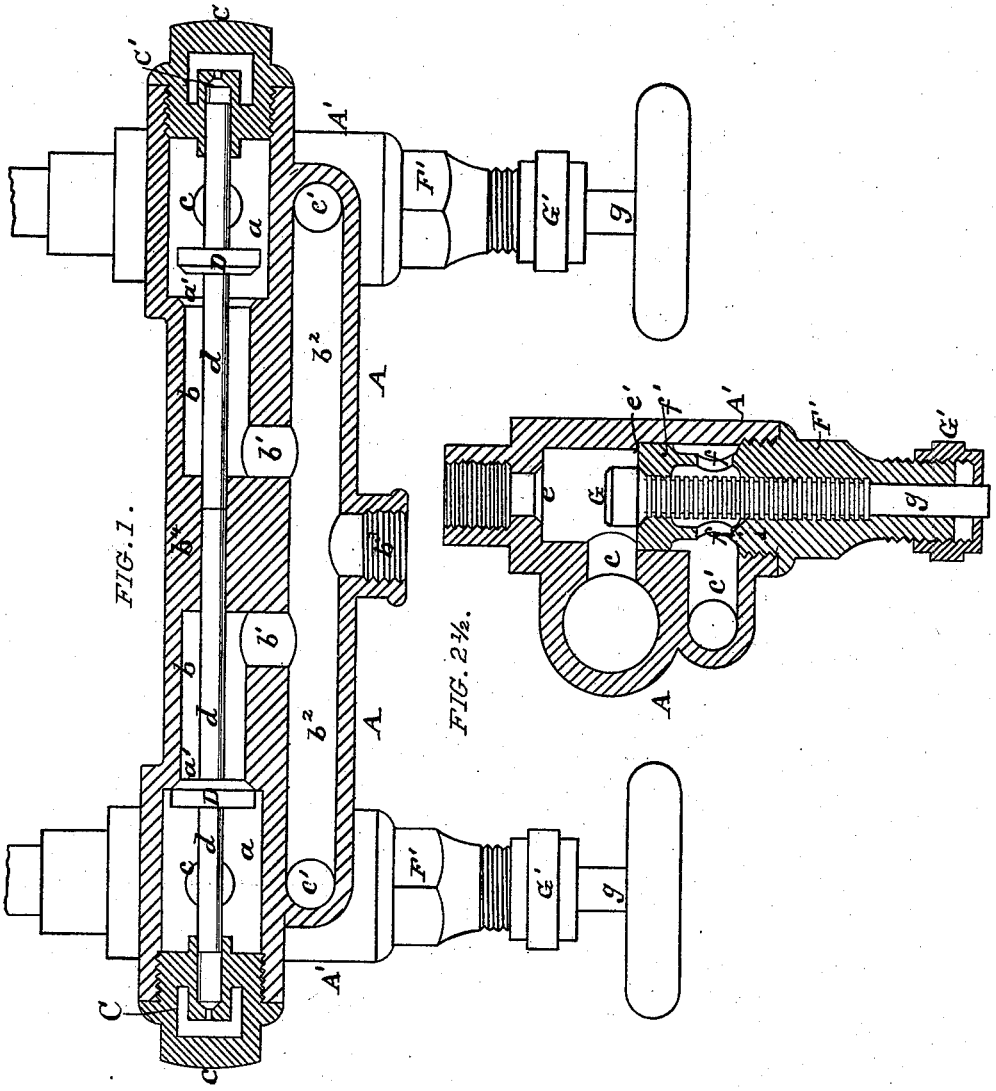
2 Sheets—Sheet 1.

J. RYAN.
Cylinder-Cock.

No. 209,518. **Patented Oct. 29, 1878.**



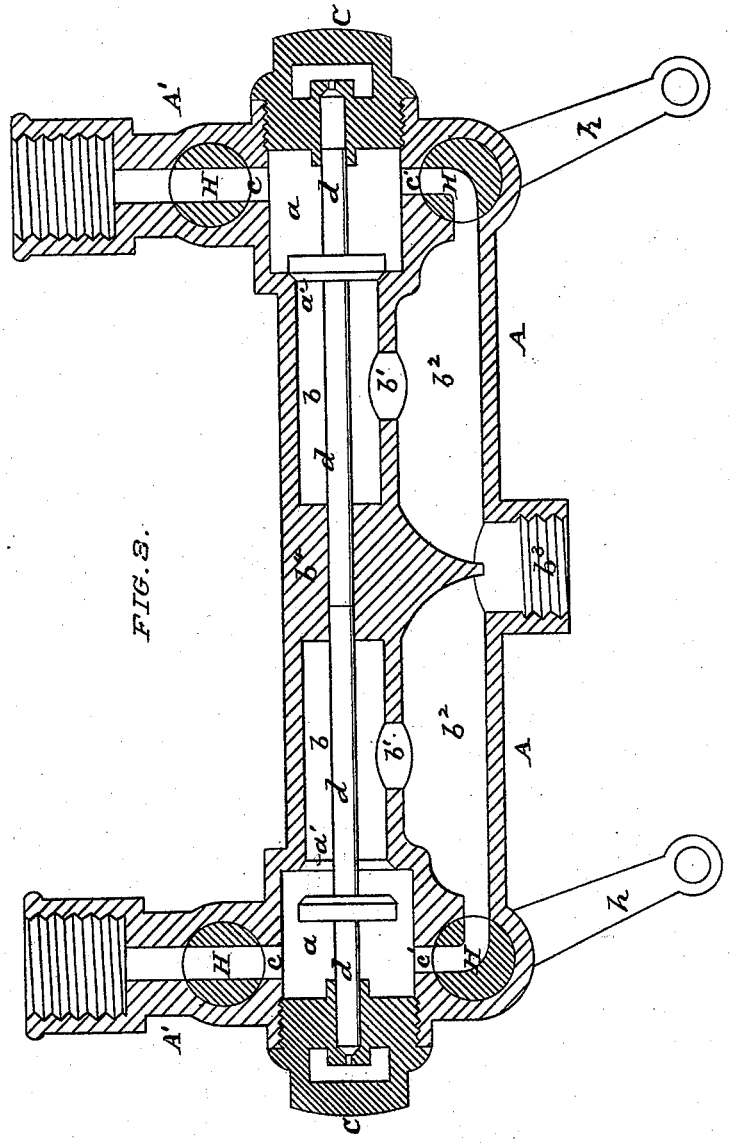
ATTEST:
J. W. Herthel.
Chas. Herthel

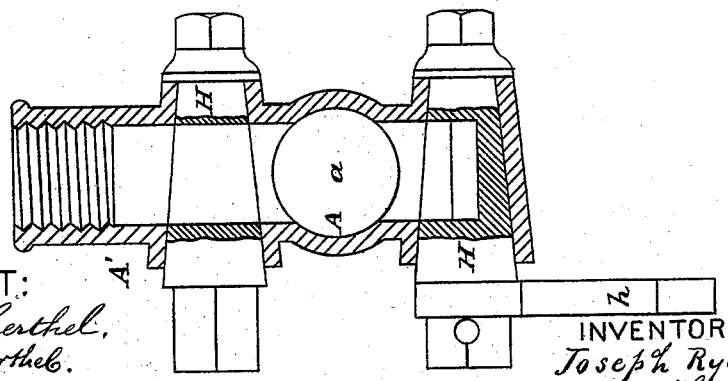
INVENTOR:
Joseph Ryan
per Herthel & Co

2 Sheets—Sheet 2.

J. RYAN.
Cylinder-Cock.

No. 209,518. **Patented Oct. 29, 1878.**





ATTEST:
John W. Herthel.
Chas. Herthel.

INVENTOR:
Joseph Ryan
per Herthel & Co

UNITED STATES PATENT OFFICE.

JOSEPH RYAN, OF ST. LOUIS, MISSOURI.

IMPROVEMENT IN CYLINDER-COCKS.

Specification forming part of Letters Patent No. **209,518**, dated October 29, 1878; application filed August 12, 1878.

To all whom it may concern:

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

This invention relates to that class of cylinder-cocks designed for purposes of relieving steam-cylinders from the water of condensation, and consequently relieving the engine of back-pressure of water.

I will first fully describe the construction, arrangement, and operation of my improved device, and hereinafter point out the novel features thereof in the claims.

Of the drawing, Sheet I, Figure 1 is a plan view of my cylinder-cock, the main barrel and its interior parts being shown in horizontal section. Fig. 2 is a transverse sectional elevation of one of the hand-screw valves and center-piece contained in one of the transverse barrels and its connection to the main barrel. Fig. 2½ is a sectional elevation of the center-piece, containing the screw-valve and part of the transverse barrel, showing, also, the valve closing the entrance that leads to the internal chamber of the center-piece. Sheet II represents a modification of my improved cylinder-cock, ordinary cocks and crank attachments being substituted in lieu of the hand-screw valves. Fig. 3 shows the said modification in horizontal section, while Fig. 4 is a transverse sectional elevation of one pair of the cocks and their connection to the main barrel.

I cast or construct my cylinder-cock to consist of a main barrel, A, forming part of which are the transverse barrels A′. (See Figs. 1, 2.) Within the main barrel the operating parts are contained that automatically act to relieve the engine from its condensation, and within each transverse barrel are provided the operating parts that control the acting parts within the first-named barrel.

The interior of the main barrel I construct as follows: *a a* are the valve-chambers. *a′ a′* are the valve-seats. *b b* and b^1 b^1 are water-passages, communicating from each valve-chamber to the discharge water-passages b^2 b^2, which further communicate each to the internal chamber of the respective transverse barrels A′, and finally discharge at the center outlet, b^3. (See Fig. 1.) b^4 is a stationary partition or wall, having an annular passage through it, to contain, also to guide, the ends of the valve-stem. Further, the partition b^4 has a **V**-shaped extremity, dividing the discharge-passages b^2 b^2, so that each of these shall discharge with freedom out of the center outlet, b^3. The ends of the main barrel are closed by the screw-caps C, having the annular recess C^1, to form the bearing and guide for the outer ends of each valve-stem. Each valve-chamber, through passages *c c*, communicates with the interior chamber of the respective barrels A^1.

The main barrel, cast or constructed as described, and shown in Fig. 1, contains two valves, with their stems. D D are my pair of valves, arranged within the respective valve-chambers, for purposes of alternately discharging the received water from the respective ends of the cylinder-cock. These valves are solid disks, with a beveled edge to accurately close on their seats. *d d* are the stems, made to project from each opposite side of the valves D D, as shown. The arrangement of the valves D D is such that one closes its seat while the other is open or away from its seat. Further, the outer ends of each stem extend into the recess of the screw-caps C C, and the inner ends of the stems abut against each other in the center partition, b^4. Thus said valves, by their stems, are guided accurately when acting to open or close their respective valve-chambers in accordance with the pressure. Both valves operate simultaneously, the pressure on one valve being imparted to the other, effecting the discharge of water through the outlet b^3, while the valve-chamber of the other valve remains closed by the live steam that presses upon the closed valve.

The interior of each transverse barrel A′ and its contained parts I construct as follows: E is an internal chamber, communicating, by the ports *c c*, before stated, to the respective valve-chambers in the main barrel. Further, by the ports or passages *c′ c′*, communication is established direct with the discharge water-passages b^2 b^2 of the main barrel. At *e* the barrels A′ have a valve-seat; at *e′* a plain or threaded shoulder, as shown in Figs. 2 and 2½. Both opposite ends of the barrels A′ are screw-threaded, to establish at one end the

pipe-connection to the steam-cylinder, and to contain at the other end the following parts: F is a center-piece, consisting of a tube having one or more ports, *f*, a plain or threaded shoulder at *f'*, the cap F', and the internal and outer screw-threads. (See Figs. 2 and 2½.) Through the ports *f* communication is established from the tube to the passages *c'*, that lead to the discharge water-passages b^2 b^2. The plain or threaded shoulder is to seat or unite the center-piece to the corresponding shoulder at *e'*. The internal threads receive the valve-stem, and otherwise, by the cap F', the center-piece can readily be screwed or unscrewed from each barrel.

G is a hand-screw valve, its stem *g* being threaded to pass through the center-piece F, and so that the valve can open or close both valve-seats—viz., the seat at *e* and the seat at *e'*—or occupying a position between said two seats. The joint between the screw-caps F' and the stem *g* is closed by the screw-coupling G'.

The parts being thus constructed and arranged, the operation is as follows: In starting the engine, the valve G G, I usually locate between the two seats *e* and *e'*, (see Fig. 2,) opening all the communications, and permitting the water to pass out readily. As soon as the engine is "warmed," the valves G G are screwed back against the inner face of the center-piece F, closing the entrance to its internal chamber. (See Fig. 2½.) The valves G G being positioned as just stated, each transverse barrel has only that part of its internal chamber, E, open which communicates by the passages *c c* direct to the valve-chambers and the water-passages in the main barrel. Full communication therefore exists between the steam-cylinder and the cylinder-cock, and the latter is ready to operate automatically. The pressure of steam, entering one of the transverse barrels, therefore, passes through the passage *c* in the valve-chamber, and closes the open valve, drives it to its seat, at same time thrusting the closed valve open, and the water of condensation then escapes from the exhaust end of the steam-cylinder through the open valve-chamber and its water-passages, and finally out of the main outlet. At the next stroke of the engine this automatic action of the valves D D is exactly reversed, and so on alternately.

It can be here stated that the V-shaped extremity divides the discharging current—that is, prevents the discharge from one of the discharge-passages b^2 entering the opposite passage b^2—and hence the current with freedom discharges out of main outlet—a great advantage, especially in using the device as a blow-off cock.

As a blow-off cock, the valves G G are positioned midway between the seats *e e'*. (See Fig. 2.) All the passages that lead from the steam-cylinder to the chamber in each transverse barrel, and from these to both valve-chambers and discharge-passages of the main barrel, are then open. The previously-accumulated water in the cylinder can thus with the utmost freedom be discharged or blown out of the cylinder-cock. When the valves G G close the seats *e e'* in each transverse barrel, all communication between the cylinder and the cylinder-cock is closed. This is done in case any grit or foreign substance should prevent the valves D D from seating, and otherwise for purposes of repairing the internal parts. To remove the obstacle, the cap C is unscrewed, and the valve by its stem can readily be removed and replaced, also the cap replaced. Hence it will be noted that my device can be gotten at internally without the necessity of disconnecting the pipes that attach the cock to the cylinder. Heretofore the pipe attachment to the cylinder has always been to the ends of the cylinder-cock, where my caps C C are, incurring great inconvenience, loss of time and labor, and the engine had to be stopped.

Sheet II, as stated, is but a modification. The parts A A' *a a' b* b^1 b^2 C D *d* are essentially the same as in Fig. 1. In lieu of the hand-screw valves, two ordinary cocks, H H, are substituted to control the same passages, *c c c' c'*, that lead to the valve-chambers and discharge-passages of the main barrel. The outer cocks have arms *h h*, to connect to the rod that extends within the operator's reach. The inner cock generally is left open.

In operation the modification is the same. The necessity for the change consists simply in affording a better accommodation to the operator. Thus, in case the hand-screw valves are used, a screw-motion must be imparted by hand. This to do is in some cases difficult, especially when the cylinder-cock is applied to an engine out of the reach of the operator. The cock and its rod-connection facilitates, therefore, the handling of the cylinder-cock so located.

What I claim as my invention is—

1. In a cylinder-cock, the combination of a barrel having the valve-chambers *a*, seats *a'*, the duplicate passages *b* b^1 b^2, divided by a stationary partition, b^4, having a V-shaped extremity, with relation to the passages b^2, outlet b^3, as shown and described, the reciprocating valves, each having stems projecting from opposite sides, and guided in action by the said partition and the screw-caps C C, substantially as and for the purposes set forth.

2. An automatic cylinder-cock consisting of transverse barrels containing a valve controlling the inlet to said barrels; further, having their internal chamber communicating by passages to the respective valve-chambers in a main barrel containing simultaneously alternating valves, and having said valve-chambers communicating with discharge water-passages, substantially as and for the purpose set forth.

3. A blow-off cock consisting of a main or horizontal barrel, having valve-chambers, each communicating to discharge water-passages,

said valve-chambers containing alternating acting valves, forming part of said main barrel, being transverse barrels, having their chambers by passages communicating with the said valve-chambers; further, to the water-discharge passages, each transverse barrel containing a valve to control the said passages that lead to the valve-chambers and to the discharge-passages, substantially as shown and described.

4. The center-piece or tube F, having one or more ports, *f*, screw-cap F′, in combination with a hand-screw valve, G, to control the inlet-opening of the said tube F, substantially as set forth.

5. The center-piece F, having the ports *f*, screw-cap F′, the hand-screw valve G, its stem passing through said center-piece, in combination with a barrel, its chamber having the seats at *e e′*, by means whereof said chamber is controlled, in the manner and for the purposes set forth.

6. In a cylinder-cock, the combination, with a main and horizontally-arranged barrel containing two alternating valves, of the transverse barrels containing a valve capable of controlling the inlet to said barrels, whereby the water or steam entering the cylinder-cock is first admitted through the chambers of said transverse barrels preparatory to being discharged out of the outlet of the main barrel.

7. As an improved article of manufacture, a cylinder-cock consisting of a barrel, A, arranged horizontally, the barrels A′, arranged transversely, the former containing two valves, D D, having stems *d d*, projecting as shown, the valve-chambers *a a*, communicating by passages *b* to passages b^1 b^2 and main outlet; further, by passages *c c c′ c′* to the chambers of said barrels A′, this latter having a valve to control the inlet as well as outlets of said transverse barrels, and effecting the admission and the discharge from the main barrel, substantially as and for the purposes set forth.

8. The transverse barrels A′, having screw-valves G G, (or cocks,) with or without the center-piece F, the horizontal barrel A, containing reciprocating valves D D, each of which have opposite projecting stems *d d*, which are guided by a center partition, b^4, and screw-caps C C; further, said barrel A, having the respective valve-chambers *a a* and seats *a′*, and water-passages *b* b^1 b^2, the latter divided by a V-shaped partition, all said parts being constructed and arranged to operate in the manner and for the purposes set forth.

In testimony of said invention I have hereunto set my hand.

JOSEPH RYAN.

Witnesses:

WILLIAM W. HERTHEL,

JOHN W. HERTHEL.