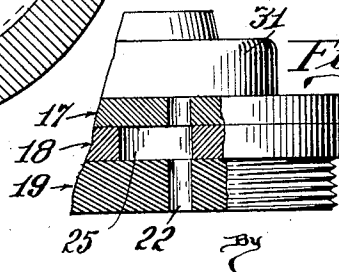
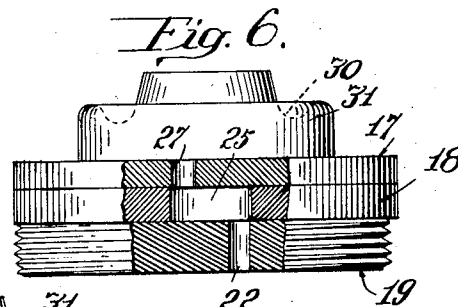
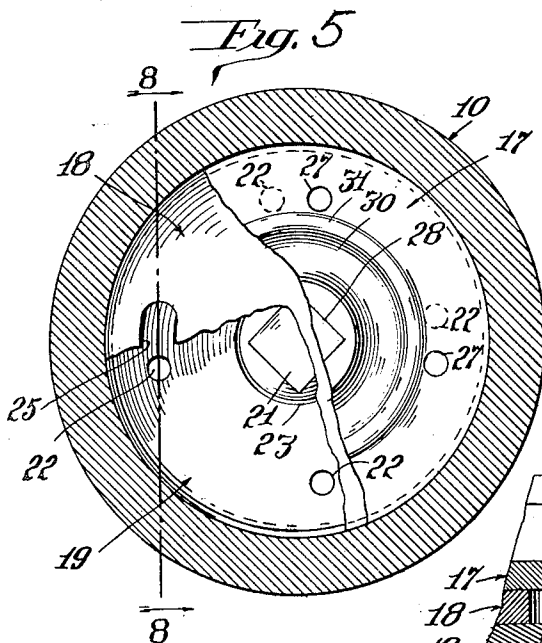
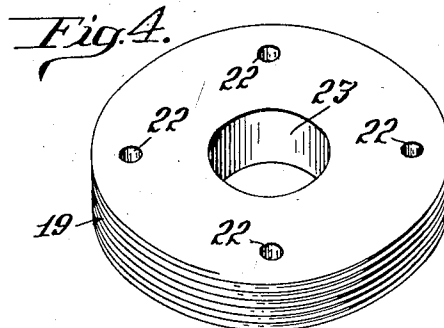
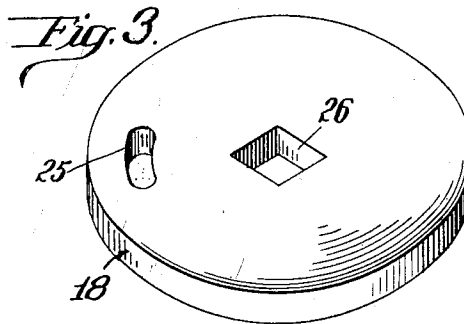
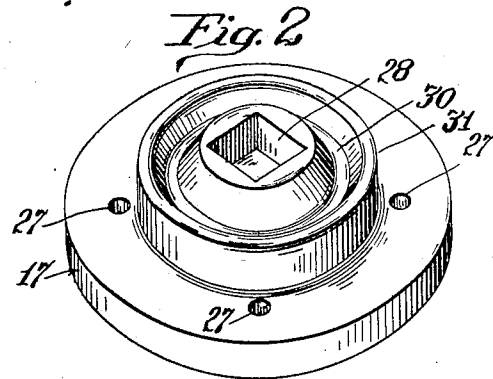
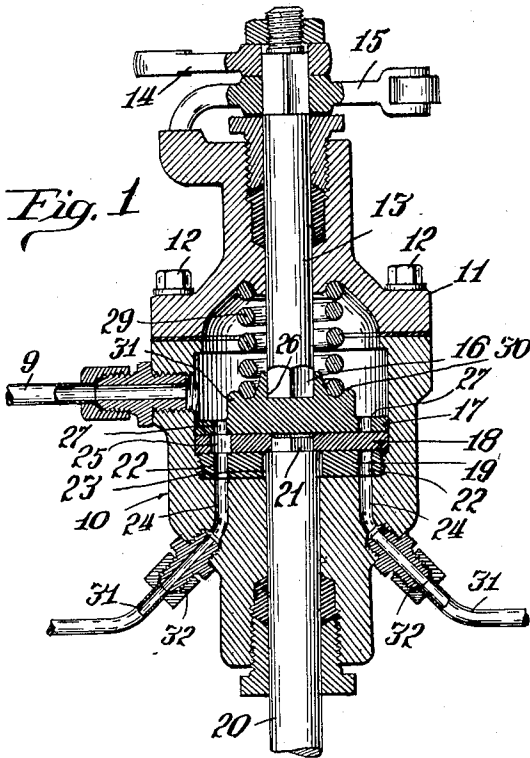


July 31, 1934.

H. HAMILTON
DISTRIBUTING VALVE
Filed Oct. 6, 1930

1,968,390

2 Sheets-Sheet 1



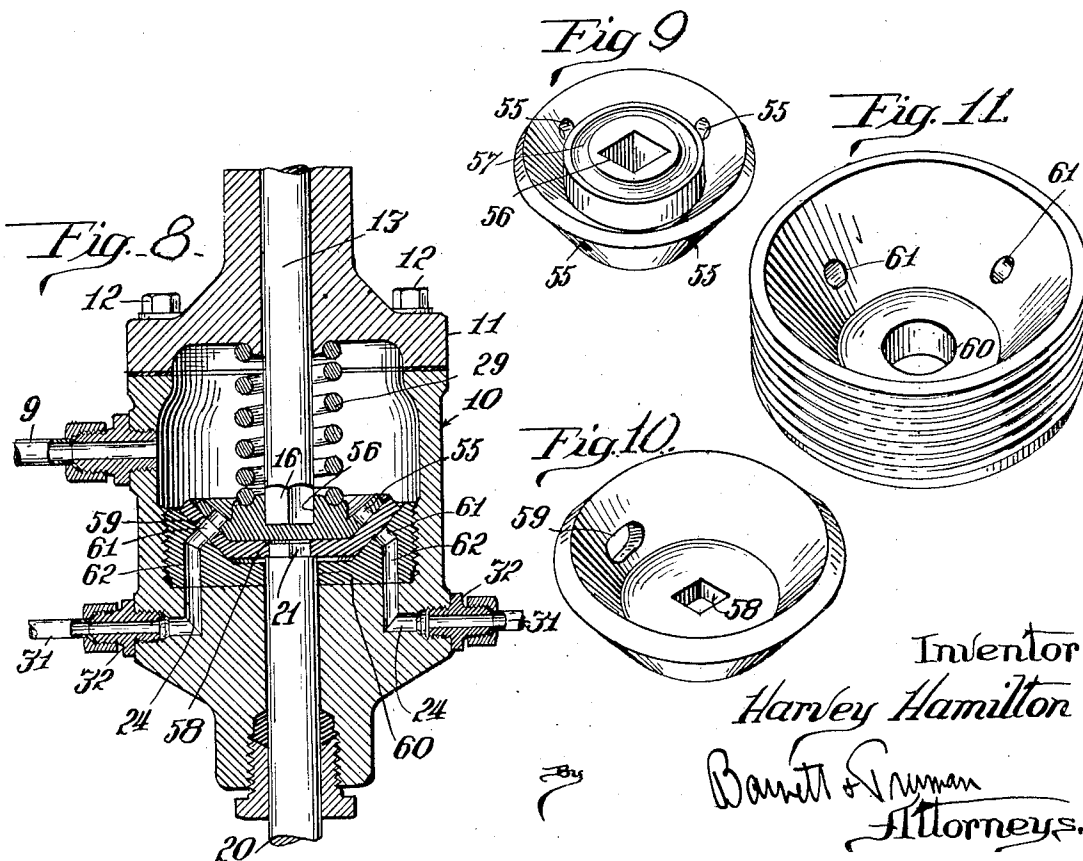
Inventor:
Harley Hamilton
By *Barnett & Truman*
Attorneys.

July 31, 1934.

H. HAMILTON
DISTRIBUTING VALVE
Filed Oct. 6, 1930

1,968,390

2 Sheets-Sheet 2



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Barnett & Snyman
Attorneys.

UNITED STATES PATENT OFFICE

1,968,390

DISTRIBUTING VALVE

Harvey Hamilton, Chicago, Ill.

Application October 6, 1930, Serial No. 486,728

7 Claims. (Cl. 277-69)

This invention relates to improvements in a distributing valve.

The principal object of the invention is to provide a distributing valve for feeding for example into each cylinder of an internal combustion engine a predetermined and variable amount of fuel to suit the requirements of the engine under all operating conditions.

The invention relates to mechanism for causing the fuel under pressure to be directed to each cylinder in equal amounts the air supply being taken in the cylinders in the usual manner, which amounts may be varied at the will of the operator by adjustment of the throttle lever. In this mechanism each cylinder is fed independently from the others directly from the fuel source. The advantage of such an apparatus is that equal distribution to each cylinder is obtained by positively injecting the desired and measured amount of fuel into each cylinder. Such equal and measured distribution of fuel results in minimum fuel consumption at all throttle positions and maximum power at full open throttle due to equal power impulses from each cylinder and consequently a smoother running, more flexible engine.

A further advantage is that it is unnecessary to heat either the air or the fuel to insure efficient distribution, as is the case in most conventional induction systems. There is no loss of power caused by decreasing the weight of the air charge supplied to the cylinders due to the heating of the air or mixture of fuel and air. Also it is unnecessary to restrict the air flow to secure sufficient velocity for atomization of fuel. Numerous other objects and advantages of this invention will be apparent from the following detailed description of mechanism embodying the principles of this invention.

In the accompanying drawings:

Fig. 1 is a vertical cross-section through the distributing valve.

Fig. 2 is a perspective of the metering plate.

Fig. 3 is a perspective of the distributing plate.

Fig. 4 is a perspective of the lower plate.

Fig. 5 is a plan view of the plates, Figs. 4, 5 and 6, assembled in operative position with parts broken away to show the relative position of each plate at closed throttle.

Fig. 6 is a cross-section along the line 8-8 of Fig. 5.

Fig. 7 is a cross-section similar to Fig. 6, but showing the plates in position for full or wide open throttle.

Fig. 8 is a cross-section of the distributing valve

of my invention showing an alternate form of plates.

Figs. 9, 10 and 11 show respectively perspective views of the metering, distributing and lower plates used in Fig. 8.

Referring now more particularly to the drawings wherein like and corresponding parts are designated by similar reference characters throughout, 9, is a pipe which leads to the distributing valve 10. The valve 10 has a cover 11 securely fastened to the lower part of the valve by bolts 12. Fig. 1 shows the interior construction of valve 10 in detail. A shaft 13 is rotatably mounted in the top 11, being operable by either the lever 14 or the arm 15. The lower end of the shaft 13 is squared, as at 16. The three plates shown in Figs. 2, 3 and 4 are positioned in the lower part of the valve 10, as indicated by 17, 18 and 19, respectively. A shaft 20 is operably connected with the crank shaft of the engine in any desired manner to rotate at the desired speed, one-half crank shaft speed in 4 cycle engines and crank shaft speed in 2 cycle engines. The shaft 20 is squared at its upper end 21. The plate 19 has four holes 22 arranged in a circular series at 90° from one another and a central circular opening 23 slightly larger than the diameter of the shaft 20, through which said shaft may rotate. The plate 19 is stationary and is fixed in position in the valve casing with the holes 22 in alignment with the outlet passages 24. The plate 18 is the same diameter as 19 and has a curved elongated slot 25, located the same distance from its edge as the holes 22 are from the edge of plate 19. A square opening 26 is located in its center of a size adapted to fit over the squared end 21 of the shaft 20. The metering plate 17 is of the same diameter as the stationary plate 19 and has four holes 27 of the same size and relative location as the holes 22 in plate 19. This plate also has a square opening 28 in its center, adapted to snugly fit the squared end 16 of the shaft 13. A spiral spring 29 is positioned around the shaft 13 and in compressed condition between the top 11 and the recess 30 in the raised portion 31 of the metering plate 17.

Feed lines 31 are joined to the outlets 24 by suitable threaded connections 32.

A modified form of distributing valve is shown in Figs. 8 to 11 inclusive:

Fig. 8 illustrates this modification of the main distributing valve shown in Fig. 1 and all similar parts are numbered as in Fig. 1. The modification consists in the use of the tapered plates Figs. 9, 10 and 11 in place of the plates, Figs. 2, 3 and

4, and the necessary changes in construction to accommodate such plates.

Fig. 8 is the metering plate corresponding to Fig. 2 and has four holes 55 located at equal distances from each other in the tapered portion of the plate. The square hole 56 located in the center fits over the squared end 16 of the shaft 13 and the recess 57 receives the lower end of the spiral spring 29. The distributing plate, Fig. 10, corresponds to the one shown in Fig. 3. It has a square hole 58 adapted to fit the square end 21 of the shaft 20 and a slot 59 in its tapered side. The plate is tapered on its inside so as to receive the plate, Fig. 9, snugly and in such a manner that the holes 55 are in alignment with the slot 59 as is the plate rotated by the shaft 20. Fig. 11 shows the plate which corresponds to Fig. 4. This plate is stationary and has an opening 60 through which the shaft 20 rotates freely. The inner part of the plate is tapered so as to receive the tapered plate, Fig. 10. Four holes 61 are located in the tapered portion so as to be in alignment with the slot 59 and the holes 55 when plates, Figs. 9 and 10, are rotated to the correct position. The lower and outer portion of plate shown in Fig. 11 is of cylindrical shape, not tapered, having outlet passages 62 connecting with the holes 61 which connect with the fuel lines 24.

The operation.—In operation the fuel is forced under pressure into the distributing valve 10 through the pipe 9. Being under pressure, the fuel seeks escape and fills the holes 27 of the plate 17. The shaft 20 which is rotating at one-half crank shaft speed causes the plate 18 to rotate at the same speed and as the slot 25 passes under one of the holes of the plate 17, it also passes over one of the holes 22 of the plate 19 thus allowing a definite amount of fuel to be forced through this hole into the outlet 24, and line 31. As the slot 25 of the plate 18 rotates, it passes in and out of alignment with the other holes 27 of plate 17 and 22 of plate 19. Each time this occurs the desired charge of fuel is forcibly injected into the cylinders to which the respective fuel lines lead.

The amount of fuel to be directed to each cylinder is controlled by the metering plate 17 which may be adjusted by either the lever 14 or the arm 15 so that its holes are in either direct alignment with the holes of stationary plate 19 or out of alignment to all or some portion of the extent of the length of the slot 25 of plate 18. Figs. 5 and 6 show the three plates adjusted to extreme out of alignment position. When in this position, the space of time during which a passage through the three plates is effected is much less than when plate 17 is adjusted so that its four holes are in alignment with the four holes of plate 19, as shown in Fig. 7. Consequently less fuel is forced through and into the cylinders and a leaner mixture is obtained.

Fig. 7 illustrates a cross-section similar to Fig. 6 but with the plate 17 adjusted with its holes in direct alignment with those of plate 19. In this position the amount of fuel forced into the cylinders is greatly increased as the duration of alignment of the two holes and the slot 25 is greater. Thus it can be clearly seen that the desired volume of fuel may be injected into the cylinders by adjusting the position of plate 17 by means of the lever 14.

The modification illustrated by Fig. 8 in which the tapered plates, Figs. 9, 10 and 11, are used in place of the flat type plates of Fig. 1, is advantageous and desirable because the plates are tapered so as to nest within each other and being

so fitted and being held in position by the spring 29 will maintain perfect alignment, thus insuring a smooth flow of fuel as the slot 59 of the distributing plate rotates past the respective orifices of the metering and stationary plates.

The structure illustrated by all drawings is for use with four cycle four cylinder engines, it being clear that the only changes necessary for engines of more cylinders are a corresponding increase of evenly spaced holes in the metering and stationary plates and fuel lines leading to each cylinder of the engine from the outlet passages into which the distributing valve delivers the fuel.

I claim:

1. A distributing valve, comprising a casing provided with outlet openings positioned at spaced intervals, a rotatable plate with a slot positioned above said outlet openings and adapted to pass over said openings when rotated, a metering plate positioned above and adjacent said first mentioned plate and having a plurality of openings corresponding to the outlet openings and in alignment with said outlets, a rotatable drive shaft operably connected to said rotatable plate, and means for rotating said metering plate out of alignment with the outlet openings in the valve.

2. A distributing valve comprising a casing having outlets, a rotatable plate positioned adjacent said outlets and having a slot adapted to pass said outlets when said plate is rotated, a plate positioned adjacent said rotatable plate having a plurality of openings corresponding to said outlets and in alignment therewith, means for rotatably adjusting said plate into and out of alignment with said outlets, and means for rotating said rotatable plate.

3. A distributing valve adapted to receive fuel under pressure, comprising a casing provided with outlets, a circular plate located above and adjacent said outlets having openings in alignment with said outlets, a rotatable circular plate having a curved slot located above and adjacent said first plate, a third plate above and adjacent said rotatable plate having openings corresponding to those of the first plate and in alignment therewith, means to hold said superposed plates in contact with one another, means to rotate said rotatable plate and means to rotate said third plate out of alignment with the openings of the first plate.

4. A distributing valve, a plurality of outlets leading from said valve said valve being provided with means for individually and successively opening and closing said outlets comprising a rotatable distributing plate and a metering plate angularly adjustable with relation to said outlets to determine the duration of opening of each outlet said distributing plate being positioned between said metering plate and said outlets.

5. A distributing valve, a plurality of outlets leading from said valve, said outlets arranged circumferentially at equally spaced intervals, said valve comprising a circular stationary tapered plate positioned immediately above said outlets and having openings corresponding to and in alignment with said outlets, a rotatable tapered plate positioned above and within said stationary plate and having a slot adapted to pass over said openings when the plate is rotated, a tapered metering plate positioned above and within said rotatable plate having openings corresponding to those of the circular plate and in alignment therewith and means for rotatably

adjusting said metering plate into and out of alignment with the openings of said stationary plate.

6. A distributing valve comprising a rotatable plate having a curved slot, a plate positioned adjacent one side of said rotatable plate having a plurality of openings circumferentially arranged and means for rotatably adjusting said plate and a plurality of outlets leading from said valve adjacent the other side of said rotatable plate corresponding and in alignment with said openings in said plate.

7. A distributing valve comprising a plate with a plurality of openings arranged circumferentially, a metering plate with a plurality of openings corresponding to and in alignment with the openings in said first plate, a rotatable plate positioned between said plates and having a slot positioned so as to pass the said openings when said plate is rotated, means for rotatably adjusting said metering plate and means for rotating said rotatable plate.

HARVEY HAMILTON.

15	90
20	95
25	100
30	105
35	110
40	115
45	120
50	125
55	130
60	135
65	140
70	145
75	150