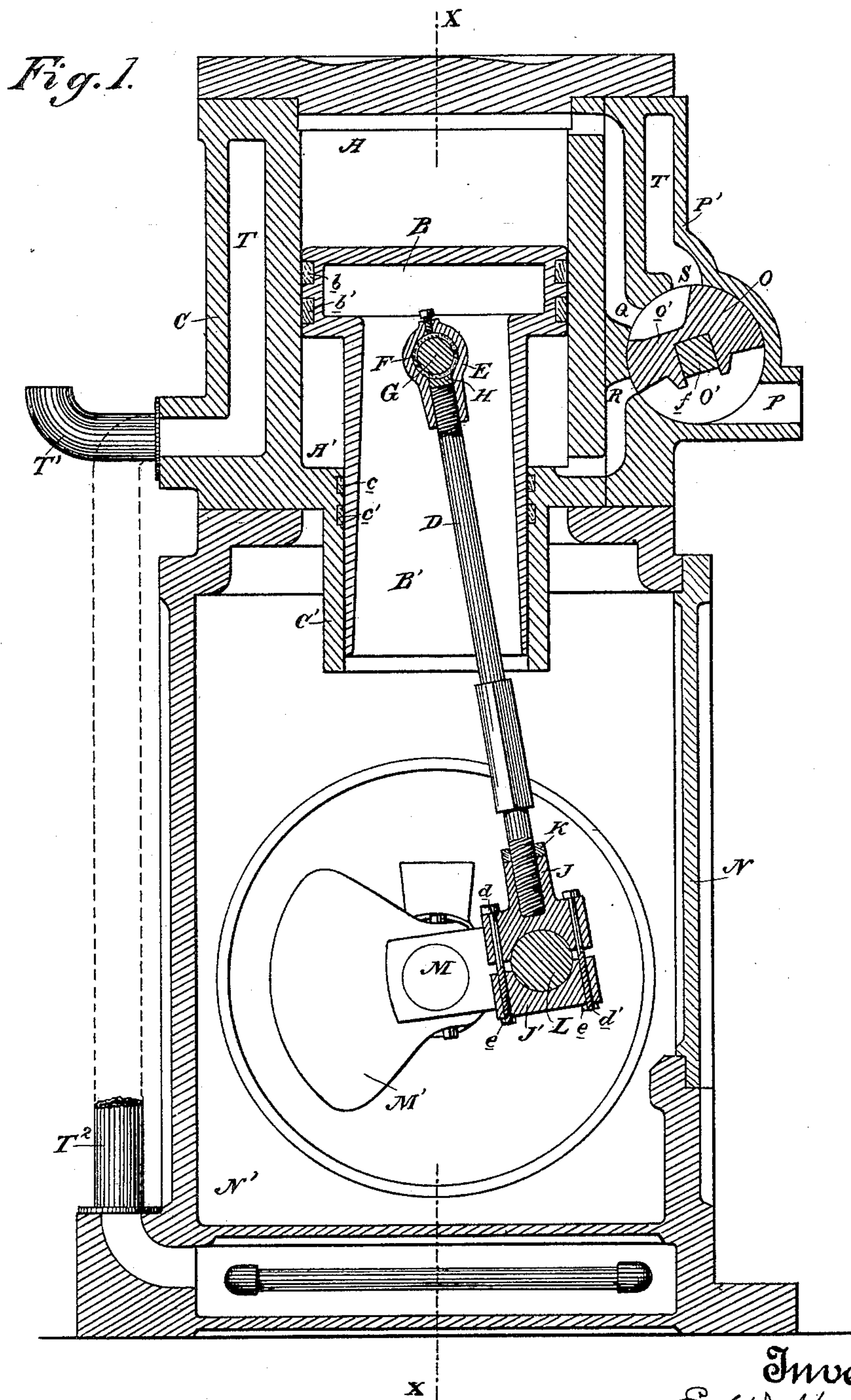


E. W. HAMLIN.  
COMPOUND CABINET ENGINE.

No. 399,524.

Patented Mar. 12, 1889.



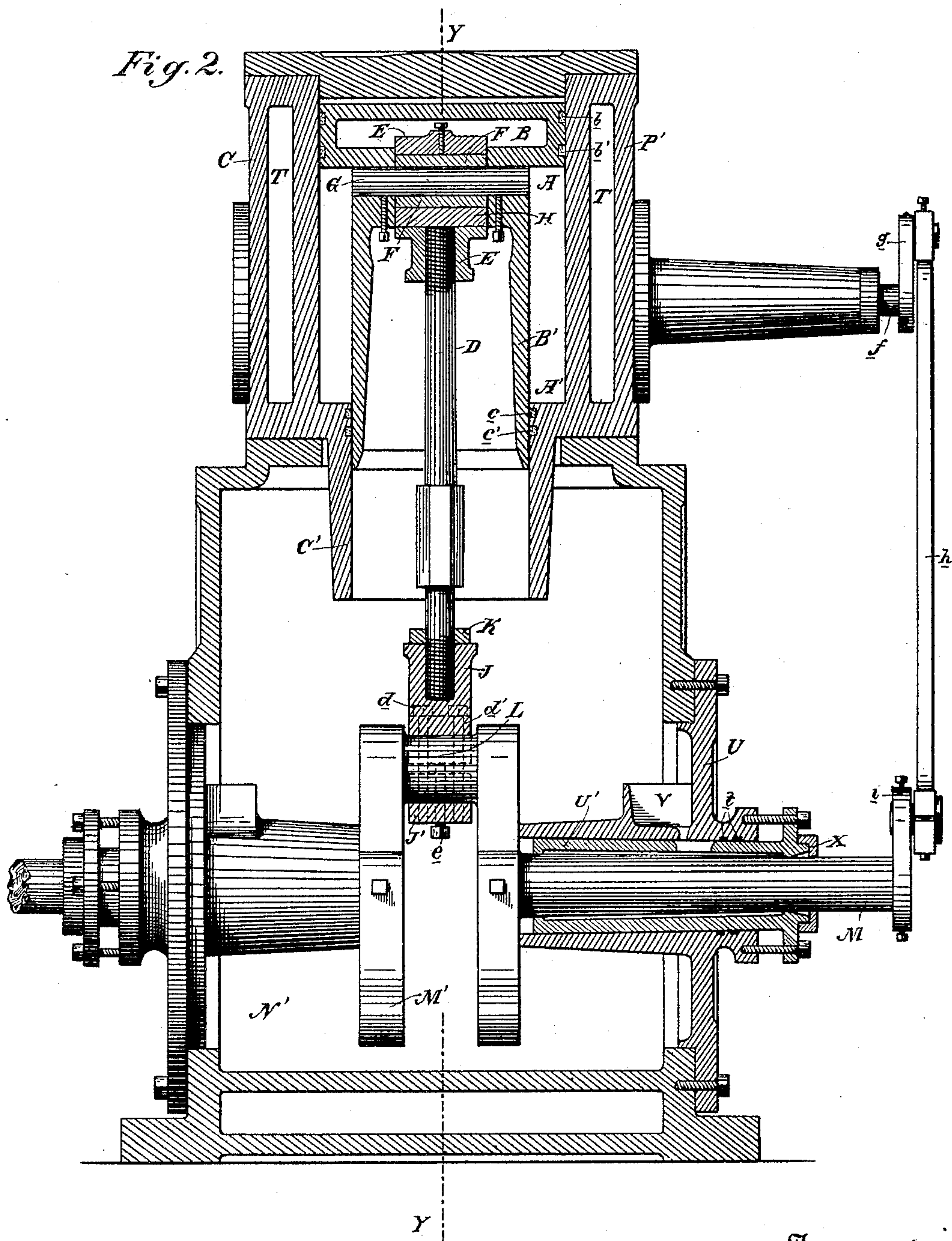
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# UNITED STATES PATENT OFFICE.

EARL W. HAMLIN, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR TO G. G. WICKSON, OF SAME PLACE.

## COMPOUND CABINET-ENGINE.

SPECIFICATION forming part of Letters Patent No. 399,524, dated March 12, 1889.

Application filed January 24, 1888. Serial No. 261,775. (No model.)

*To all whom it may concern:*

Be it known that I, EARL W. HAMLIN, of the city and county of San Francisco, State of California, have invented an Improvement in a Compound Cabinet-Engine; and I hereby declare the following to be a full, clear, and exact description of the same.

This invention relates to that class of compound engines which employ one steam-cylinder and the trunk form of piston-head, the working parts being inclosed for automatic lubrication.

It consists in certain details of construction which will be more fully set forth in the following description and drawings, to which reference is made, like letters showing like parts in all the views.

Figure 1 is a vertical section taken through Y Y of Fig. 2 and in a plane transverse to the engine-shaft. Fig. 2 is a vertical section taken through X X of Fig. 1 and in the longitudinal plane of the axis of the engine-shaft.

A and A' are the high and low pressure ends, respectively, of the compound steam-cylinder.

B is the piston-head proper, which fits this cylinder, and is packed with the usual form of packing-rings, *b b'*, and is hollowed out to lighten it.

B' is the trunk portion of this piston-head, of cylindrical form, extending through the lower end of the steam-cylinder, which is formed into a sleeve-shaped guide and stuffing-box, and which forms an extension of the steam-cylinder casting C. The sleeve C' is packed steam-tight by the rings *c c'*, as shown, and by this construction the inner surface of the guide forms the joint instead of the outer surface of the trunk. This enables me to use a shorter guide without danger of the packing-rings being exposed by the reciprocation of the piston which might occur if the rings were upon the trunk.

D is the connecting-rod extending from the piston-head within its trunk portion to the crank-pin L of the engine-shaft. The connecting-rod has a solid box yoke or strap, E, into which the upper end of the connecting-rod D screws. This yoke incloses an anti-frictional ring, F, which encircles the pin G,

and this pin is held securely within the trunk piston-head. The ring F is cut on one or both sides to provide for adjustment for the wear which occurs at this point. This end of the connecting-rod abuts against a block, H, also inclosed within the yoke E, this block fitting against the ring F. The connecting-rod has a polygonal surface formed upon it, to which a wrench may be applied, so as to screw the rod into the yoke E for the purpose of forcing the block H against the ring F, thus taking up lost motion from wear. A set-screw upon the upper side of the yoke prevents the ring from turning within the yoke. The crank-shaft end of the connecting-rod also screws into the box-yoke formed in two parts, J J'. The screw-threads in the part J correspond in their direction and pitch with those at the opposite end of the connecting-rod in the yoke E, so that when the connecting-rod is screwed farther into the yoke E it is correspondingly screwed out of the yoke J, thus maintaining a uniformity of length between the centers, whatever adjustment may be made. This rod is secured at any point of adjustment by the lock-nut K, which screws down against the yoke J. The two halves J and J' of this yoke inclose the crank-pin, and are held together by bolts or cap-screws *d d'*, and these bolts are locked by a set-screw, *e*, which screws through one half, J', and against the other half, thus holding the two parts rigidly at any distance apart which may be desired. By this construction lost motion is easily taken up and the joint always kept suitably tight. These adjustments are easily accessible by removing the inspection door-plate N, which is secured on one side of the inclosing case or cabinet.

O is the valve which controls the distribution and retention of the steam at either end of the compound cylinder. In the present case I have shown it of an oscillating pattern, which somewhat resembles a self-seating Corliss valve having an enlarged recess or chamber, O', and the increased lap-bridge *o'* to adapt it to its compound function. The valve-stem *f* oscillates the valve by means of a rocker-arm, *g*, which receives its motion from the valve-rod *h*, and this rod is connected



with and operated by the valve-crank *i*, secured at the end of the main engine-shaft *M*.

*P* is the opening through which steam is admitted to the valve-chamber.

5 *Q* is the steam-port which admits steam to the high-pressure end *A*.

When the valve has been turned sufficiently to expose this port, the steam admitted to this portion of the cylinder surrounds the trunk *B'*, acting at its highest pressure upon the reduced piston-surface, which is exposed to it around the trunk. This high-pressure steam forces the piston up to the rear or low-pressure end of the steam-cylinder, when the valve 15 will have turned so that its recess *o'* will include the steam-port *Q* and also the steam-port *R*, which latter port leads to the rear or low-pressure end, *A'*, of the cylinder, where, by reason of the increased area of the piston-head presented for the steam to act upon, the piston is again returned by the force of the expanding steam to the lower or high-pressure end, *A*, of the cylinder. When the port *Q* is again uncovered, the recess *O'* in the valve 25 will include the steam-port *R* and the exhaust-port *S*, so that upon the next reciprocation of the piston the steam will be allowed to exhaust through this port.

The exhaust-port *S* communicates with the exhaust-jacket *T*, which surrounds the cylinder, and from this it is conducted either into the open air by an exhaust-pipe, *T'*, or preferably through a pipe, as shown at *T''*, into a water-heating chamber at the base of the engine, within which coils of pipe are placed so that the feed-water for the boiler may pass from the pump through these coils before entering the boiler. The valve-chamber *P'*, with all its ports, is preferably cast separately from 35 the main cylinder casting to secure accuracy in the formation of the ports and to decrease the cost of making.

I prefer making the crank-shaft *M* with a crank and a counter-balance, *M'*, to equal the weight of the crank-pin, and that added by the connecting-rod. The journals of the crank-shaft are composed of a main casing, *U*, which is secured to the inclosing case or cabinet *N'*, and it is provided with an anti-friction lined shell, *U'*, the interior of which is tapered so as to fit that portion of the shaft *M* inclosed by it, the shaft being similarly tapered on its exterior surface. This inclosing-shell is made adjustable within its main 45 casing, and is packed with rings *t* between the two.

The adjustment of the shell upon the tapering shaft *M* is made similar to that of the

yoke *J J'* by means of two bolts or cap-screws to hold the shell in, and two set-screws at right angles with these to hold it out and to act as a lock for the bolts when the proper adjustment has been obtained. A stuffing-box, *X*, packs the shaft and shell joint, and an automatic lubricating-cup, *V*, receives the lubricating-spray from the tank or casing and conveys it to the shaft-journal, from which it is again returned to the tank for further use. 60

The object to be attained in this invention is a high grade of economy and proficiency when applied to smaller sizes of compound engines, and especially under a high rate of speed. 70

These engines may be constructed either as uprights or horizontals, the results being the same in either case. 75

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is— 80

1. The engine-cylinder and sleeve or guide with a piston fitted therein and having a hollow cylindrical trunk projecting outwardly through the sleeve, the yoke *E*, fitting a pin within the trunk and inclosing the anti-frictional ring *F*, yoke *J J'*, fitted to the crank-pin at the opposite end, and the intermediate connecting-rod, *D*, having screw-threads of the same direction and pitch cut upon its opposite ends, so that one end may be screwed into the yoke *E* and act against the block *H* to close the ring *F* and take up wear at that end, and be equally screwed out of the strap or yoke upon the crank end, so that the distance between the two centers will remain the same, substantially as herein described. 85 90 95

2. The engine-cylinder having the piston of the cylindrical hollow-trunk pattern extending outward through a guide-sleeve at one end, the pin fixed inside the trunk, and the connecting-rod extending from said pin to the crank with screw-threads cut at opposite ends, so that adjustment for wear upon the pin *G* may be made by turning the connecting-rod without lengthening the distance between the two points, in combination with the two part yoke *J J'*, the cap-screws *d d'*, and the set-screw *e*, substantially as herein described. 100 105

In witness whereof I have hereunto set my hand. 110

EARL W. HAMLIN.

Witnesses:

S. H. NOURSE,  
H. C. LEE.