

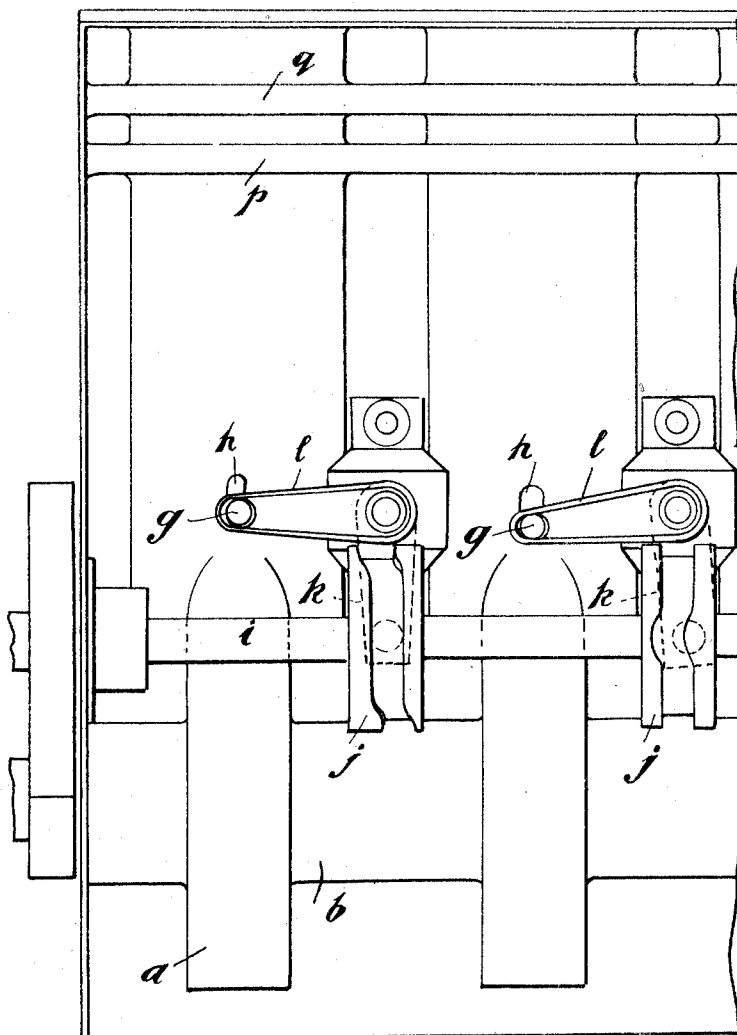
A. W. WALL.
VALVE MECHANISM OF INTERNAL COMBUSTION ENGINES.
APPLICATION FILED AUG. 8, 1919.

1,401,294.

Patented Dec. 27, 1921.

3 SHEETS—SHEET 1.

Fig. 1.



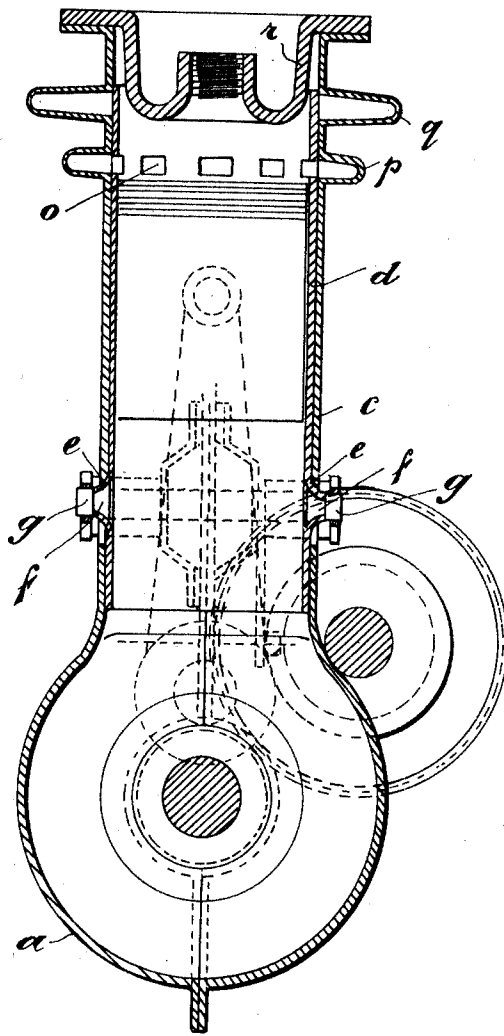
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Fig. 2.



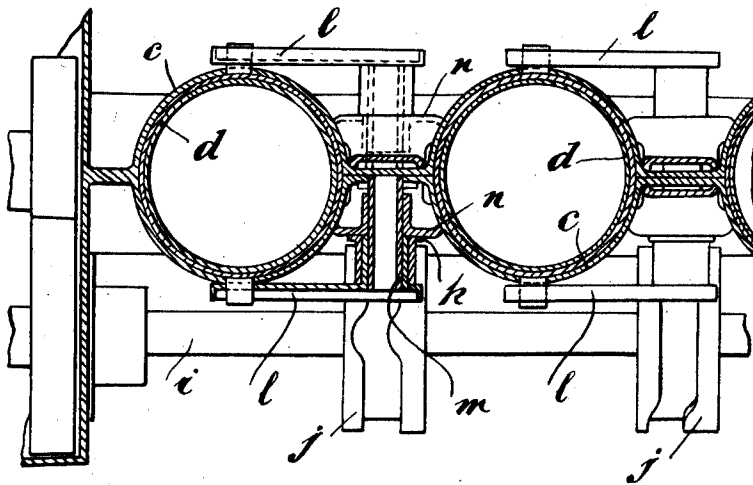
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3 SHEETS—SHEET 3.

Fig. 3.



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UNITED STATES PATENT OFFICE.

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VALVE MECHANISM OF INTERNAL-COMBUSTION ENGINES.

1,401,294.

Specification of Letters Patent.

Patented Dec. 27, 1921.

Application filed August 8, 1919. Serial No. 316,195.

To all whom it may concern:

Be it known that I, ARTHUR WILLIAM WALL, of "The Laurels," Lyndon End, Sheldon, near Birmingham, England, a subject of the Kingdom of Great Britain, have invented certain new and useful Improvements in the Valve Mechanism of Internal-Combustion Engines, of which the following is a specification.

This invention is an improvement in or modification of the invention forming subject of prior patent application No. 268543, December 27th, 1918, which comprises a casing for an internal-combustion engine, which casing is manufactured by pressing, stamping, or equivalently working the metal of which the casing is composed, said casing being characterized by what is hereinafter termed a cylinder locating portion, that is to say, a portion which either extends longitudinally of the cylinder for the purpose of locating it, or itself constitutes the cylinder; this cylinder locating portion extends toward and comprises means for angularly locating the crank-shaft.

The present invention comprehends an engine having a casing thus manufactured, in combination with a moving sleeve or slide valve adapted to control a port or ports appertaining to the explosion space. This sleeve advantageously constitutes the cylinder proper; it is adapted to slide or move in relation to the casing, and the piston in turn slides within the said sleeve. The sleeve may be integral or sectional, and may have either a longitudinal or rotary movement, or a combination of these movements.

In order that this invention may be clearly understood and readily carried into practice, reference may be had to the appended explanatory sheets of drawings, upon which:—

Figure 1 illustrates in elevation an embodiment of the present invention as applied to a four-stroke engine.

Fig. 2 is an end sectional elevation of the engine shown in Fig. 1.

Fig. 3 is a sectional plan of the engine shown in Figs. 1 and 2.

In a convenient embodiment of the present invention, as illustrated in the drawings, and which illustrates an engine operating upon the four-stroke cycle principle, *a* represents the casing formed by stamping or pressing, said casing having portions *b*

adapted to constitute bearings for the crankshaft, and portions *c* extended longitudinally of the cylinder whereby the axis of the latter is accurately located at right angles to the axis of the crankshaft. *d* is a sleeve adapted to slide longitudinally within each portion *c* of the casing; this sleeve *d* may, for instance, be manufactured from a length of tube. At *e, e* the sleeve *d* is perforated and extruded, the extruded perforations being adapted to receive studs *f* which are fitted with nuts *g*. Alternatively, projections or trunnions may be mounted in any appropriate manner upon the sleeve, as for instance by welding; these trunnion portions *g* constitute the medium by which longitudinal movement is imparted to the sleeve. They pass through elongated perforations *h* in the casing and are operated by any suitable mechanism. In the mechanism illustrated *i* is a countershaft carrying cams *j*, each of which operates the one arm *k* of a bell-crank lever, the other arm *l* of which is slotted to actuate the trunnion member *g*. One of the bell-crank levers *k, l* is provided on each side of the engine, the respective levers being rigidly mounted upon a common rocking shaft *m* which is rotatably mounted in bearing bracket portions *m, n* suitably applied to the parts of the casing occurring between the cylinders so that the shaft *m* passes through these parts. The bell crank levers and their supporting brackets may if desired all be manufactured in the form of stampings or pressings. A series of ports *o* are provided in the sleeve *d* adapted to register alternately with the inlet *p* and with the exhaust *q*. The inlet *p* and the exhaust *q* are incorporated by providing internal recesses in the portions *c* of the casing, which recesses extend around the sleeve and are continued from one cylinder to another so that the explosive mixture may be placed in communication with the one extremity of the conduits *p*, while the exhaust egress provision may be placed in communication with the exhaust conduits *q*, as for instance at the other extremity of the engine. *r* represents the cylinder head which may take the form of a stamping, and which is suitably secured to the extremity of the casing.

The invention is equally applicable to engines of the two-stroke cycle type.

What I claim as my invention and desire to secure by Letters Patent is:—

In an internal combustion engine, a casing comprising portions stamped from an integral piece for accurately locating the
5 cylinder and the crank shaft at right angles to each other, a sleeve slidable in said cylinder-locating portion and maintained in pre-

cise relation to the crank shaft, said sleeve being adapted to control ports appertaining to the explosion chamber, and means extraneous of said casing and actuated by the crank shaft for reciprocating said sleeve. 10

In witness whereof I have hereunto set my hand.

ARTHUR WILLIAM WALL.