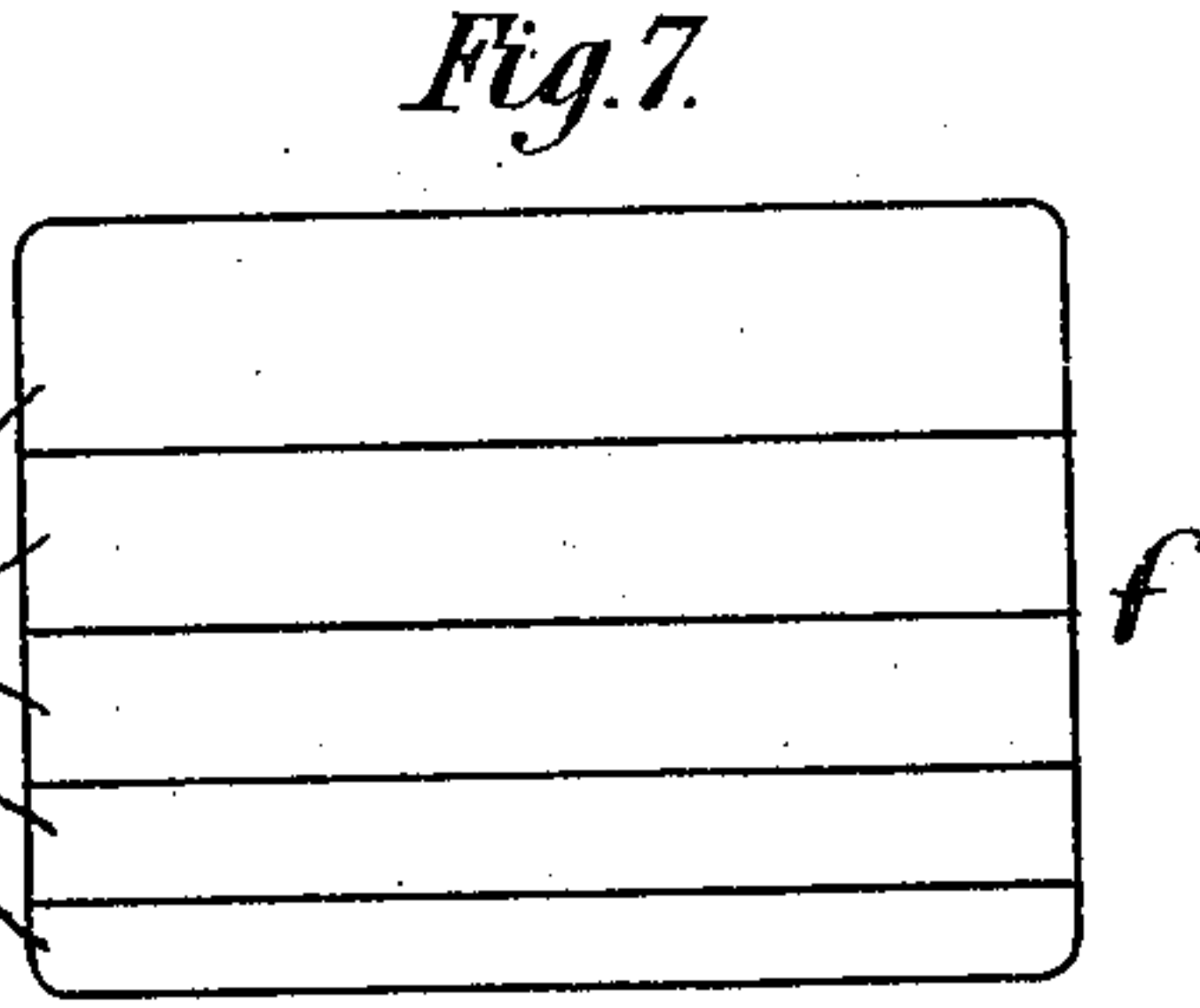
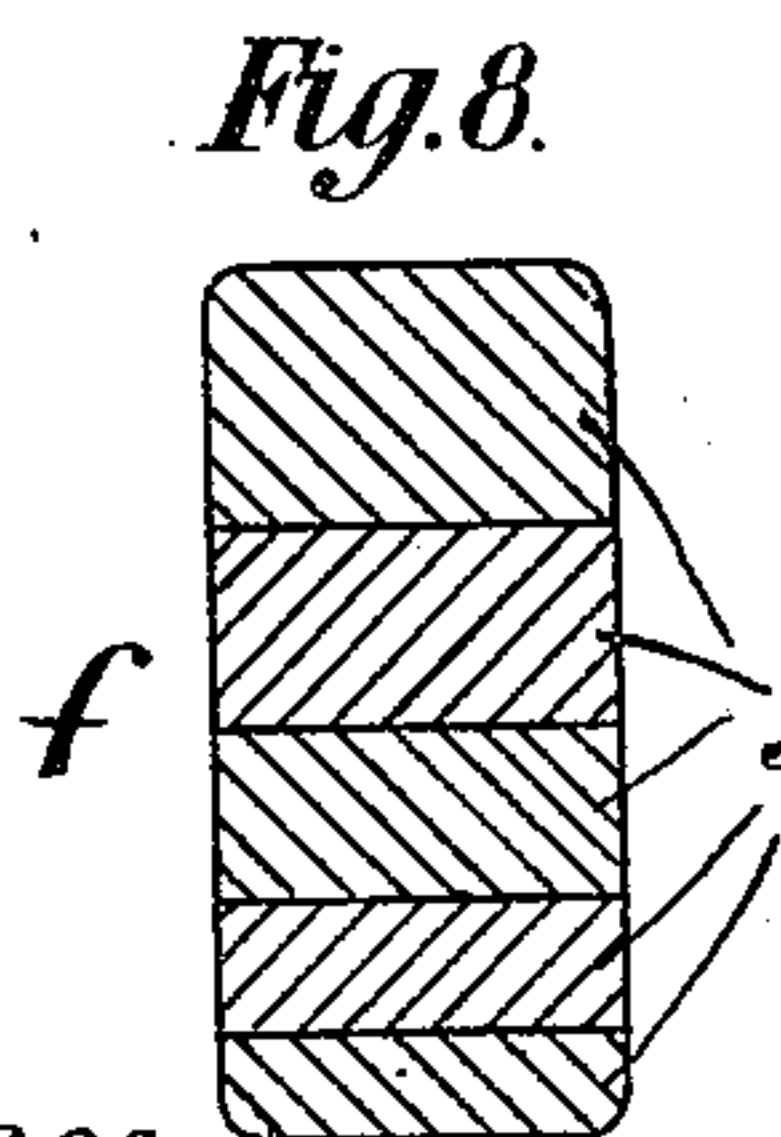
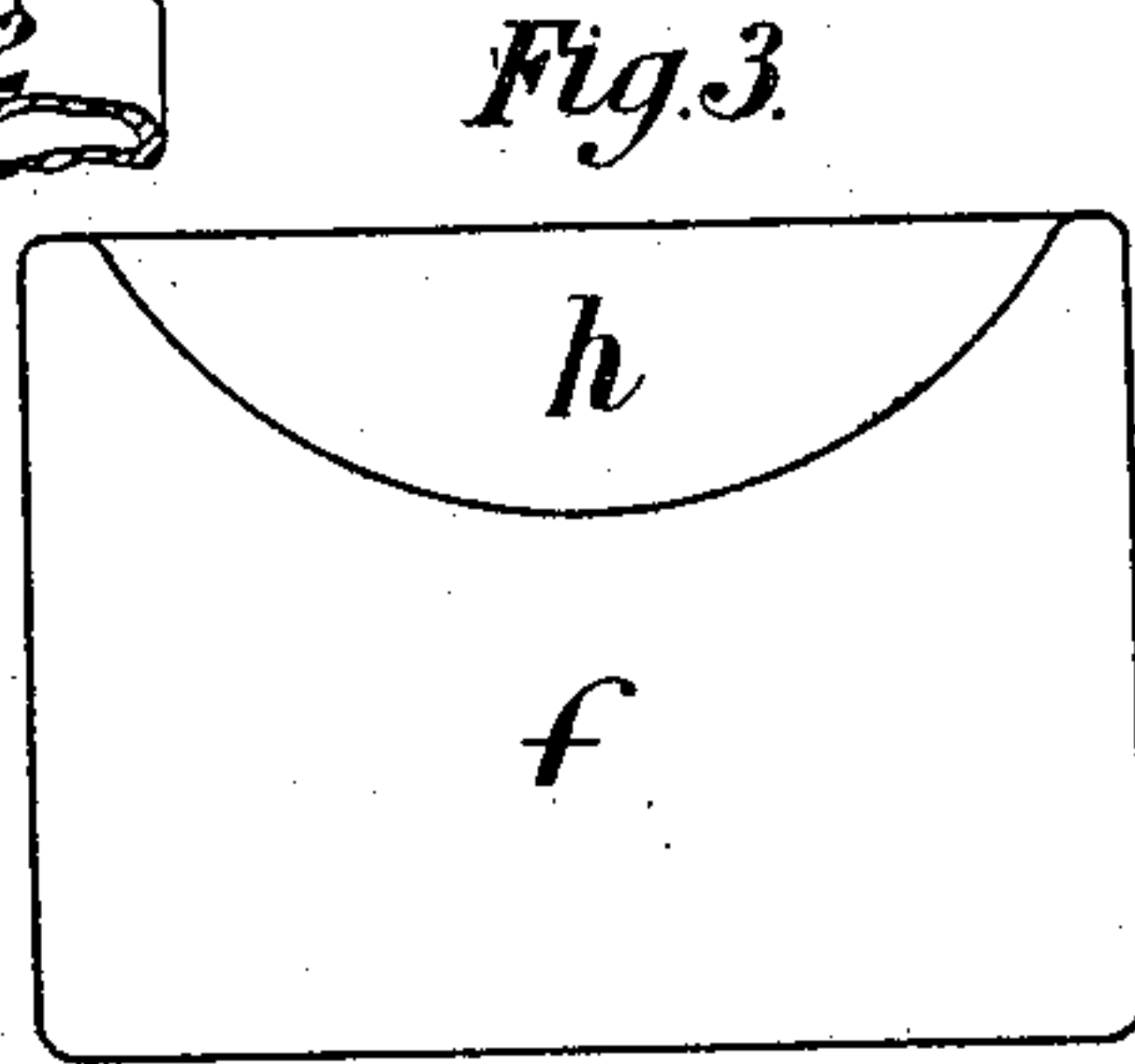
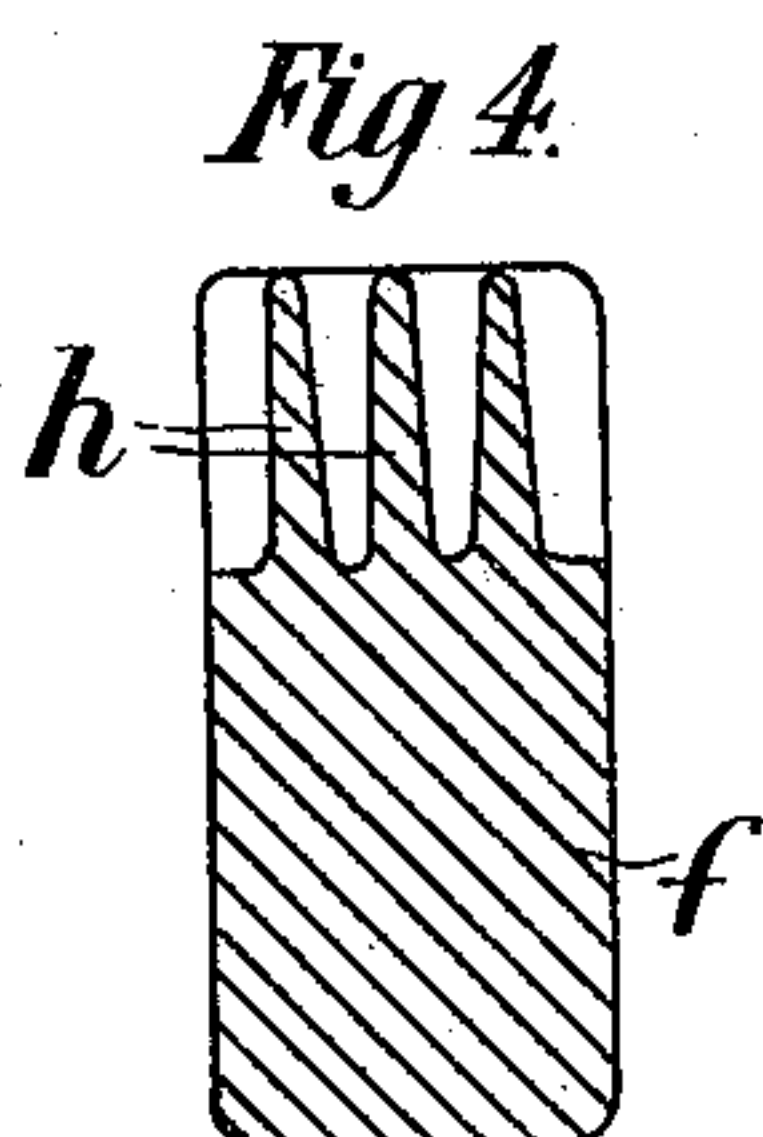
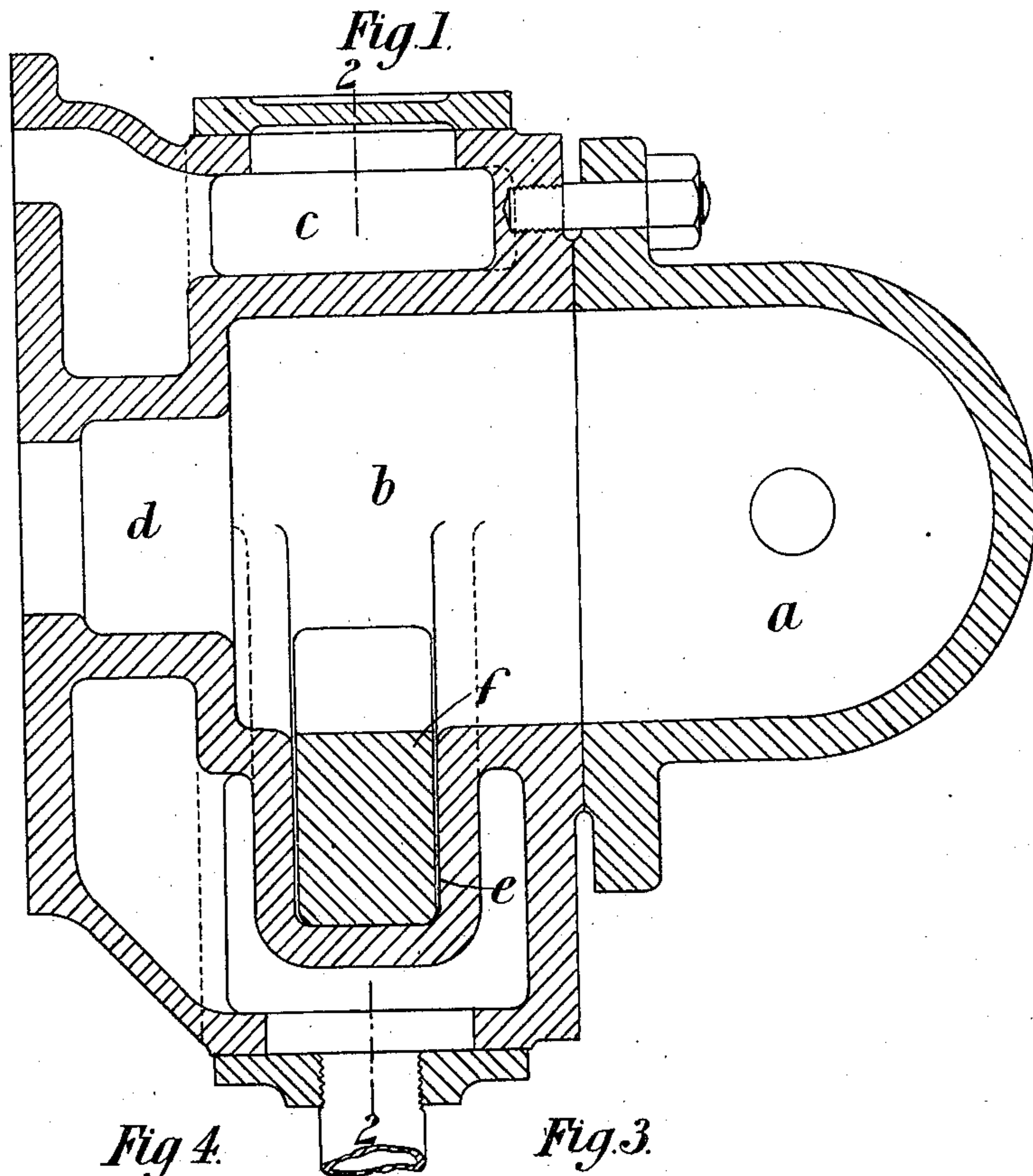


D. ROBERTS & J. W. YOUNG.
 VAPORIZER FOR INTERNAL COMBUSTION ENGINES.
 APPLICATION FILED DEC. 13, 1909.

Patented Feb. 7, 1911.
 3 SHEETS—SHEET 1.

983,646.



Witnesses
J. K. Moore
R. E. Barry

Inventors
David Roberts and
John W. Young
 By *Whitaker Wood* atty.

D. ROBERTS & J. W. YOUNG.
 VAPORIZER FOR INTERNAL COMBUSTION ENGINES.
 APPLICATION FILED DEC. 13, 1909.

983,646.

Patented Feb. 7, 1911.

3 SHEETS—SHEET 2.

Fig. 2.

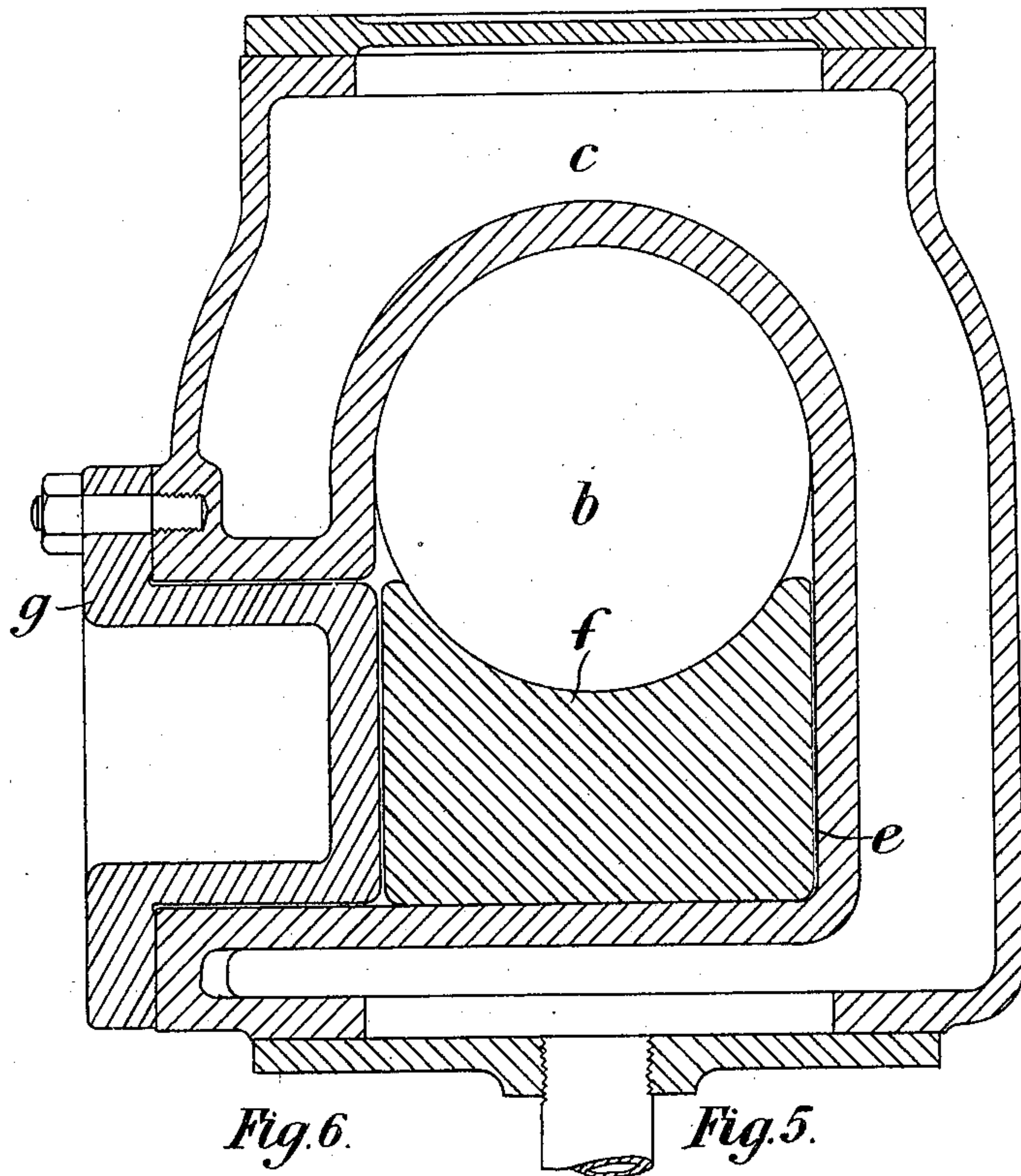


Fig. 6.

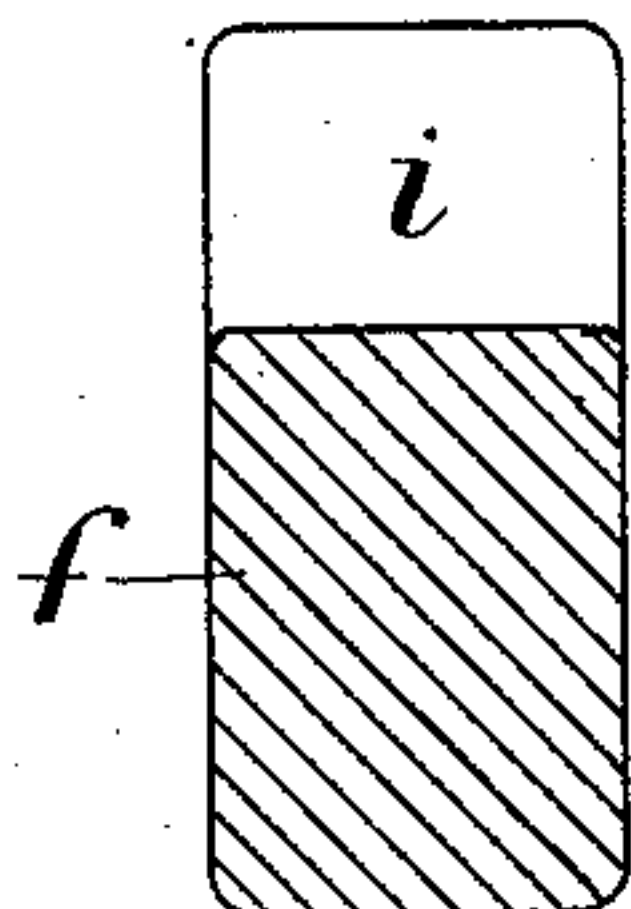


Fig. 5.

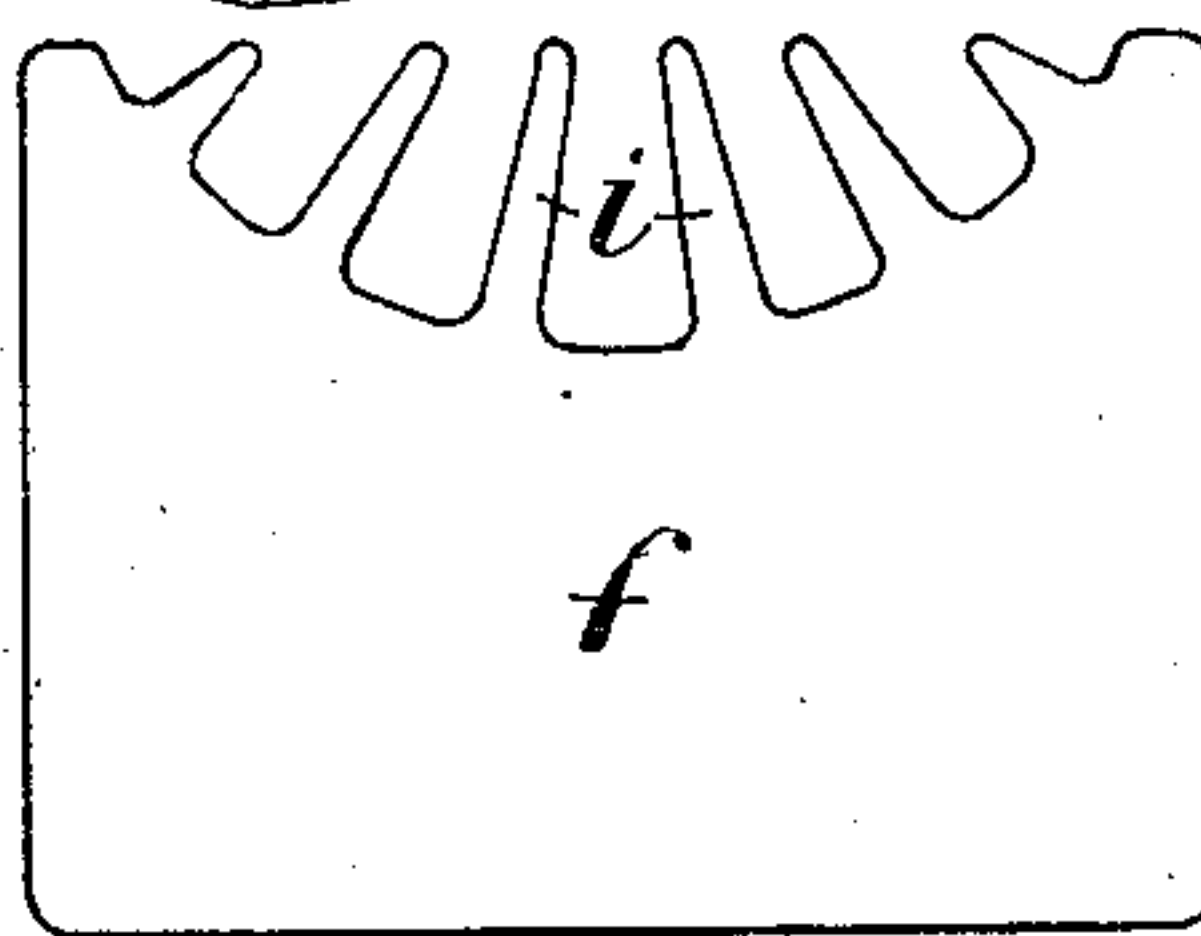


Fig. 10.

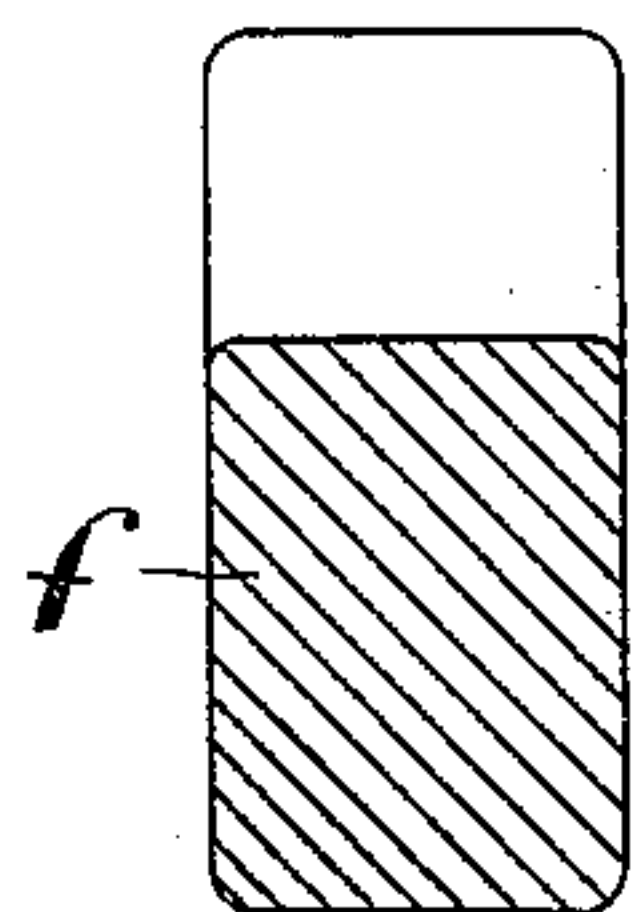
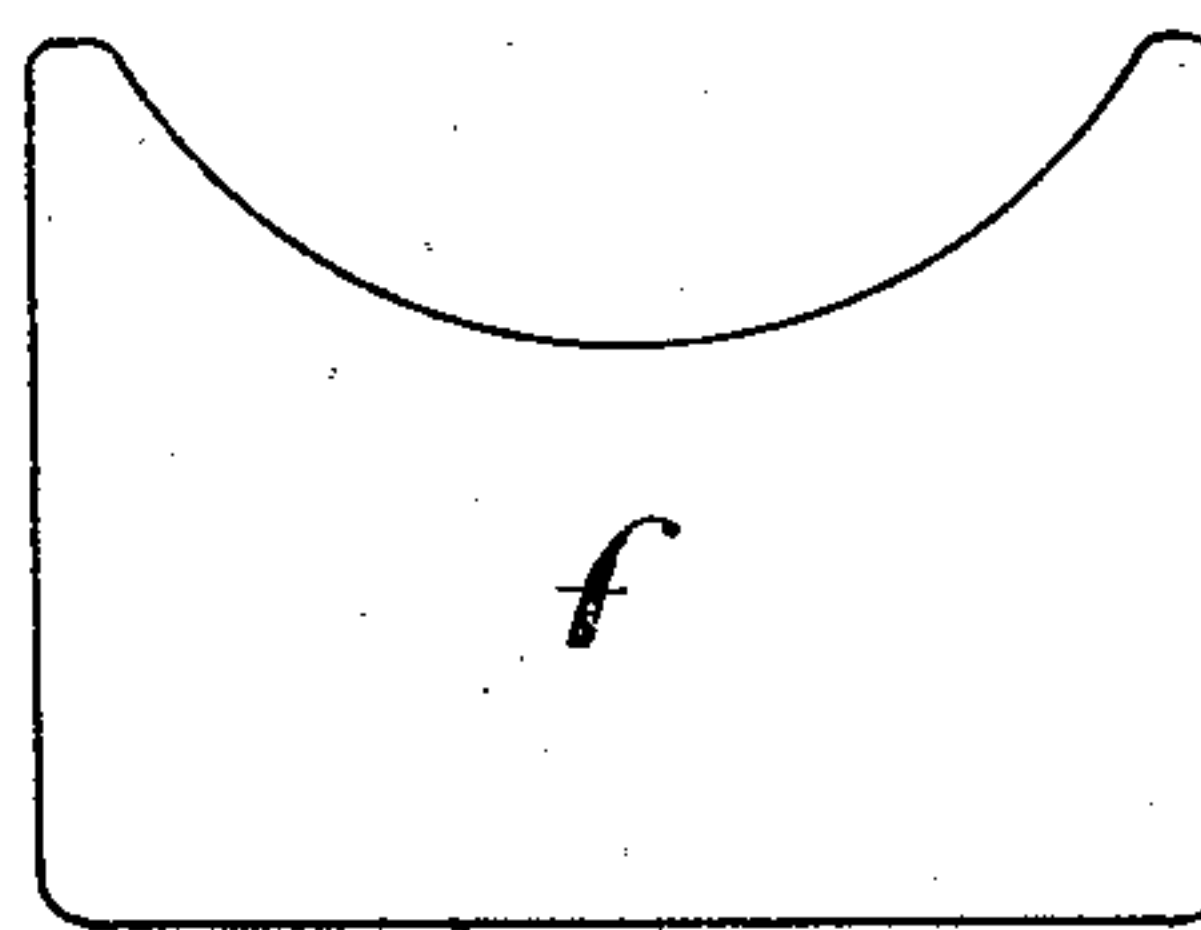


Fig. 9.



Witnesses.

J. A. Moore
R. E. Barry.

Inventors.

David Roberts and
John W. Young
By Whitaker & Perch atty.

D. ROBERTS & J. W. YOUNG.
VAPORIZER FOR INTERNAL COMBUSTION ENGINES.
APPLICATION FILED DEC. 13, 1909.

983,646.

Patented Feb. 7, 1911.

3 SHEETS—SHEET 3.

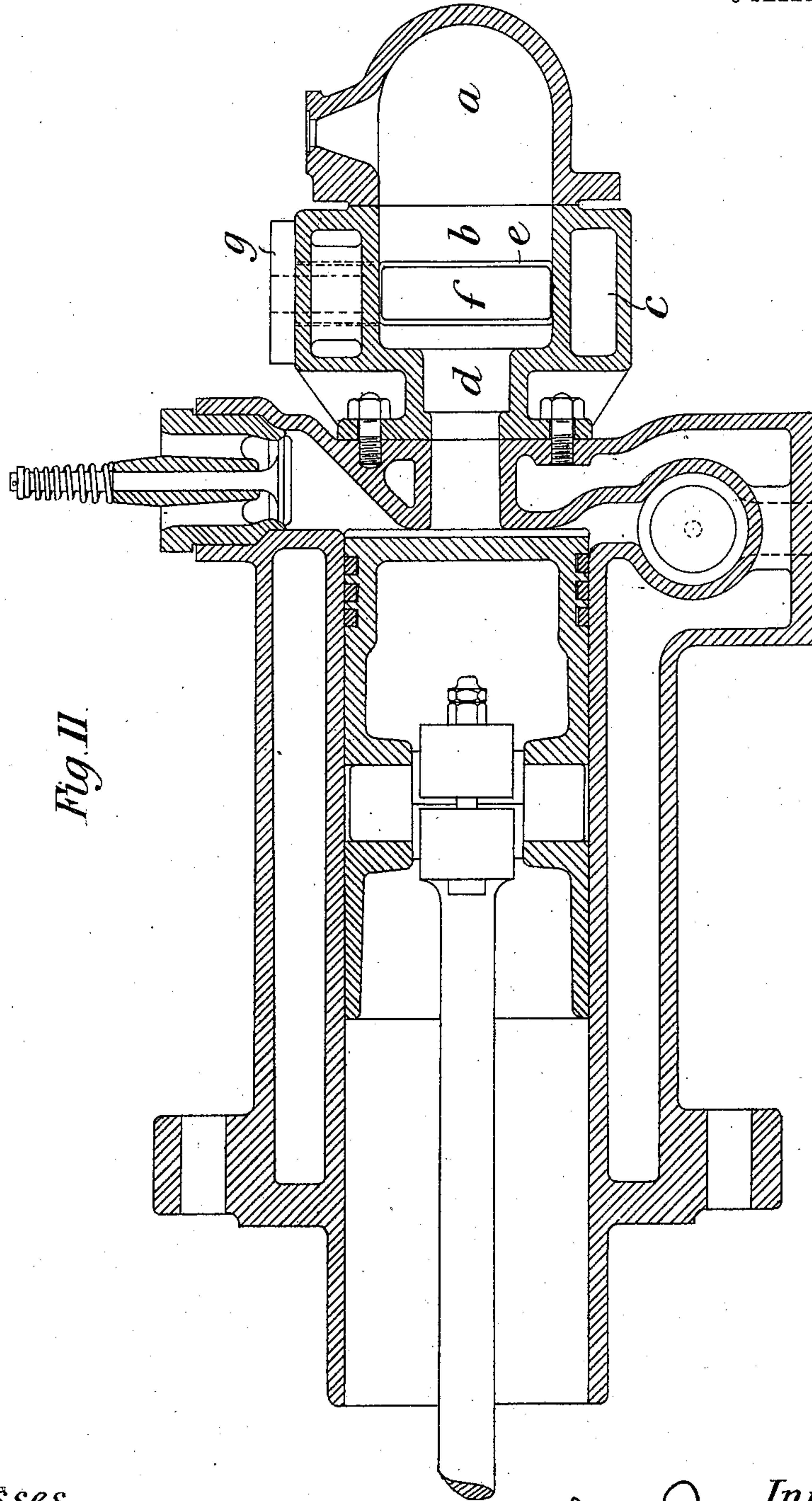


Fig. II.

Witnesses.
J. K. Moore
R. E. Barry.

Inventors.
David Roberts and
John W. Young
By Whitaker & Wash Atty.

UNITED STATES PATENT OFFICE.

DAVID ROBERTS AND JOHN WILLIAM YOUNG, OF GRANTHAM, ENGLAND.

VAPORIZER FOR INTERNAL-COMBUSTION ENGINES.

983,646.

Specification of Letters Patent.

Patented Feb. 7, 1911.

Application filed December 13, 1909. Serial No. 532,866.

To all whom it may concern:

Be it known that we, DAVID ROBERTS and JOHN WILLIAM YOUNG, subjects of the King of Great Britain, residing at Spittlegate Iron Works, Grantham, Lincolnshire, England, have invented new and useful Improvements in or Connected with Vaporizers for Internal-Combustion Engines, of which the following is a specification.

Our invention relates to improvements in vaporizers for internal combustion engines of the kind described in the specifications of former Patents Nos. 7146 and 15994 of 1890, the object of our invention being to provide simple means whereby the degree of compression and the proportion and consequently the value of the heating surface of the vaporizer may be varied in order to render the latter capable of dealing efficiently with fuels which differ widely in their physical properties. To this end, according to our invention, we form or provide the vaporizer with a recess, channel or the like, of any convenient shape in cross section, such as rectangular and in any convenient position in the said vaporizer, but preferably across the bottom and communicating with the interior thereof. In conjunction with the channel we provide a series of compression blocks which are so shaped that they fit in the said channel and may be either solid or formed or provided with gills or ribs for the purpose of increasing their heating surface. Furthermore, the said blocks may have their surface formed or arranged so as to provide greater or less metallic contact with the metal wall of the water-cooled portion of the vaporizer. With this arrangement it will be obvious that a compression block can be selected which is particularly adapted for the quality of fuel to be employed. For example, in the case of fuels requiring an extreme degree of heat for vaporizing purposes we may make use of a block having ribs or gills and presenting a minimum of contact area with the body of the vaporizer. Again for fuel that requires a high degree of compression and a comparatively low degree of heat we may employ a block of maximum size and without ribs or gills, but with a maximum surface in metallic contact with the water-cooled part of the vaporizer. This latter type of block will obviously give the greatest degree of compression, and at the same time will be heated only to a comparatively low degree

having regard to the fact that the heat generated is conducted away by the water-cooled part of the vaporizer. In practice a door or cover is provided at the outer end of the channel and preferably at the side of the vaporizer for the purpose of enabling the blocks to be introduced and removed with facility.

In the accompanying drawing:—Figure 1 is a longitudinal section of a vaporizer having our improvements applied thereto. Fig. 2 is a transverse section on the line 2—2 Fig. 1. Figs. 3 and 4 are respectively a side view and a vertical section of a compression block with gills or ribs arranged crosswise relatively to the axis of the vaporizer. Figs. 5 and 6 are views similar to Figs. 3 and 4 respectively of a compression block with the ribs or gills longitudinal to the axis of the vaporizer. Figs. 7 and 8 are similar views of a compression block made in sections, and Figs. 9 and 10 are like views of a compression block made in one piece. Fig. 11 is a sectional view showing the vaporizer attached to the cylinder of a gas engine.

Referring first to Figs. 1 and 2 *a* is the non-jacketed part of the vaporizer and *b* is the portion thereof which is provided with the water-jacket *c*, *d* being the flanged neck by means of which the vaporizer is bolted to the engine cylinder, not shown in the drawing. *e* is the channel, recess or the like which is here shown formed in the bottom of the water-cooled part *b* of the vaporizer, although it will be understood that it can, if desired, be made in the hot part of the vaporizer, and *f* is the compression block which is inserted within the said recess or channel *e*. To enable the block to be introduced into, and withdrawn from, the channel *e* the vaporizer is provided with a detachable door *g*. As above described the recess or channel *e* may be of any convenient shape in cross section, such as rectangular as illustrated, and may occupy any suitable position within the vaporizer, although in practice we have found good results are obtained by arranging it across the bottom and communicating with the interior thereof as in the example shown in the drawing. Furthermore, the block *f* may vary in shape and design in order that the same vaporizer may be adapted to deal efficiently with fuels having different physical properties. A number of different designs of compression block are shown in Figs. 3 to 10.

The block shown in Figs. 3 and 4 is made in one piece and is provided with gills *h* extending longitudinally along the block while that shown in Figs. 5 and 6 is similar but has gills *i* extending transversely across the blocks.

Figs. 7 and 8 show a block composed of a number of parts *j*, *j* and without gills, while Figs. 9 and 10 illustrate a block made in one piece and without gills.

Having now fully described and ascertained our said invention and the manner in which it is to be performed, we declare that what we claim is:—

1. In an internal combustion engine, the combination with the cylinder, of a vaporizing chamber, a removable compression block stationarily supported in said vaporizer, said vaporizer having an aperture to facilitate the insertion and removal of said block and a closure for said aperture separate from said block.

2. In an internal combustion engine, the combination with the cylinder, of a vaporizer connected therewith and provided with a recess for receiving and retaining in stationary position a removable compression block, a removable compression block for engaging said recess, and means for holding said block removably therein.

3. In an internal combustion engine, the combination with a vaporizer provided with a lateral aperture in its wall, a recess in line with said aperture for receiving and retaining in stationary position a removable block, a removable compression block fitting said recess, and a detachable closure for said aperture.

4. In an internal combustion engine, the combination with the cylinder, of a vaporizer communicating therewith having a portion thereof provided with a water jacket and having a recess in its jacketed portion, and a lateral aperture in the wall of the vaporizer in line with said recess, a removable compression block for engaging said recess, and a detachable closure for said aperture.

5. In an internal combustion engine, the combination with a vaporizer, provided with

a transversely disposed recess, and having a lateral aperture communicating therewith, of a removable compression block fitting in said recess and a detachable closure for said aperture, said block being held for movement by said closure and the walls of said recess.

6. In an internal combustion engine, the combination with a vaporizer provided with a substantially cylindrical vaporizing chamber, and having a recess extending transversely of the axis of the said chamber, beyond the cylindrical portions thereof, and a removable compression block located in said recess and having portions of its surface disposed in line with the cylindrical wall of the vaporizer.

7. In an internal combustion engine, the combination with a vaporizer provided with a substantially cylindrical vaporizing chamber, and having a recess extending transversely of the axis of the said chamber beyond the cylindrical portions thereof, and a removable compression block located in said recess and having portions of its surface disposed in line with the cylindrical wall of the vaporizer and having projecting portions extending into the vaporizing chamber.

8. In an internal combustion engine, the combination with the vaporizer provided with a recess to receive a compression block, of a removable compression block adapted to be inserted in said recess, and provided with gills.

9. In an internal combustion engine, the combination with the vaporizer provided with a recess to receive a compression block, of a plurality of removable compression blocks of different sizes and forms, and means for securing one of said blocks at a time in the vaporizer, whereby by changing said blocks the engine may be adapted to different fuels.

DAVID ROBERTS.
JOHN WILLIAM YOUNG.

Witnesses:

SAMUEL WILLIAM PAYNE,
EDWARD PEACOCK.