

J. E. SEARS.
VALVE OF INTERNAL COMBUSTION ENGINES.
APPLICATION FILED JAN. 11, 1910.

1,010,189.

Patented Nov. 28, 1911.
2 SHEETS—SHEET 1.

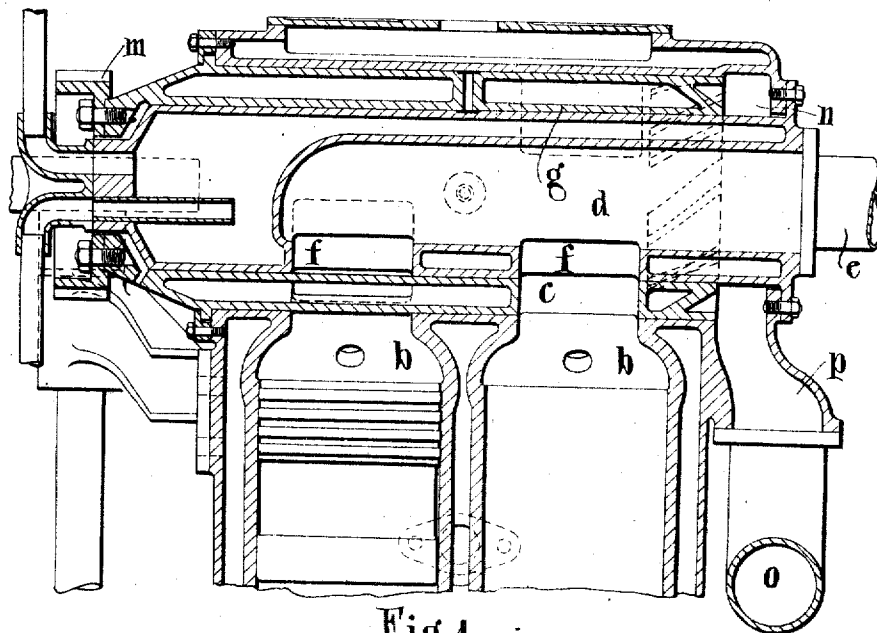


Fig. 1.

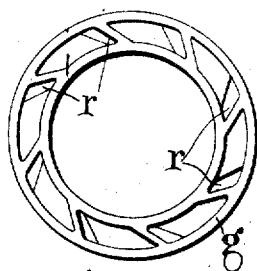


Fig. 4.

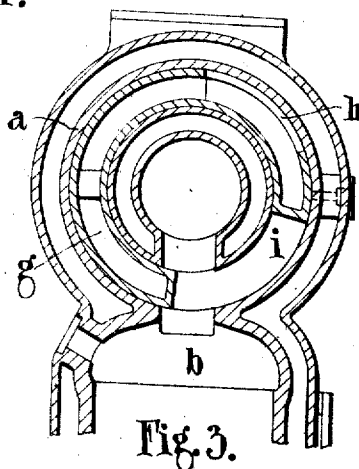


Fig. 3.

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2 SHEETS-SHEET 2.

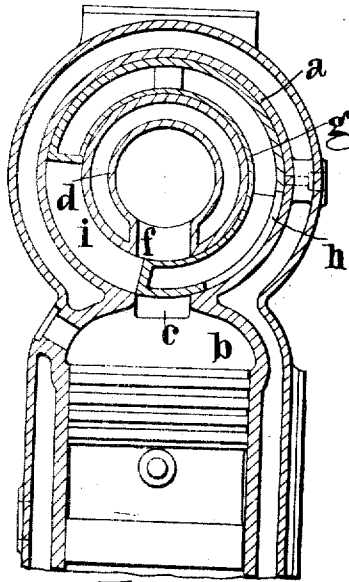


Fig. 2.

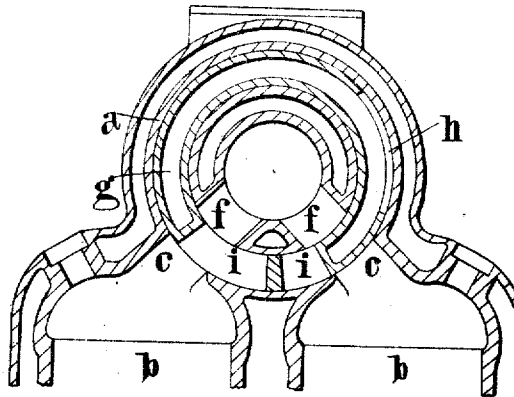


Fig. 3.

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UNITED STATES PATENT OFFICE.

JOHN E. SEARS, OF HENDON, ENGLAND.

VALVE OF INTERNAL-COMBUSTION ENGINES.

1,010,189.

Specification of Letters Patent.

Patented Nov. 28, 1911.

Application filed January 11, 1910 Serial No. 537,529.

To all whom it may concern:

Be it known that I, JOHN EDWARD SEARS, a subject of the King of Great Britain and Ireland, and residing at Rydal Mount, Holder's Hill, Hendon, in the county of Middlesex, England, have invented certain new and useful Improvements in the Valves of Internal-Combustion Engines, of which the following is a specification.

10 This invention relates to valves of the rotary cylindrical type for internal combustion engines and has for its objects to simplify the construction of such valves and particularly to avoid distortions of the valve due to unequal expansion caused by the difference in the temperature of the gases passing through the same.

15 In the accompanying drawings, which show, by way of example, two modes in which my invention may be carried out, Figure 1 is a fragmentary view in longitudinal section. Figs. 2 and 3 are cross sections taken on the lines *x-x* and *c-c* of Fig. 1, showing the application of my invention to a two-cylinder engine in which the cranks are set at an angle of 180°. Fig. 4 is an end view of the tubular valve showing a modification in construction. Fig. 5 is a sectional view showing the annular valve arranged transversely to the line of the working cylinders and controlling the ports of two cylinders of a multi-cylinder engine.

20 In carrying out my invention according to one mode, as illustrated in Figs. 1 to 3, an outer valve cylinder *a* for containing the rotary valve is arranged longitudinally above the heads of the working cylinders *b b* of the engine being connected with the combustion chambers of said cylinders by suitably arranged and proportioned ports *c c*. Arranged concentrically within the outer valve cylinder *a* is a second valve cylinder *d*, which is secured to or forms an extension of the exhaust pipe *e* and which is provided with ports *f f* corresponding with the ports *c c* connecting the outer valve cylinder *a* with the working cylinders *b b*. A tube *g* of annular form fits on the annular space between the two valve cylinders *a* and *d*, and its outer wall is provided with ports *h* so shaped and arranged that they operate to put said valve into communication with the cylinders *b b* through the ports *c c*. Passing through the annular valve *g* are the ports *i i*, so shaped and arranged that they operate to put the working cylinders *b b* into communication with the inner valve cylinder *d* through the ports *c* and *f*. The one end of the annular valve *g* projects through one end of the outer valve cylinder *a* and carries a skew gear wheel *m* through which motion is imparted to it from the crank shaft, the speed of the annular valve being preferably half that of the crank shaft. The other end of the annular valve terminates within the outer valve cylinder *a* so as to form a chamber *n* which is in communication with the inlet pipe *o* by means of a suitable port or passage *p*. Either the outer valve cylinder *a* or the inner valve cylinder *d* or both as shown in the drawings, may be water-jacketed, and although I have described the inner valve cylinder as being used as the exhaust tube and the annular valve as being connected to the inlet pipe, the disposition and functions of these two parts may be reversed. To facilitate the flow of the charge through the inlet pipe *p* and annular valve *g*, vanes or blades *q* may be formed at the open end of the annular valve *g* so as to produce a fan-like action. In an alternative form of construction I may make the annular valve with both ends closed, in which case a port or ports will be provided in the wall of said annular valve to serve as a means of communication with the supply and exhaust. Fig. 5 illustrates a valve arranged transversely to the line of the working cylinders so that one valve controls the ports of two working cylinders. My invention is equally applicable to single cylinder engines as well as to engines having a plurality of working cylinders, and it will also be obvious that the annular valve may be driven at any desired speed in relation to the speed of the crank-shaft, by a proper disposition of the inlet and exhaust ports. Having now described my invention what I claim as new and desire to secure by Letters Patent is:—

1. Valve mechanism for admission and exhaust of an internal combustion engine comprising in combination two fixed concentric valve cylinders and a hollow annular valve working in the annular space between said cylinders.

2. Valve mechanism for admission and exhaust of an internal combustion engine comprising in combination two fixed concentric valve cylinders and a hollow annular valve working in the annular space between said cylinders.

3. Valve mechanism for admission and exhaust of an internal combustion engine comprising in combination two fixed concentric valve cylinders and a hollow annular valve working in the annular space between said cylinders.

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8. Valve mechanism for admission and exhaust of an internal combustion engine comprising in combination two fixed concentric valve cylinders and a hollow annular valve working in the annular space between said cylinders.

9. Valve mechanism for admission and exhaust of an internal combustion engine comprising in combination two fixed concentric valve cylinders and a hollow annular valve working in the annular space between said cylinders.

valve cylinders, and a hollow annular valve rotating in the annular space between said cylinders, and means for rotating said annular valve.

5 3. Valve mechanism for admission and exhaust of an internal combustion engine comprising in combination an outer fixed valve cylinder provided with ports communicating with the working cylinders of the engine,
10 an inner fixed concentric valve cylinder having ports corresponding with the ports in the outer valve cylinder, a hollow annular valve open at one end and closed at the other end and rotating in the annular space between
15 the valve cylinders, and means for rotating said valve.

4. Valve mechanism for admission and exhaust of an internal combustion engine comprising in combination two fixed concentric
20 valve cylinders, a hollow annular valve rotating in the annular space between the said valve cylinders, said annular valve being open at one end and closed at the other, vanes inside the open end of said annular
25 valve, and means for rotating said valve.

5. Valve mechanism for admission and exhaust of an internal combustion engine comprising in combination an outer valve cylinder provided with ports communicating with

the working cylinders of the engine, a water 30 jacket for said valve cylinder, a fixed inner valve cylinder concentric with said outer valve cylinder, a water jacket for said inner valve cylinder, a hollow annular valve rotating in the annular space between said valve 35 cylinders and means for rotating said valve.

6. Valve mechanism for admission and exhaust of an internal combustion engine comprising in combination an outer valve cylinder having ports communicating with the 40 working cylinders of the engine, a water jacket for said valve cylinder, an inner valve cylinder fixed concentrically within the outer valve cylinder and having ports corresponding with the ports in the outer valve cylinder, a water jacket for said inner valve cylinder, a hollow annular valve open at one 45 end and closed at the other and rotating in the annular space between said valve cylinders, vanes inside the open end of said annular valve, and means for rotating said valve. 50

In testimony whereof I affix my signature in the presence of two witnesses.

JOHN E. SEARS.

Witnesses:

W. W. TRIGGS,
BERTRAM M. MATTHEWS.