

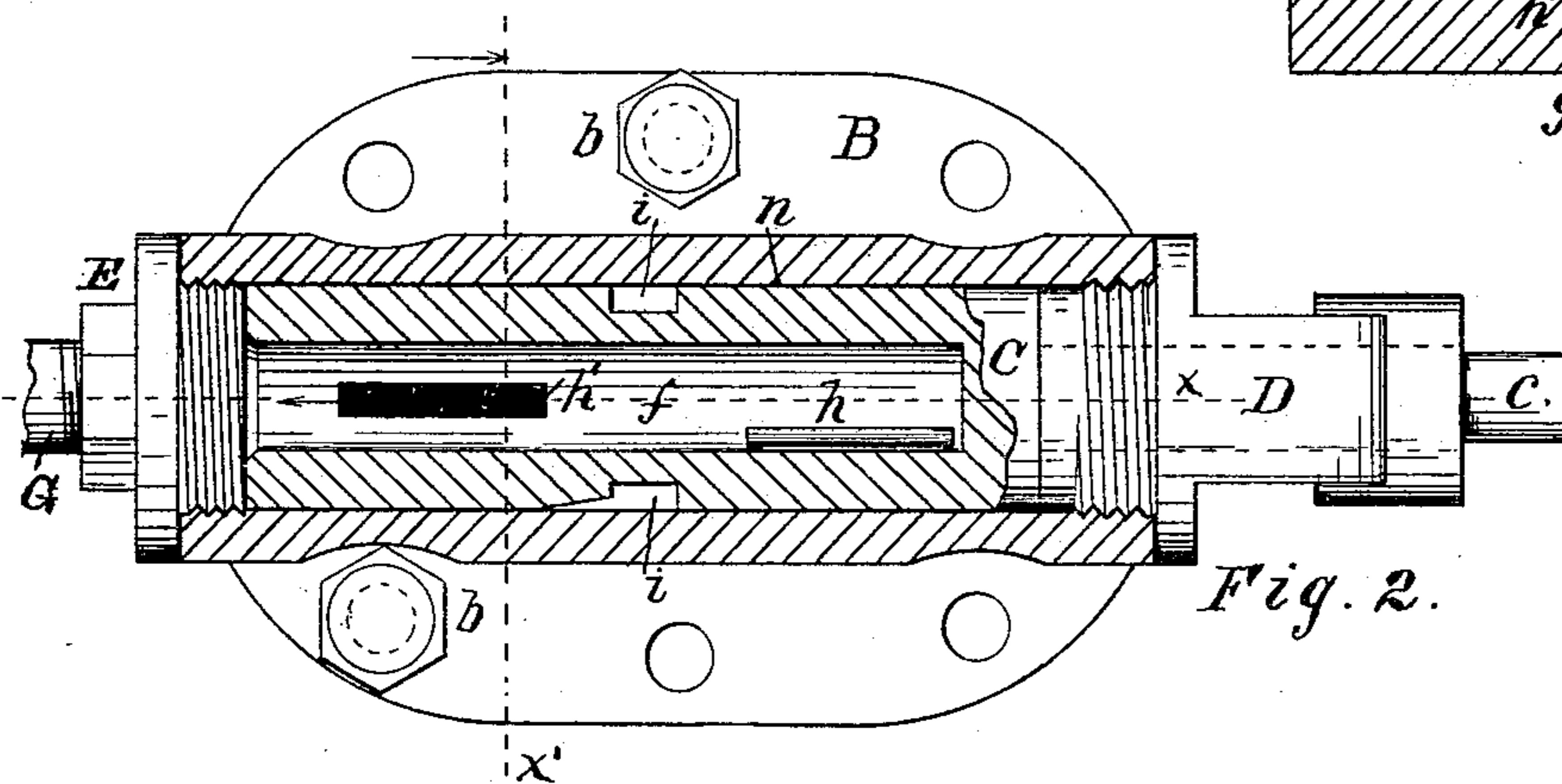
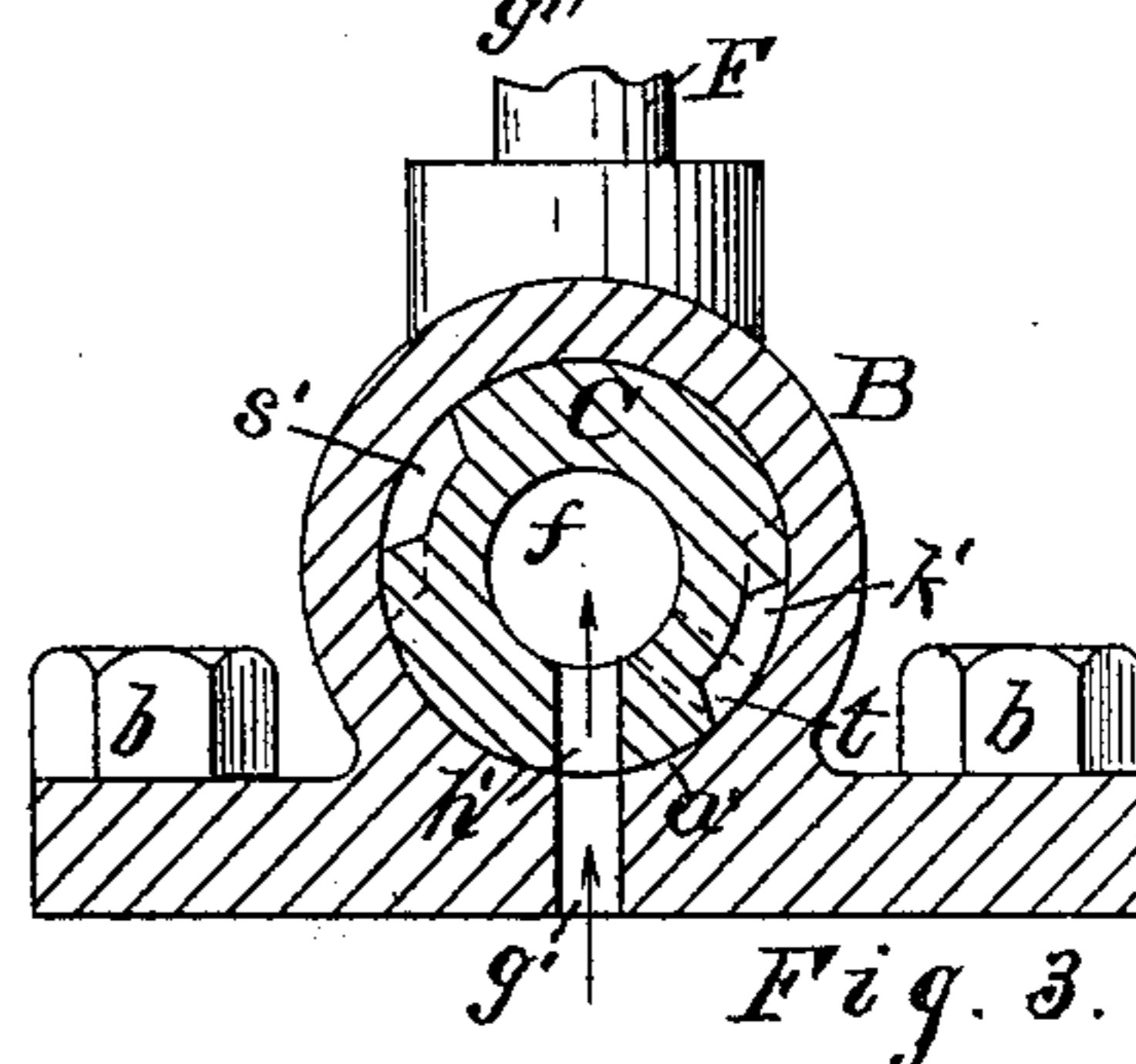
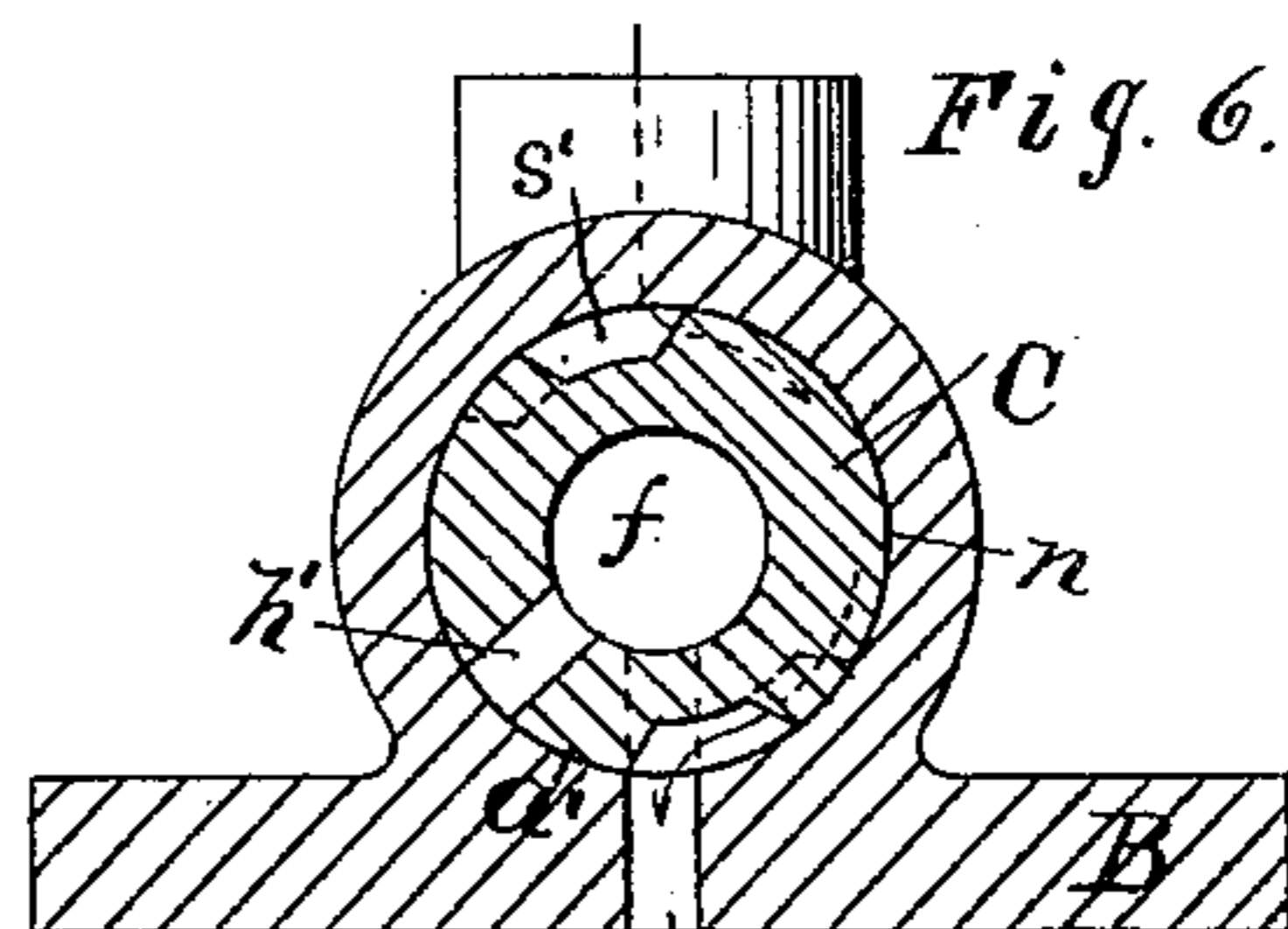
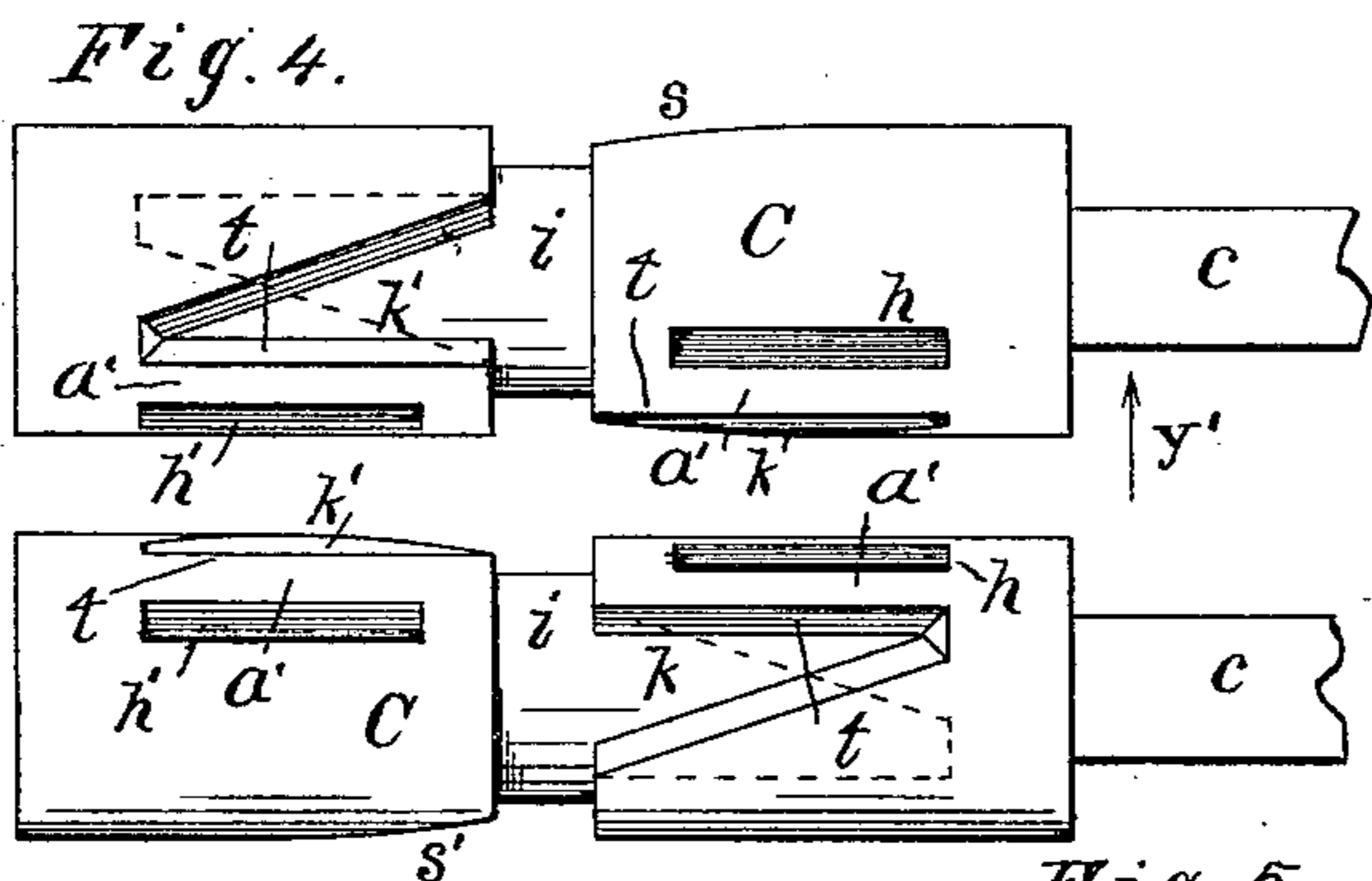
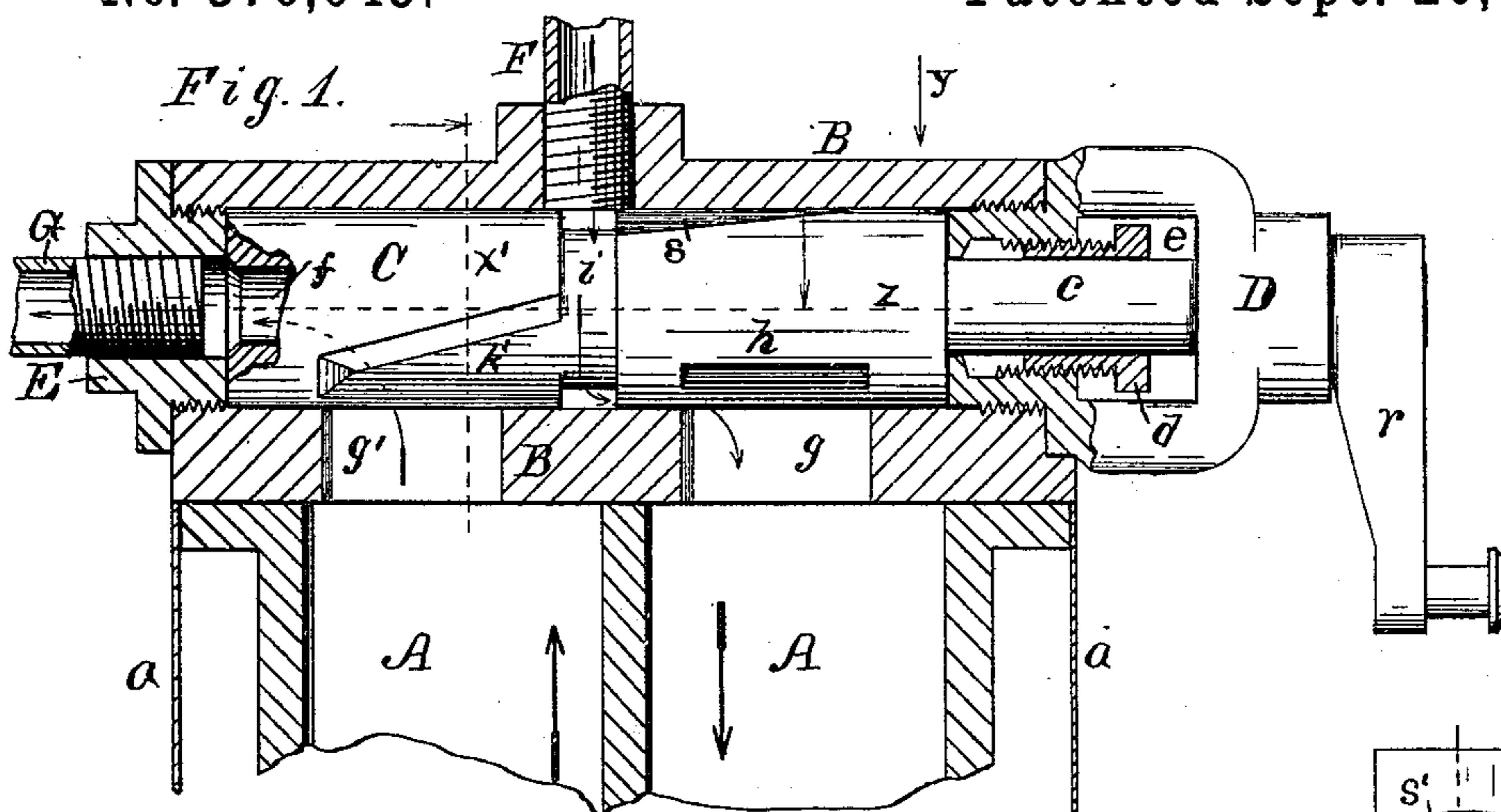
(No Model.)

E. R. BRYANT.

STEAM VALVE.

No. 370,043.

Patented Sept. 20, 1887.



Attest:

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Att'y

# UNITED STATES PATENT OFFICE.

EDWIN R. BRYANT, OF ROCHESTER, NEW YORK, ASSIGNOR TO THE ROCHESTER MACHINE TOOL WORKS, OF SAME PLACE.

## STEAM-VALVE.

SPECIFICATION forming part of Letters Patent No. 370,043, dated September 20, 1887.

Application filed November 15, 1886. Ser'al No. 218,883. (No model.)

*To all whom it may concern:*

Be it known that I, EDWIN R. BRYANT, of Rochester, in the county of Monroe and State of New York, have invented a new and useful Improvement in Steam-Valves, which improvement is fully set forth in the following specification and shown in the accompanying drawings.

The object of my invention is to produce an improvement for steam-valves, the same being hereinbelow fully set forth, and more particularly pointed out in the claim.

Referring to the drawings, Figure 1 is a central vertical section of the valve case or cover for the cylinders and other parts, taken as on the dotted line *x* in Fig. 2, and viewed as indicated by the arrow pointed thereon, a part of the valve being broken out and sectioned upon the same plane; Fig. 2, a view of the same, seen as indicated by arrow *y* in Fig. 1, the valve and the case or cap being centrally horizontally sectioned, as on the dotted line *z* in Fig. 1; Fig. 3, a transverse section of the valve-case and valve, taken as upon the dotted lines *x'* in Figs. 1 and 2, and viewed as indicated by the arrows pointed thereon, drawn to further show the relation of the openings in the valve and the valve case or cover, the valve being in one of its extreme positions in which one cylinder is being exhausted of its steam; Fig. 4, a side elevation of the valve, drawn to better show the external form thereof; Fig. 5, a view of the same, seen as indicated by arrow *y'* in Fig. 4, the valve being turned upon its axis one-fourth around; and Fig. 6, a view of the valve and the case or cover similar to that shown in Fig. 3, the valve being turned to the other extreme position from that shown in Fig. 3, for the purpose of showing the other relation of the various openings.

Referring to the parts, A is a pair of equal parallel steam-cylinders, substantially of common kind, cast or formed in one piece, surrounded by a jacket, *a*.

B is a cover for the upper ends of said cylinders, being held to the latter by ordinary cap-screws or bolts, *b*, to form a steam-tight joint between the parts. This cover is bored to form a cavity, *n*, in which to receive a

valve, C, the axis of the bore being at right angles to the axes of the cylinders and in the plane thereof.

D is a stopper fitted by a screw-thread to one end of the bore of the valve-case, out through which the stem *c* of the valve passes. This stopper is in the form of an open frame, containing within its cavity or opening *e* a stuffing-box with its follower *d*, the latter being thus inclosed and better protected, the valve having a bearing in the stopper outside of the opening *e*, being expanded to form an opening, *e*. E is a screw plug or stopper fitted to close the opposite end of the bore of said valve-case, the inner ends of these stoppers bearing, respectively, against the ends of the valve, forming stops or rests therefor to prevent end-wise play. The live steam is taken into the valve case or cover through a pipe, F, at the top, and the exhaust-steam passes out through the pipe G, inserted in the stopper E. The valve-case is formed with two rectangular openings, *g g'*, one leading into the interior of either cylinder for the inflow of live steam and the outflow of exhaust-steam. The cylinders take steam at one end only.

The valve is cylindrical and formed with an axial cavity, *f*, opening out at the end opposite the stem thereof. The valve is further formed with longitudinal steam-ports *h h'*, corresponding to the ports *g g'* in form and size, and in position to alternately register with said ports *g g'* as the valve is rocked in the case. The ports *h h'* communicate between the exterior surface of the valve and the interior cavity, *f*, thereof. The ports *g g'* are in the same plane—that is to say, the plane of the axes of the cylinders—but the ports *h h'* of the valve are not in the same plane, one being radially in advance of the other, so that as the valve is rocked in the case its ports will be brought alternately to register with the ports *g g'* of the case, as stated.

At the middle of its exterior the valve is formed with a lateral groove, *i*, immediately opposite the inflow-opening for the steam, from which similar and equal external longitudinal depressions, *k k' s s'*, extend toward either end of the valve. The depression *s'* is opposite the depression *k'*, the depression *s*

opposite the depression *k*, and the plane of the pair *k' s'* alternates with the plane of the pair *k s*—that is to say, the planes of the two pairs named form right angles. The ports *h h'* lie at equal distances to the right and left, respectively, of the groove *i*, and the depressions *k s k' s'* extend longitudinally to the distance of the farther ends of said respective ports. The depressions *k k'* and the groove *i* in the exterior of the valve together form passages for the live steam to the respective cylinders, said depressions being brought alternately over the ports *g g'* as the valve is rocked. These depressions or passages *k k'* and *s s'* are tapered from the groove *i* toward their extreme ends, the narrow ends having the same width as the ports *g g'*. This form of steam passages allows an ample flow of steam to and from said ports, while by thus forming them I gain a much greater wearing-surface for the valve than is possible when they are made rectangular, as heretofore.

The valve is rocked in the case by means of an arm, *r*, or other simple device, secured to the projecting end of the valve-stem *c*. The depressions *s s'* are simply steam-cavities to balance the respective opposing steam-passages *k k'*, and are of the same size or area. This causes the steam-pressure exerted laterally against the valve to be equal, or balance on opposite sides. The working sides *t* of the passages *k k'* are formed truly longitudinal, so as to register nicely with the straight longitudinal sides of the respective ports *g g'* as the valve is rocked, so that the openings formed for the passage of steam shall be true and well defined. The partitions or bridges *a'* between the ports *h h'* and passages *k k'* are also formed of a definite width, to the end that the lap and lead for the valve shall be as desired. The pistons of the cylinders work against cranks that are diametrically opposite on the shaft, on account of which said pistons always move in opposite directions from which, when either cylinder is being filled with live steam, the other is being exhausted of spent steam.

The valve operates as follows: When turned, for instance, so the opening *h'* registers with the opening *g'*, there will be a continuous passage from the interior of the left-hand cylinder

der out through the central cavity of the valve to the open air through the pipe *G* for the spent steam in said cylinder. At the same time the passage *k* will be over the opening *g* and form a continuous passage from the pipe *F* through the groove *i*, said passage *k*, and opening *g* to the interior of the right-hand cylinder for the live steam. When the valve is rocked to its other extreme position, the openings will be reversed—that is to say, the opening *h* will register with the opening *g*, forming an exhaust-passage for the steam in the right-hand cylinder, while the passage *k'* will be over the opening *g'* to allow the left-hand cylinder to fill with live steam.

This valve and the combined parts would work equally well were the direction of the flow of steam reversed—that is to say, the live steam might be taken in at *G* through the valve, and the exhaust-steam pass out upon the exterior of the valve through the opening at *F*.

Instead of two cylinders, a battery of four or other number may be employed, there being a cover and valve provided suitable to the number of cylinders combined in any given case.

What I claim as my invention is—

In combination with steam-cylinders, a cover therefor formed with a bore opening out at the ends thereof, and longitudinal steam-ports leading from said bore into the respective cylinders, stops for the open ends of said bore, and a rocking valve in said bore having its respective ends pressed by said stops, said valve being formed with an axial cavity opening out at one end thereof into an opening through one of said stops, longitudinal steam-ports communicating between said cavity and the interior surface of said bore, an external transverse groove, and longitudinal steam-passages and opposing depressions leading from said groove, said passages and depressions being each formed with one longitudinal side and one inclined side, substantially as and for the purpose set forth.

E. R. BRYANT.

Witnesses:

E. B. WHITMORE,  
M. L. McDERMOTT.