A. W. WALL.

CASING OF INTERNAL COMBUSTION ENGINES.

APPLICATION FILED DEC. 27, 1918.

1,402,695. Patented Jan. 3, 1922.

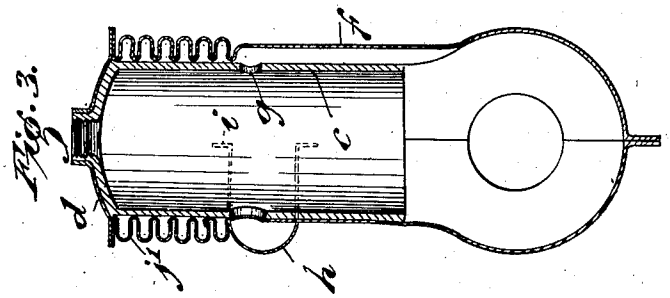


Fig. 3.

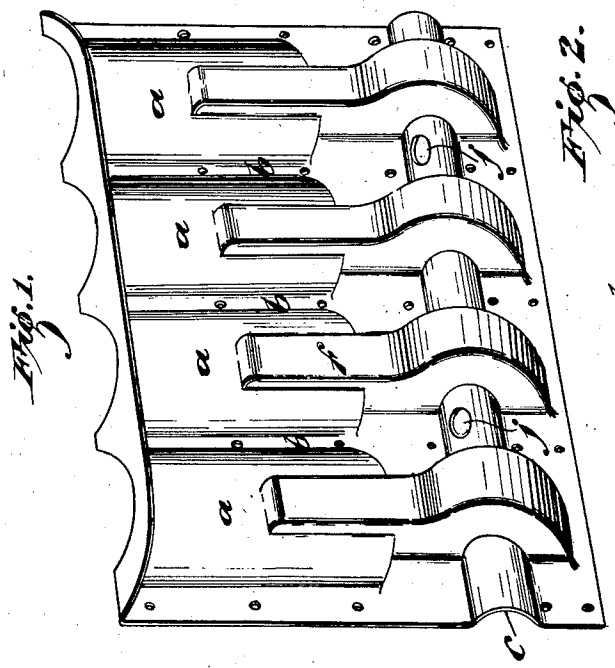


Fig. 1.

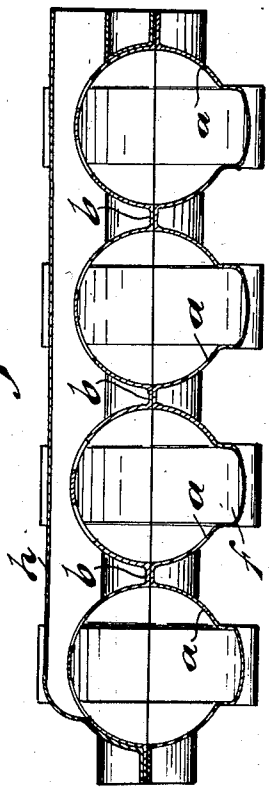


Fig. 2.

Inventor:-
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By:- B. Singer, Atty.

UNITED STATES PATENT OFFICE.

ARTHUR WILLIAM WALL, OF SHELDON, NEAR BIRMINGHAM, ENGLAND.

CASING OF INTERNAL-COMBUSTION ENGINES.

1,402,695. Specification of Letters Patent. Patented Jan. 3, 1922.

Application filed December 27, 1918. Serial No. 268,543.

To all whom it may concern:

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

This invention 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 towards and comprises means for angularly locating the crank shaft.

In this said casing (in the case of a two-stroke engine) the transfer passage or passages may be formed, and an exhaust conduit appertaining to two or more cylinders may be formed in the said casing or incorporated separately by applying a stamping or the equivalent to the exterior of said casing.

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

Figure 1 illustrates a casing embodying the present invention in one form.

Figure 2 illustrates in sectional plan an embodiment of the present invention.

Figure 3 illustrates in sectional end elevation an embodiment of the present invention shown in Figure 2.

The figures illustrate a casing for a multi-cylindered two stroke engine of which the present invention has been applied.

In the form shown the crank-case consists of two main parts only, being divided in the plane of the axes of the crank-shaft and cylinders, and each half of the crank-case is integrally formed with semi-tubular upward extensions *a* constituting the cylinder locating portions adapted each to embrace one half of a cylinder and to locate angularly the latter. Between these upward extensions an integral web *b* of metal occurs, the one face of which coincides with the plane of division between the two stampings. At the point at which the crank-shaft occurs, this web is formed with a semi-circular depression *c* to form a bearing for and to locate angularly the crank shaft. These webs are adapted to be bolted together to form the enclosed crank-case and cylinder supports. The extensions *a* may be enclosed by a separate top *d* bolted to flanges or bosses integrally stamped or formed in the said cylinder supports. Or the extensions *a* may involve integral closure portions at the top, which closure portions are formed half in each stamping or pressing. In this invention I may employ a pressed, stamped, drawn, or extruded cylinder, as shown at *e*, or I may employ any other cylinder, such as one comprising an internally bored casting, or a length of tube. The cylinder supports, or the head applied thereto, may constitute the cylinder heads and may have a ground fit with the open extremity of the cylinder.

In one of the two stampings, an elongated indentation *f* is formed at the juncture of each extension *a* with the crank-chamber portion. These are adapted to function as the transfer passages, which offer communication between the crank-chambers and an aperture *g* formed in the cylinder. The other stamping may have a transverse indentation (not shown) extending parallel with the axis of the crank-shaft bearings and adapted to form the outer wall of the exhaust conduit, the inner wall of which is formed by the cylinders in which suitable exhaust apertures are provided. Or the inner wall of the exhaust conduit may be formed by the cylinder supports and crank-chambers and the outer wall by the additional stamping *h* which is formed with integral flanges *i* or bosses and adapted to be bolted to the main stampings. The additional stamping may be extended downwardly externally of the crank-chamber, and may be formed with a concavity (not shown) which, in conjunction with the wall of the base chamber, forms a bearing for a countershaft which may receive power from the crank-shaft, and may constitute the main driving shaft of the engine.

Integrally with the main stampings forming the crank-chambers and cylinder supports, parts (not shown) may be stamped, which together form a support for the magnets of the magneto, and the rotary part of

the magneto may be borne by the crank casing in the manner, for instance described in my concurrent application serially numbered 268,547, filed December 27, 1918. Perforations *j* may be provided in the bearing parts of one of the stampings and may admit explosive mixture which may pass through the interior of a hollow crank-shaft so that the latter functions as a rotary valve. Such a form of crank-shaft is described in application serially numbered 268,547, filed December 27, 1918.

Heat-radiating ribs, flutings, or corrugations j^1 may be stamped, pressed, rolled, or worked in the parts of the stampings which embrace the cylinders. These ribs may be extended across the webs *b* between the cylinders so that they constitute continuous conduits from one end to the other of the stampings. Through these conduits air may be forced, as for instance by a fan. If desired, the air may be forced in opposite directions through alternate conduits.

Instead of employing a separate cylinder within the casing, the upper part of the casing may itself constitute the cylinder.

A plurality of multi-cylinder casings such as have been illustrated may be located side by side with the crank chambers of one casing projecting between the crank chambers of another casing. Two or three casings combined together in this way may have their crank shafts geared together to operate as a multi-crank shaft engine.

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

1. A casing for an internal combustion engine constructed of sheet metal, comprising a cylinder locating portion extending towards the crank shaft, a crank case locating portion, and transfer passages for a two-stroke engine.

2. A casing for an internal combustion engine constructed of sheet metal, comprising a cylinder locating portion extending towards the crank shaft, a crank case locating portion, and transfer passages for a two-stroke engine, said casing being formed with an exhaust conduit for a plurality of cylinders.

3. A casing for an internal combustion engine constructed of sheet metal, comprising a cylinder locating portion extending towards the crank shaft, a crank case locating portion, transfer passages for a two-stroke engine, and an exhaust conduit of sheet metal secured to said casing and connecting with a plurality of cylinders.

4. A casing for an internal combustion engine constructed of sheet metal, comprising a cylinder locating portion extending towards the crank shaft, a crank case locating portion, crank shaft bearings, crank housings, and transfer passages for a two-stroke engine, said casing being formed of two main parts divided in the plane of the axes of the crank shaft and cylinders, and webs provided in said plane and constituting connecting parts between each pair of cylinders, crank shaft bearing portions and crank housings.

5. A casing for an internal combustion engine constructed of sheet metal, comprising a cylinder locating portion extending towards the crank shaft, a crank case locating portion, and transfer passages for a two-stroke engine, said cylinder locating portion being provided with corrugations stamped therein.

6. A casing for an internal combustion engine constructed of sheet metal, comprising a cylinder locating portion extending towards the crank shaft, a crank case locating portion, and transfer passages for a two-stroke engine, said cylinder locating portion being provided with corrugations stamped therein and constituting conduits for cooling air.

7. A casing for an internal combustion engine comprising portions stamped from an integral piece for accurately locating the cylinder and crank shaft at right angles to each other, the casing being formed of two main parts divided in the plane of the axes of the crank shaft and cylinders.

8. A casing for an internal combustion engine comprising portions stamped from an integral piece for accurately locating the cylinder and crank shaft at right angles to each other, the casing intermediate to each pair of adjacent cranks being formed with a depression constituting a bearing for the crank shaft intermediate the cranks of adjacent cylinders.

9. A casing for an internal combustion engine comprising portions stamped from an integral piece for accurately locating the cylinder and crank shaft at right angles to each other, and integral webs interconnecting said cylinder and crank case locating portions, said webs adapted to abut in a plane defined by the axes of the crank shaft and cylinders.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

ARTHUR WILLIAM WALL.

Witnesses:
ARTHUR H. BROWN,
EDGAR N. WHEELER.