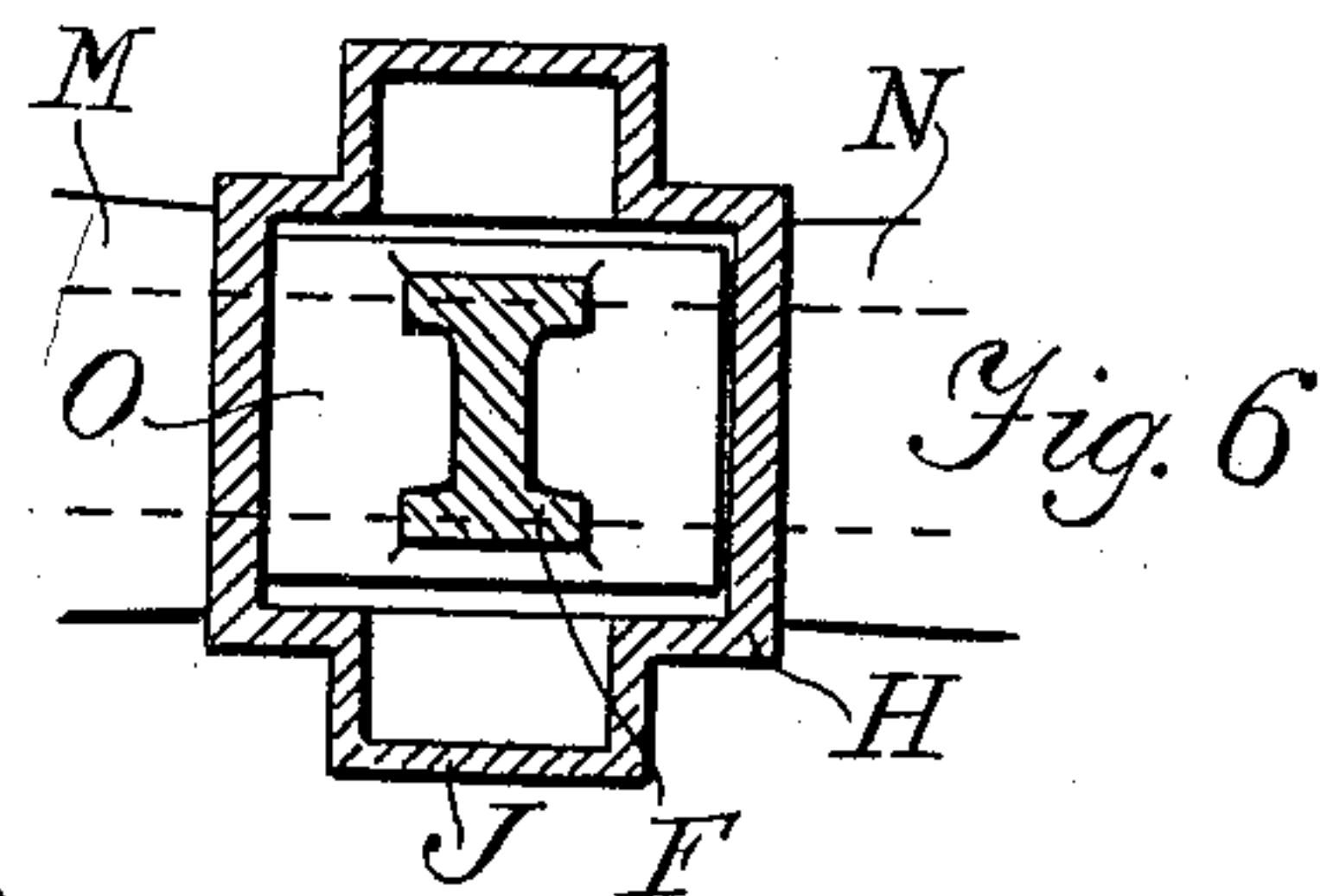
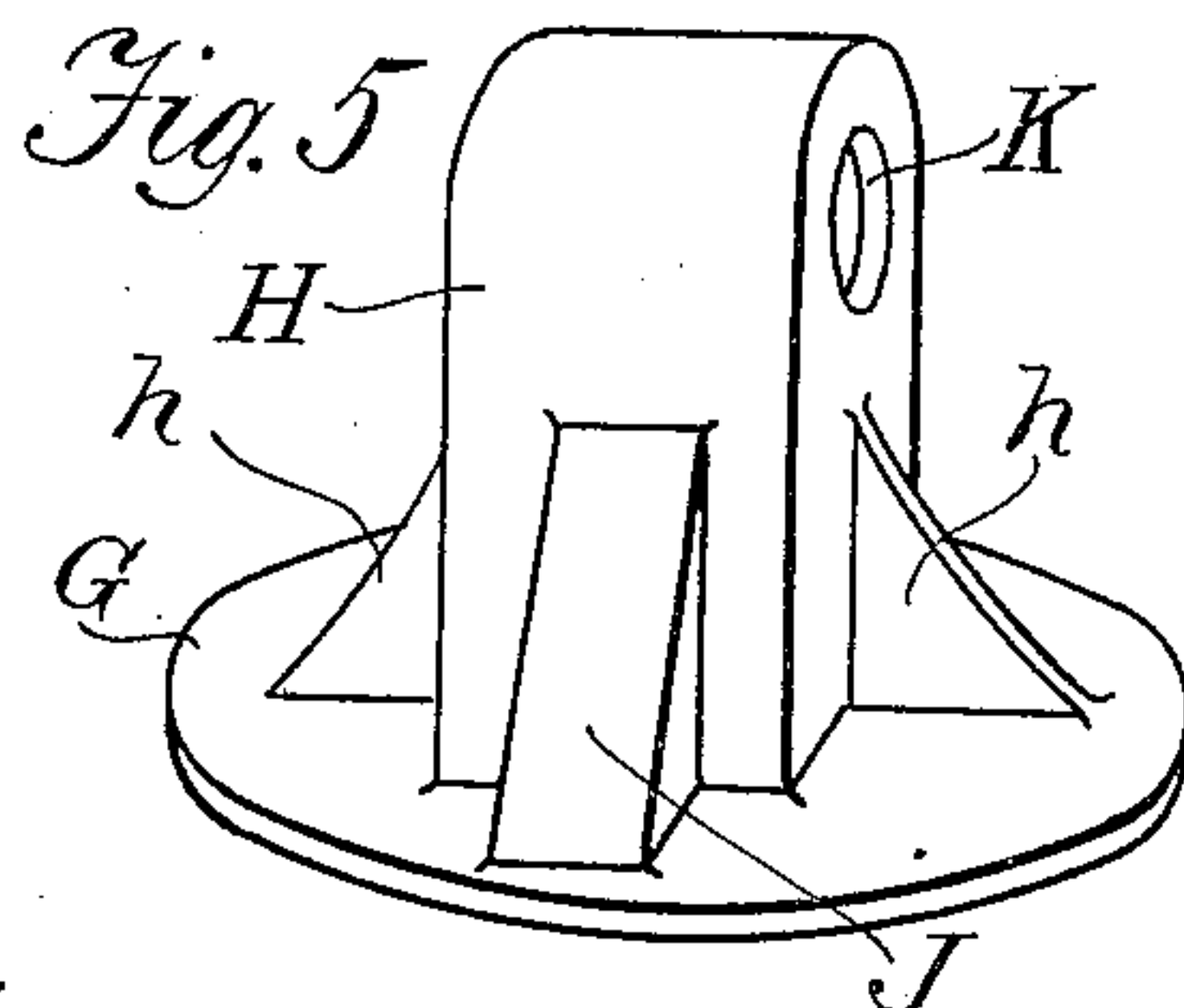
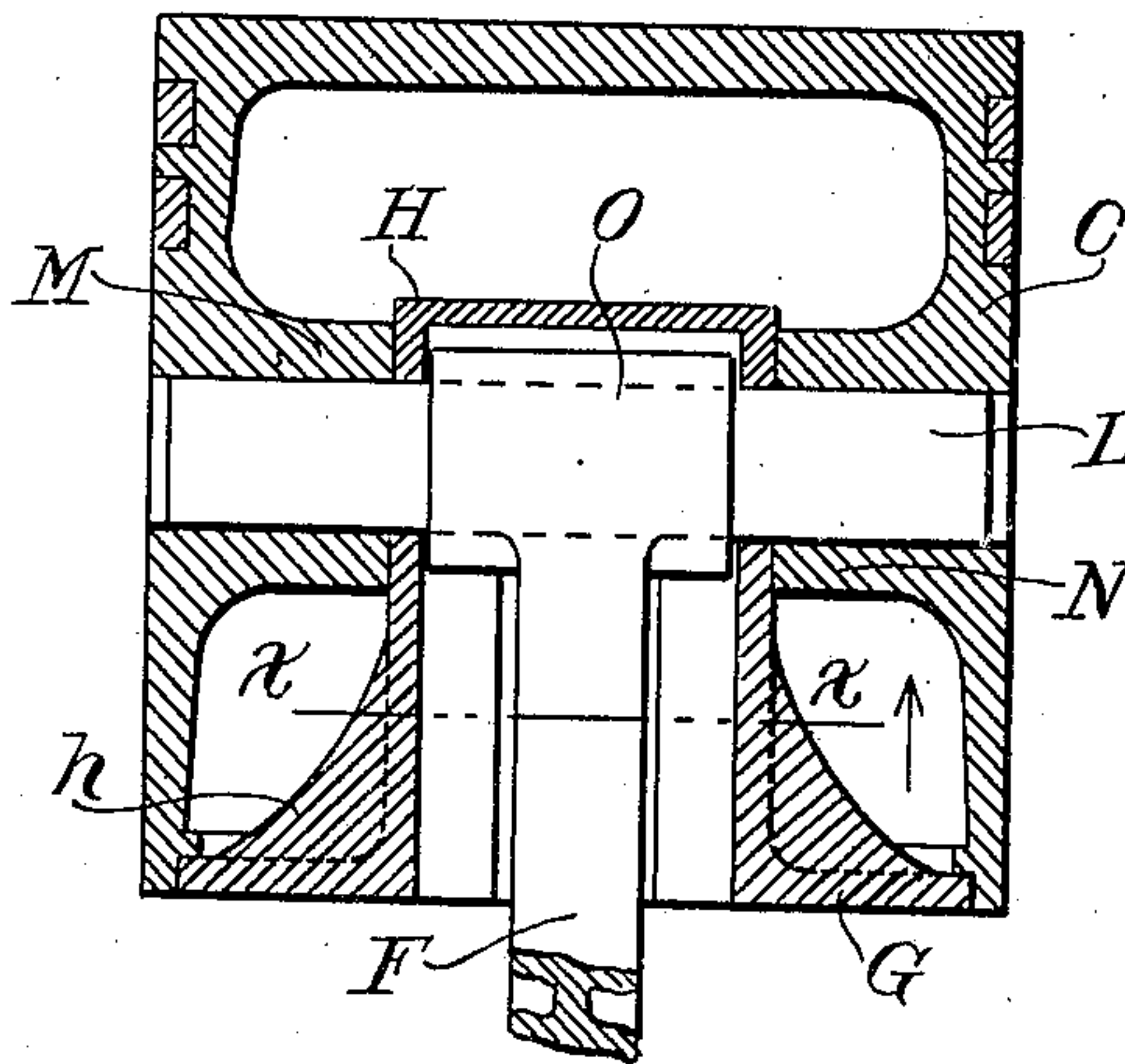
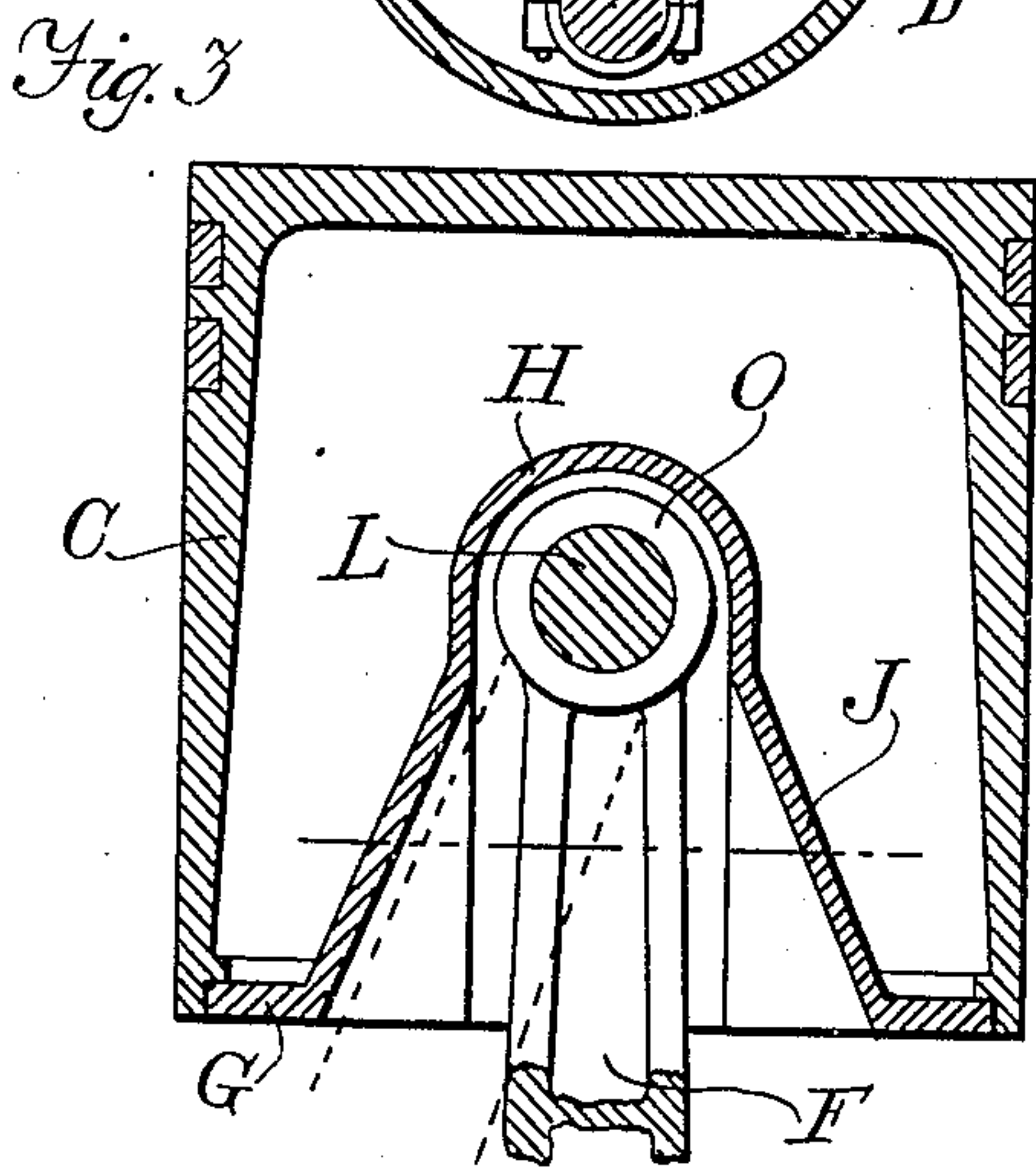
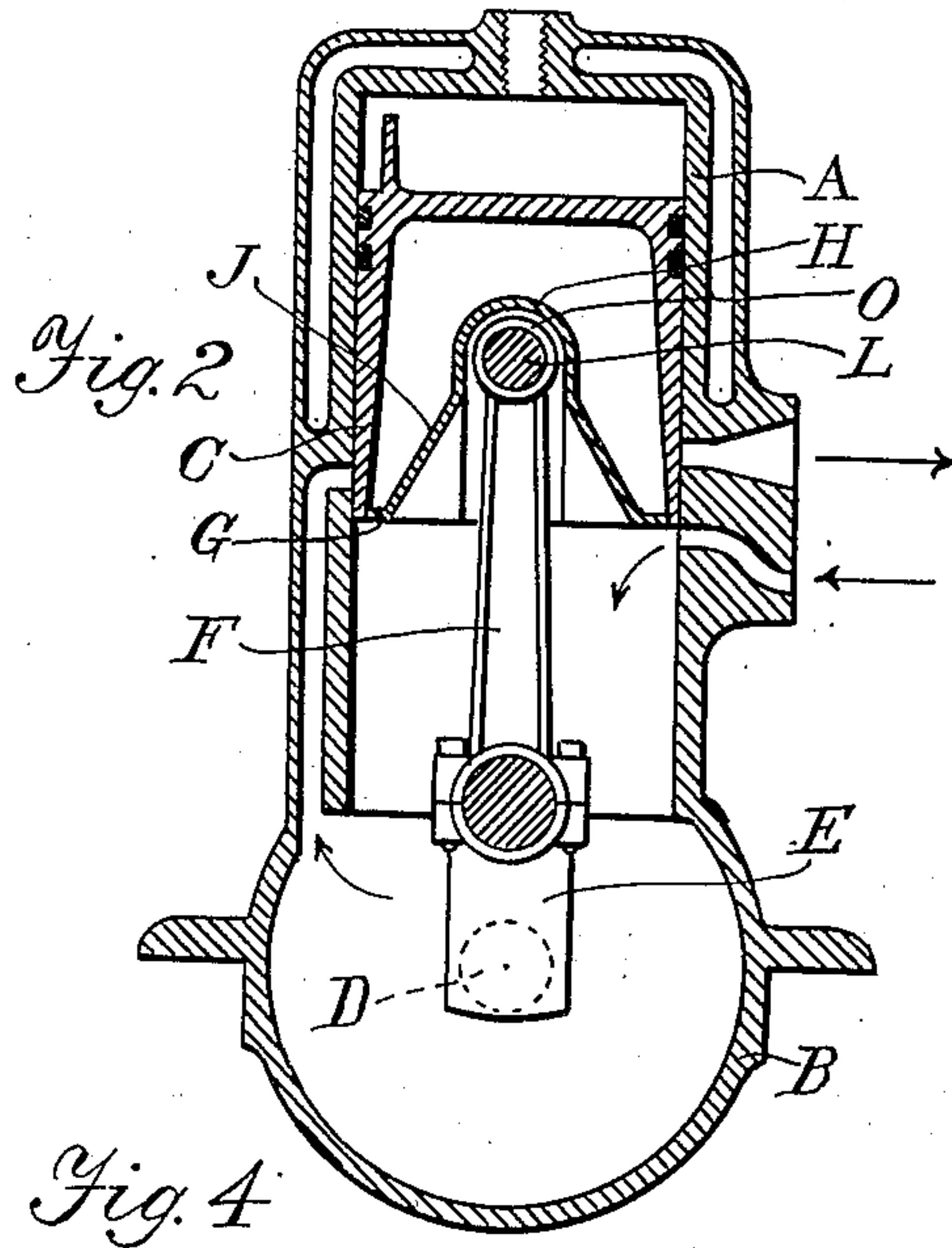
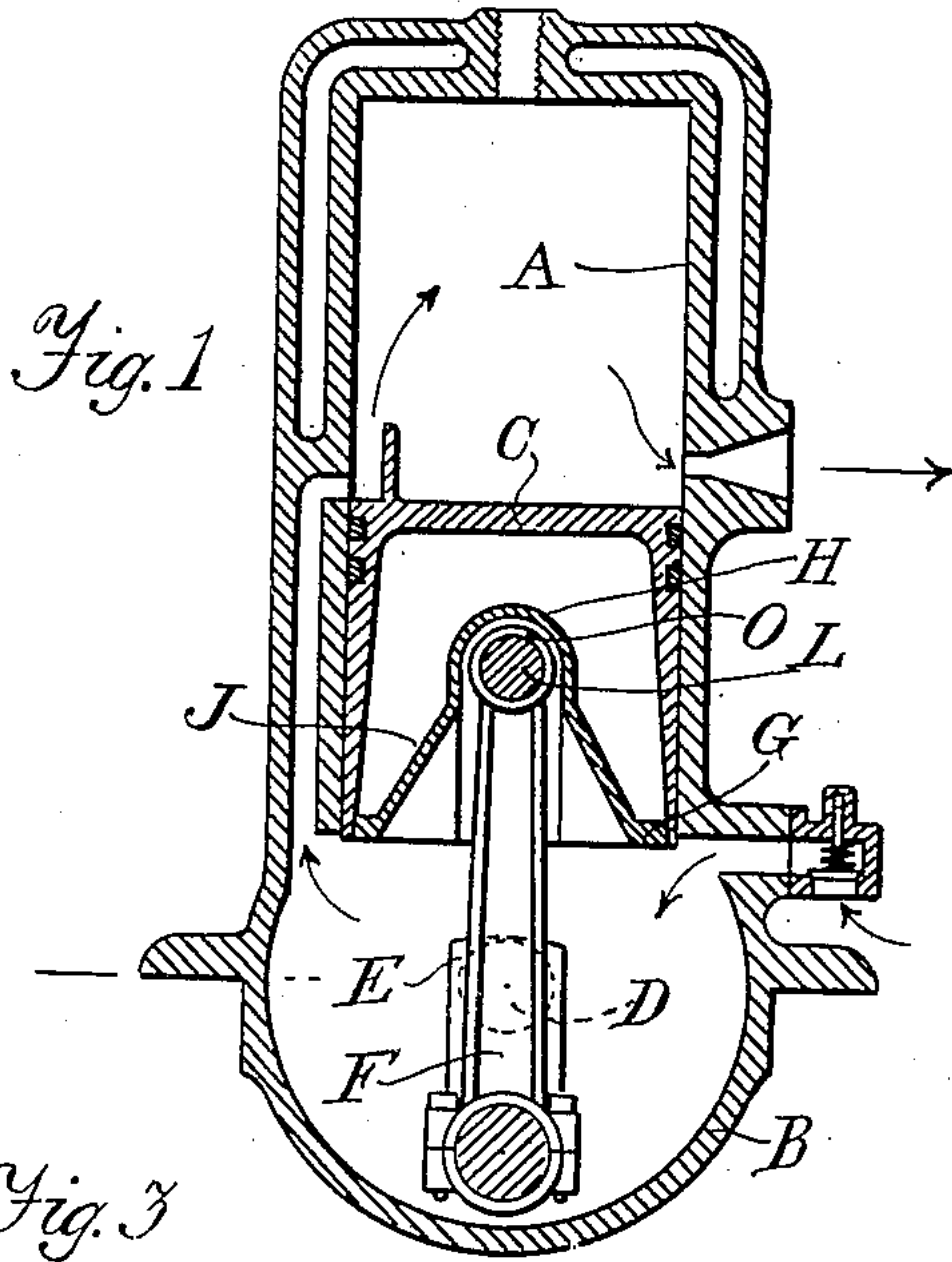


No. 876,636.

PATENTED JAN. 14, 1908.

W. T. HARDER.  
TRUNK PISTON CLOSURE.  
APPLICATION FILED MAY 11, 1907.



Witnesses  
Louis H. Galucia  
Arthur Rickman

Inventor  
William J. Harder.



# UNITED STATES PATENT OFFICE.

WILLIAM T. HARDER, OF NEW BEDFORD, MASSACHUSETTS.

## TRUNK-PISTON CLOSURE.

No. 876,636.

Specification of Letters Patent.

Patented Jan. 14, 1908.

Application filed May 11, 1907. Serial No. 373,098.

*To all whom it may concern:*

Be it known that I, WILLIAM T. HARDER, a citizen of the United States, residing at New Bedford, in the county of Bristol and State of Massachusetts, have invented certain new and useful Improvements in Trunk-Piston Closures, of which the following is a specification.

My invention relates to trunk piston closures, for internal combustion engines, applicable more particularly to pistons adapted for use in what have been termed "crank case compression engines."

The object of my invention is the construction of a piston having the ordinary characteristics as to its general features, its hollow interior being closed by a device of special construction and particular arrangement with respect to the said piston, whereby it is thought that less of the internal chamber of the piston is added to the internal space of the crank case than in any such engine constructions with which I am acquainted. By the use of my invention the internal space of the crank case compression chamber is reduced materially, with increased initial compression and augmented ultimate power of the engine resulting. The stated object I accomplish by fashioning and associating parts as illustrated in the accompanying drawings, of which

Figure 1 represents a vertical section of one form of crank case compression engine equipped with my invention, and Fig. 2 is a like section of another form of such engines also provided with my invention. Fig. 3 is a vertical section of the piston detached, the section being taken upon a plane transversely of the wrist pin, and Fig. 4 is a like vertical section taken on a plane in which lies the axis of the wrist pin. Fig. 5 is a perspective outline view of the piston closure detached. Fig. 6 is a fragmentary sectional view on line  $x-x$  of Fig. 4 looking upwardly. The scale of drawing in Figs. 3, 4, 5 and 6 is increased to render details clearer.

Like letters of reference are used to designate the same parts throughout the description and drawings.

The engine cylinder is marked A, the crank case B, the body of the piston C, the engine shaft D, the crank E, and the pitman or connection rod is referred to by the letter F, all of customary structure and operation.

The piston closure forming part of my invention comprises the device substantially as

illustrated in Fig. 5, having a disk base G the periphery of which is finished and fits tightly at the lower edge of the interior of the body of the piston against an annular surface also finished to effect a practically steam tight joint. Formed integrally with the disk base G is the upwardly-extending rectangular housing H, usually braced at the sides by the webs  $h$ , and having extensions J of its remaining sides, those extensions forming wedge-shaped chambers as best shown in Figs. 1 and 3, into which the pitman swings alternately during the operation. The orifices K in the sides of the housing near its top are for the passage of the wrist pin L.

In assembling the parts, the housing H is passed into the hollow of the piston C, and fits closely between the sockets M and N which project within the piston and receive and hold the ends of the wrist pin, which is ordinarily passed tightly through the sockets M and N and orifices K of the housing and movably through the head O of the pitman within the housing as shown. It is believed to be clear that after the closure has been thus assembled with the pitman head and wrist pin, and is placed within the cylinder of the engine, the closure cannot become displaced. It is, in fact, locked in position by the passage of the wrist pin. It is also thought to be made apparent that the interior of the trunk piston is shut off from the crank case chamber as far as it is practicable to do it, thereby materially reducing the compression chamber in size below what it would ordinarily be with the piston open.

Having now described my invention and explained the mode of its operation, what I claim is—

1. In a trunk piston closure, the combination with a piston, of a closure comprising a base having a housing thereon, the said housing being closed at the top and open at the bottom and having downwardly and outwardly inclined portions to permit the swing of the pitman rod, and means constructed and arranged to secure the said closure within the piston.

2. In a trunk piston closure, the combination with a piston, of a closure comprising a base having a housing thereon, the said housing being closed at the top and open at the bottom and having outwardly and downwardly inclined portions to permit the swing of the pitman rod, a wrist pin, the said pis-



ton and housing having apertures constructed to receive the said wrist pin whereby the closure is secured within the piston.

3. In a trunk piston closure, the combination with a piston, of a closure comprising a base having a housing thereon, the said housing being closed at the top and open at the bottom, a wrist pin, the said piston and housing having apertures constructed to receive the said wrist pin whereby the closure is secured within the piston.

4. In a trunk piston closure, the combination with a wrist pin, of a piston having internal projecting portions provided with passages adapted to receive the wrist pin, a piston closure comprising a base having a housing thereon, the upper part of said housing being arranged between the said project-

ing portions of the piston and having apertures for the passage of the said wrist pin whereby the closure is secured to the said piston.

5. A hollow trunk piston having its lower end closed by a plate or base having a housing thereon, the said housing being closed at the top and open at the bottom and having outwardly and downwardly inclined portions to permit the swing of the pitman rod, the said piston and housing having apertures constructed to receive a wrist pin.

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

WILLIAM T. HARDER.

Witnesses:

DANL. T. DEVOLL,  
ANNIE J. HAYES.