equal distances when subjected to the same pressure, a notched bar connected with the piston in the main controller cylinder, a lever for turning the said valve, means for connecting the said lever with the said notched bar at any of the notches thereof, the construction being such that as the pistons are pushed upwardly by the fluid pressure, the carbureters will be regulated and the valve will be moved toward its closing position, and as the pressure in the pipe lowers, the said valve will be moved toward its open position for reëstablishing the pressure in the pipe, and means for exhausting the fluid from the pipe and cylinders.

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

DAVID E. ROSS.

Witnesses:
D. L. Ross,
Wm. Ross.