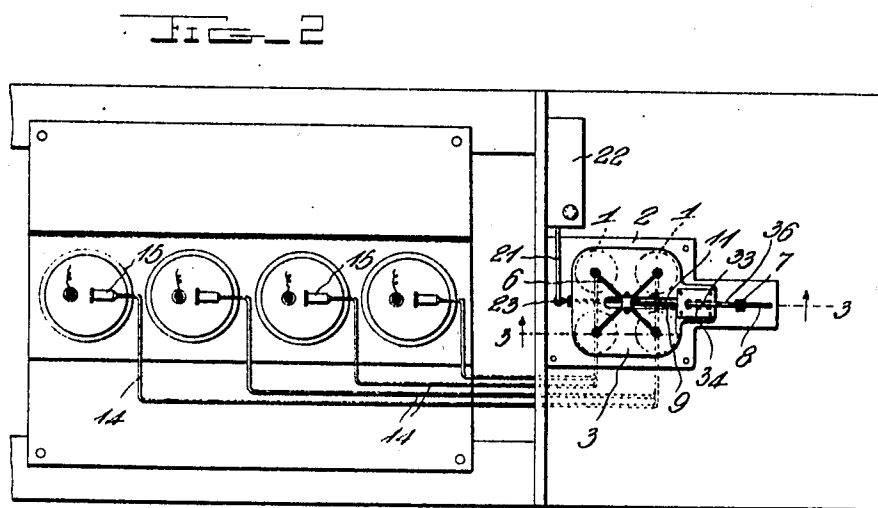
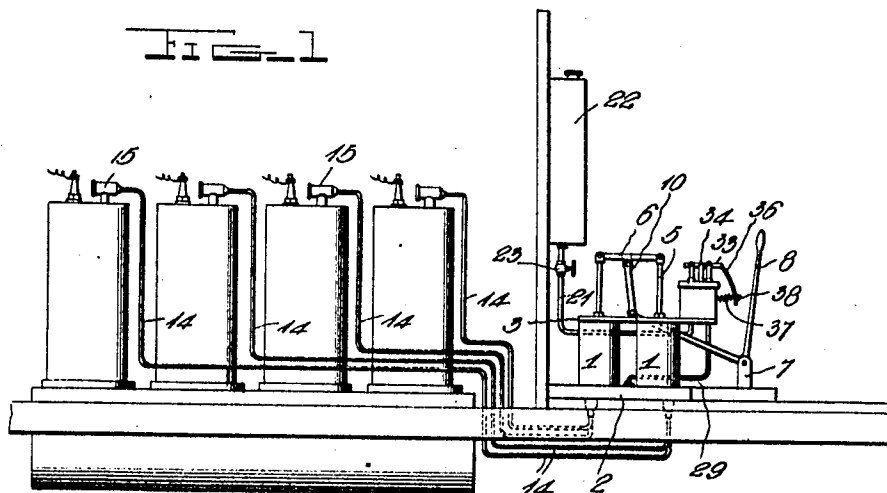


H. L. MEEDER.
 STARTING DEVICE FOR EXPLOSIVE ENGINES.
 APPLICATION FILED OCT. 16, 1911.

1,049,122.

Patented Dec. 31, 1912.

2 SHEETS—SHEET 1.



Witnesses

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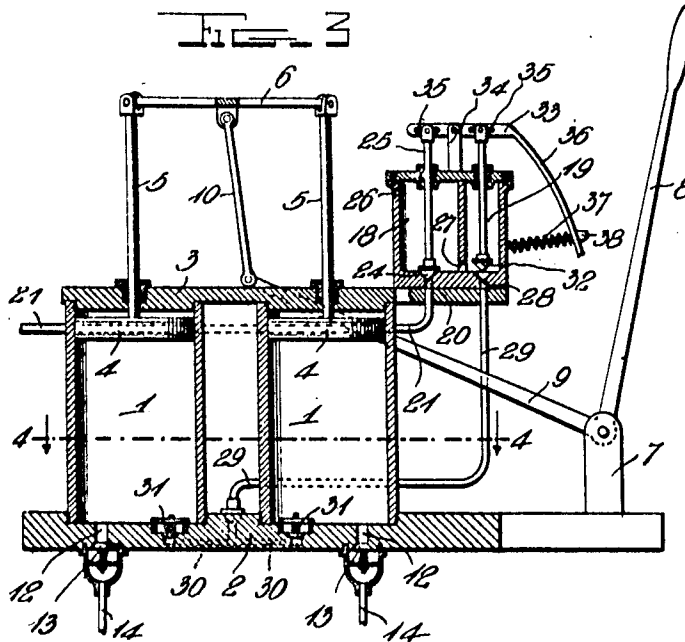


Fig. 4

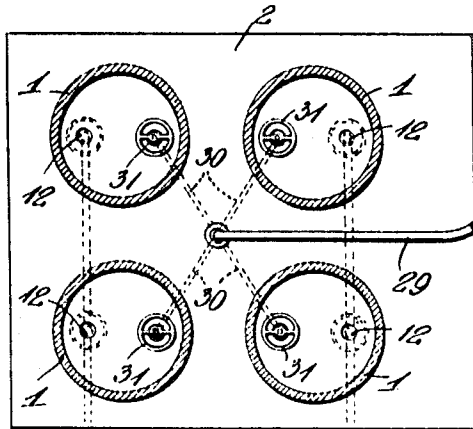
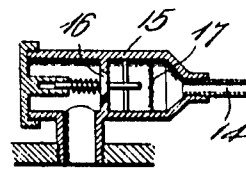


Fig. 5



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HERBERT L. MEEDER, OF FREMONT, NEBRASKA.

STARTING DEVICE FOR EXPLOSIVE-ENGINES.

1,049,122.

Specification of Letters Patent.

Patented Dec. 31, 1912.

Application filed October 16, 1911. Serial No. 654,921.

To all whom it may concern:

Be it known that I, HERBERT L. MEEDER, a citizen of the United States, residing at Fremont, in the county of Dodge and State of Nebraska, have invented certain new and useful Improvements in Starting Devices for Explosive-Engines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to starting devices for explosive engines.

One object of the invention is to provide a device of this character by means of which the cylinders of an explosive engine may be primed or charged and the engine thus started without the usual cranking operation.

Another object is to provide a priming or charging mechanism for explosive engines having an improved construction and arrangement of fuel compressing and mixing mechanism and an improved means for forcing the charge of fuel mixed by said mechanism into the cylinders of the engine wherein the charge is ignited and exploded by a suitable sparking mechanism, thus starting the engine.

A further object is to provide a starting device of this character which is particularly adapted for use in connection with the engines of motor vehicles and which may be arranged within convenient reach of the operator from the seat of the vehicle.

With these and other objects in view the invention consists of certain novel features of construction, and the combination and arrangement of parts as will be more fully described and claimed.

In the accompanying drawings; Figure 1 is a side view, of a portion of a motor vehicle showing the application of the invention; Fig. 2 is a top plan view thereof; Fig. 3 is an enlarged vertical sectional view through two of the cylinders of the fuel compressing or pumping mechanism and the automatic measuring and controlling valve of the invention taken on an irregular plane indicated by the dotted line 3-3 in Fig. 2; Fig. 4 is a horizontal sectional view taken on the line 4-4 of Fig. 3; Fig. 5 is an enlarged detail longitudinal sectional view

through the fuel inlet valve casing of one of the motor cylinders.

In the embodiment of the invention, I provide a plurality of fuel compressing or pumping cylinders 1, one of which is provided for each cylinder of the engine or motor with which the device is connected. The cylinders 1 are arranged on a suitable base and when employed in connection with the engine of a motor vehicle as shown in the accompanying drawings, the base 2 is secured to the floor or frame work of the vehicle and may be arranged beneath the hood, or, as shown in the drawings, may be arranged adjacent to the inner side of the dash board and in front of the chauffeur's seat. The upper ends of the cylinders 1 are closed by a top plate 3 and in the cylinders are arranged pistons 4 having piston rods 5 which work through stuffing boxes arranged in the plate 3 and are connected at their upper ends by a spider 6 whereby the pistons are operated in unison.

Mounted in a suitable bracket 7 arranged on an extension of the base plate 2 is a hand lever 8 having on its lower end an angular operating bar 9, the outer end of which is connected by a link 10 with the center of the spider 6 whereby the latter is moved up and down by the lever to reciprocate the pistons 4. The link 10 and outer end of the bar 9 are adapted to work through a slot 11 formed in the top plate 3 of the cylinders as clearly shown in Fig. 2 of the drawings.

In the base plate 2 below each of the cylinders 1 and communicating therewith is a fuel discharge 12 in the outer end of which is formed a valve seat with which is engaged a check valve 13 whereby the ports 12 are normally closed. Connected with the casings of the valves 13 are fuel conducting pipes 14 which lead to and are connected with check valve casings 15 arranged on and connected with the upper end of each of the cylinders as shown. In the casings 15 are arranged check valves 16 which open under the pressure of the fuel being pumped into the engine cylinders by the compression or pumping mechanism hereinbefore described and which closes between the working strokes of the pumping mechanism to prevent the escape of the fuel from

the engine cylinder. In the casings 15 are also arranged screens 17 through which the fuel passes before entering the engine cylinders, said screens tending to break up or vaporize the fuel when forced therethrough.

Arranged on an extension of the top plate 3 of the cylinders is an automatic fuel measuring and discharging mechanism by means of which the proper quantity of fuel is admitted to the cylinders for priming the same. The measuring and discharging mechanism comprises a measuring chamber 18 and a discharging chamber 19. The chamber 18 is provided in its lower end with a fuel inlet port 20 to which is connected a fuel supply pipe 21 leading to a fuel supply tank 22 secured to the dash board or other suitable part of the vehicle. In the pipe 21 is arranged a cut off valve 23 whereby the flow of fluid from the tank may be controlled. In the inner end of the port 20 of the chamber 18 is formed a valve seat with which is engaged a needle valve 24, the stem 25 of which projects upwardly through a stuffing box in the top of the chamber 18 as shown. In one side of the chamber 18 near its upper end is formed an air vent 26 which permits the escape of air from the chamber and thus permits the fuel to flow into the chamber. In the partition or dividing wall between the chambers 18 and 19 and at the bottom of said wall is formed a passage 27 through which the fuel from the chamber 18 is permitted to flow into the discharging chamber 19.

In the bottom of the chamber 19 is formed a discharge port 28 to which is connected a fuel conducting pipe 29 the opposite end of which is connected with a plurality of fuel inlet ports 30 formed in the base 2, said ports having their outer ends opening into the cylinders 1 as shown. In the outer ends of the ports 30 are formed valve seats with which are engaged check valves 31, said valves opening under the pressure of the fuel when drawn into the cylinders 1 by the upward strokes of the pistons 4, thus permitting the fuel to be drawn into the cylinders, said valve closing on the down stroke of the pistons to permit the fuel to be compressed and forced out through the discharge ports 12 past the valves 13 and through the fuel conducting pipes 14 to the engine cylinders.

In the inner end of the port 28 in the bottom of the chamber 19 is formed a valve seat with which is engaged a needle valve 32, the stem of which works through a stuffing box formed in the top of the chamber 19. In order to alternately open and close the valves 24 and 32 to measure and discharge the fuel from the tank or reservoir 22, I provide a valve operating lever 33 which is pivotally mounted in a bracket 34 arranged on the top plate of the cham-

bers 18 and 19 as shown. In the lever 33 on opposite sides of its pivotal connection with the bracket 34 are formed slots 35 with which are connected the upper ends of the stems of the needle valves 24 and 32 whereby when said lever 33 is rocked, one of said valves will be opened and the other closed.

The lever 33 is provided with a downwardly projecting extension 36 between the lower end of which and the adjacent side of the chamber 19 is arranged a coiled spring 37. The pressure of the spring 37 is exerted to actuate the lever 33 in the proper direction for closing the valve 24 and opening the valve 32 thus permitting the fuel to pass from the chamber 19 through the port 28 and the pipe 29 to the ports 30 from which it is drawn out through the valves 31 into the compressing chambers 1 on the upward strokes of the pistons as hereinbefore described. On the lower end of the extension 36 of the lever 33 is formed a lug 38 with which the lever 8 is adapted to engage when said lever is pushed forwardly to a sufficient extent. In thus engaging the lever 8 with the lug 38 the lever 33 will be rocked against the pressure of the spring 37 and in the proper direction for closing the discharge valves 32 of the chamber 19 and opening the valve 24 of the chamber 18, thus permitting the fuel to flow from the tank 22 into the chamber 18. As long as the lever 8 is held in a forward position the valve 24 will be held open, thus permitting the desired quantity of fuel to flow into the chamber 18. When the chamber 18 has filled with fuel as will be indicated by the overflow of the fuel through the vent 26, the lever 8 is swung back, thus releasing the lever 33 and permitting the spring 37 to actuate the same and close the valve 24 and open the discharge valve 32. As the lever 8 is pulled farther back the pistons 4 in the cylinders 1 will be drawn upwardly through the medium of the bar 9 and link 10 thus sucking the fuel through the port 28, pipe 29, ports 30 and check valves 31 into the cylinders 1. When the lever 8 is again pushed forwardly the bar 9 and link 10 will be actuated to force the pistons 4 downwardly in the cylinders 1, thus compressing and forcing the fuel from said cylinders through the discharge ports 12 and fuel conducting pipes 14 to the engine cylinders as hereinbefore described, thus providing said cylinders with a priming charge which is ignited and exploded by any suitable sparking mechanism thus starting the engine.

From the foregoing description taken in connection with the accompanying drawings, the construction and operation of the invention will be readily understood without requiring a more extended explanation. Various changes in the form, proportion

and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of the invention as claimed.

5 Having thus described my invention, what I claim is;

1. In a starting device for explosive engines, a series of fuel compressing cylinders, a fuel supply tank, measuring and discharging chambers connected with said tank, fuel
10 controlling valves arranged in said chambers, fuel suction and compressing pistons arranged in said cylinders, and means to simultaneously operate said pistons and the
15 valves in said measuring chambers.

2. In a starting device for explosive engines, a series of fuel compressing cylinders adapted to be connected with the cylinders of the engine, pistons operatively mounted
20 in said cylinders, a fuel supply tank, measuring and discharging chambers connected with said tank, valves arranged in said measuring chamber to control the flow of the fuel from said tank to said chamber, a valve arranged in said discharging chamber to control
25 the flow of the fuel from said chamber to said cylinders, a valve operating lever connected with said valves whereby the latter are alternately opened and closed, and a
30 piston operating lever adapted to reciprocate the pistons in said compressing cylinders and to engage and actuate said valve operating lever whereby the valve in said
35 discharging chamber is closed and the valve in the measuring chamber is opened simultaneously with the down stroke of said pistons.

3. In a starting device for explosive engines, a fuel compressing mechanism, compressing cylinders one of which is provided
40 for each cylinder of the engine, said cylinders having inlet and discharge ports, check valves arranged in said ports, fuel compressing pistons slidably mounted in said cylinders, an operating lever connected with said
45 pistons, a fuel supply tank, fuel measuring and discharging chambers connected with said supply tank, said chambers having formed therein inlet and discharge ports,
50 valves to open and close said ports, and means operable by said lever to alternately open and close said ports.

4. In a starting device for explosive engines, a fuel compressing mechanism comprising

a base, compressing cylinders arranged on said base, one of said cylinders being provided for each cylinder of the engine, said cylinders having in the base inlet and discharge ports, check valves arranged
55 in said ports, fuel compressing pistons slidably mounted in said cylinders, an operating lever connected with said pistons, a fuel supply tank, fuel measuring and discharging
60 chambers connected with said supply tank, said chambers having formed therein inlet and discharge ports, valves to open and close said ports, a pivoted valve-operating lever connected with the stems of said valves,
70 whereby the latter are actuated to alternately open and close said ports, a spring engaged with said lever, whereby the latter is actuated to close the valve of the inlet port and to open the valve of the discharge
75 port, and means on said valve operating lever adapted to be engaged by said piston operating lever, whereby the valve operating lever is actuated to open the valve of the inlet port and close the valve of the discharge port on the down stroke of the pistons in said cylinders.

5. In a starting device for explosive engines, a series of fuel compressing cylinders, one of which is provided for each cylinder of the engine, said compressing cylinders having fuel inlet and discharge ports, check
85 valves to normally close said ports, a valve casing arranged on each of the cylinders of the engine and connecting said cylinders, check valves arranged in said casings, fuel vaporizing screens also arranged in said
90 casings, fuel conducting pipes to connect said casings with the discharge ports of said compressing cylinders, a fuel supply tank, a fuel measuring mechanism to connect said tank with said compressing cylinders, fuel
95 compressing pistons arranged in said cylinders, and an operating lever connected with said pistons, whereby the latter are actuated to compress the fuel in said cylinders and to force the fuel therefrom into said engine cylinders.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

HERBERT L. MEEDER.

Witnesses:

OTTO H. SCHURMAN,
JOHN A. VAN ANDO.