(No Model.)

S. HAWKRIDGE.

STOP COCK.

No. 383,356. Patented May 22, 1888.

Fig. 1.

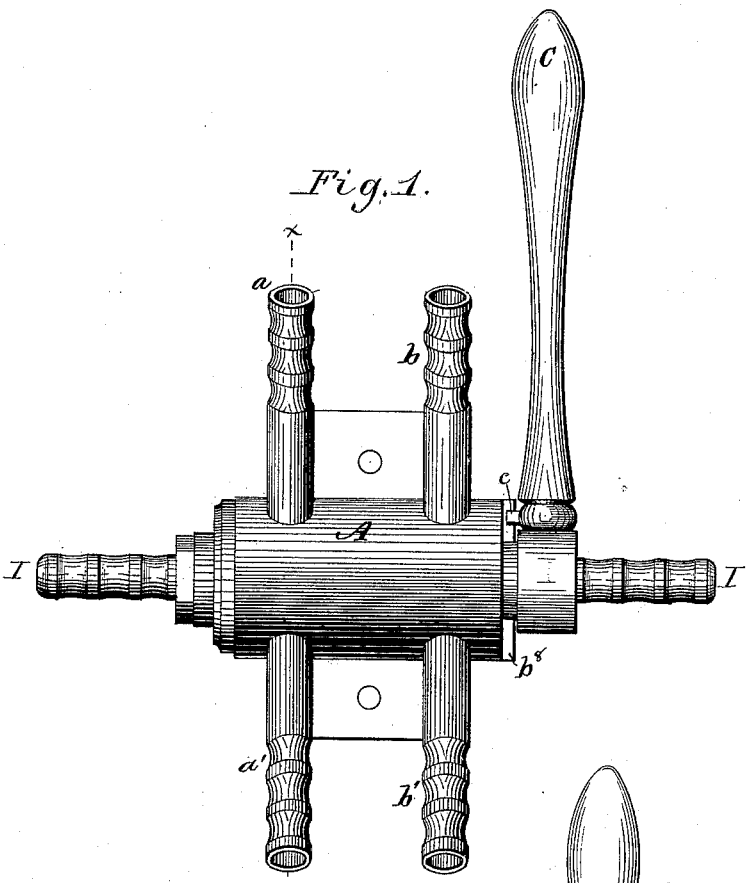


Fig. 2.

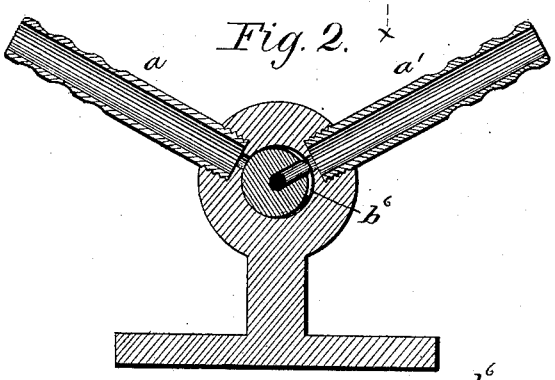
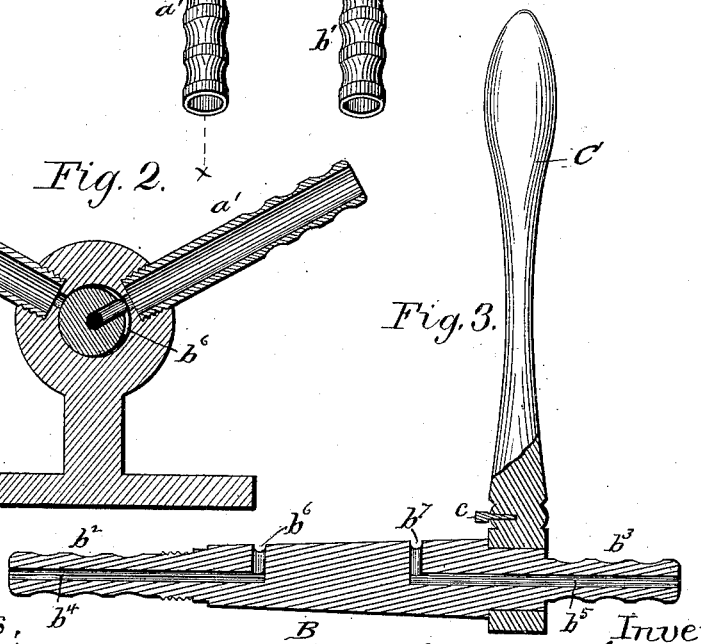


Fig. 3.



Witnesses,
Henry Norton
Thomas D. Greany.

Inventor.
Samuel Hawkridge.

UNITED STATES PATENT OFFICE.

SAMUEL HAWKRIDGE, OF HOBOKEN, NEW JERSEY.

STOP-COCK.

SPECIFICATION forming part of Letters Patent No. 383,356, dated May 22, 1888.

Application filed May 7, 1887. Serial No. 237,491. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL HAWKRIDGE, a citizen of the United States, residing at Hoboken, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Stop-Cocks; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to stop-cocks for gas and water mains, service-pipes, and fixtures for cutting off or regulating the flow of gas or water.

The objects of the invention are to provide for the more gradual turning off of the gas or water, to regulate the flow with greater ease and certainty, and to avoid injury to the pipes or mains by the sudden cutting off of the supply when flowing under heavy pressure; and to these ends the invention consists in the construction hereinafter described, and defined in the claims.

The snapping or pounding heard in water-pipes when the water, moving rapidly and under heavy pressure, is suddenly cut off results from the lateral pressure or expansive force to which the pipe is subjected by the sudden stoppage of the flow. The flow or movement of the volume being suddenly arrested, the pressure under which it moves or was moving has a tendency to compress it in the direction of movement and consequently to expand it laterally. The force thus suddenly developed within the pipe frequently ruptures the latter or tears the joints apart. The action of gases moving under heavy pressure and suddenly arrested is substantially the same as that of water; hence the explosions in the pipes and apparatus employed in the production of calcium lights are attributable to the causes above recited.

The invention is particularly applicable to magic lanterns for the production of what are termed "dissolving" or "fading" views, and in the accompanying drawings it is illustrated in a form adapted to this purpose.

Figure 1 is a plan view of a double stop-cock adapted to be used in connection with two magic lanterns. Fig. 2 is a transverse section on the line $x\,x$, Fig. 1; and Fig. 3 is a longitudinal section through the plug.

A designates a barrel or casing, provided with two pairs of radial tubular arms, $a\,a'$ and $b\,b'$, to which the burners are to be attached, and which may therefore be denominated "burner-arms."

B designates a plug, which is fitted to the barrel A and adapted to turn therein, both being preferably tapered, to insure a close fit and to permit adjustment to compensate for wear. The reduced ends b^2 b^3 project beyond the ends of the barrel or casing, to provide for the attachment of the supply pipes or tubes (not shown) through which the gas is delivered from the source of supply. Axial openings or passages b^4 b^5 extend from opposite ends of the plug toward its middle, each terminating in the plane of the arms at that end of the barrel and opening outward into circumferential grooves or channels b^6 b^7, which extend part way around the plug, the length of said grooves or channels corresponding with the rotary movement of the plug.

The plug B is rotated by a lever or handle, C, fixed upon one of the projecting ends, and the amount of rotation is controlled by a pin or stud, c, which projects from said handle, and is arrested in either direction by a shoulder, b^8, on the end of the barrel. The grooves or channels b^6 b^7 have a depth at their centers where the passages b^4 b^5 open into them to give them a capacity substantially equal to that of said passages, but gradually diminish in depth and capacity toward their ends until they run out. (See Fig. 2.) The grooves are of such length that when the plug is turned to bring the lateral openings of the passages b^4 b^5 opposite the burner-arms at one side of the barrel the ends of the grooves b^6 b^7 in one direction will be opposite to and in communication with the burner-arms at the other side, so that a maximum supply of gas will be delivered to the burners at one side and a minimum supply to those at the other side. When the plug is turned, the maximum supply of gas will be delivered to the burners which before received the minimum supply, and the minimum supply will be delivered from the opposite terminals of the grooves to the burners which before received the maximum supply. Thus as the light fades at one side it increases at the other.

It will of course be understood that the dou-

ble stop-cock above described is merely a duplication of a single cock, and that it may be constructed with a single gas-passage and a single groove to supply gas to a single pair of burners without substantial modification or change.

When the stop-cock is used in water-mains and fixtures, the axial passages b^4 b^5 may be omitted, the plug B in such case being set with its axis at right angles to the line of pipe.

The operation may be explained by reference to Fig. 2. Suppose the plug B to be turned to the left just far enough to bring the widest and deepest part of the groove or channel between the two arms a a'. Then suppose the latter to be water-pipes and water to be flowing through the same. If, now, the plug or cock be turned in either direction, the communicating passage between the two arms will be gradually closed and the flow of water will be stopped. This will be done so gradually, however, that the snapping and straining above referred to will be avoided. The rotary movement in this case and the length of the groove will be such that the flow of water may be entirely cut off. For this purpose it is not necessary that the groove should taper in both directions, a taper in one direction only being sufficient.

Having thus described my invention, I claim as new—

1. In a stop-cock for gas and water mains, service-pipes, and fixtures, the combination, with the barrel or casing A, having two openings or passages through its walls, of a rotary valve-plug formed with a tapering circumferential grove or channel in the plane of the openings in the barrel or casing to form a passage between the same, said groove or channel having a length greater than the distance between said openings, whereby when the plug is turned the passage between the openings is gradually increased or diminished, substantially as shown and described.

2. In a stop-cock for gas and water mains, service-pipes, or fixtures, the combination, with the barrel or casing having two passages through its walls, of a rotary valve-plug formed with a circumferential groove or channel in the plane of the openings through the walls of the barrel or casing to form a passage between the same, said groove tapering in both directions from a point of maximum capacity, and each part from said point of maximum capacity outward having a length equal to or greater than the distance between the said two passages in the barrel or casing, substantially as and for the purpose described.

3. In a stop-cock for gas and water mains, pipes, or fixtures, the combination, with the barrel or casing having two openings through its walls, of a rotary valve-plug having an axial opening or passage in communication with the source of supply, said passage opening laterally into a circumferential groove or channel of varying capacity in the plane of the openings through the walls of the barrel or casing, said groove or channel having a length greater than the distance between the said openings, substantially as shown and described.

SAMUEL HAWKRIDGE.

Witnesses:

THOMAS D. GREANY,

JAS. A. DONALDSON.