

(No Model.)

W. McINTOSH.
BLOW-OFF COCK.

No. 529,133.

Patented Nov. 13, 1894.

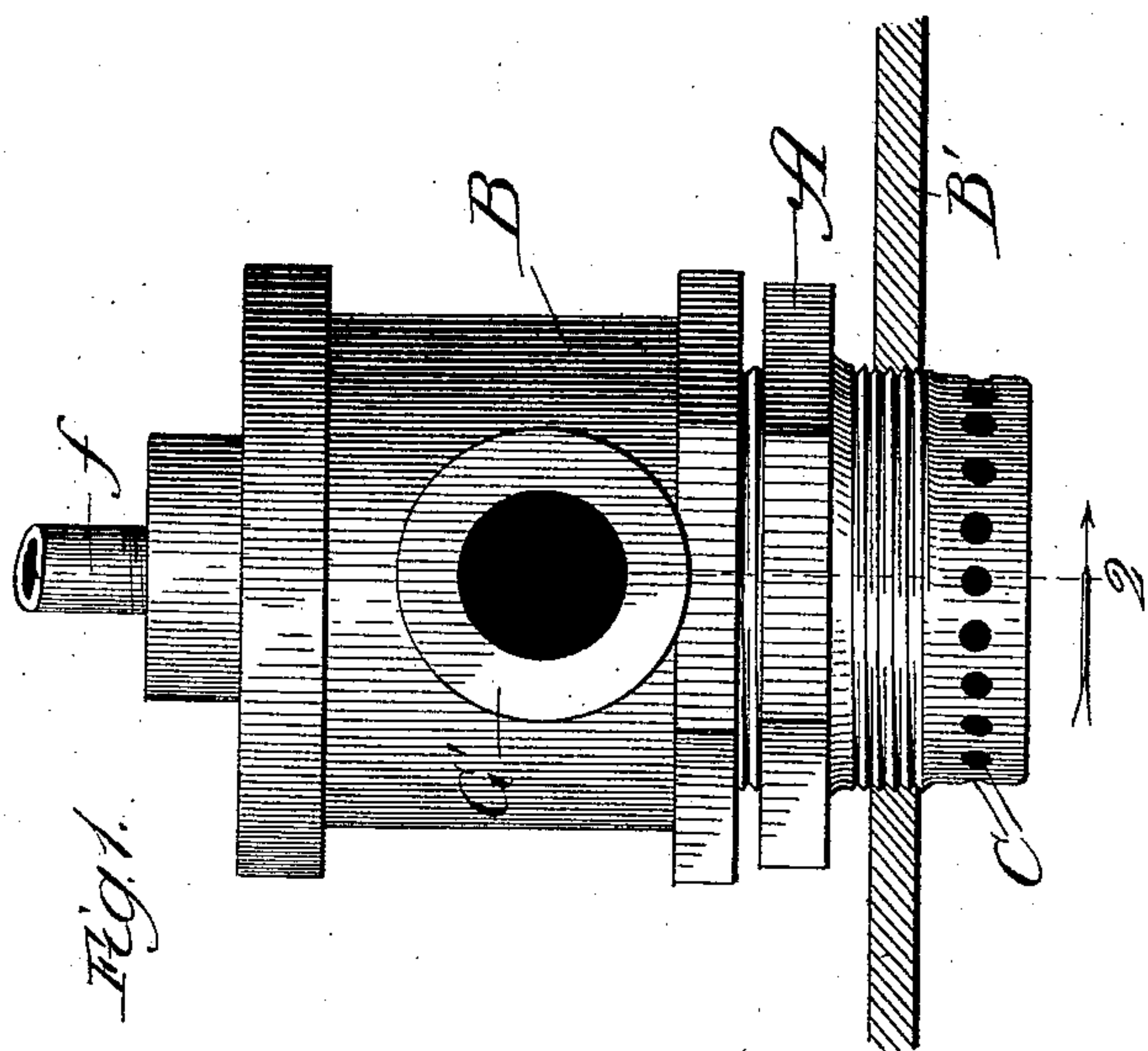


Fig. 1.

Fig. 4.

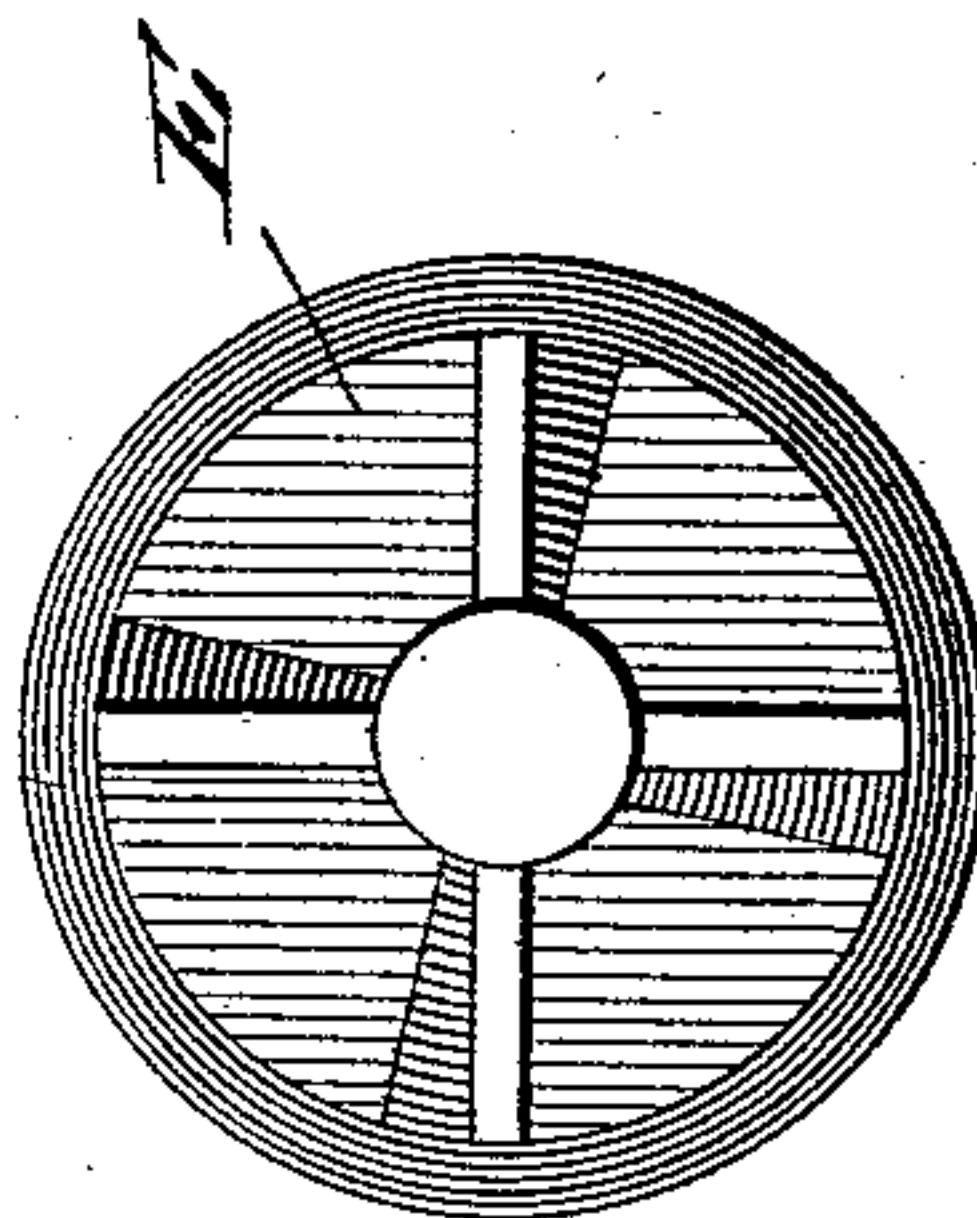


Fig. 3.

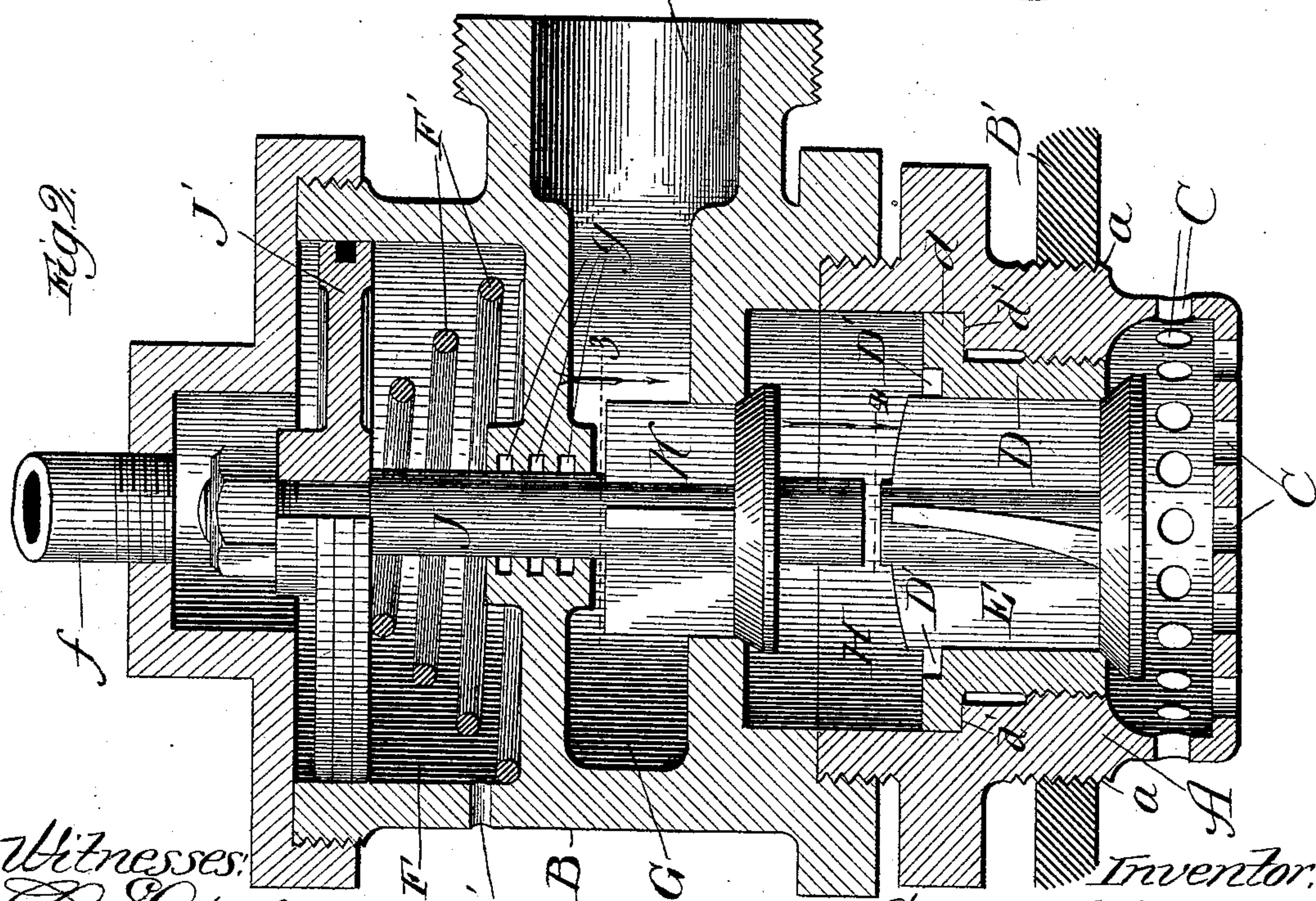
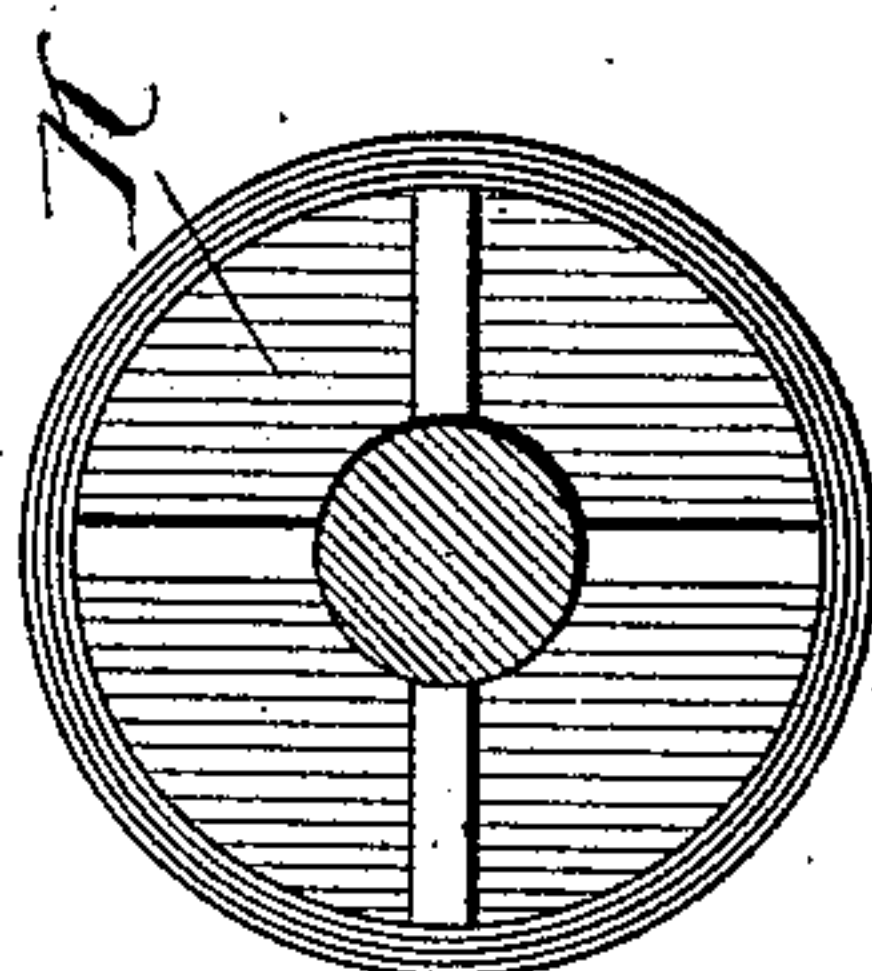


Fig. 2.

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UNITED STATES PATENT OFFICE.

WILLIAM MCINTOSH, OF WINONA, MINNESOTA.

BLOW-OFF COCK.

SPECIFICATION forming part of Letters Patent No. 529,133, dated November 13, 1894.

Application filed June 23, 1894. Serial No. 515,463. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM MCINTOSH, residing at Winona, in the county of Winona and State of Minnesota, have invented certain new and useful Improvements in Blow-Off Cocks, of which the following is a specification.

The object of my invention is to construct an efficient and economical safety blow-off cock for use in connection with boilers of all kinds and which shall be compact in form, simple in construction and safe in operation.

Speaking generally, my preferable form of device consists of a casing containing duplex valves operated by fluid pressure and of such construction and operation that in case of accident or injury to the device the outlet through the boiler-plate will be automatically and effectually closed by one of the valves operating independently of the other, thus providing a feature of absolute safety in use.

Furthermore, the device consists of two portions or sections, one a foundation plug securely attached to the boiler-plate and containing the inner valve, and the other portion removably secured to the foundation plug. This plug is provided with a perforated cap or strainer serving the double purpose of a strainer and a cage for the inner valve, and my invention consists in the features, combinations and details of construction hereinafter described and claimed.

In the accompanying drawings Figure 1 is a side elevation of my device; Fig. 2, an enlarged sectional view taken through line 2 of Fig. 1 looking in the direction of the arrow; and Figs. 3 and 4, sectional plans of the valves taken on lines 3 and 4, respectively, of Fig. 2, looking in the direction of the arrow.

My improved blow off cock consists preferably of two portions or sections A and B, which are detachably secured together in any suitable manner and constructed of the desired form and dimensions. The portion A which I will hereinafter in the specification and claims term, for the sake of convenience, a foundation plug, is made preferably of the form shown in the drawings and is provided with external screw-threads a which are received by corresponding threads in the proper opening through the boiler-plate B'. The lower or inner end of the plug which projects

into the interior of the boiler is provided with a perforated cap C serving the purpose of a strainer and also of a cage for the valve above, as hereinafter mentioned.

Screwing upon the inner walls of the plug is a removable valve-seat D provided with a flange d resting, when in position, upon the shoulder d' within the plug. The top of the valve-seat is preferably provided with oppositely arranged recesses D' to receive a key or other instrument for rotating the seat for the purpose of removing or inserting the same.

Loosely arranged within the plug is an inner valve E which normally closes the blow-off opening, being forced automatically upon its seat in the normal position shown in Fig. 2 by means of the pressure of the boiler. As shown in the drawings I employ a valve of the type known as the spiral wing valve which is preferable for this purpose principally on account of its ability to readily center itself.

From the foregoing description it will be observed that the plug may be easily and quickly taken apart thus permitting the refitting or examination of the valve or the removal both of the valve and seat without disturbing the plug which is supposed for all practical purposes to remain in position permanently.

The removable portion or section B is preferably provided with two independent chambers, a piston-chamber F and an outlet chamber G with outlet port G'. Upon the attachment of the two portions A and B there is formed another chamber H intermediate of the valves and hereinafter designated a valve-chamber. Extending longitudinally through these three chambers is a valve-stem J provided near its lower end with a valve-body K which valve I shall term a supplemental valve. As shown in Fig. 3 this valve is preferably of the straight wing type, and is adapted to control the opening between the valve-chamber and the outlet chamber. Upon the other end of the valve-stem is mounted a piston-head J' adapted to travel within the piston-chamber or cylinder. The cap or head of this chamber is provided with an inlet pipe f leading from any suitable source of fluid pressure and communicating with the space above the piston-head, and an exhaust or bleed f' is provided through the walls of the

chamber to allow the air below the piston-head to escape.

In case my device is employed upon a locomotive the fluid pressure may be taken from the air-drum.

In order to keep the piston-head and the dependent valve in their normal position shown in Fig. 2, I arrange a suitable spring F' below such piston-head the tendency of which is to force the head to its outward limit of motion. As the most suitable and efficient packing around the valve-stem in passing through the wall separating the outlet chamber and piston-chamber, I prefer to use water grooves thereby avoiding the necessity of packing-nuts.

The object and purpose of the strainer upon the inner end of the plug is to prevent scale and other deposits from passing through the blow off cock and at the same time to serve as a cage or protection to the inner valve, and to prevent it dropping into the boiler when not under pressure.

The particular function and design of the supplemental valve is to provide a secondary regulated passage so that in the event of the destruction of, or any damage to, the inner valve, or, in case of its leaking, this supplemental valve will serve to effectually close all communication and still permit of the blowing off of the boiler as desired. The water or steam from the boiler must therefore pass through two regulated and controlled passages or valves which are independent of each other but capable of simultaneous operation. The supplemental valve, therefore, provides the element of absolute safety in use and the preferable form of device, as illustrated in the drawings may properly be styled a duplex counter-pressure blow-off cock.

Having constructed my device as above set forth I will now proceed to describe its operation. The position of the valves being that shown in Fig. 2, and it being necessary to blow off the boiler, fluid pressure is admitted through pipe *f* forcing the piston-head and, consequently, the valve-stem inward and raising the supplemental valve from its seat, opening the port between the valve-chamber and outlet chamber. As shown in the drawings, the lower free end of the valve-stem within the valve-chamber does not contact the head of the inner valve which is held upon its seat by boiler pressure. In the further travel of the piston-head the end of the stem will contact the head of the inner valve, forcing it from its seat against the boiler pressure. Direct communication is thereby established from the boiler to the outlet and can be maintained so long as pressure is applied to the piston-head and the stem contacts the inner valve. As soon as the pressure is removed, however, the spring will restore the piston-head and the supplemental valve to their normal positions while the boiler pressure will automatically seat the inner valve.

From the above it will be noticed that the closing of the inner valve is entirely independent of the other mechanisms so that in case of any injury or derangement of the parts comprised in section B, the blow off port will always be securely closed. This construction secures to my blow-off cock the important advantage of being absolutely safe under all conditions. At the same time it obtains the advantage of simplicity and smoothness of operation and economy in construction, and, furthermore, the outer section may be detached from the foundation plug for any purpose desired while the boiler is under steam.

This invention is particularly applicable to locomotives where there is a ready and abundant fluid pressure supply, and the drawings show the construction of the same as adapted to such use, although I do not intend to be understood as limiting myself thereto.

Although I have described more or less precise forms and details of construction, I do so for the purpose of convenience and clearness of description and not as tending to limit myself thereto as I contemplate changes of form, proportion of parts and the substitution of equivalents as circumstances may suggest or render expedient.

I claim—

1. In combination with a boiler, a blow-off cock consisting of a valve-casing secured in the blow-off port, a valve arranged therein and automatically seated by the boiler-pressure to close said port and independent fluid controlled mechanism adapted to open the valve against the boiler pressure, whereby the boiler may be blown off whenever desired.

2. In combination with a boiler, a blow-off cock consisting of a valve normally closing the blow-off port and automatically seated by the pressure within the boiler and fluid controlled mechanism independent of that pressure seating said valve and adapted to open the same against the boiler pressure.

3. In combination with a boiler, a blow-off cock consisting of a valve-casing, a valve arranged therein and normally closing the blow-off port, means for operating the valve and a strainer secured to the valve-casing within the boiler and below the valve whereby the fluid passing through the valve is strained and a cage formed for the valve, substantially as described.

4. In combination with a boiler, a blow-off cock consisting of a valve-casing, an inner valve arranged therein and normally closing the blow-off port, a supplemental valve arranged within the valve-casing and fluid-controlled mechanism adapted to operate the supplemental valve and thereby open the inner valve against the boiler pressure.

5. In combination with a boiler, a blow-off cock consisting of a valve-casing, an inner valve arranged therein and normally closing an opening through the boiler-shell, a supplemental valve arranged within the valve-

casing and provided with a depending stem adapted to contact the inner valve when the supplemental valve is forced from its seat and means for actuating the supplemental valve by fluid pressure, substantially as described.

6. In combination with a boiler, a blow-off cock consisting of a valve-casing, an inner valve automatically seated by the pressure within the boiler and normally closing the blow-off port thereof and an independent valve operated by fluid pressure and adapted to contact said inner valve to blow off the boiler, substantially as described.

7. In combination with a boiler, a blow-off cock consisting of a plug secured in the opening through the boiler shell, an inner valve arranged therein and automatically seated by pressure within the boiler to close said opening, a valve-casing removably secured to the plug, a supplemental valve arranged therein and having an elongated stem adjacent to the inner valve and means for operating the supplemental valve whereby the inner valve will be forced from its seat by the contact of the valve-stem and the boiler relieved of pressure, substantially as described.

8. In combination with a boiler, a blow-off cock consisting of a plug secured in the blow-off port, an inner valve arranged therein and automatically seated by the boiler pressure, an outer valve-casing removably secured to the plug, a supplemental valve within said outer casing having a stem elongated in both directions of its body and means for reciprocating said valve-stem whereby the inner

valve may be unseated and the boiler blown off, whenever desired, substantially as described.

9. In combination with a boiler, a blow-off cock, consisting of a plug secured in the blow-off port, a valve arranged therein and normally closing said port, a valve seat adjacent to the valve and removably secured within the plug and mechanism adapted to open the valve against the boiler-pressure, substantially as described.

10. In combination with a boiler, a blow-off cock consisting of a plug secured in the opening through the boiler shell, an inner valve arranged therein and automatically seated by pressure within the boiler to close said opening, a valve-casing removably secured to the plug and provided with a valve-chamber, an outlet chamber and a piston-chamber, a supplemental valve arranged within said casing between the valve-chamber and the outlet chamber and having its stem elongated in both directions of its body, a piston-head arranged upon the valve-stem within the piston-chamber, whereby as fluid-pressure is introduced into the piston-chamber, the supplemental valve will be depressed, opening communication between the valve-chamber and the outlet-chamber and the inner valve will be opened by contact of the projecting stem thereagainst and the boiler thereby relieved of pressure, substantially as described.

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