

PATENT SPECIFICATION



Application Date: Aug. 9, 1921. No. 21,129/21.

187,068

Complete Left: Apr. 24, 1922.

Complete Accepted: Oct. 19, 1922.

PROVISIONAL SPECIFICATION.

An Inlet and Exhaust Valve of the Rotary Type for Internal Combustion Engines.

We, RICHARD JAMES SIMPSON, of 20, Cornwall Terrace Mews, Alsop Place, Upper Baker Street, London, N.W. 1, and CHARLES SIDNEY ERNEST LACEY, of 57, Eccleston Square Mews, London, S.W. 1, both Engineers and British subjects, do hereby declare the nature of this invention to be as follows:—

In the Specification relating to our invention in respect of which His Majesty's Letters Patent for the United Kingdom granted to us under No. 153,360 and dated July 29, 1919, there is described a valve for internal combustion engines whereby the inlet of fuel and the exhaust gases are regulated and controlled and our present invention relates to a modification of the valve referred to which modification will simplify the construction of our valve and cheapen the cost of production. According to our previous specification two separately rotating sleeves the one arranged within the other in one instance and in the other instance one sleeve regulating the inlet of fuel and another sleeve regulating the exhaust outlet each sleeve rotating in its own casing are employed: whilst according to the present invention we employ one rotating sleeve only in the casing.

The valve in the present instance which is also formed tubular consists of a tubular casing (which as in our previous specification is arranged parallel with the crank shaft of the engine at the upper part of cylinder or cylinders) a sleeve—also formed tubular—rotating within the said casing, and a tube (hereinafter referred to as the valve tube) arranged longitudinally in and rotating with the sleeve. Preferably the casing forms the cylinder head and may be formed detachable and the cylinder or cylinders—as in our previous specification—is or are preferably water jacketed and provided

with means of access thereto as set out in such previous specification. Preferably the valve sleeve and tube are longitudinally formed in two or more portions (according to the number of cylinders in the engine) having a tubular part between the adjacent ends of each portion of the valve tube. The said tubular part or parts of the valve tube are of appreciable smaller cross sectional dimensions relatively to the valve sleeve and the tubular parts between the respective portions of the sleeve and valve tube are detachably held together in such way that they may rotate as one by any suitable means but preferably by means of dogs and slots suitably carried by the parts of the sleeve and valve tube, the tubular parts being of lesser dimensions than the casing provides for a circumferential dip or recess or dips or recesses in the sleeve. The valve tube portions have arranged thereon and suitably spaced apart a series of concentric flanges the outer circumference of which flanges fitting the sleeve gas tightly. There are thus provided clear recesses or compartments between the valve tube and the sleeve thus providing passage ways for the combustible mixture to the cylinders and the exhaust gases to the exhaust outlet or manifold. The valve tube, the sleeve and the casing are provided with suitably arranged ports for the exhaust and also ports for the outflow of fuel from the valve tube to the cylinders—the tubular parts between the portions of the valve tube and sleeve being provided with ports for the inflow of combustible mixture into the valve tube. The extreme (two) ends of the valve tube and sleeve are hermetically closed by means of plates. The sleeve carries at one end thereof a part provided with a sprocket wheel or other means whereby the sleeve and valve tube may be caused to rotate

through suitable gearing to the engine—such means may consist of a disc carrying a short shaft the end of which shaft projecting through the bearing supporting the shaft the disc and the sleeve being preferably held to each other by means of dogs.

As in our previous case, we prefer to provide the sleeve with piston rings.

Dated the 9th day of August, 1921.

H. C. FOWLER,

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329, High Holborn, London, W.C. 1,
Agent for Applicants.

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COMPLETE SPECIFICATION.

An Inlet and Exhaust Valve of the Rotary Type for Internal Combustion Engines.

15 We, RICHARD JAMES SIMPSON, late of 20, Cornwall Terrace Mews, Alsop Place, Upper Baker Street, London, N.W. 1, but now of 29, Wolseley Gardens, London, W. 4, and CHARLES SIDNEY
20 ERNEST LACEY, late of 57, Eccleston Square Mews, London, S.W. 11, but now of 2, Langley Mansions, Langley Lane, South Lambeth Road, London, S.W. 8, both Engineers and British subjects, do
25 hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

30 In the Specification relating to our invention in respect of which His Majesty's Letters Patent for the United Kingdom was granted to us under No. 153,360 and dated 29 July, 1919, there is described a valve for internal combustion engines whereby the inlet of fuel and the outlet of the exhaust gases are regulated and controlled and our present
35 invention relates to a modification of the valve referred to, which modification will simplify the construction of our valve and cheapen the cost of production. According to our previous specification two separately rotating sleeves—the one
40 arranged within the other in one instance and in the other instance one sleeve regulating the inlet of fuel and another sleeve regulating the exhaust outlet each sleeve rotating in its own casing are
50 employed.

According to the present invention we form the valve from a rotating sleeve in which is rigidly secured a valve tube having a series of flanges which divide the
55 space between the valve tube and sleeve into compartments, the sleeve being closed at one end by a plate, certain compartments have two openings or ports in the sleeve whereby the cylinder or
60 cylinders can be opened to exhaust, and the other compartments have openings or ports in the sleeve and openings to the interior of the valve tube so that the cylinder or cylinders can be opened to the

fuel supply which is in connection with the interior of the valve tube. 65

We prefer where more than two cylinders are employed to form the sleeve and valve tube in portions with a tubular piece removably connected between each portion and of less diameter than the sleeve, such tubular piece being provided with openings or ports leading from outside to the interior of the valve tube as will be hereinafter more fully described. 70 75

Our invention will be clearly understood from the following description aided by the annexed drawings in which

Figure 1 is a side elevation partly in section of an engine showing our improved valve applied. 80

Figure 2 is a sectional elevation of part of the casing and valve.

Figure 3 a section on the lines *a a* of Figure 2. 85

Figure 4 a sectional elevation of the valve, the tube on the left hand being in elevation and on the right hand in section.

Figure 5 is a section of part of the sleeve showing the ports. 90

Figure 6 is an end view of same.

Figure 7 is a section of one of the tubes and Figure 8 an end view of same.

In the cylinder head is formed the usual tubular casing A (which as in our previous specification is arranged parallel with the crank shaft of the engine at the upper part of the cylinder or cylinders B, B) a sleeve C also formed tubular—
100 rotating within the said casing A.

Preferably the casing A forms the cylinder head and may be formed detachable and the cylinder or cylinders B—as in our previous specification—is or are preferably water jacketed and provided with means of access thereto as set out in such previous specification. Preferably the valve sleeve C and tube D are longitudinally formed in two or more portions (according to the number of cylinders in the engine). 105 110

According to this invention the sleeve C or each portion of the valve sleeve C has

a valve tube D which is formed with a series of flanges H suitably spaced apart and of such diameter that when forced into the sleeve C the flanges will rigidly and gas tightly hold with a press-fit and for all practical purposes the sleeve C and valve tube D become one article with recesses or compartments between the sleeve C and valve tube D.

The adjacent ends of each portion of the sleeve C are detachably held together by a tubular part E in such way that they may rotate as one by any suitable means but preferably by means of dogs F on the tubular part E engaging in slots G in the end walls of the valve sleeve C. The tubular part E is of lesser diameter than the valve sleeve C so providing a circumferential dip or dips or recess or recesses between the portions of the sleeve C.

Ports or openings D¹ are formed in the tube D and ports or openings K are formed in the sleeve C between certain of the flanges H thus providing passage ways for the combustible mixture to the cylinders. The sleeve C is also provided with suitably arranged ports J between the other flanges H for the exhaust, the tubular parts E between the portions of the sleeve C being provided with ports L for the inflow of combustible mixture into the valve tube D. The extreme (two) ends of the valve tube D and sleeve C are hermetically closed by means of plates M. The sleeve C carries at one end thereof a part provided with a sprocket wheel N or other means whereby the sleeve C and with it the valve tube D may be caused to rotate through suitable gearing to the engine—such means may consist of a disc O carrying a short shaft P the end of which shaft P projects through a bearing Q formed on a plate affixed to the casing A and supporting the shaft P, the disc O and the sleeve C being held to each other preferably by means of dogs R as will be well understood.

As in our previous case, we prefer to provide the sleeve C with piston rings S also laminated vanes or scrapers S¹ held in recesses in the casing as in our previous patent.

The combustible mixture or fuel enters the casing in the portion or portions having the tubular part or parts E and passes through the ports or openings L into the tube or tubes D out through the ports or openings D¹ into the particular compartments or recesses and where a port K coincides with a cylinder B passes through same into the cylinder for compression and firing, and when a port J

coincides with a cylinder B the exhaust passes through same around the tube D and out the other port J into the exhaust outlet or manifold, there being no communication between the compartments or recesses for the exhaust and the interior of the tube D.

It will be understood that the ports J, K and gearing are so arranged that a proper cycle occurs in each cylinder.

Having now particularly described and ascertained the nature of our said invention, and in what manner the same is to be performed, we declare that what we claim is:—

1. In an internal combustion engine having a tubular casing located in the cylinder head with ports or openings leading to the cylinder or cylinders and a rotatable valve positioned in such tubular casing for controlling the inlet of combustible material and the outlet of exhaust gases therefrom, constructing the rotatable valve from a sleeve, a valve tube having a series of flanges rigidly secured in said sleeve and dividing the space between the valve tube and sleeve into compartments, openings or ports in the sleeve leading to certain compartments for opening such compartments and cylinders to exhaust, openings or ports in the sleeve and valve tube in each other compartment for connecting the cylinders to the interior of the valve tube, a connection between the fuel inlet and the interior of the valve tube at one end, and a plate closing the sleeve at the other end, substantially as and for the purpose set forth.

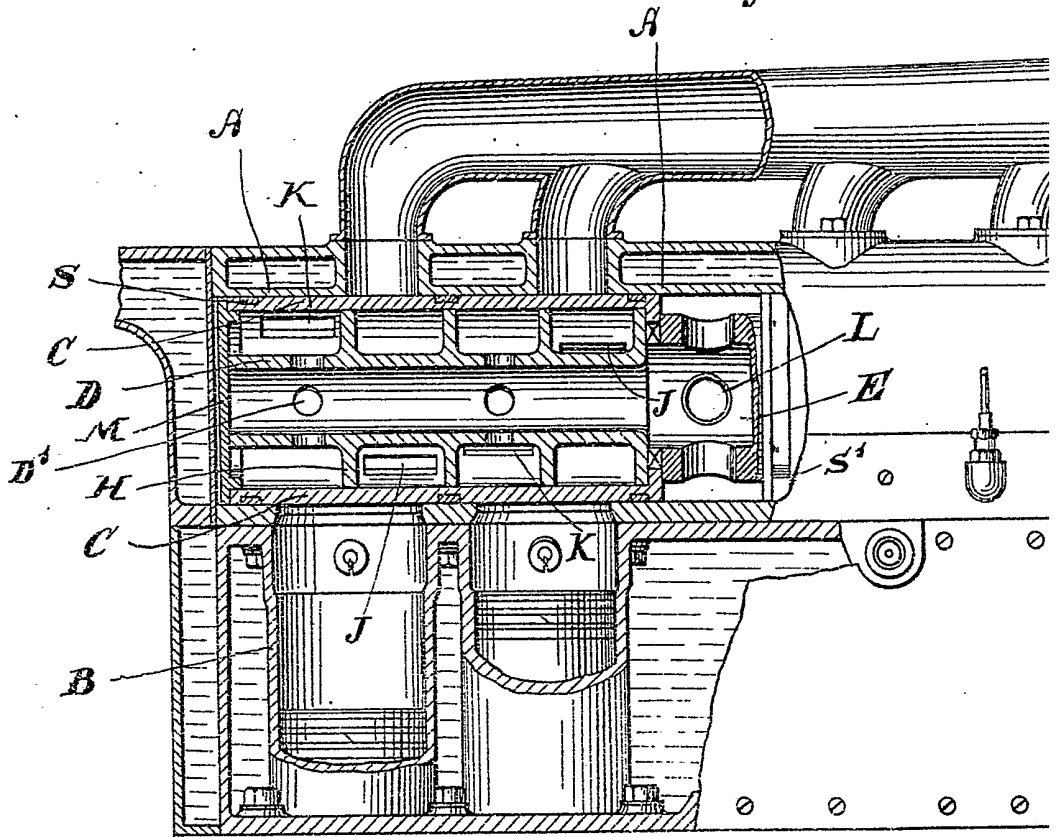
2. In a valve as claimed in Claim One for use with multiple cylindered engines forming the rotatable valve in portion and providing a tubular piece of less diameter than the sleeve with means for removably connecting the portions together, such tubular piece being formed with openings or ports for connecting the interior of the valve tube to the fuel inlet, substantially as and for the purpose set forth.

3. The valve for controlling the inlet of combustible material to the cylinder or cylinders of internal combustion engines and the outlet of the exhaust gases therefrom constructed substantially as described with reference to the annexed drawings.

Dated this 24th day of April, 1922.

H. GARDNER & SON,
Chartered Patent Agents,
173—4—5, Fleet Street, London, E.C. 4,
Agents for the said Applicants.

Fig. 1.



[This Drawing is a reproduction of the Original on a reduced scale.]

Fig. 1.

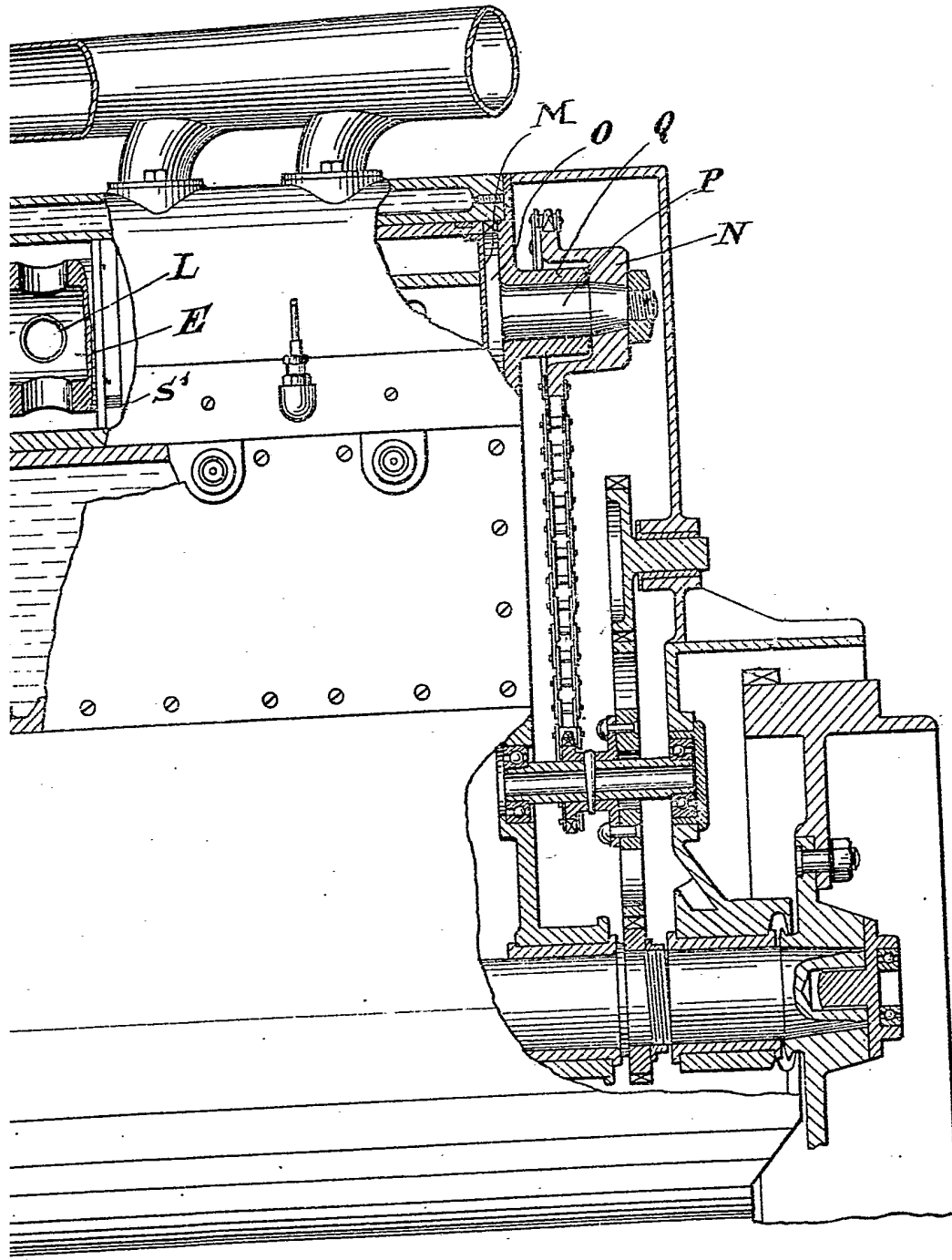
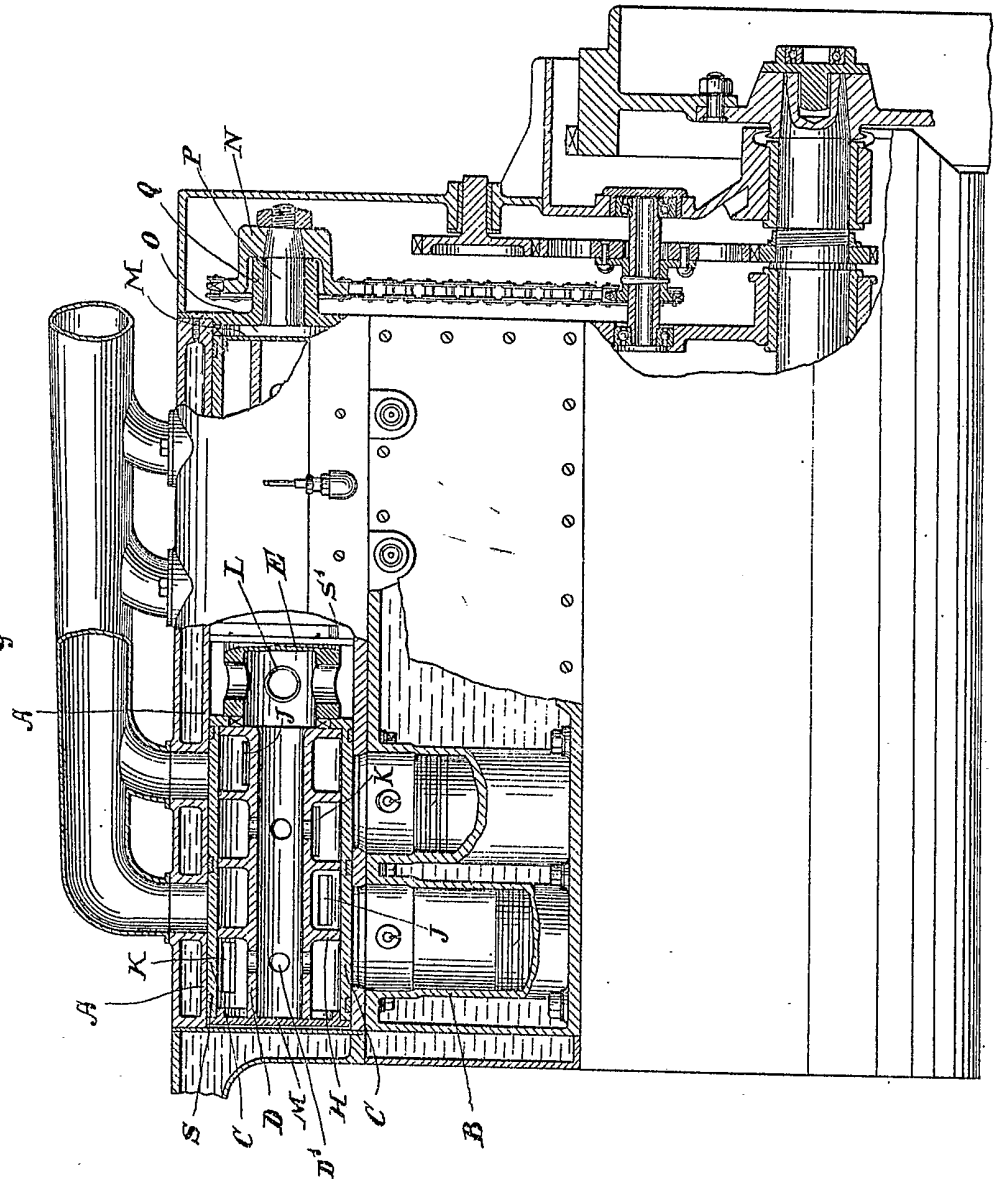


Fig. 1.



[This Drawing is a reproduction of the Original on a reduced scale.]

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Fig. 2.

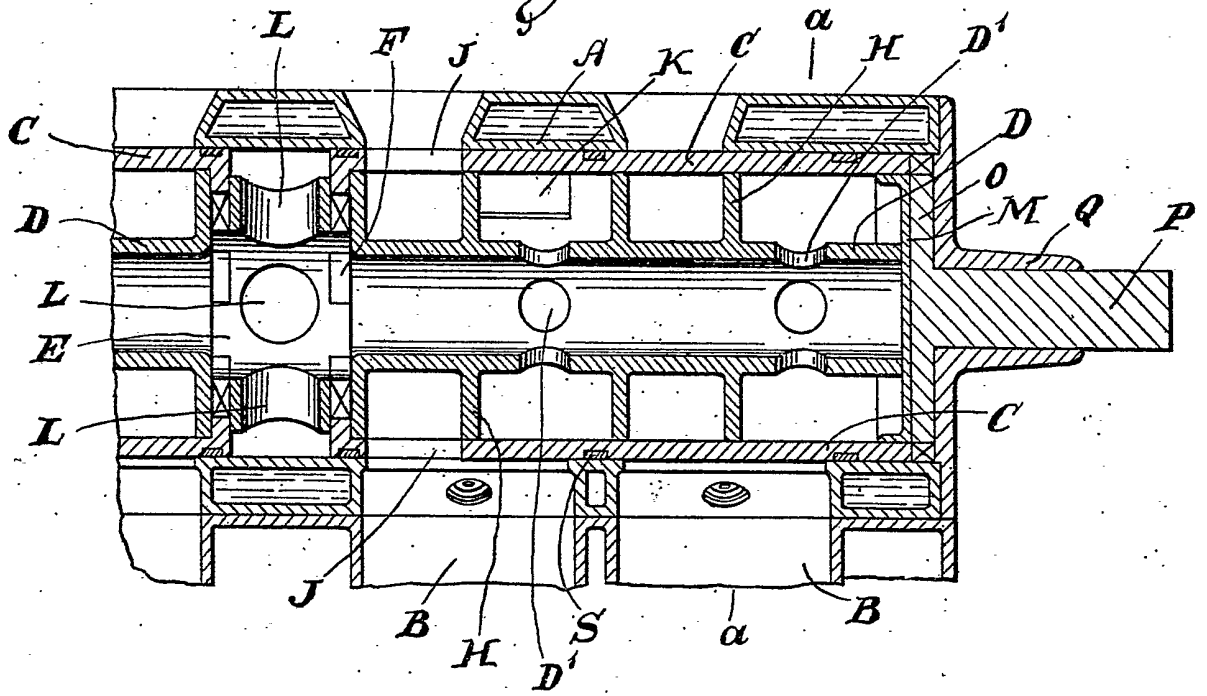


Fig. 4.

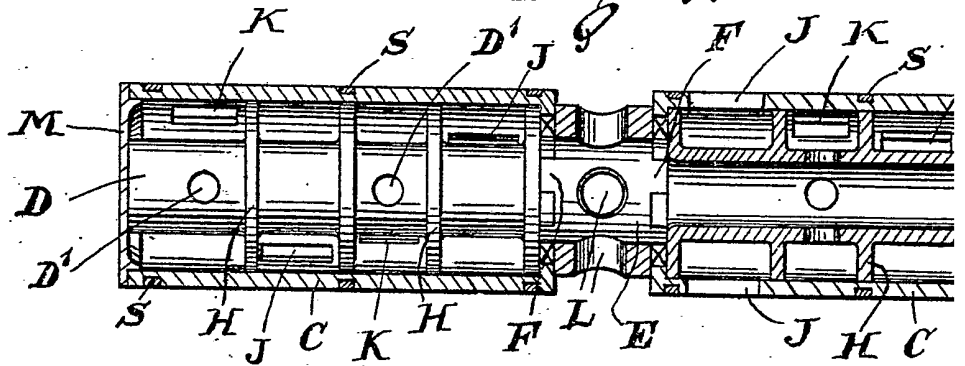


Fig. 5.

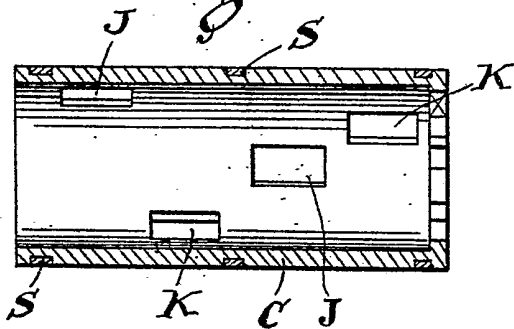


Fig. 6.

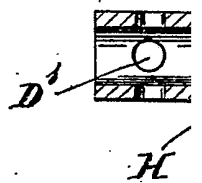
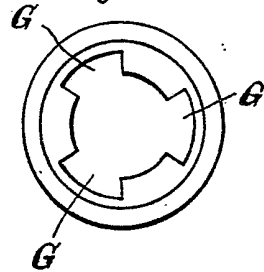


Fig. 3.

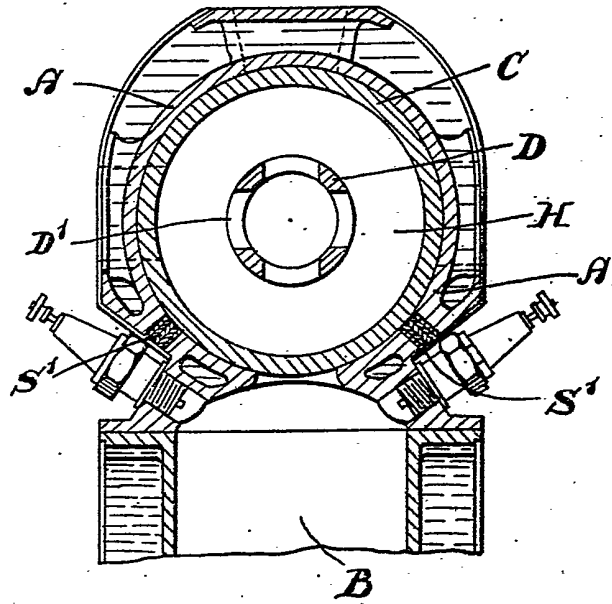
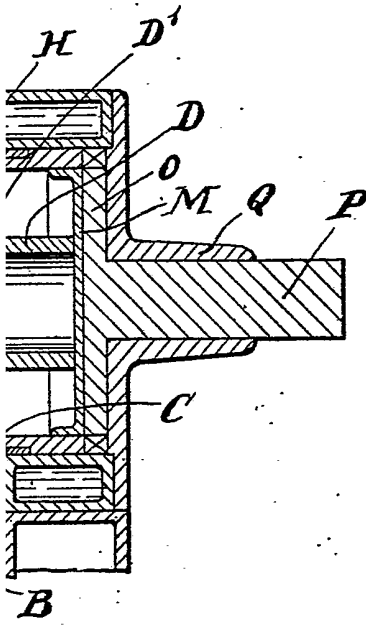


Fig. 4.

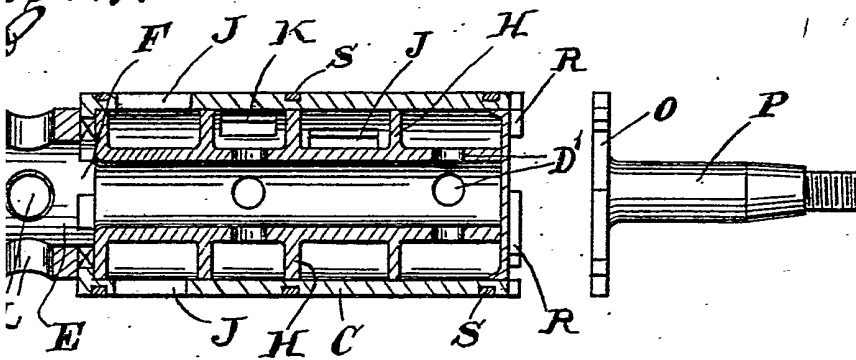


Fig. 7.

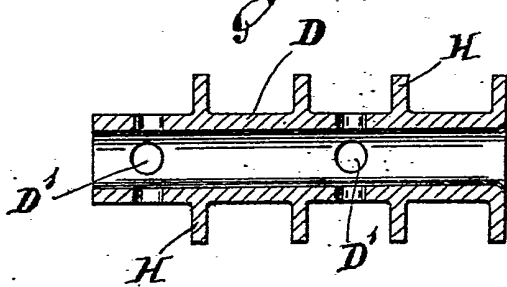


Fig. 8.

