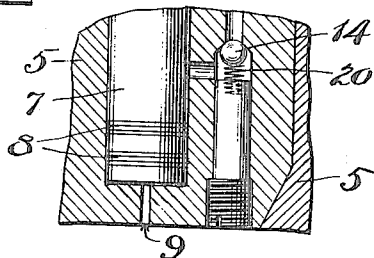
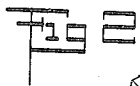
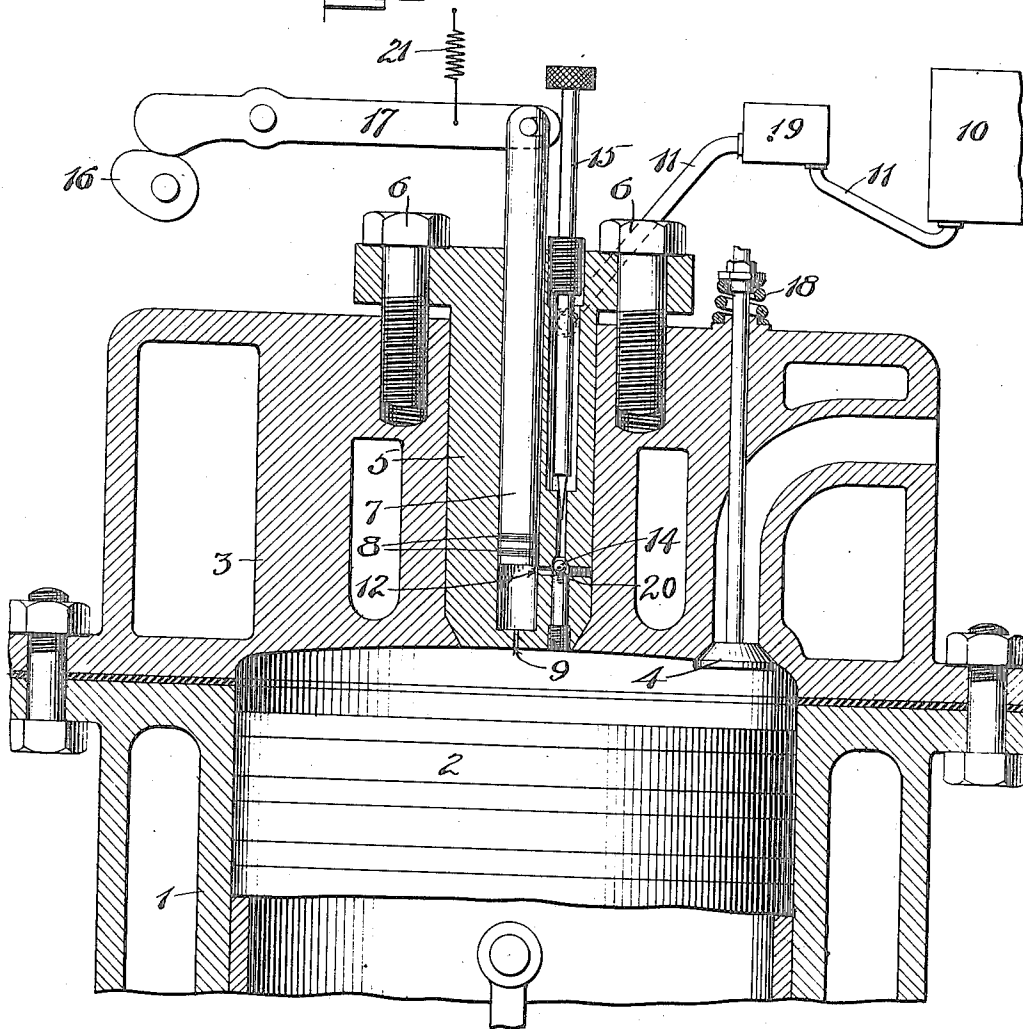


1,208,012.



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UNITED STATES PATENT OFFICE.

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FUEL-FEEDING APPARATUS.

1,208,012.

Specification of Letters Patent.

Patented Dec. 12, 1916.

Application filed July 7, 1916. Serial No. 107,897.

To all whom it may concern:

Be it known that I, EUGENE A. RIOTTE, a citizen of the United States of America, residing at Douglaston, Queens county, New York, have invented a new and useful Fuel-Feeding Apparatus, of which the following is a specification.

My invention relates to an improved fuel feeding device for engines of the oil burning or high compression type in which a charge of fuel is forced into the cylinder at the proper period and usually at a time when the air compression in the cylinder is at approximately its highest point.

The object of my invention is to provide a simple and effective device or apparatus for performing this function.

In the accompanying drawings: Figure 1 is a vertical sectional view of the upper part of an engine cylinder equipped with my fuel feeding apparatus. Fig. 2 is a fragmentary view illustrating certain parts in a different position.

It should be understood that the drawings are merely illustrative and do not pretend to give exact proportions. Furthermore the said drawings are illustrative of a preferred construction, it being my expectation that various changes and modifications may be made without departing from the spirit and scope of my invention.

In that form of the invention shown herein, 1 represents the upper part of an ordinary water jacketed cylinder.

2 represents a piston therein which may be connected in the usual manner with the crank shaft, not shown.

3 represents the usual water jacketed cylinder head.

4 represents an intake valve by which air may be admitted to the cylinder to be compressed by the piston ready to receive a charge of fuel.

5 represents a plug which is insertible into a bore in the cylinder head 3 and is made gas tight, as by providing a packing or a ground joint at the lower end which may be tapered, as shown, if desired. The plug 5 may be held in place by any suitable means, such as by bolts 6—6.

7 is a fuel feeding piston in the form of a plunger slidable longitudinally in a bore in the plug 5. This piston may have packing rings 8, if desired. The bore in which the piston 7 is located is contracted at its lower

end so that it is open to the interior of the cylinder only by a comparatively small passage 9.

10 is a fuel supply reservoir which connects by a pipe 11 to a second bore in the plug 5. This last mentioned bore opens into the first mentioned bore approximately at the point 12, which, as shown, is just below the lower end of the fuel feeding piston 7 when the latter is elevated whereby fuel can be fed into the space below the piston 7 at such a time.

14 is a check valve in the fuel supply passage. The fuel supply passage is preferably controllable so as to control the amount of fuel that is fed to the space underneath the piston 7.

In the drawings, I have shown a needle valve 15 which is manually adjustable for the purpose of varying the amount of fuel in each charge. The fuel feeding piston 7 is operated from the engine in any desirable way so as to feed fuel at the proper time in the cycle of operation thereof. In the particular form shown, the fuel feeding piston 7 is moved by a suitable cam 16 through the medium of an arm 17, although any other well known means may be substituted. The valve 4 may be normally closed by a spring 18. In the fuel pipe line 11 there may be provided any desired means for assisting in the feed of the fuel, such a means being illustrated conventionally at 19. In some instances, and with some kinds of fuel, gravity alone will suffice, in which event the means 19 may be assumed to be a gravity tank.

20 is a light spring that may be provided to assist in the closing of the check valve 14. Any suitable means may be provided to retract the fuel feeding piston, but for the purposes of illustration, I have shown a retracting spring 21 which may be secured at one end to any suitable abutment, and at the other end to the lever 17.

Operation: In the particular position indicated in the drawings, Fig. 1, the power piston 2 is located in approximately its highest position, wherein the air contained in the cylinder above the piston is at approximately its highest pressure. Obviously, the pressure in the chamber underneath the fuel feeding piston 7 will, at such time, be only slightly less, if any, than the air pressure in the working cylinder. Hence, when the fuel

feeding piston 7 descends, it will increase the relative air pressure therein and force any fuel that may be contained in said space through one or more small openings 9 into the combustion chamber. When the cylinder has been scavenged, that is to say, when the burnt gases have been discharged, and a new charge of pure air is being drawn in into the working cylinder, fuel from the tank 10 will flow past the valve 15 and check valve 14 into the space underneath the fuel feeding piston, for at such a time the parts are so arranged that said fuel feeding piston will stand elevated or in the position shown in Fig. 1. When the working piston 2 has ascended to the proper degree, the cam 16 will be called into action and will cause the fuel feeding plunger 7 to again descend and force such fuel (mixed with air) as may be contained in the chamber directly underneath the fuel feeding piston 7 into the combustion chamber through passage 9. The fuel feeding piston 7 will then ascend to the position shown in Fig. 1 until it is desired to again inject a new charge. In Fig. 1 the cam 16 is shown conventionally and in approximately a position ready to force the fuel feeding piston 7 in a direction to inject fuel.

In Fig. 2 I have shown the fuel feeding piston 7 in approximately its lowermost position in which there is very little clearance, although this of course may be varied as varying conditions require.

It should be understood that the fuel feeding means conventionally shown at 19 may be of any well known pattern capable of feeding predetermined quantities of fuel through the passage 11 into the fuel feeding bore in synchronism with the stroke of the engine, in which event the valve mechanism in said passage may be omitted. Such measuring devices are too well known to require illustration and no claim is made herein to any specific form thereof, it being sufficient that it be understood that the means 19 may be such a device, or may be a device capable of feeding fuel under pressure to be controlled by the aforesaid valve mechanism.

What I claim is:

1. In a fuel feeding apparatus for internal combustion engines, an engine driven fuel feeding piston, a mounting therefor having a bore extending partially there-through of a size to snugly receive said fuel feeding piston, with a relatively small fuel feeding passage from the inner end of said bore to the inner end of the mounting, a fuel feed passage through said mounting opening into said bore at a point adjacent to the piston at the back of its stroke, with means for causing said piston to pause at the back of its stroke for a period sufficient to permit fuel to enter the chamber be-

tween the inner end of the piston and the contracted fuel outlet and means to cause said piston to be projected at certain times to expel said fuel through said contracted passage.

2. In a fuel feeding apparatus for internal combustion engines, an engine driven fuel feeding piston, a mounting therefor having a bore extending partially there-through of a size to snugly receive said fuel feeding piston, with a relatively small fuel feeding passage from the inner end of said bore to the inner end of the mounting, a fuel feed passage through said mounting opening into said bore at a point adjacent to the piston at the back of its stroke, with means for causing said piston to pause at the back of its stroke for a period sufficient to permit fuel to enter the chamber between the inner end of the piston and the contracted fuel outlet and means to cause said piston to be projected at certain times to expel said fuel through said contracted passage, said piston operating to close said fuel inlet during the feeding period.

3. In a fuel feeding apparatus for internal combustion engines, an engine driven fuel feeding piston, a mounting therefor having a bore extending partially there-through, of a size to snugly receive said fuel feeding piston, with a relatively small fuel feeding passage from the inner end of said bore to the inner end of the mounting, a fuel feed passage through said mounting opening into said bore at a point adjacent to the piston at the back of its stroke, with means for causing said piston to pause at the back of its stroke for a period sufficient to permit fuel to enter the chamber between the inner end of the piston and the contracted fuel outlet and means to cause said piston to be projected at certain times to expel said fuel through said contracted passage, and means for closing said fuel inlet during the feeding movement of the piston against the return of the fuel therethrough by action of said piston.

4. In a fuel feeding apparatus for internal combustion engines, an engine driven fuel feeding piston, a mounting therefor having a bore extending partially there-through, of a size to snugly receive said fuel feeding piston, with a relatively small fuel feeding passage from the inner end of said bore to the inner end of the mounting, a fuel feed passage through said mounting opening into said bore at a point adjacent to the piston at the back of its stroke, with means for causing said piston to pause at the back of its stroke for a period sufficient to permit fuel to enter the chamber between the inner end of the piston and the contracted fuel outlet, and means to cause said piston to be projected at certain times to expel said fuel through said contracted pas-

sage, said regulating means being manually operable.

5 In a fuel feeding apparatus for internal combustion engines, an engine driven fuel feeding piston, a mounting therefor having a bore extending partially there-
 10 through, of a size to snugly receive said fuel feeding piston, with a relatively small fuel feeding passage from the inner end of said bore to the inner end of the mounting, a fuel feed passage through said mounting opening into said bore at a point adjacent to the piston at the back of its stroke, with means for causing said piston to pause at
 15 the back of its stroke for a period sufficient to permit fuel to enter the chamber between the inner end of the piston and the contracted fuel outlet, and means to cause said piston to be projected at certain times
 20 to expel said fuel through said contracted passage, said fuel regulating means being manually operable.

6. In a fuel feeding apparatus for internal combustion engines, an engine driven fuel feeding piston, a mounting therefor having a bore extending partially there-
 25 through, of a size to snugly receive said fuel feeding piston, with a relatively small fuel feeding passage from the inner end of said bore to the inner end of the mounting, a fuel feed passage through said mounting opening into said bore at a point adjacent to the piston at the back of its stroke, with means for causing said piston to pause at
 30 the back of its stroke for a period sufficient to permit fuel to enter the chamber between the inner end of the piston and the contracted fuel outlet, and means to cause said piston to be projected at certain times to
 35 expel said fuel through said contracted passage, said fuel regulating means being manually operable, and comprising a needle valve.

7. In a fuel feeding apparatus for internal combustion engines, an engine driven fuel feeding piston, a mounting therefor having a bore extending partially there-
 45 through, of a size to snugly receive said fuel feeding piston, with a relatively small fuel feeding passage from the inner end of
 50

said bore to the inner end of the mounting, a fuel feed passage through said mounting opening into said bore at a point adjacent to the piston at the back of its stroke, with means for causing said piston to pause at
 55 the back of its stroke for a period sufficient to permit fuel to enter the chamber between the inner end of the piston and the contracted fuel outlet, and means to cause said piston to be projected at certain times to
 60 expel said fuel through said contracted passage, said fuel regulating means being manually controllable and comprising a needle valve, and a back check valve in said feed passage.

8. In a fuel feeding means for internal combustion engines, a working cylinder, a working piston therein, an air inlet into said working cylinder, a fuel feeding piston, a mounting therefor, including a bore
 65 of sufficient size to snugly receive said fuel feeding piston, the inner end of said bore being contracted to form a relatively small fuel feeding passage communicating with the interior of said working cylinder, a
 70 fuel feeding passage leading through said mounting and communicating with said bore, to permit fuel to enter the bore between the end of the fuel feeding piston and the contracted passage when said fuel feed-
 80 ing piston is retracted.

9. In a fuel feeding means for internal combustion engines, a working cylinder, a working piston therein, an air inlet into said working cylinder, a fuel feeding piston, a
 85 mounting therefor, including a bore of sufficient size to snugly receive said fuel feeding piston, the inner end of said bore being contracted to form a relatively small fuel feeding passage communicating with the
 90 interior of said working cylinder, a fuel feeding passage leading through said mounting and communicating with said bore, to permit fuel to enter the bore between the end of the fuel feeding piston
 95 and the contracted passage when said fuel feeding piston is retracted, and a fuel regulating means to control the amount of fuel fed through said passage.

EUGENE A. RIOTTE.