

R. T. BAINES.
STOP COCK.

No. 451,746.

Patented May 5, 1891.

Fig. 1.

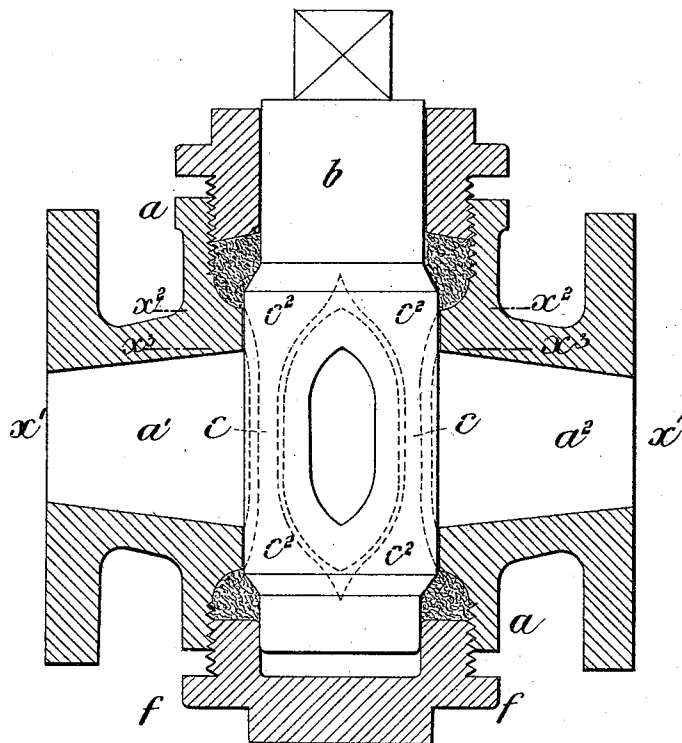
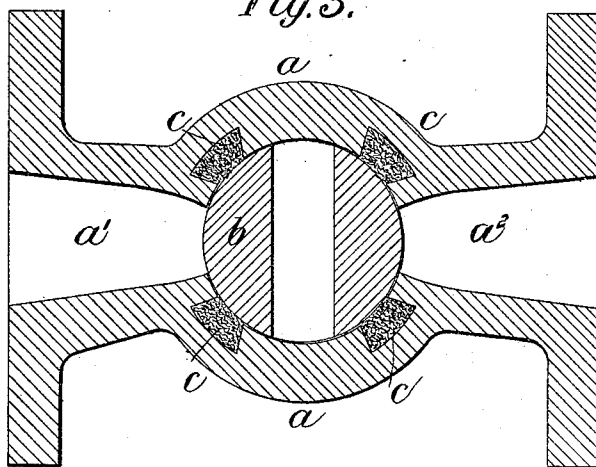


Fig. 3.



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(No Model.)

4 Sheets—Sheet 2.

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Fig. 2.

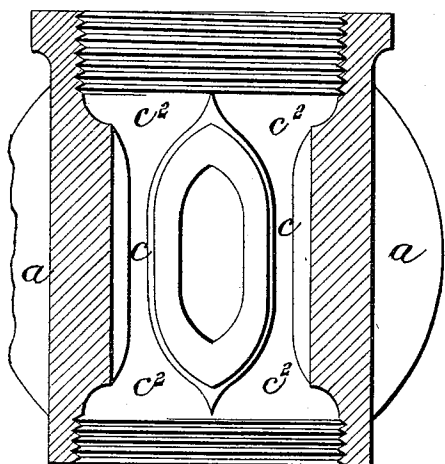


Fig. 4.

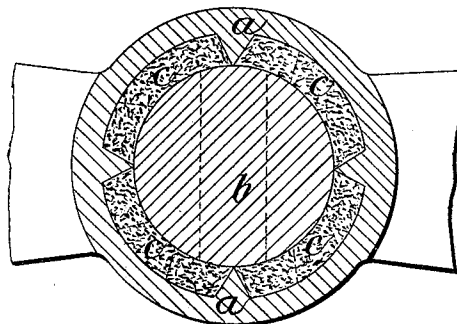


Fig. 6.

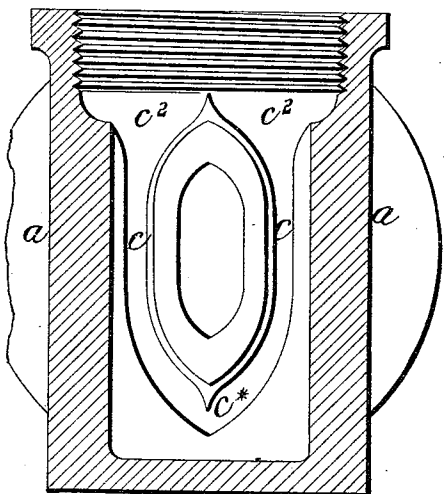
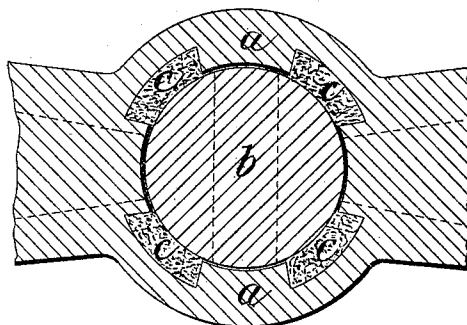


Fig. 5.



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Fig. 8.

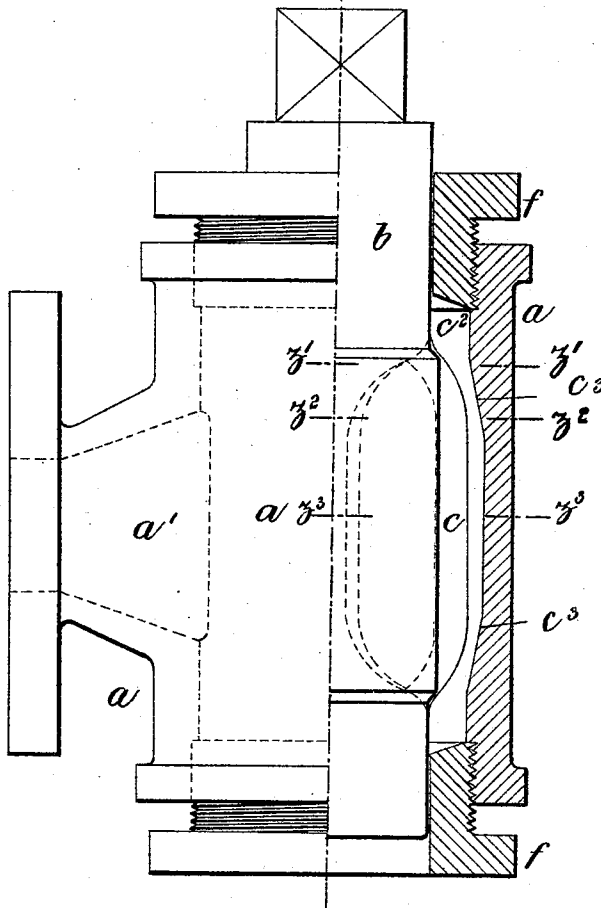
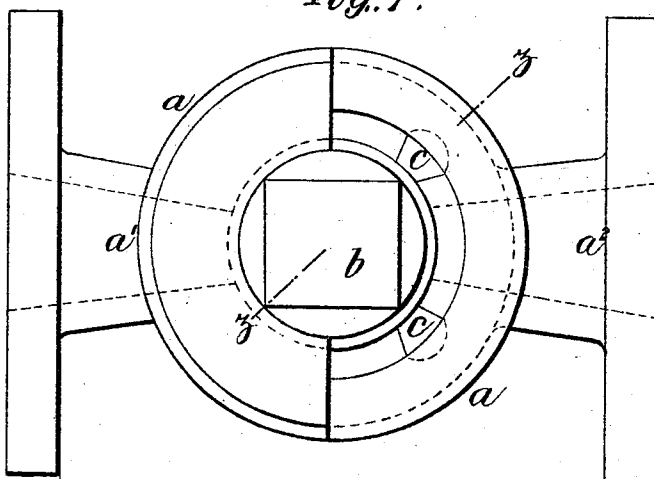


Fig. 7.



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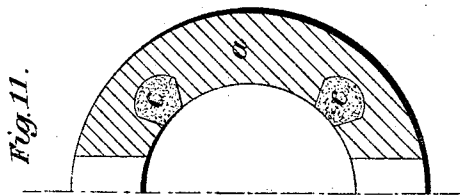
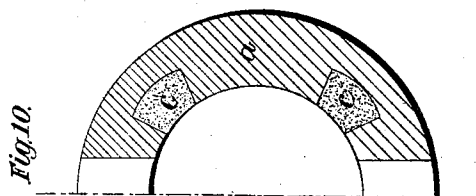
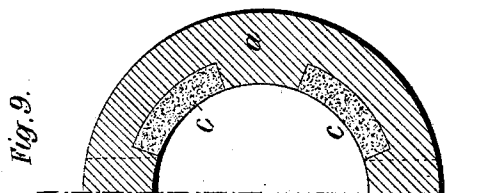
(No Model.)

4 Sheets—Sheet 4.

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UNITED STATES PATENT OFFICE.

ROBERT THOMPSON BAINES, OF LONDON, ENGLAND.

STOP-COCK.

SPECIFICATION forming part of Letters Patent No. 451,746, dated May 5, 1891.

Application filed August 11, 1887. Serial No. 246,754. (No model.) Patented in England February 18, 1887, No. 2,574, and November 8, 1888, No. 16,157.

To all whom it may concern:

Be it known that I, ROBERT THOMPSON BAINES, engineer, a subject of the Queen of Great Britain, and a resident of London, England, have invented new and useful Improvements Relating to Stop-Cocks, (for which I have obtained Letters Patent in Great Britain No. 2,574, dated February 18, 1887, and No. 16,157, dated November 8, 1888,) of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to stop-cocks of the kind or class wherein jute, hemp, asbestos, or other fibrous or soft packing is employed for insuring the tightness of the plug in the barrel or body of the cock.

The packing in stop-cocks of the kind or class above mentioned has usually been applied in straight grooves formed in the barrel or body of the cock parallel to the axis of the plug and in annular grooves or spaces also formed in the said barrel or body, one above and the other below the ways or passages therein. The compression of the packing in the straight or longitudinal grooves is usually effected by endwise pressure applied thereto through the packing contained in the annular grooves or spaces. Therefore if any leakage should occur through the packing contained in one or more of the longitudinal grooves such leakage cannot be stopped without compressing the packing in one or both of the annular grooves or spaces, as well as that in the longitudinal grooves. In stop-cocks of this kind or class as hitherto constructed the packing in the annular grooves or spaces is by this operation in many instances compressed to such an extent as to produce excessive friction between the same and the plug of the cock, thereby rendering the turning of the plug difficult and causing the rapid wear of the packing. Moreover, when the packing in the said annular grooves or spaces has been compressed until it has become hard enough to resist further tightening of the gland the compression of the packing in the longitudinal grooves is no longer possible, and in order to stop leakage through the packing in the said longitudinal grooves it becomes necessary to remove the gland or one

of the glands and insert more packing in the longitudinal grooves. As this operation cannot be effected while the cock is subjected to the pressure of the fluid, great inconvenience is sometimes experienced in the use of such cocks as heretofore constructed.

Now one object of my present invention is to obviate these disadvantages and to provide for the tightening or compression of the packing in the longitudinal grooves without undue compression of the packing in the annular grooves or spaces. Moreover, a novel and peculiar feature of my said invention is the provision of means whereby when the gland is tightened a wedge-like action will be exerted upon the packing in the longitudinal grooves. For this purpose I make the ways or passages of the cock oval, elliptical, or of other suitable shape and the packing grooves or spaces of corresponding shape—that is to say, instead of making the longitudinal grooves straight from end to end of the socket or barrel I make the said grooves so that they gradually increase in width and depth, or either, from the center or near the center of the said socket or barrel to the ends thereof, and I make the plug in the form of a cylinder.

In the accompanying drawings, Figure 1 is a vertical longitudinal central section of one form of my improved stop-cock. Fig. 2 is a transverse section through the barrel or body of the said cock. Fig. 3 is a horizontal section on the line $x'x'$, Fig. 1. Fig. 4 is a horizontal section on the line x^2x^2 , Fig. 1; and Fig. 5 is a horizontal section on the line x^3x^3 , Fig. 1. Fig. 6 is a vertical transverse section of the barrel of a cock, illustrating a modification of my invention. Fig. 7 is a plan or top view illustrating another modification of my said invention. Fig. 8 shows the stop-cock illustrated in Fig. 7, partly in side elevation and partly in section, on the line z,z , Fig. 7. Figs. 9, 10, and 11 are horizontal sections, respectively, on the lines $z'z'$, z^2z^2 , z^3z^3 , Fig. 7.

a is the barrel or body of the cock, which is formed with the usual ways or passages $a'a^2$.

b is the plug.

$c c$ are the longitudinal packing-grooves.

In Figs. 1 to 5 I have shown a stop-cock formed with ways or passages which are approximately oval in transverse section and with packing-grooves c of corresponding form—that is to say, each of the said grooves increases in width from the center or near the center of the socket for the plug to or nearly to the ends of the said socket, as shown at c^2 , and as indicated by the various horizontal sections shown in Figs. 3, 4, and 5. The sides or walls of the said grooves therefore conform or approximately conform to the said ways or passages. A screw-gland f is inserted in each end of the barrel or body a for the purpose of tightening or compressing the packing.

It is evident that by reason of the wedge-like shape of the ends c^2 of the grooves c lateral or transverse pressure will be exerted upon the packing in the longitudinal grooves when either of the glands is tightened, and pressure may be applied by means of the said glands to the whole of the packing throughout the cock in a very efficient manner. Moreover, it is obvious that the packing can be tightened or compressed to a very considerable extent before further tightening of the gland will be prevented, there being no annular shoulder like that in packed cocks, as heretofore usually constructed, between which and the gland the packing can be compressed until it becomes hard, and by reason of the widening of the longitudinal grooves a considerable space is afforded for the storage of packing within the cock, so that the cock may be used for a very long period without the necessity for repacking the same.

The arrangement of grooves shown in Figs. 1, 2, 3, 4, and 5 may be used with more or less advantage in solid-bottom cocks, the grooves in this case meeting below the ways or passages of the barrel or body of the cock.

In the modification of my invention (illustrated in Fig. 6) the grooves c at the sides of each way or passage in the barrel or body a are so formed that they meet below the said way or passage, as at c^3 . In this case the bottom of the cock is made solid and only one screw-gland is required.

In the cock shown in Figs. 7 to 11 the longitudinal packing-grooves c are made with the peculiar wedge-like or taper formation above described with reference to Figs. 1 to 5. The body of the plug b is cylindrical, and the interior of the barrel a is made taper from the ends toward the center thereof, as shown at c^3 , so that the said walls are concave internally in vertical transverse section. I thus increase the space available for packing at the narrowest parts of the grooves c , so as to obtain a greater body of packing at these parts, and thus enable the cock to be used for a long period without repacking. Moreover, I thus provide for facilitating the flow of the packing in the grooves when the gland

is tightened. When I thus provide for increasing the space for the packing, I depend solely upon the above-described taper formation of the grooves c for obtaining a wedge-like action upon the packing when the gland is tightened.

Prior to my invention it has been proposed to construct a cock with a tapering plug and tapering grooves in the barrel or casing to contain a packing which can be forced inwardly upon the tapering plug, as in English Patent No. 4,297, dated November 16, 1877. My invention differs therefrom, in that the grooves in my construction are formed in the barrel so that they increase in depth as they decrease in width—that is, the grooves not only increase in depth, but they correspondingly increase in width from end to end—and, further, the grooves are closed at one end and open at the other end, while the plug is a true cylinder. By my construction of grooves the screwing down of the gland does not force the packing laterally inward upon the plug, as in the prior construction; but, on the contrary, the screwing down of the gland simply forces the packing lengthwise along the grooves, so that I effectually avoid jamming the plug or forcing the metal of the barrel, as will occur in the prior construction. By my invention, therefore, I materially diminish friction and wear. In my invention the grooves are of the same area in cross-section throughout their length, and consequently the packing, when acted upon by the gland, will flow easily along the length of the groove and will not become jammed therein. This is an important feature over the prior construction, where the grooves decrease in width, but are of uniform depth, so that they decrease in area in cross-section, and thereby act to jam the packing when the gland is screwed down.

What I claim is—

1. The combination, in a stop-cock, of a plug-cylinder with the casing or barrel formed with longitudinal grooves which gradually decrease in width and increase in depth and contain fibrous packing, substantially as described.

2. The combination, in a stop-cock, of a plug-cylinder with a casing or barrel formed with grooves closed at one end, open at the opposite end, and gradually decreasing in width and increasing in depth, and fibrous packing in the grooves, substantially as described.

3. The combination, in a stop-cock, of the plug b , having a way which tapers to a point at its upper and lower ends, the barrel or casing having tapered ways and packing-grooves c , each of which gradually increases in width from at or near the middle of its length to its opposite end portions, fibrous packing in the grooves, and a gland f , substantially as and for the purpose described.

4. In a stop-cock, the combination of the

barrel or casing *a*, provided with elliptical
ways and packing-grooves *c*, each of which
gradually increases in width from at or near
the middle of its length to its opposite ends,
5 fibrous packing located in the grooves, the
plug *b*, and the gland *f*, substantially as de-
scribed.

In testimony whereof I have hereunto signed
my name in the presence of two subscribing
witnesses.

ROBERT THOMPSON BAINES.

Witnesses:

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WALTER J. SKERTEN.