

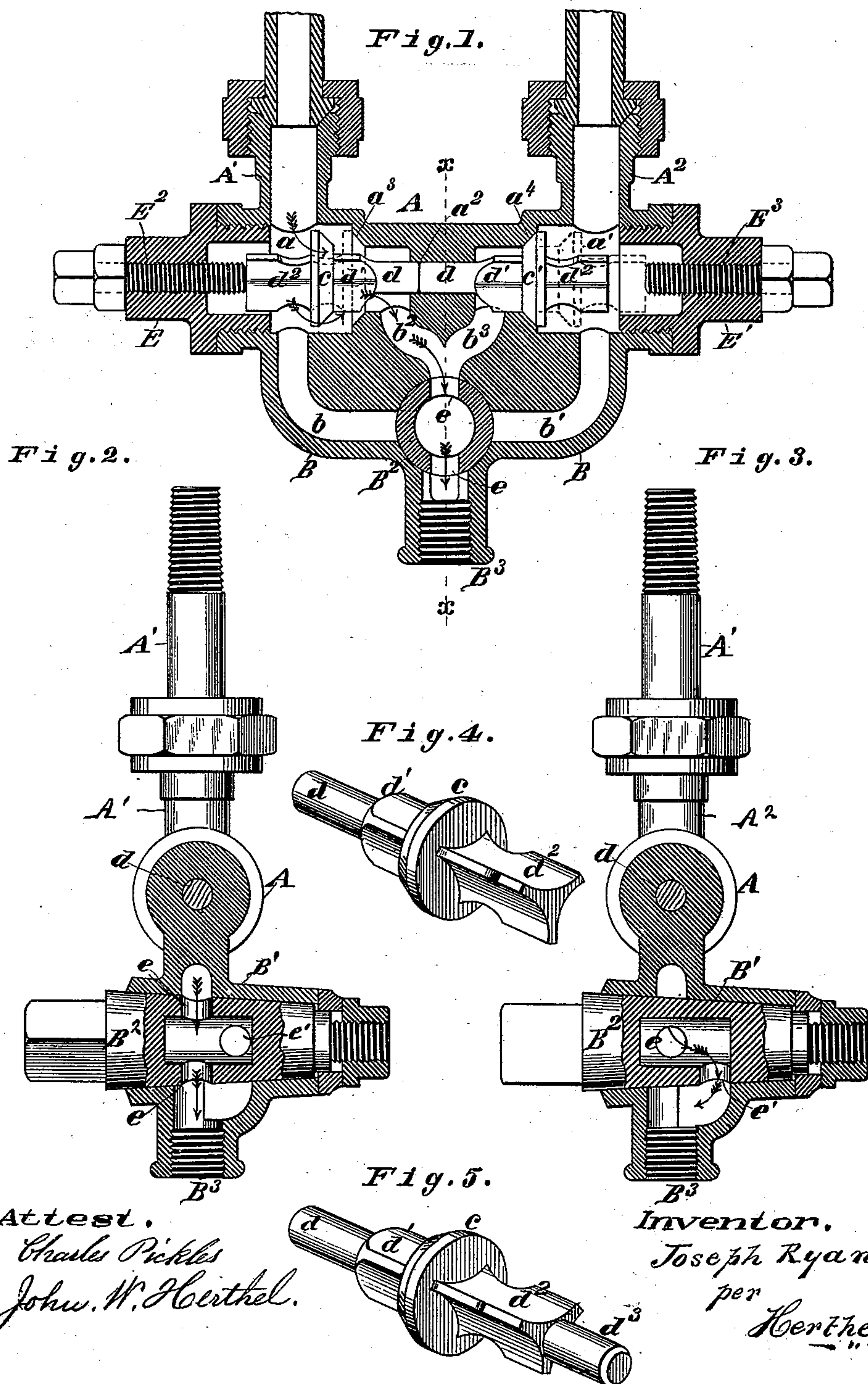
(No Model.)

2 Sheets—Sheet 1.

J. RYAN.
Cylinder Cock.

No. 235,101.

Patented Dec. 7, 1880.



Attest.

Charles Pickles
John W. Herthel.

Inventor.

Joseph Ryan
per Herthel & Co.

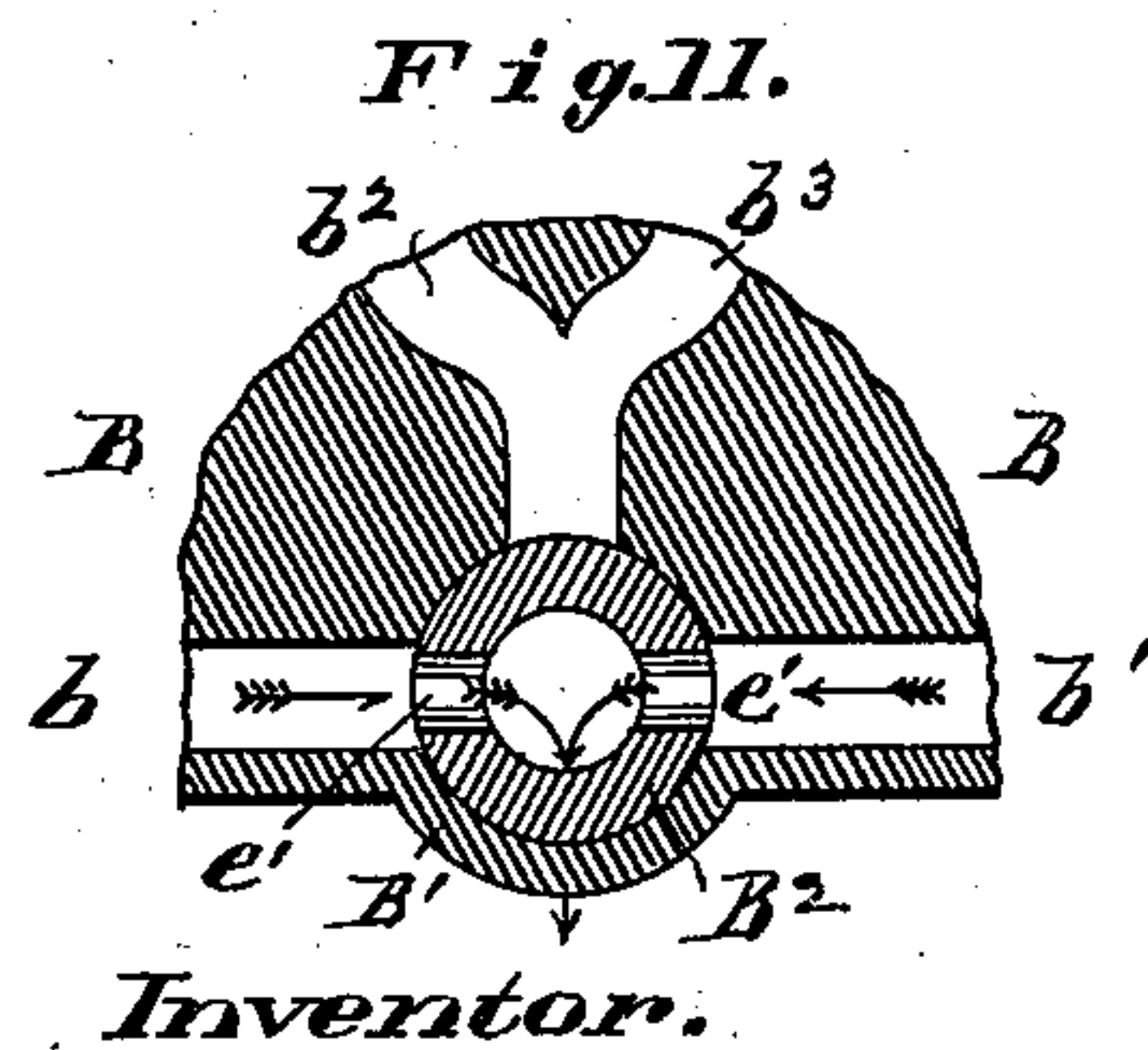
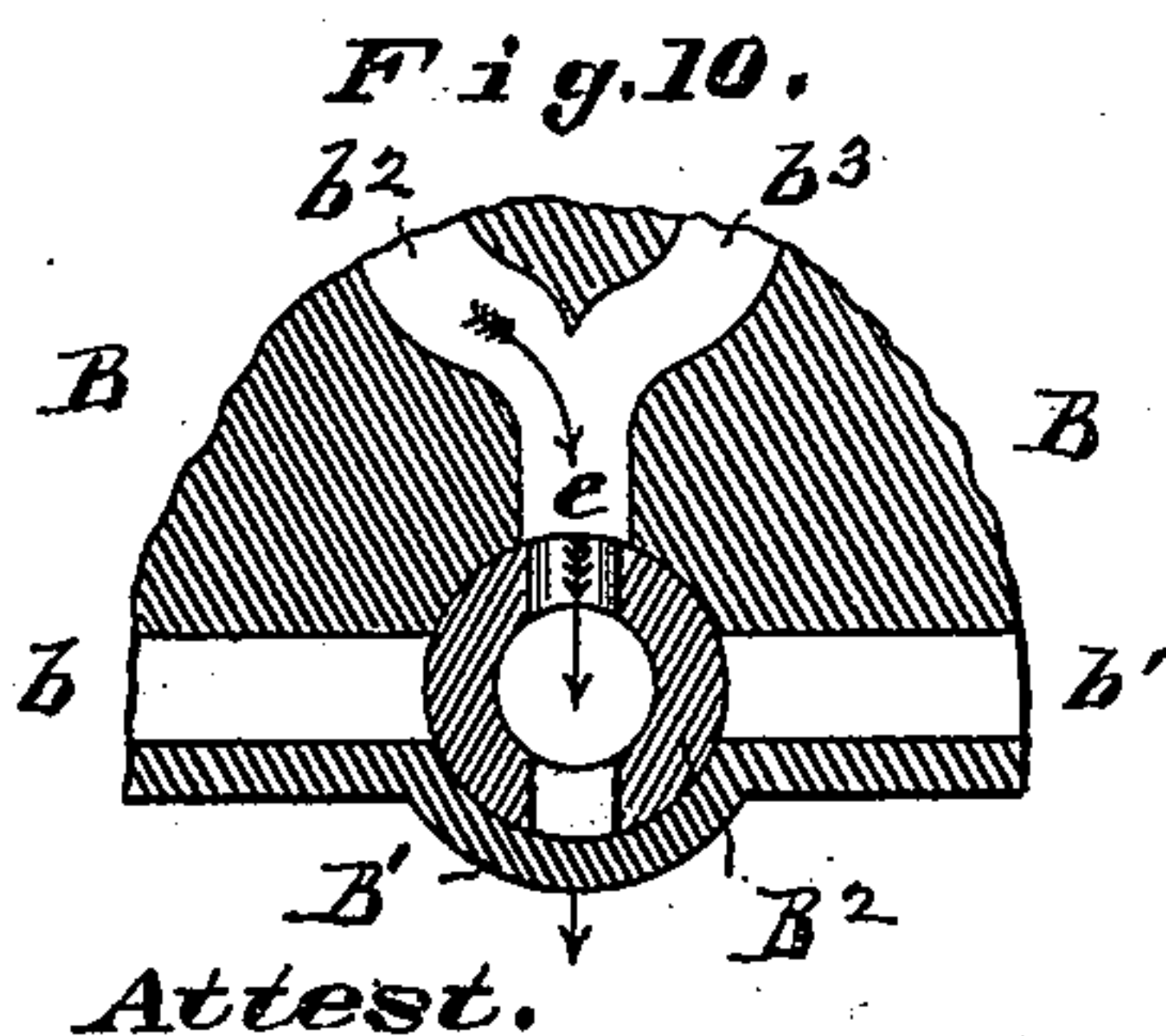
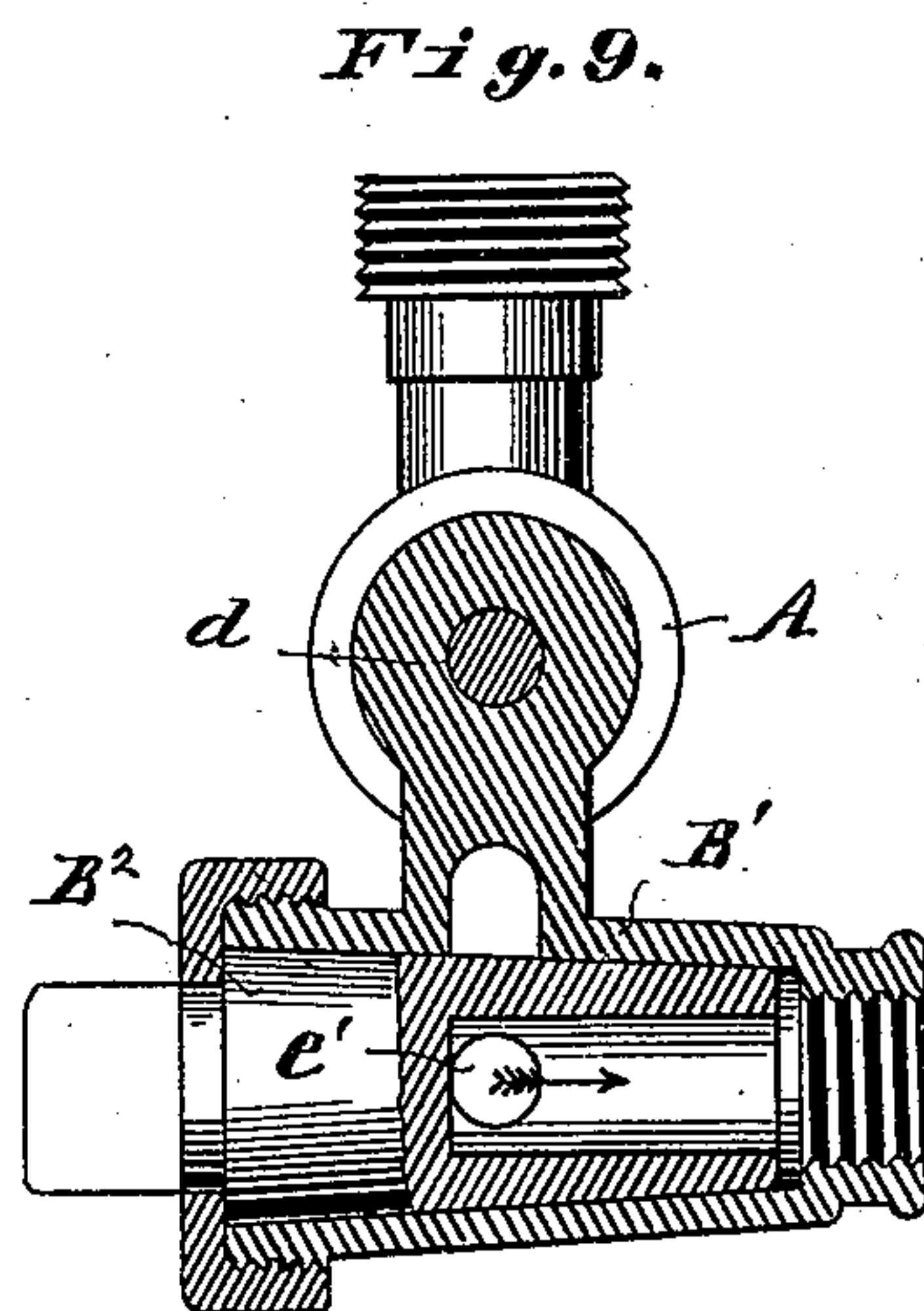
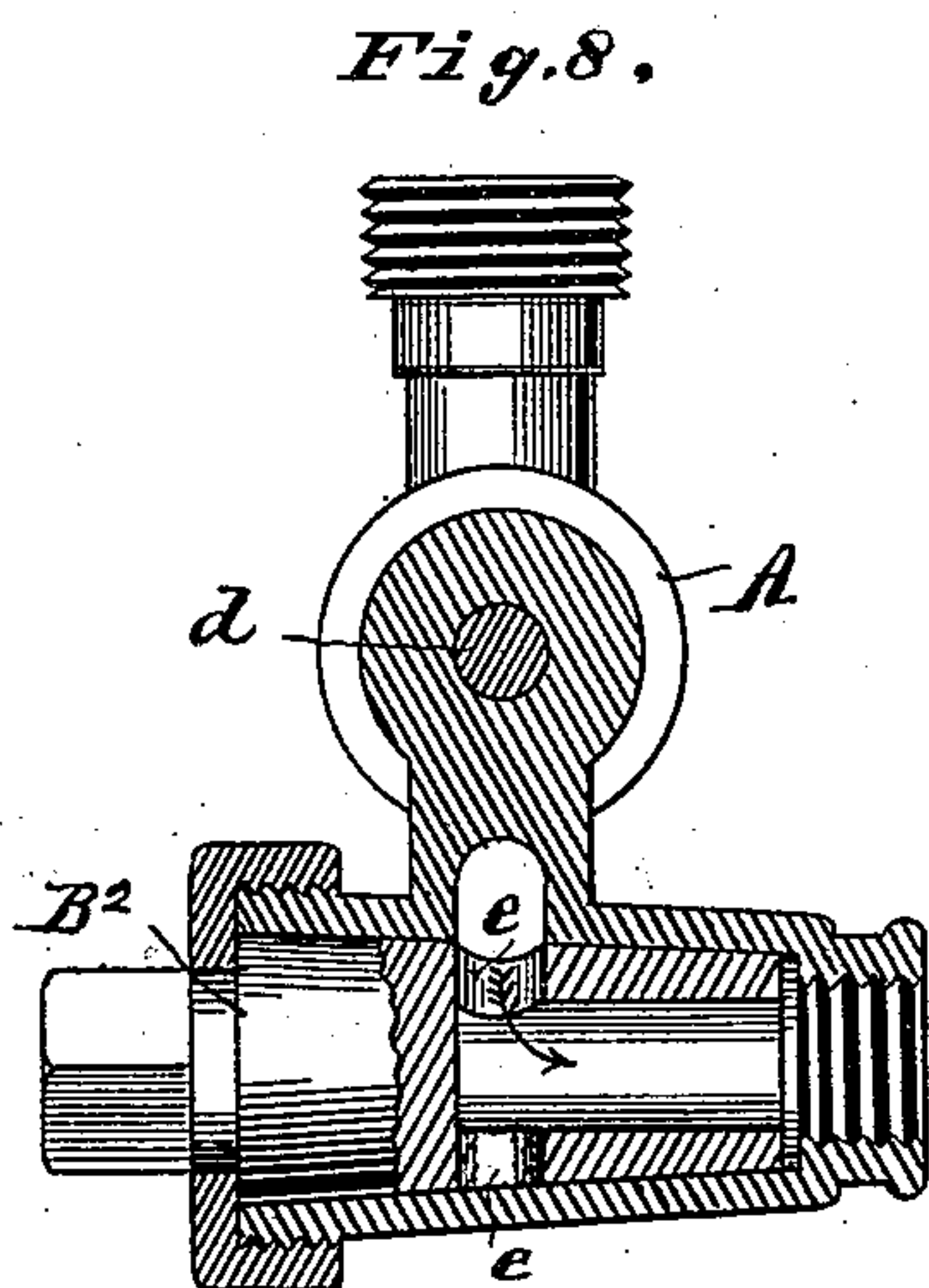
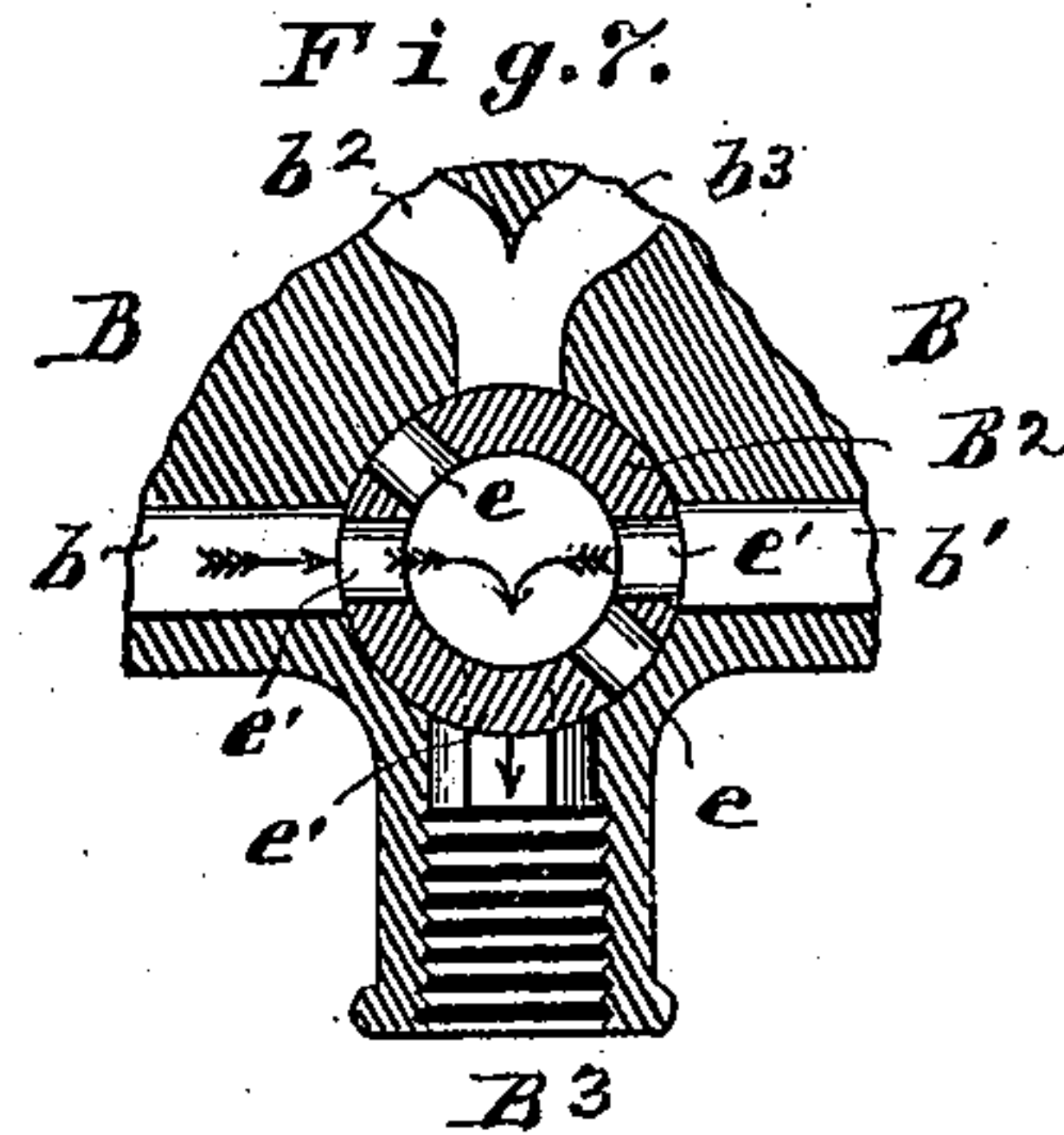
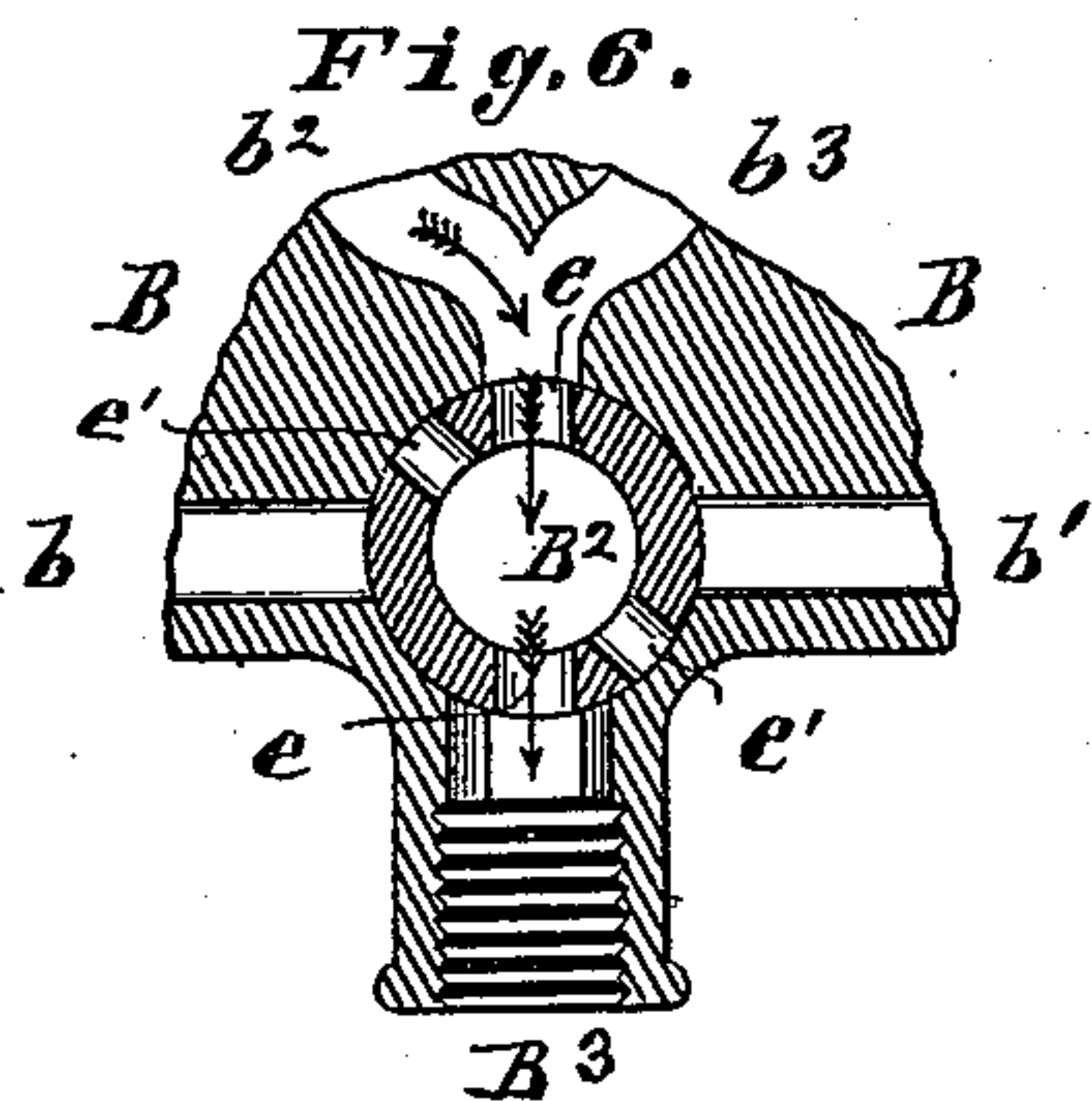
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2 Sheets—Sheet 2.

J. RYAN.
Cylinder Cock.

No. 235,101.

Patented Dec. 7, 1880.



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UNITED STATES PATENT OFFICE.

JOSEPH RYAN, OF ST. LOUIS, MISSOURI.

CYLINDER-COCK.

SPECIFICATION forming part of Letters Patent No. 235,101, dated December 7, 1880.

Application filed April 24, 1880. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH RYAN, of St. Louis, Missouri, have invented a new and useful Improved Automatic Cylinder-Cock, of which the following is a specification.

My invention relates to improvements in cylinder-cocks or devices for removing the condensation from steam-engine cylinders; and the objects of my improvements are, first, to construct the reciprocating valves of the cylinder-cock so as to be better able to withstand the cutting or abrasive action of the sand or grit contained in the water, achieve a more even and uniform wear on part valves and their seats, be more reliable in operation, and more durable in use; secondly, to provide but a single key or cock to serve for both purposes—viz., a “blow-off” cock, also the cock wherewith to regulate the final discharge of the waters of condensation; thirdly, to provide reliable acting means with which the reciprocating action or throw of the valves can be regulated to suit the discharge as to requirements from the valve-chambers; fourthly, to provide an improved cylinder-cock and blow-off cock capable of being applied to long or short stroke engines, to successfully drain same, prevent back-pressure, &c. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Sheet I, Figure 1 is a plan view of the cylinder-cock and blow-off cock, the main barrel and its interior parts, as well as sub-barrel and its single key or cock, being shown in horizontal section. Figs. 2 and 3 are, respectively, enlarged views, each taken on the line $x x$, showing the vertical key or cock and its parts in sectional elevation. The inlet branch pipe in side view, Fig. 2, specially shows the key positioned to suit the purposes of a cylinder-cock proper. Fig. 3 shows the same parts when used as a blow-off cock. Figs. 4 and 5 are each perspective views of the improved valves employed, Fig. 5 being a modification of Fig. 4.

Sheet II represents a modification specially of the single cock or key employed to control the respective ports or water-passages. Figs. 6 and 7 show plan sections of such a modification in which the single cock has five ports.

The former figure shows the ports of the cock in communication with the cylinder-cock, the latter figure the cock positioned as a blow-off cock. Figs. 8, 9, 10, and 11, all taken together, constitute another modification, Fig. 8 being a sectional elevation, and Fig. 10 a plan section of Fig. 8; likewise Fig. 9 is a vertical or sectional elevation, and Fig. 11 a plan section of Fig. 9, the position of the cock in said Figs. 8 and 10 being for cylinder-cock purposes, while the position of the cock shown in Figs. 9 and 11 is for blow-off purposes, all said four last-named figures showing that the outlet or discharge can be effected through the stem of the cock.

Similar letters refer to similar parts throughout the several views.

A is the main barrel to contain the pair of reciprocating valves. $A' A^2$ are the respective steam-inlet branch pipes, and which connect the device to the cylinder-heads of the engine. B is a “sub-barrel” having the vertical shell B' , which contains the key B^2 , that controls the discharge through the center outlet or branch, B^3 .

As seen in Figs. 1, 2, 3, I cast or construct the parts A, A' , A^2 , B, B' , and B^3 all in one piece, so as to form one casting.

The interior of the main barrel I construct as follows: $a a'$ are the respective valve-chambers, with center guide at a^2 , as shown in Fig. 1. $a^3 a^4$ are the valve-seats. $b b'$ are the outer or blow-off water-ports, each communicating from the respective valve-chambers to the center outlet, B^3 . $b^2 b^3$ are the inner ports or passages, likewise communicating, respectively, from each valve-chamber to the center outlet, B^3 . (See Fig. 1.)

$c c'$, Figs. 1, 4, 5, represent my improved valves. As shown, each valve, as an entirety, consists of a stem, d , the adjoining wings or ribs d' , the valve c proper, and the further wings or ribs d^2 on the opposite side of the valve, as shown in Figs. 1, 4; or said valves can be of the construction shown in Fig. 5, to embrace, besides the parts just enumerated, these same parts duplicated on the other side of the valve, and being the parts—viz., the wings or ribs d^2 and stem d^3 .

I am aware that for cylinder-cocks valves

have been employed having a single stem; also stems projecting from both sides of the valve-disk.

The valves with the stem or stems and wings combined, as shown in either Figs. 4 or 5, produce the following functions, results, and advantages: First, the greatest possible amount of metal exists close to the opposite sides of the valve-disk, consequently achieving greater strength and durability of the valve parts, adapting same specially to better resist the greatest pressure and concussion, (in the act of opening away from or closing against their seats;) secondly, the diameter of the stems being less than that of the wings, the former can therefore be better fitted to move in the bore of the screw-caps, and hence the latter can be made very strong and durable; thirdly, the wings or ribs, by virtue of their shape, and extending from the center line of the valve-body, as shown, are first acted upon by the steam. The pressure tends to rotate said wings; consequently the wear and grinding action of the valves and seats will be more even and uniform.

I prefer to employ the valve shown in Fig. 5, having both stems projecting from the valve-disk, to constitute the pair of valves to operate in the main barrel. Each valve is so arranged within the barrel A that the stems of each valve abut against each other in the center guide at a^2 . (See Fig. 1.) A simultaneous operation of both valves is thus had—that is to say, the pressure of the steam, acting to close the open valve by forcing it to its seat, causes said valve, by its stem, to strike the contiguous stem of the other or closed valve, and forces same away from its seat, and said action on part both valves is continued in vice versa manner. The alternate reciprocation of the valves c c' changes the communication to the passages or ports b^2 b^3 for the condensation to pass out of the cylinder-cock or center outlet, B^3 .

It is of importance that the ports b^2 b^3 , or outlet for the condensation, can be regulated as desired. For this purpose I have provided screw-caps E E' to close the respective ends of the main barrel. Further, through the cap E passes an adjusting-screw, E^2 ; likewise through cap E' a similar screw, E^3 . Both said adjusting-screws are so arranged that the inner end of each can engage the outer end of the valve-stems, or, as indicated in Fig. 1, the end of the wings d^2 of each valve. By adjusting either or both of the screws E^2 E^3 the "throw," "play," or action of each valve and its parts can be regulated, enlarging or making smaller the distance between the valves and their seats; hence the escape of the water through the ports b^2 or b^3 can be made to suit, and that without the necessity of disconnecting any part. Also, this adjustment of the valves is accomplished from the outside or at the ends of the cylinder-cock.

I lay stress upon the employment of a single cock or key, not only to control the escape of the condensation through the ports b^2 b^3 and center outlet, B^3 , but also to serve at same time to control the ports b b' . Thus to control the passages or ports b^2 b^3 the body of the cock B^2 has the horizontal port marked e . (See Figs. 1 and 2.) When the cock is turned to the position shown in Figs. 1, 2, its port e comes in line with the junction of ports b^2 b^3 and the center outlet. The escape or discharge of the water from each valve-chamber can thus take place through either of the ports b^2 or b^3 ; thence through the body of the cock by way of its horizontal port e , out of the outlet B^3 , and as shown by arrows in Figs. 1 and 2.

To control the passages or ports b b' , the body of the cock B^2 has the further angular port e' —that is, said port e' branches from the horizontal port e , first in a downward direction, thence transversely, where it communicates with the center outlet, B^3 , in manner shown in Fig. 3. By therefore turning the cock B^2 so that its port e comes in line with either of ports b b' , the blow-off or discharge takes place through either of said ports b b' , port e' , thence out of center discharge. (See arrows in Fig. 3.)

As apparent, when the cock is turned to be in open communication with ports b^2 b^3 , the blow-off ports b b' are closed by the body of the cock, and similarly, when the cock is turned to establish communication with the blow-off ports b b' , the body of said cock shuts off communication with the ports b^2 b^3 . (See Figs. 1, 2, and 3.)

The parts being thus constructed and arranged, the operation is as follows: In starting the engine, and the valves being in the positions shown in Fig. 1, the pressure of steam is supposed to be acting against the valve c' , keeping same closed onto its seat, shutting the port b^3 , and having opened the port b^2 to the valve-chamber a , in which the valve c is shown away from its seat. The condensed steam can now pass, as shown by the arrows, from the cylinder-heads through the valve-chamber a into port b^2 ; from thence, through the port e in the cock, out of the outlet B^3 . At same time, be it noted, the cock closes the blow-off ports b^2 b^3 . In this position of the parts the cylinder-cock is fully open and automatic in its action. At the next stroke of the engine the action of the valves is reversed—viz., c closes on its seat, closing the port b^2 , while c' opens away from its seat, opening the port b^3 , effecting the discharge through said port b^3 and e out of B^3 , the position of the cock B^2 having remained the same.

To operate as a blow-off cock, the cock B^2 is turned to bring its port e' in line with b b' , shutting the ports b^2 b^3 , Fig. 3. The accumulated water in the cylinder can thus be blown off or discharged out of the cylinder-cock with perfect freedom.

In using the modifications shown in Sheet II the main barrel A and sub-barrel B, with their parts and ports b b' b^2 b^3 , remain the same.

In Figs. 6 and 7 the arrangement of the ports in the body of the cock is such that the ports marked e e establish open communication with ports b^2 b^3 when the cock B^2 is turned in the position shown in Fig. 6, and the ports marked e' e' e' establish open communication with ports b b' when the cock is in the position shown in Fig. 7.

Figs. 8, 9, 10, and 11 show the modification that permits the outlet for the water to take place through the hollow body of the cock itself in both the uses—viz., as a cylinder-cock proper, also as a blow-off cock. The outlet branch B^3 can thus be dispensed with.

What I claim is—

1. The improved cylinder-cock consisting of the main barrel A, having valve-chambers a a' , seats a^3 a^4 , the ports b^2 b^3 , the valves c , having wings d' d^2 , stem or stems d d^3 , the caps E E' , the cock B^2 , having ports e e , to operate as and for the purposes set forth.

2. In combination with barrels A and B, the former having ports b^2 b^3 , the latter barrel having ports b b' , the single cock B^2 , having

ports e and e' , by means whereof the said cock serves both for the uses of a cylinder-cock and blow-off cock.

3. The combination of the main barrel A, having valve-chambers a a' , the pair of valves, each consisting of a valve-disk proper, having wings d' d^2 , stem or stems d d^3 , the caps E E' , their adjusting-screws E^2 E^3 , by means whereof the throw of said valves can be regulated, as and for the purposes set forth.

4. The improved cylinder-cock consisting, essentially, of the combination of the main and sub barrel parts, the former having valve-chambers a a' , center guide, a^2 , ports or passages b^2 b^3 , the latter barrel having passages b b' , the pair of valves, each consisting of a valve-disk, c , projecting wings d' d^2 , and stem or stems d d^3 , caps E E' , adjusting-screws E^2 E^3 , and key or cock B^3 , having ports e e' , all said parts constructed and arranged to operate in the manner and for the purposes set forth.

JOSEPH RYAN.

Witnesses:

CHARLES PICKLES,
WILLIAM W. HERTHEL.