Aug. 7, 1934. G. PIELSTICK 1,969,031

HOUSING FOR A VERTICAL COMBUSTION POWER ENGINE

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Fig. 1.

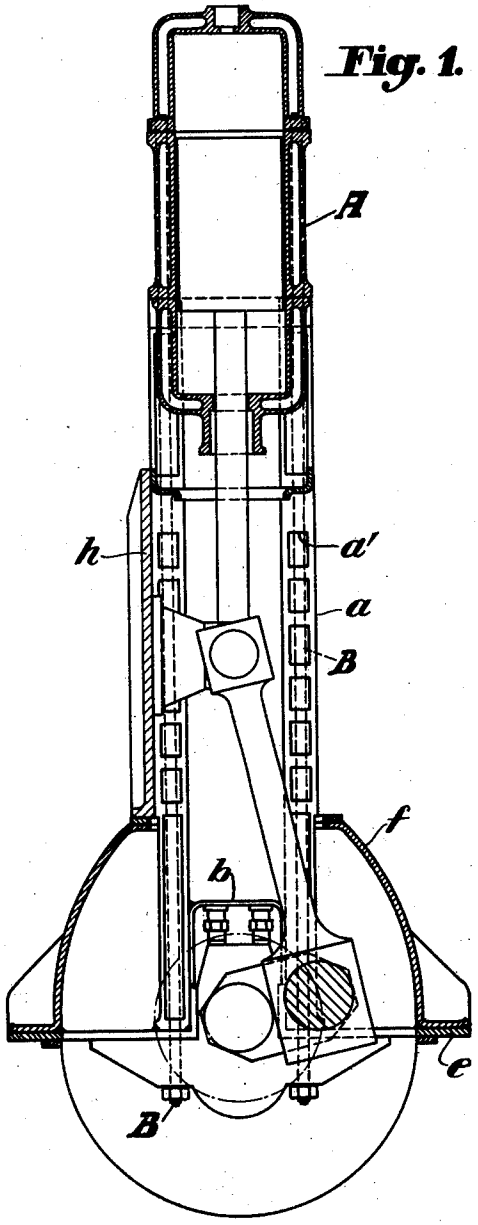

Fig. 2.

1-1

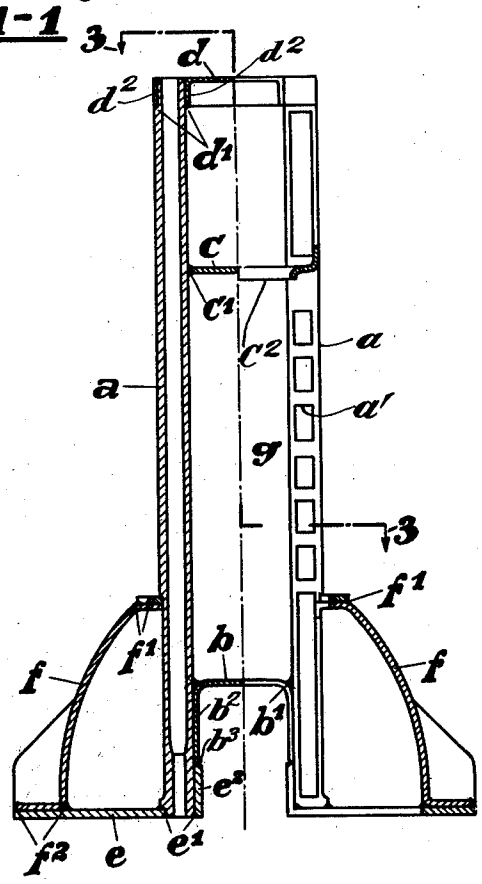

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Fig. 3.
2-2

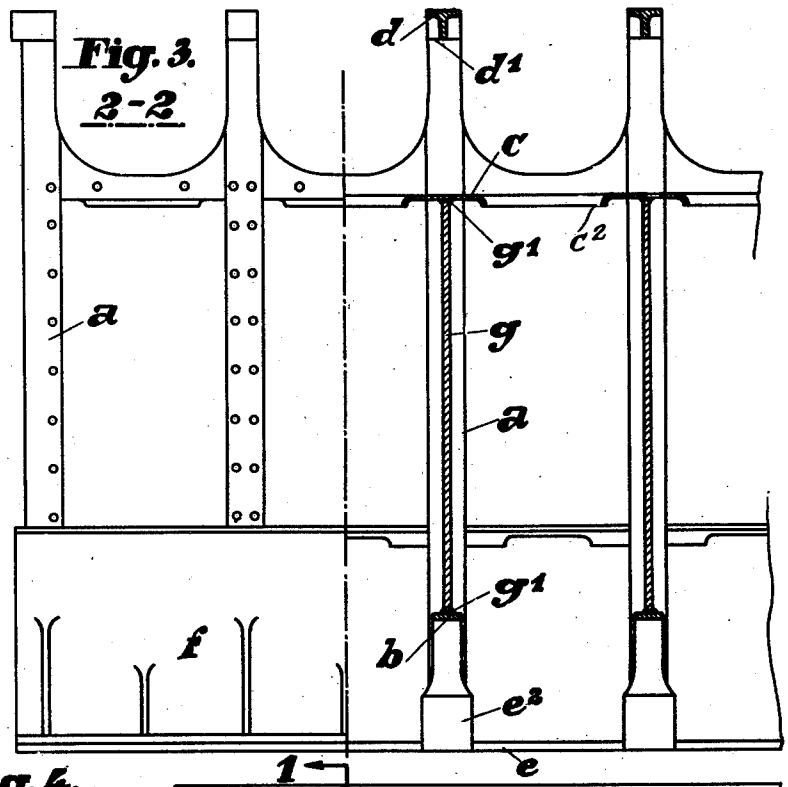
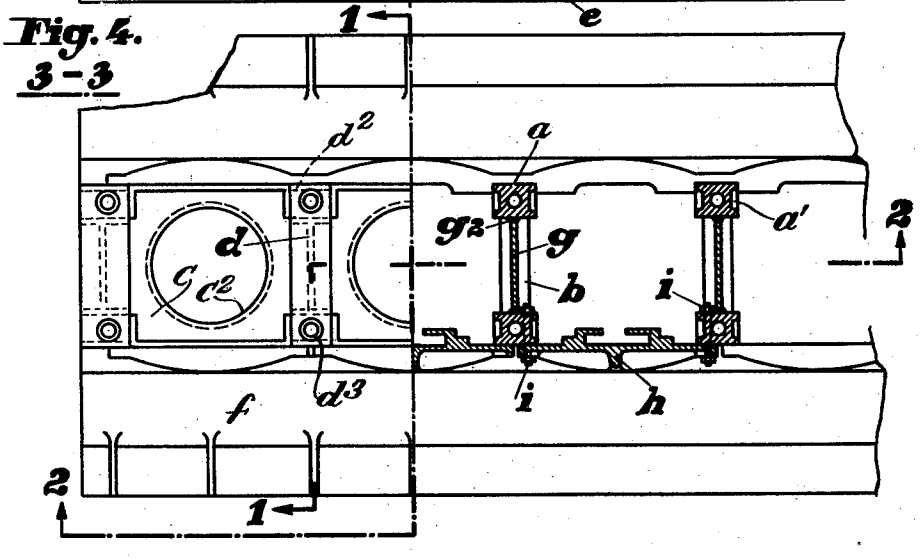


Fig. 4.
3-3



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UNITED STATES PATENT OFFICE

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HOUSING FOR A VERTICAL COMBUSTION POWER ENGINE

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In Germany April 22, 1929

6 Claims. (Cl. 121—194)

This invention relates to internal combustion power engines, and more particularly to engine frames or housings.

The primary object of the invention is the provision of an engine frame or housing which is built up of a number of separate wrought iron or steel pieces integrally united together by welding or the like to provide a frame which is strong and yet which is comparatively light in weight.

Further objects and advantages of the invention will be apparent in the following description and from the accompanying drawings in which

Fig. 1 is a vertical section of an engine according to the invention;

Fig. 2 is a vertical section through an engine frame or housing, taken along the line 1—1 of Fig. 4;

Fig. 3 is a side elevation, the right half of the view being shown in section along the line of 2—2 of Fig. 4; and

Fig. 4 is a top plan view, shown in section at the right, along the line 3—3 of Fig. 2.

In accordance with prior constructions of internal combustion engine housings or frames, these frames have been generally made of cast iron or light metal, and have been either cast as an integral part, or made up of assembled castings, usually screwed together. The housings of the light metal cast constructions are of light weight, but are not sufficiently rigid, and the cast iron constructions are quite heavy. In accordance with the present invention, however, the housing is constructed of wrought iron or steel profile pieces and connecting parts or plates welded together to provide a unitary structure of light weight and great rigidity.

As shown in Fig. 1 of the drawings the engine frame or housing is of the type used in vertical internal combustion engines, the frame serving as a support for a series of cylinders A, held at the top of the frame preferably by means of vertical through bolts B that project down through the frame or housing and interconnect the frame with the lower removable crank bearing and support the cylinders in place. The frame or housing of the present invention comprises separate upright standards or profile pieces *a*, each of which is preferably a wrought iron or steel bar which is milled from a single piece of metal and provided with a longitudinally extending passage through which a tension rod may extend. If desired recesses *a'* may be provided in the laterally extending faces of the upright standards. These standards are connected together by wrought iron or steel plates *b*, *c* and *d* which are welded at *b'*, *c'* and *d'* respectively. The plates *b* and *d* are preferably rather narrow strips extending laterally between adjacent standards, while the plate *c* extends continuously past the various standards, as shown in Fig. 3. Plate *c* is provided with circular openings c^2 through which the piston rod of the adjacent cylinder extends. The cross strips or plates *b* which extend down as shown at b^2 along the inner sides of the standards are also welded at their lower ends at b^3 to the top portions of the upwardly extending flanged projections e^2 of the base plate *e*. Each of the plates *d*, which may be of T-section as shown, has a pair of spaced downwardly extending tongues d^2 at each end, which are welded to the opposite sides of the standard ends. The upper ends of the standards, where they extend through the plates *d*, are of reduced circular section as indicated at d^3 for a vertical height equal to the thickness of the plate *d*. Side stiffening members *f* are provided along the lower sides of the housing, being constructed of suitably bent wrought iron, welded to the profile pieces *a* at *f'* and to the base plate *e* at f^2. Vertically extending plates *g* extend between the plates *c* and *b* to provide lateral reinforcement between the profile pieces *a*, the plates *g* being welded to the plates *b* and *c* at *g'* and to the profile pieces *a* at g^2. These plates *g* and the additional lateral bracing means provided between the uprights by the plates *b* and *d* rigidly interconnect the opposed standards together, while the longitudinal plate *c* and the side and bottom plates *f* and *e* interconnect all of the standards longitudinally. As all the connecting plates which are welded to the standards are arranged to conduct forces horizontally between standards, it will be apparent that the vertical forces acting through the uprights are not carried through the welds or through the connecting plates, which are, therefore, normally without substantial strain. The slide *h* for the cross-head is screwed to the rear side of the profile pieces *a* by bolts *i*, each slide being a separate plate extending between adjacent profile pieces.

While the form of apparatus herein described constitutes a preferred embodiment of the invention, it is to be understood that the invention is not limited to this precise form of apparatus, and that changes may be made therein without departing from the scope of the invention which is defined in the appended claims.

What I claim is:

1. A frame for an engine of the character described comprising a series of uprights spaced apart both longitudinally and laterally of the frame and arranged oppositely in two adjacent rows and adapted for the support of engine cylinders at the upper ends thereof, laterally extending vertical thin sheets or plates welded throughout their lengths to opposed uprights, and a longitudinally and horizontally extending thin sheet or plate welded to the uprights, the various plates and uprights constituting a single integral structure of light weight in which all normal vertical compression forces are assumed by the uprights.

2. A frame for an engine of the character described comprising a double row of spaced uprights of relatively small cross-section adapted for the support of engine cylinders at the upper ends thereof, a horizontal longitudinal thin sheet or plate welded to said uprights below the upper ends thereof, laterally extending vertical thin sheets or plates welded along their vertical edges to opposed uprights, and laterally spaced lower longitudinal plates each welded to the uprights of a row adjacent the lower ends thereof, the various plates and uprights constituting a single integral structure of light weight in which all normal vertical compression forces are assumed by the uprights.

3. A double acting multi-cylinder engine of the character described comprising a double row of spaced uprights of relatively small cross-section arranged oppositely, a longitudinal series of double acting engine cylinders supported on the upper ends of said uprights, a crank supporting structure, tension rods extending through said uprights and securing said crank supporting structure to said cylinders, and thin sheets or plates extending horizontally and vertically with respect to the uprights and integrally welded thereto so as to respectively interbrace the uprights longitudinally and laterally, said vertical plates extending between the inner sides of opposed uprights and being welded to the uprights throughout the height of said vertical plates, the various plates and uprights constituting a single integral structure in which all normal vertical compression forces are assumed by the uprights.

4. A cylinder supporting frame for multi-cylinder engines of the character described having a plurality of aligned cylinders, comprising a double row of spaced uprights of relatively small cross section, transverse vertical thin sheets or plates of steel welded to opposed uprights, a longitudinal steel plate provided below the upper ends of said uprights and welded to all of said uprights and welded also to the upper ends of said vertical plates, and laterally spaced lower longitudinal sheets or plates reaching along the outer sides of the rows of uprights and each welded to the uprights of a row adjacent the lower ends of the uprights.

5. A cylinder supporting frame for multi-cylinder engines of the character described comprising a double row of spaced steel uprights of relatively small cross-section arranged one laterally opposite another, a series of laterally extending steel sheets or plates each welded to opposed uprights, a horizontal steel sheet or plate welded to all of said uprights, laterally spaced lower longitudinal plates reaching along opposite sides of the uprights and each having its upper end welded to the uprights of a row above the lower ends of the uprights, the lower end of each of said longitudinal plates being spaced laterally outwardly of the uprights, and spaced steel base plates one on either side and each welded to the lower ends of a row of uprights and to the lower end of one of said longitudinal plates.

6. A cylinder supporting frame for multi-cylinder engines of the character described comprising a double row of spaced steel uprights of relatively small cross-section arranged one laterally opposite another, a series of laterally extending vertical plates each welded to opposed uprights, a horizontal plate welded to all of said uprights and to said laterally extending vertical plates, a horizontal plate for each pair of opposed uprights welded to said uprights and vertically spaced from said first horizontal plate, laterally spaced lower longitudinal plates reaching along opposite sides of the uprights and each having its upper end welded to the uprights of a row above the lower ends of the uprights, the lower end of each of said longitudinal plates being spaced laterally outwardly of the uprights, and spaced base plates one on either side and each welded to the lower ends of a row of uprights and to the lower end of one of said longitudinal plates.

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