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MECHANISM FOR FEEDING FUEL.

APPLICATION FILED OCT. 19, 1905.

962,248. Patented June 21, 1910.

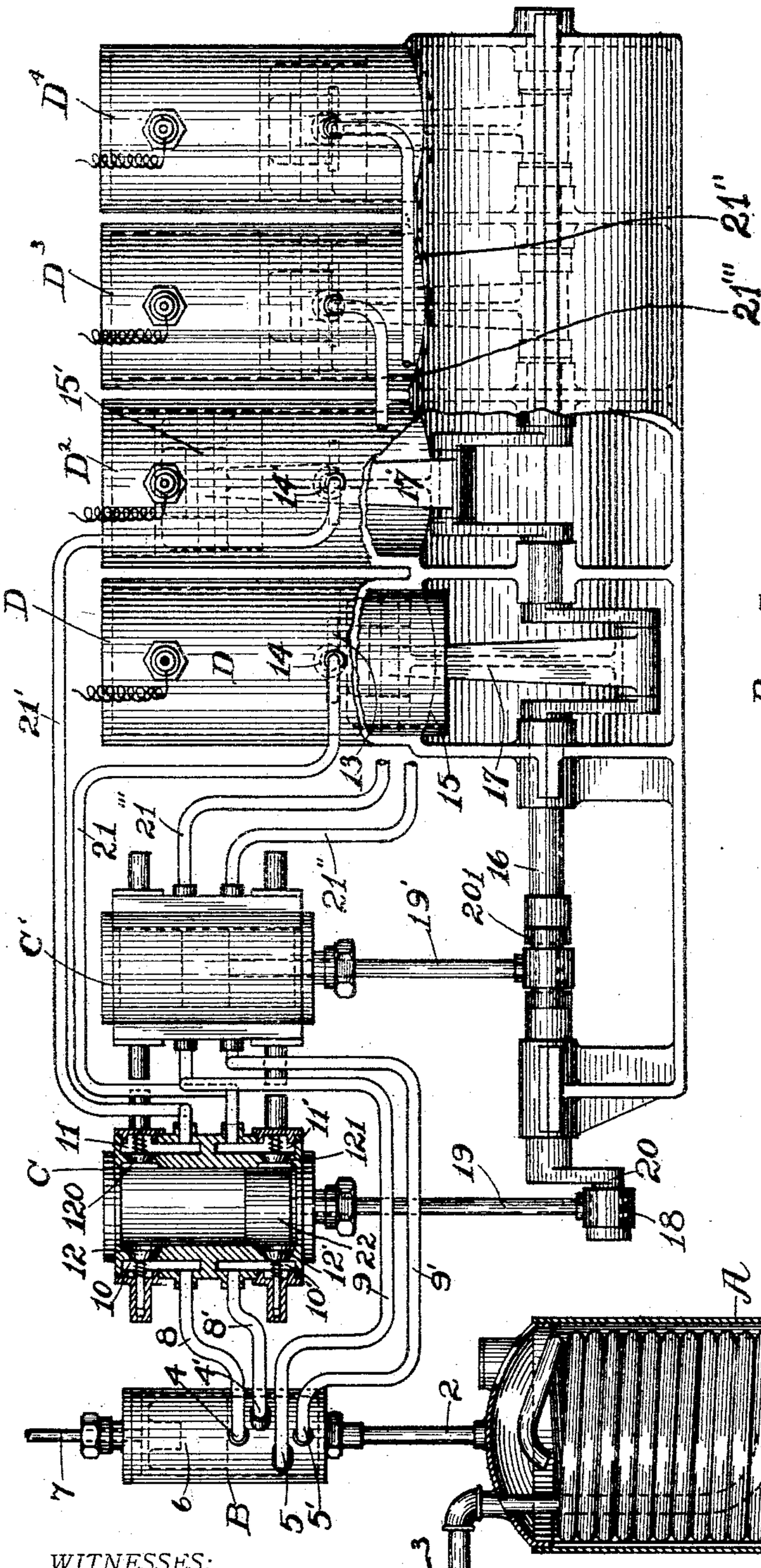

FIG. 2.

WITNESSES:

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MECHANISM FOR FEEDING FUEL.

962,248. Specification of Letters Patent. **Patented June 21, 1910.**

Application filed October 19, 1905. Serial No. 283,476.

To all whom it may concern:

Be it known that I, ALBERT F. ROCKWELL, a citizen of the United States, residing at Bristol, county of Hartford, State of Connecticut, have invented a certain new and useful Feeding Mechanism, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

This invention relates to explosive motors and particularly to a mechanism for feeding fuel to the cylinder or cylinders thereof in such a manner that the volume of the fuel may be governed or the charge regulated to suit varying conditions.

One object of my invention is to provide a means for measuring the charge to be fed to the cylinder or cylinders of the motor.

A further object is to provide means whereby a motor employing a plurality of cylinders may have its charge or charges fed in such a manner that one or more of the cylinders may be rendered inefficient for supplying power to the drive shaft of the motor.

Another object of my invention is to provide means whereby a motor may be constructed with a plurality of cylinders arranged in batteries, said motor to have complementary mechanism for cutting out one or more of the batteries without affecting the remaining ones.

Other objects and advantages of this invention as well as the novel details of construction will be specifically described hereinafter, it being understood that changes in form, proportion and minor details of construction may be resorted to without departing from the spirit of the invention or sacrificing any of the advantages thereof.

In the drawings: Figure 1 is a view of the general arrangement of the motor charge feeding device, measuring means and the source of fuel supply, parts being shown in section to illustrate the interior construction of certain elements, and Fig. 2 is a longitudinal sectional view through the controlling means for governing the volume of fuel fed to the motor.

A designates a source of fuel supply, B, the charge governing device, C and C′, measuring means and D, D², D³ and D⁴, the cylinders of an explosive motor into which is fed the fuel to be exploded.

The pipe 1 is illustrated as being in communication with the outside atmosphere, and this pipe may enter the casing of the carbureter A constituting the source of fuel supply, said pipe being coiled within said carbureter casing in a manner fully disclosed in the companion application filed by me on or about October 9, 1905 and given Serial Number 281,958. The pipe 1 is provided with a valve 3 to regulate the quantity of air which passes through said pipe so that the proportions of air or liquid within the carbureter may be controlled. Leading from the carbureter is a tube 2 in communication with the cylindrical casing of the regulating device or controller B. This cylindrical casing is closed at its respective ends, except for a port whereby communication may be had between said carbureter A and the casing B through the medium of the pipe 2.

4 and 4′ designate openings in the wall of the casing B and 5 and 5′ are similar openings also in the wall of said casing.

6 is a cut-off illustrated as a sliding valve snugly fitting the inner wall of the casing B and provided with a stem 7 projecting through one end of the casing so that the cut-off may be manipulated in a convenient manner.

8 and 8′ designate tubes which are in communication with the interior of the casing B and with the pump C.

9 and 9′ are tubes in communication with the casing B and with the pump C′. The tubes 8 and 8′ are illustrated as being in communication with the separated chambers 10 and 10′ of the measuring device C and these chambers 10 and 10′ are in communication with the interior of the measuring device C through the medium of communicating openings, which are normally closed by

the inwardly opening valves 12 and 12′ respectively. Chambers 11 and 11′ are also provided as part of the measuring device C and these chambers may be in communication with the interior of the measuring device through the medium of openings which are normally closed by the outwardly opening check valves 120 and 121. In the cylinders D and D² of the motor are inlet openings 14 and 14′ which communicate with the chambers 11 and 11′ respectively through the medium of tubular connections 21 and 21′.

15 designates a piston in the cylinder D and it is to be understood that there is a piston in each cylinder connected to the crank shaft 16 by pitmen 17 and 17′ as shown in Fig. 1. On the end of the crank shaft 16, which is the drive shaft of the motor, I have illustrated a crank arm 20 which is movable in the head 18 connected to the stem 19 of the piston 22 of the measuring device C so that the rotation of the shaft 16 will impart a reciprocatory motion to the piston 22 which moves in the cylinder portion of the measuring device C. The construction of the measuring device C′ is similar to that of the measuring device C and the piston in the measuring device C′ is operated from the crank 201 on the shaft 16 through the medium of the pitman 19′. Similarly fuel is conducted from the measuring device C′ to the cylinders D³ and D⁴ through pipes 21″ and 21‴, the latter mentioned pipes corresponding to those disclosed by the numerals 21 and 21′ leading from the measuring device C.

For the purpose of illustrating I have shown four cylinders, but it is obvious that any number of cylinders may be employed, the number utilized being dependent upon the estimated maximum efficiency of the motor. In actual practice, however, I prefer to generally arrange the motors in batteries of two each, although they may be arranged in batteries of multiples of these if desired. Assuming that the motor is in the form shown, that is, having four cylinders and accessories therefor necessary for the proper operation thereof, the operation will be as follows:

The fuel will be taken from the source of supply, in the present instance illustrated as the carbureter A, and drawn through the casing B and alternately through pipes 8 and 8′ or 9 and 9′, according to the outward or inward stroke of the pistons 22. As an example on the inward stroke of the piston 22 the fuel will be drawn into the cylinder of the measuring device C through, say the pipe 8 and on its outward stroke, the gas will be forced through the opening closed by the valve 120 and out through the pipe 21′ into the cylinder D². During the time that the fuel is being forced through the pipe 21′, fuel will be drawn into the cylinder of the measuring device C in rear of the piston 22, (through the pipe 8′), and as soon as the piston begins to return on its inward stroke the charge which has accumulated in rear of the piston 22 will be forced through the opening closed by the valve 121, out through the pipe 21 and into the cylinder D. The alternation of the feeding of the fuel from one cylinder to the other will continue as long as the motor is in operation and so long as the openings 4 and 4′ are not closed by the valve 6, but by moving the valve 6 so as to govern said openings 4 and 4′ the supply would be cut off.

By reference to Fig. 1, it will be seen that when the valve 6 is in the position illustrated the fuel will be fed to all four cylinders during the operation of the motor. If, however, it is necessary to cut out one of the cylinders, the valve will be moved so as to close one of the ports (for example port 4) and in this event only three of the pistons would be operating. If it becomes desirable to cut out two cylinders, the valve would be moved to close two ports (as for example ports 4 and 4′). It is also apparent that all of the ports could be cut out by moving the valve so as to shut off all of the ports.

From the description heretofore given it will be perfectly obvious that any number of cylinders may be arranged to coöperate for driving the shaft 16 and by properly arranging the controlling device B to provide for a sufficient number of openings any number of cylinders may be thrown in or out from communication with the source of fuel supply by merely manipulating the valve 6. Therefore, if the motor should be arranged with eight cylinders, the entire eight might be operating at one time, or these could be cut down to seven, six, five or in fact to any number desired. Of course, it is to be understood that the spent gases may exhaust through the exhaust ports 13 in the usual manner common to explosive motors.

What I claim is—

1. The combination with a plurality of engine cylinders and a charge supply, of a controller connected with the supply and provided with a plurality of ports, a pump, separate connections leading from the ports to the pump, means in the controller for successively covering and uncovering the ports to successively cut off the supply from communication with the pump, and means separately connecting the pump with each of the engine cylinders.

2. The combination with a source of fuel

supply and a plurality of fuel-receiving motor elements adapted to communicate therewith, of tubular connections between the source of fuel supply and the motor elements, a pump for supplying the fuel to the motor elements, separate communication between said pump and said respective motor elements, and a controller for cutting off communication between the source of fuel supply and the pump.

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

ALBERT F. ROCKWELL.

Witnesses:

JOSEPH D. BROWN,

DE WITT PAGE.