Dec. 27, 1938. H. E. CARROLL 2,141,428

DIESEL ENGINE

Filed Jan. 14. 1937 3 Sheets-Sheet 1

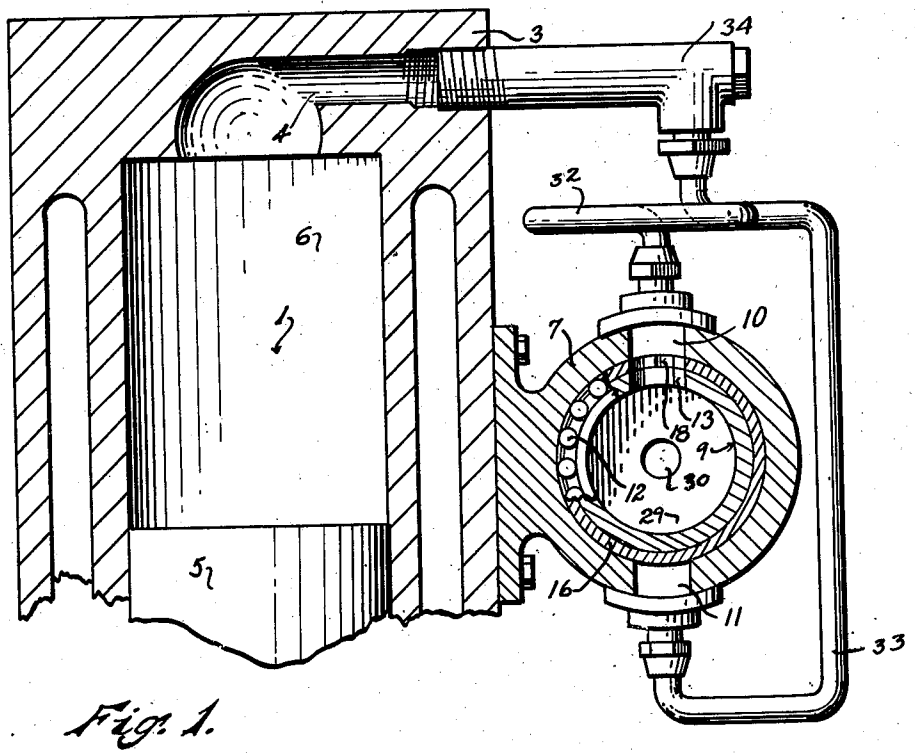



Fig. 1.

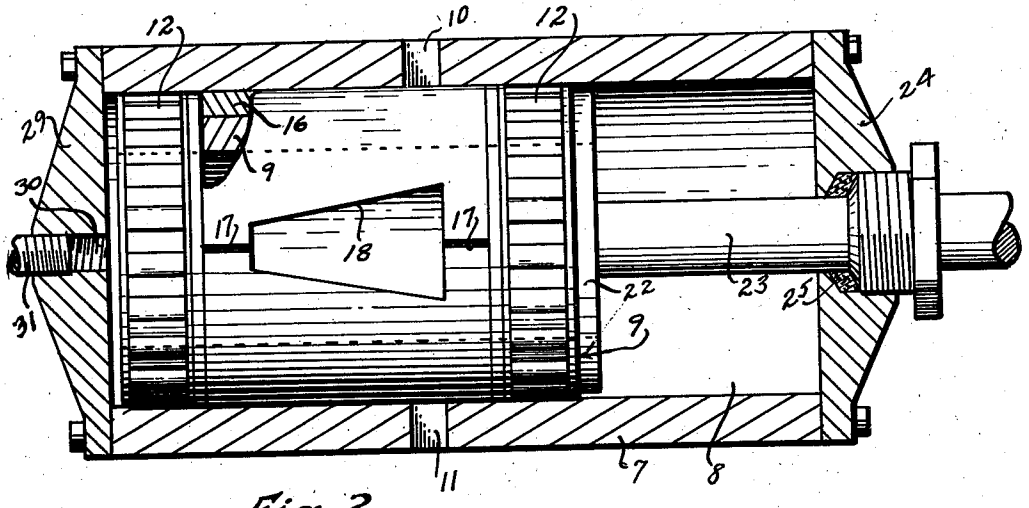



Fig. 2.

INVENTOR:
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DIESEL ENGINE

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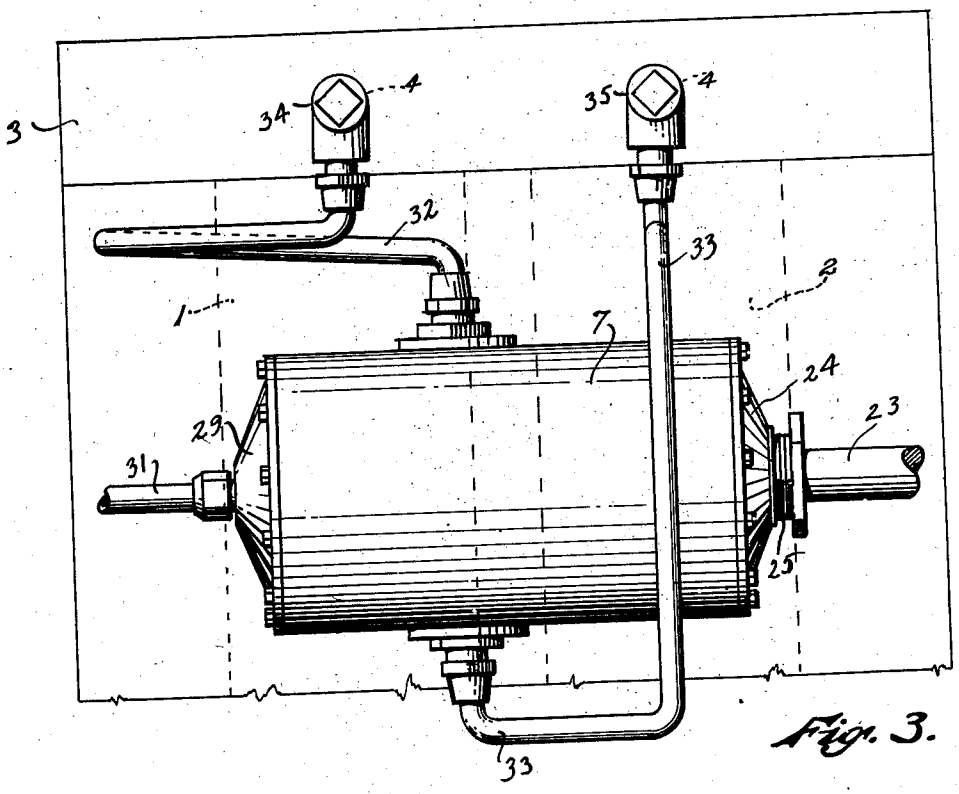



Fig. 3.

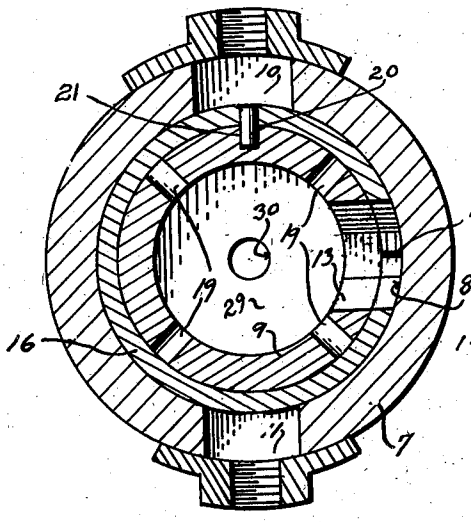



Fig. 4.

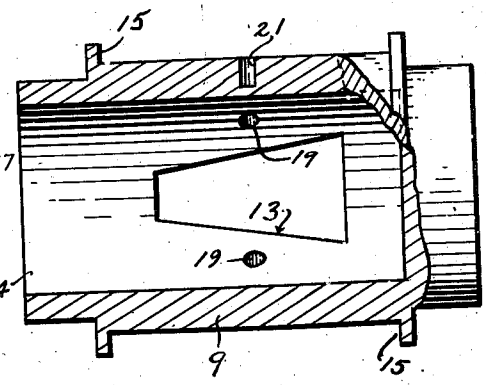



Fig. 5.

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DIESEL ENGINE

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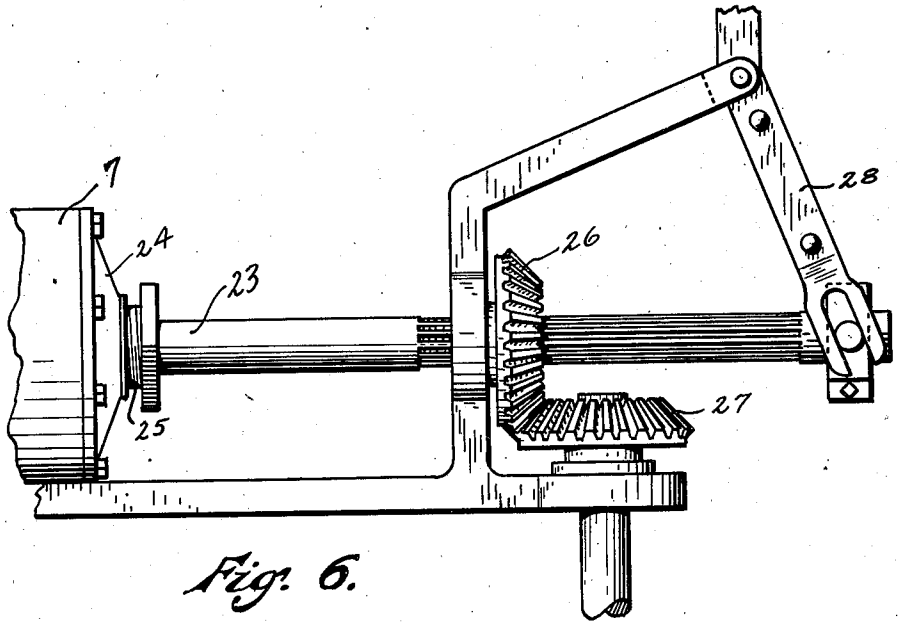



Fig. 6.

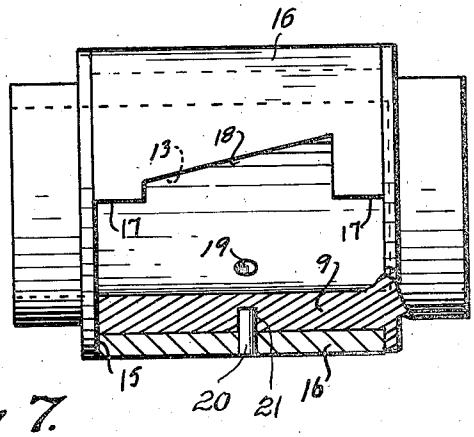



Fig. 7.

INVENTOR:
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Patented Dec. 27, 1938 2,141,428

# UNITED STATES PATENT OFFICE

2,141,428

## DIESEL ENGINE

Henry E. Carroll, St. Louis, Mo.

Application January 14, 1937, Serial No. 120,534

1 Claim. (Cl. 251—4)

My invention relates to Diesel engines, and more particularly to a rotary sleeve valve for controlling the admission of fuel under predetermined pressures into the explosion chambers of the engine.

An object of the invention is the provision of a rotatable sleeve valve mounted within a header, and, which is also longitudinally slidable, as desired, relative to the header.

A further object of the invention resides in providing a sleeve valve member with fuel outlet, which is trapezoid in shape, adapted to register with the fuel outlet in the header.

A further object of the invention resides in grooving the sleeve valve member to accommodate the mounting of a split pressure ring on the sleeve valve member, in the grooves thereon, so that a fuel outlet, trapezoid in shape, therein will register with outlet in the sleeve valve member.

A further object of the invention resides in providing the sleeve valve member with a series of openings so that the split rings can be expanded against the interior wall of the header by means of fuel pressure in said openings and within the sleeve valve member.

A further object of the invention is the provision of fuel line members connecting ported sections of the header with their respective explosion chambers in engine cylinders.

A still further object of the invention is the provision of a rotary sleeve valve for Diesel engines, which possesses advantages in points of simplicity and efficiency, and, at the same time, comparatively inexpensive in cost of manufacture.

With the above and other objects in view, the invention consists in the novel features of construction, arrangement and combination of parts hereinafter more fully described and finally pointed out in the claim hereto appended.

Referring to the accompanying drawings forming a part of this specification, wherein like characters of reference denote similar parts throughout the several views:

Fig. 1 is a front elevation of a part of an engine equipped with rotary valve mechanism embodying the features of my invention.

Fig. 2 is a plan view of the rotary and slidable sleeve valve mounted in a header which is shown in cross-section.

Fig. 3 is a side elevation of two engine cylinders, the valve header and the fuel conduits leading therefrom to the spray valve associated with the engine cylinders.

Fig. 4 is a sectional view of the sleeve valve and header therefor.

Fig. 5 is a sectional view of the valve with the bearings and the split expansion ring removed.

Fig. 6 illustrates means for rotating the sleeve valve and for moving it longitudinally.

Fig. 7 is a longitudinal sectional view of the sleeve valve member and split ring, and showing the fuel outlet opening in the valve member.

Referring to the drawings, the reference characters 1 and 2 designate a pair of engine cylinders. The upper open ends of the cylinders are closed by means of a head member 3 having fuel inlets 4 leading to the cylinders. A piston 5 is reciprocably mounted in each cylinder and an explosion chamber 6 is formed between the head of each cylinder and the head of each piston 5. While I have shown but two cylinders, any number of cylinders can be employed, as is manifest.

In carrying out the invention, I employ a suitable header designated, generally, as 7. The header 7 is suitably secured to the cylinder block, as shown, although not necessarily so, as it can be secured to the cylinder head, or any other convenient part of the engine with satisfactory results. The interior of the header 7 provides a smooth cylinder 8 for the mounting of a rotatably and slidably mounted sleeve valve member 9, as will be hereinafter described. The wall of the header 7 is provided with suitable opposed rectangular fuel outlets 10 and 11, one of such outlets for each cylinder employed in a two cylinder construction. For each additional two cylinders, additional opposed fuel outlets are employed.

The suitable rotary valve member 9, tubular in structure, is employed and provided at its ends with suitable bearings 12. The rotary sleeve valve member 9 is mounted for rotation within the header 7, and, it is so dimensioned in length as to permit of sliding movement simultaneously with rotary movement thereof, when so desired.

The rotary valve member 9 has its wall provided with a single peripheral fuel outlet 13 for each two engine cylinders employed. One end of the sleeve valve is open as at 14 and serves as a fuel inlet thereto. The fuel outlet 13 in the rotary valve member 9 is trapezoid in shape and with the medial line thereof running longitudinally of the valve member 9, thus, as the rotary valve 9 is moved longitudinally in one direction within the header cylinder 8, a greater quantity of fuel is progressively injected into the engine cylinders, and when moved in the

other direction, a less quantity of fuel is progressively injected into the engine cylinders.

The rotary sleeve valve member 9 is peripherally grooved at the outlet 13, as at 15, to accommodate a suitable split expansible ring 16, which ring is provided at the split 17 thereof with a fuel outlet 18 corresponding in shape and size to its co-operating fuel outlet 13 in the rotary sleeve valve member 9 and with which outlet it registers.

The rotary sleeve valve member 9 is also provided with a series of suitable relatively small openings 19 in the peripherally grooved section 15 thereof, thus permitting fluid fuel pressure to pass therethrough from within the sleeve valve 9 and exert fluid pressure against the inner faces of the split seal rings 16 for expanding the ring against the cylinder wall of the header 7. The split ring 16 is held against rotary displacement relative to the rotary sleeve valve member 9 by means of inwardly projections 20 on one side of the split in the ring, and, which are receivable in openings 21 in the valve member 9.

One end of the rotary sleeve valve 9 is suitably secured to the flanged head 22 of a suitably splined shaft 23, which passes through a suitable end plate 24 provided with a suitable packing gland 25, and the end plate 24 is suitably secured to the end of the header 7. A suitable gear 26 is mounted on the splined shaft 23, and is driven in any suitable manner such, as by a gear 27 driven from a cam shaft of the engine, not shown, as it is not believed necessary to do so. The shaft 23 is moved longitudinally by suitable actuating means such, for instance, as a lever 28.

The header 7 at the fuel inlet end of the rotary valve 9 is provided with a suitable end closure member 29, which member is suitably secured in position and provided with a fuel inlet 30 with which a suitable fuel line 31 communicates, and which line leads from a suitable fuel pump, not shown.

Suitable fuel conduits 32 and 33 connect the fuel outlets 10 and 11 of the header 7 with suitable spray valves 34 and 35, which connect with their respective cylinder head fuel inlets 6.

The many advantages of the herein described invention will readily suggest themselves to those skilled in the art to which it appertains.

From the foregoing description, it is evident that a simple device for this purpose has been disclosed, but it is to be understood that I do not desire to restrict, or limit myself to the very details of the construction shown and described, which is merely illustrative, it being obvious that changes, not involving the exercise of invention, may be made without conflicting or departing from the spirit of the invention within the scope of the appended claim.

What I claim is:

A fuel distributing device for Diesel engines having, in combination, a header cylinder, removable heads at the ends of the header cylinder, said cylinder having a rectangular fuel outlet opening intermediate its ends, a fuel inlet for the cylinder and associated with one of the cylinder heads, a tubular valve member having one end closed and one end open with the open end adjacent the cylinder head provided with the fuel inlet, anti-friction means for mounting said valve member in the header cylinder, means for rotating said valve member, means for manually sliding said valve member longitudinally in either direction, a fuel outlet port in the wall of the valve member intermediate the ends thereof, the lead and follow up edges of the fuel outlet port being inclined in opposite directions longitudinally of the valve member, a split sealing member mounted on the valve member and having a fuel outlet port corresponding in shape and area to the fuel outlet port in the valve member, and a series of openings in the wall of the valve member to permit the sealing member to be expanded by fuel pressure within the valve member.

HENRY E. CARROLL.