Jan. 30, 1923. 1,443,777.

W. J. WOODCOCK.

ADJUSTABLE TIMING OF OIL ENGINES.

FILED JULY 25, 1918.

Fig. 1.

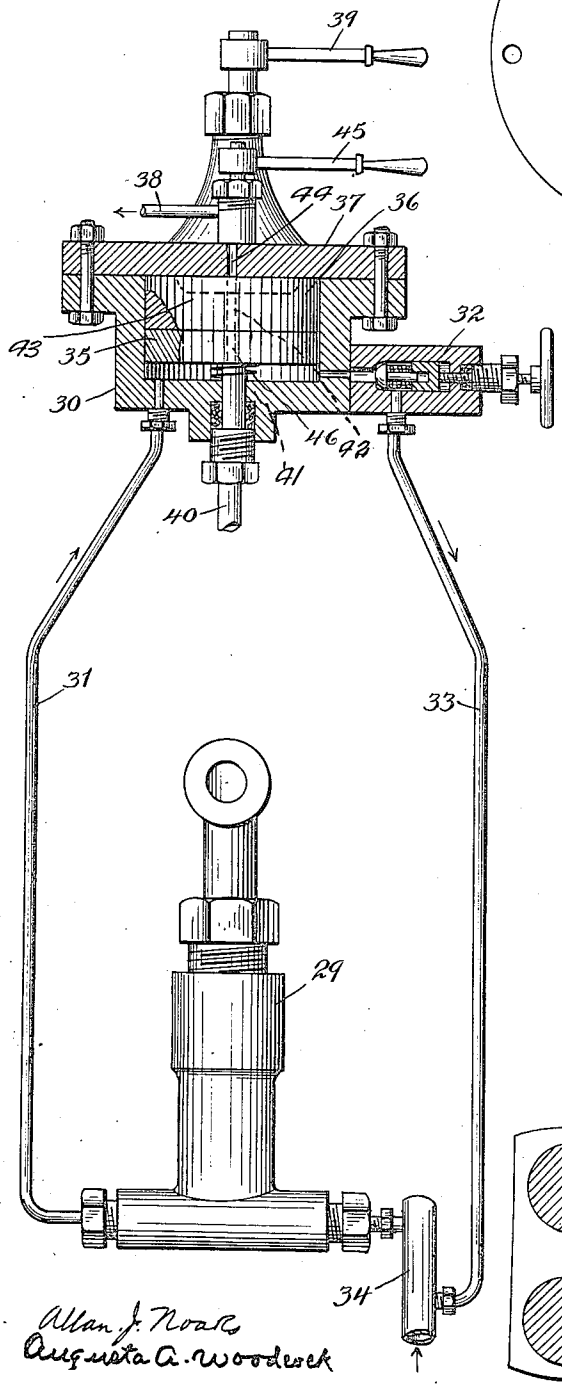


Fig. 2.

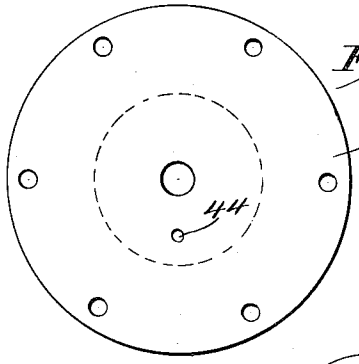
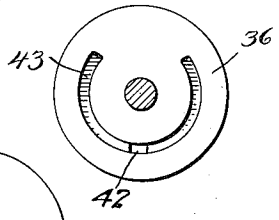


Fig. 3.



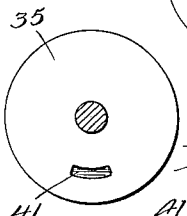


Fig. 4.

Fig. 6.

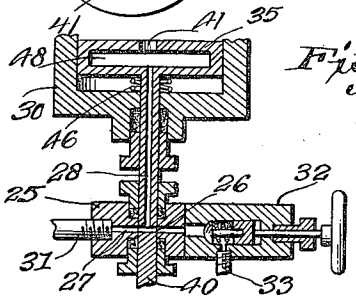
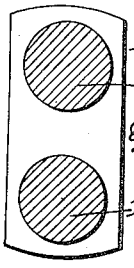


Fig. 5.



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UNITED STATES PATENT OFFICE.

WILLARD JAY WOODCOCK, OF BROOKLYN, NEW YORK.

ADJUSTABLE TIMING OF OIL ENGINES.

Application filed July 25, 1918. Serial No. 246,792.

To all whom it may concern:

Be it known that I, WILLARD JAY WOODCOCK, a citizen of the United States, and resident of Brooklyn, New York, in the county of Kings and State of New York, have invented certain new and useful Improvements in Adjustable Timing of Oil Engines, of which the following is a specification.

My invention relates to a device for adjusting the time of injecting fuel oil into an internal combustion engine.

An adjustment of this nature is desirable not only for starting and reversing the engine, but also in using fuel of different densities which have different firing points, and pre-ignition is thus avoided by adjusting the time of fuel injection and complete combustion accomplished.

The objects of my invention are to provide means for adjusting the time of fuel injection, so that the energy resulting may be advanced or retarded, similar to advancing and retarding the spark in a gasoline engine, so that the maximum effect may be attained, and also to relieve the working parts from excessive friction by relieving pressure on the working parts in part or full.

The method of obtaining these results are illustrated in the accompanying drawings.

Fig. 1 shows an elevation of the device which is partly in section.

Fig. 2 shows a plan of the working surface of the head of the disk case.

Fig. 3 shows a plan of the adjustable disk.

Fig. 4 shows a plan of the revolving or rotating disk.

Fig. 5 shows the position of the crank on the top center, and adjustment is made for fuel injection on either side of this position.

Fig. 6 is a sectional view of the moving disk arranged to relieve excessive friction.

Reference being made to Fig. 1, the numeral 29 represents a fuel pump of excess capacity although it is not essential which maintains a pressure in the distribution case 30 by means of the pipe connection 31, and the surplus fuel oil is returned to the suction side of the fuel pump 29 by means of the pressure relief valve 32 and pipe 33 to the suction pipe 34.

The numeral 35 indicates a distributor disk which is operated by suitable means from the crank shaft of the engine and which admits fuel oil through port 41 to the adjustable disk 36, which is in contact with it. The position of this adjustable disk determines the time of fuel injection, because it is located between the revolving or rotating disk 35 and the stationary cover 37 of the disk case 30, and it is provided with the port 44 and also the pipe connection 38, which leads to the cylinder of the engine.

The adjustable disk 36 is fitted with a receiving port 42 and a connecting port 43, which provides for the passage of fuel from port 41, Fig. 4, in the revolving or rotating disk 35 to port 44 in the stationary cover 37, Fig. 2. Fuel is passed while disk 36 is in any position within the scope of the connecting port 43; thus providing means to advance or retard the time of fuel injection, the adjustment being made by means of lever 39, and the lever 45 is the oil throttle.

When fuel oil is admitted to the disk case 30 by means of pipe 31, the pump pressure is on the disk, and if the pressure is great friction will be excessive. In case that a high oil pressure is desired, to relieve the excessive friction, the disk 35, Fig. 6, is made hollow as indicated by 48, and the hole 28, in the center of the shaft 40, admits oil through the hole 26, which connects to the port 27, connecting with the supply pipe 31, in the bearing 25, and the surplus oil passes out through the relief valve 32, to the return pipe 33, in every other respect the action of the device is the same as when low oil pressure is used.

The advantage of this arrangement is that as the fuel is fed internally into the hollow space 48 in disk 35, the device will be relieved from the pump pressure and the friction will be greatly reduced.

All contact surfaces will be held in close contact by the spring 46.

The device may be arranged to serve one or more cylinders and may also vary in detail.

In practical operation, when the crank 1 on the crank shaft 19, Fig. 5 is set, as shown, and the port 41 in the revolving or rotating disk 35, Fig. 4, and the port 42 in adjustable disk 36, Fig. 3, and the port 44 in the case cover 37, Fig. 2, are all set in line with each other, as shown, the piston of the engine (not shown) will be on the top center, and firing, due to fuel having a free passage to the cylinder, will take place on the top center. Now if the adjustable disk 36 should be turned either way by means of the lever

39, Fig. 1, the port 42 will be advanced or retarded and fuel injection and therefore firing will take place before the crank 1, Fig. 5, reaches, or after it passes, the top center. The connecting port 43, Fig. 3, provides means to connect port 41, Fig. 4, and port 44, Fig. 2, thus providing means to advance and retard fuel injection, as desired, and which, if moved far enough, will reverse the engine in either direction.

This action is the same with center fuel supply or disk case supply, as the case may be.

Having thus described my invention, what I claim as new is,

1. In a device for supplying fuel to an internal combustion engine, a case enclosing a moving member provided with passageway, which is in contact with an adjustable member provided with passageway, which is also in contact with a stationary member provided with passageway, arranged to adjust the time of fuel injection from a source of supply.

2. In a device for supplying fuel to an internal combustion engine, a case enclosing a moving member provided with passageway, means provided to relieve said member from excessive friction, the said member being in contact with an adjustable member provided with passageway, which is also in contact with a stationary member provided with passageway, arranged to adjust the time of fuel injection from a source of supply; means provided to return an excess amount of fuel to the source of supply.

Signed at Brooklyn, in the county of Kings and State of New York this 28th day of February, A. D. 1918.

WILLARD JAY WOODCOCK.

Witnesses:
ALLAN J. NOAKS,
BEATRICE WOODCOCK.