Oct. 12, 1926.

1,603,173

E. A. WATTS

INTERNAL COMBUSTION ENGINE

Filed Dec. 6, 1924 2 Sheets-Sheet 1

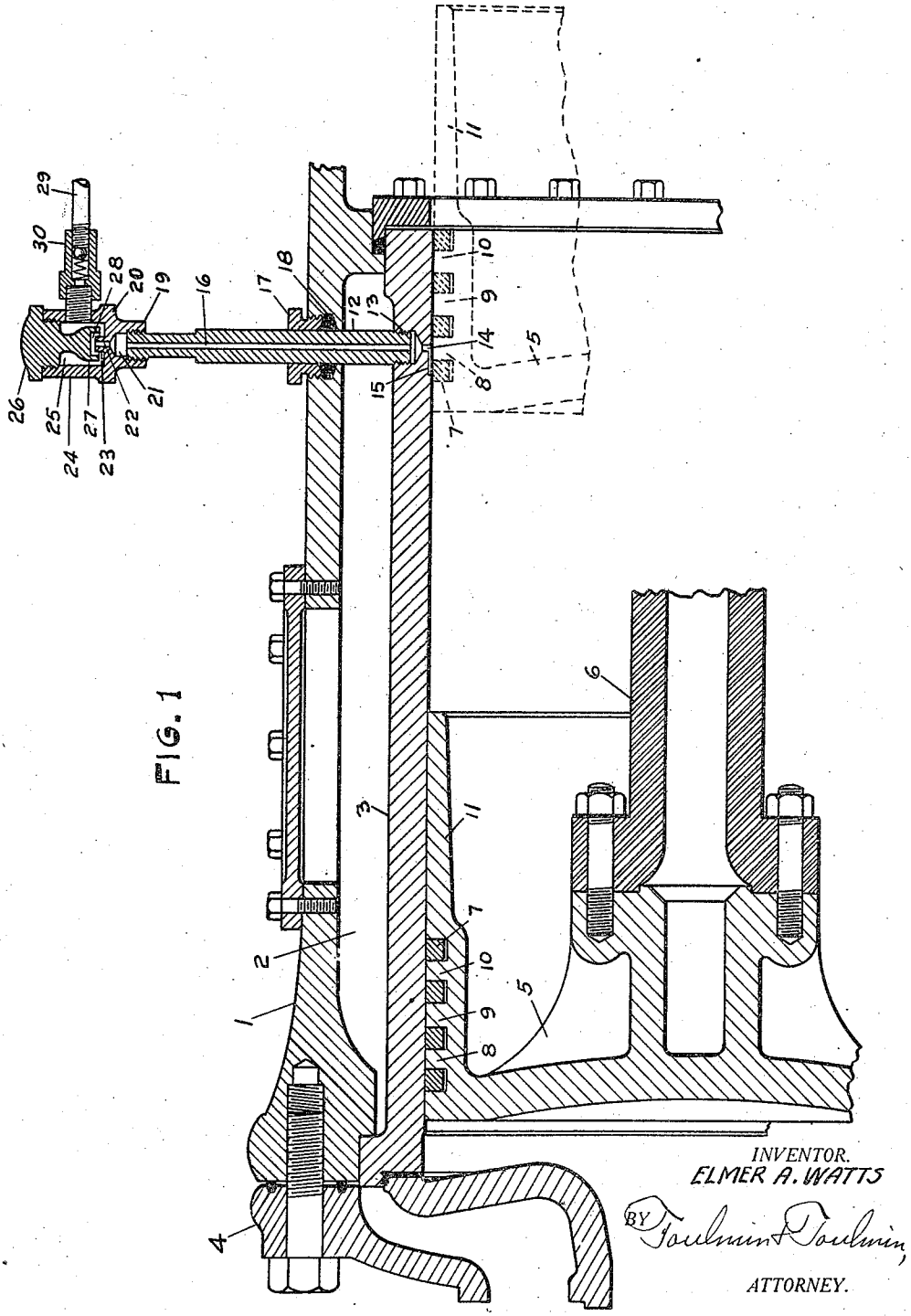


FIG. 1

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FIG. 3

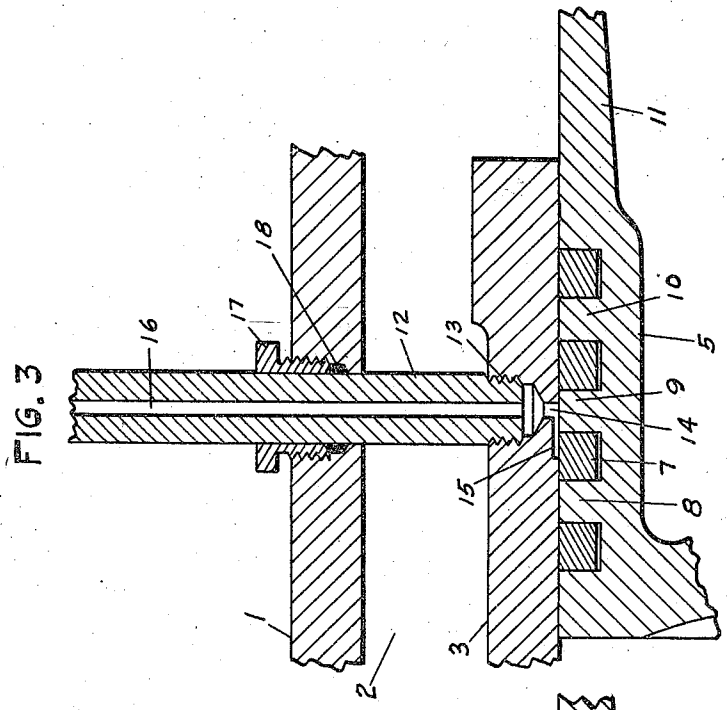
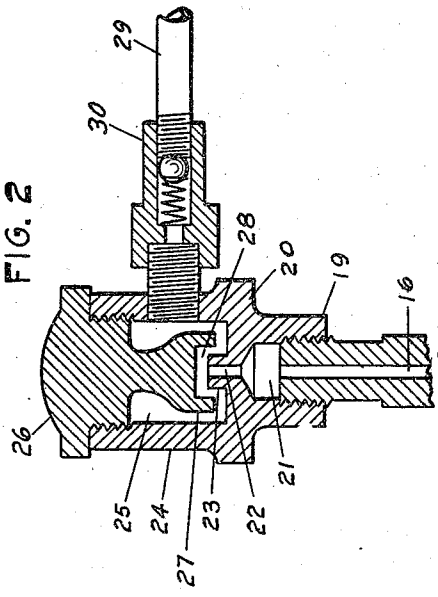
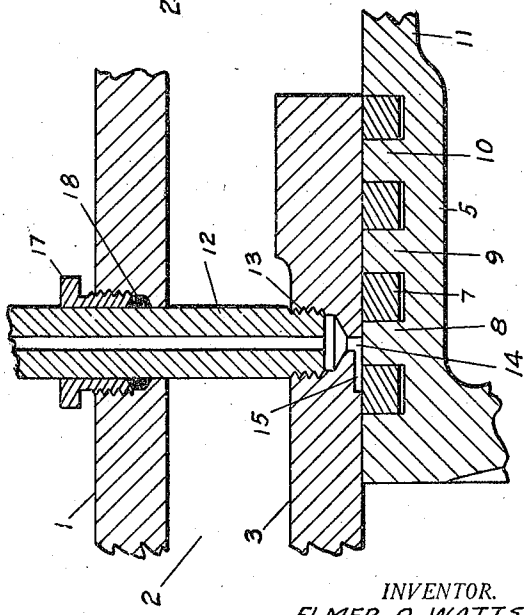


FIG. 2





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Patented Oct. 12, 1926. 1,603,173

UNITED STATES PATENT OFFICE.

ELMER A. WATTS, OF SPRINGFIELD, OHIO, ASSIGNOR TO THE MILLER IMPROVED GAS ENGINE COMPANY, OF SPRINGFIELD, OHIO, A CORPORATION OF OHIO.

INTERNAL-COMBUSTION ENGINE.

Application filed December 6, 1924. Serial No. 754,272.

My invention relates to internal combustion engines, and to a method and mechanism for lubricating the cylinder walls and pistons thereof.

It is the object of my invention to provide means of furnishing lubricant under pressure in an atomized condition adjacent the piston working in a cylinder.

To this end I provide means of utilizing the pressure in the cylinder for atomizing and subsequently ejecting the atomized lubricant.

It is a further object of my invention to progressively supply pressure to an oil chamber for assisting in atomizing the fuel and to eject it and to permit of its ejection at a predetermined point or within a predetermined range, depending upon the speed of the engine.

It is a further object of my invention to provide a lubricator which does not require packing of a complicated character, which is stationary, which has no moving parts, which is free from springs and other mechanisms of similar kind which are liable to wear out, and which is easily and simply manufactured and easily cleaned as well as easily applied to the internal combustion engine.

In detail, it is my purpose, in an internal combustion engine where the pressure decreases between the rings on the piston the further the spaces between the rings are removed from the head of the piston, to use these successive pressures between the rings for atomizing and ejecting oil from a chamber into which the pressure is admitted, the lubricant also being admitted in a small amount into said chamber so that when the pressure is relieved upon the return of the piston, the oil will be carried out on to the piston walls as the piston returns to its original position.

Referring to the drawings:

Figure 1 is a section through a cylinder of an internal combustion engine and through the lubricator.

Figure 2 is an enlarged view of the lubricator and a cylinder and piston with piston rings.

Figure 3 shows the piston at the beginning of the oil discharge position when the engine is turning.

Referring to the drawings in detail:

1 is the main casing of the engine forming the outer wall for the water circulation passageway 2, the inner wall of which is formed by the cylinder liner 3. A head 4 carries the valve mechanism and cylinder head of any desired construction. 5 is the piston, cooperating with the piston rod 6. This piston carries a plurality of spaced piston rings 7 between which are the spaces 8, 9 and 10. Back of the piston rings is the extended apron 11.

In the rear wall of the cylinder liner is threaded a tubular member 12 passing through the main cylinder wall 1 to the exterior of the engine.

The interior end of the tubular member 12 is threaded in the cylinder wall at 13. It communicates with a restricted passageway 14 in the inner wall of the cylinder liner 3. This restricted passageway is expanded into a shallow groove 15 running lengthwise of the cylinder.

A minute passageway 16 is formed within the cylindrical member 12. The cylindrical member 12 is carried in the outer wall 1 by a threaded sleeve 17 between which and the outer wall is a packing 18.

The outer end of the tubular member 12 has mounted thereon an interiorly threaded sleeve 19 on the upper end of which is formed a cup-shaped member 20 having a chamber 21 above the end of the cylindrical member 12 upon which the sleeve 19 is threaded. The base of this cup is provided with a minute aperture 22 projected through an upstanding collar 23. This collar projects into a second cup of larger diameter having the walls 24. The space within the cup is designated 25. This cup is closed by a threaded plug 26 which has a depending apron 27 extending over the collar 23 but spaced therefrom vertically and laterally to form a chamber 28.

The lubricant is supplied by a force feed pump through the pipe 29, past a ball check valve 30 into the chamber 25.

As it is well known that the pressure be-

tween the rings in the spaces 8, 9 and 10 decreases in the order named, it will be apparent that as the compressed gas around the portion 10 of the cylinder comes opposite to the groove 15 and aperture 14, a certain amount of compressed gas will pass through the passageway 16 and into the chamber 25. As each space is uncovered, such as 9 and 8, additional compressed gas will be delivered into this chamber.

A few drops of oil have meanwhile been forced into the chamber 28 prior to the admission of pressure accumulating at the bottom of the chamber 25 beneath the apron 27. The drops of oil accumulating beneath the apron or in the chamber are subjected to the pressure therein and become atomized when the pressure is suddenly released upon the return stroke of the piston which permits the pressure to escape and the oil to be carried with it in atomized condition to the walls of the piston.

Thus, when the piston reaches a point where the space 9 is about opposite the opening 14 and groove 15, the pressures will successively begin to decrease, permitting the pent-up higher pressure to escape from the cup 25 and passageway 16 along with the oil which is thus sprayed on the piston wall. The point at which this release begins to take place depends upon how light the engine is running; the lighter it is running, the earlier the discharge of the oil will take place in the stroke.

It will thus be seen that according to my method I build up successive pressures in the chamber having a few drops of oil and carry the oil out of the chamber when the pressure is released, atomizing the oil simultaneously due to the high pressure to which it is subjected.

Large engines of this character frequently have pressures of 250 lbs. or more to the square inch.

It will be understood that I desire to comprehend within my invention such modifications as may be necessary to adapt it to varying conditions and uses.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is:—

1. In an internal combustion engine, a cylinder, a piston having piston rings working therein so arranged that the pressure between the piston rings decreases from the front of the piston towards the rear, an exit passageway in the wall of the cylinder leading to a reservoir outside of the cylinder, said passageway being located near the rear end of the cylinder, a reservoir, means of introducing oil thereto and of receiving pressure from the cylinder between the piston rings, whereby as the spaces between the piston rings progressively pass by the orifice in the cylinder wall, gases are admitted under increasing pressure into said chamber, and upon the return of the piston, without completely uncovering the orifice in the cylinder wall before the return of the piston, the gases are progressively allowed to escape with oil which was carried therewith and atomized thereby.

2. In an internal combustion engine, a cylinder, a piston having piston rings working therein so arranged that the pressure between the piston rings decreases from the front of the piston towards the rear, an exit passageway in the wall of the cylinder leading to a reservoir outside of the cylinder, said passageway being located near the rear end of the cylinder, a reservoir, means of introducing oil thereto and of receiving pressure from the cylinder between the piston rings, whereby as the spaces between the piston rings progressively pass by the orifice in the cylinder wall, gases are admitted under increasing pressure into said chamber, and upon the return of the piston, without completely uncovering the orifice in the cylinder wall before the return of the piston, the gases are progressively allowed to escape with oil which was carried therewith and atomized thereby, and means in said reservoir over the orifice through which the gases enter to deflect said gases downwardly on the oil in the bottom of the reservoir.

3. In combination in an internal combustion engine, a lubricating system with an internal combustion engine cylinder, a cylinder, a piston having spaced rings, said cylinder having an orifice, a groove connected therewith near the rear end thereof, a tubular member leading from said orifice to the exterior of the cylinder, a reservoir mounted thereon, means of forcing lubricant into said reservoir, a check valve to prevent the escape of lubricant out of the reservoir through the feed line, whereby as pressure is admitted progressively into said reservoir and progressively allowed to exhaust, the oil will be atomized and carried out on to the piston and cylinder wall, and a collar mounted around the orifice through which the gases enter into the reservoir, and a depending apron in said reservoir over said collar, vertically and laterally spaced therefrom but relatively closely adjacent thereto.

4. In a lubricator, a tubular member having a relatively minute passageway therethrough communicating with a minute passageway and groove in a cylinder wall on the interior thereof, a cup-shaped member threaded on the outer end of said tubular member, an orifice in the bottom of said cup opening into a second cup, a second cup, a collar adjacent the orifice, said collar being located within the second cup, a threaded plug closing the open end of the second cup and having a depending apron

extending over and around said collar but spaced therefrom, an oil pipe leading into said second cup and a ball check valve in said oil line, whereby as a piston over the groove and orifice in the cylinder, pressure will be progressively admitted through said tubular member into said second cup, oil already having been forced therein in a predetermined quantity, and as said piston returns without having completely uncovered said orifice and groove in the cylinder, the pressure and oil will make their exit on to the cylinder wall and piston.

In testimony whereof I affix my signature.

ELMER A. WATTS.