No. 709,491. Patented Sept. 23, 1902.

D. KENNEDY.

STRAIGHTWAY VALVE.

(Application filed Nov. 16, 1901.)

(No Model.)

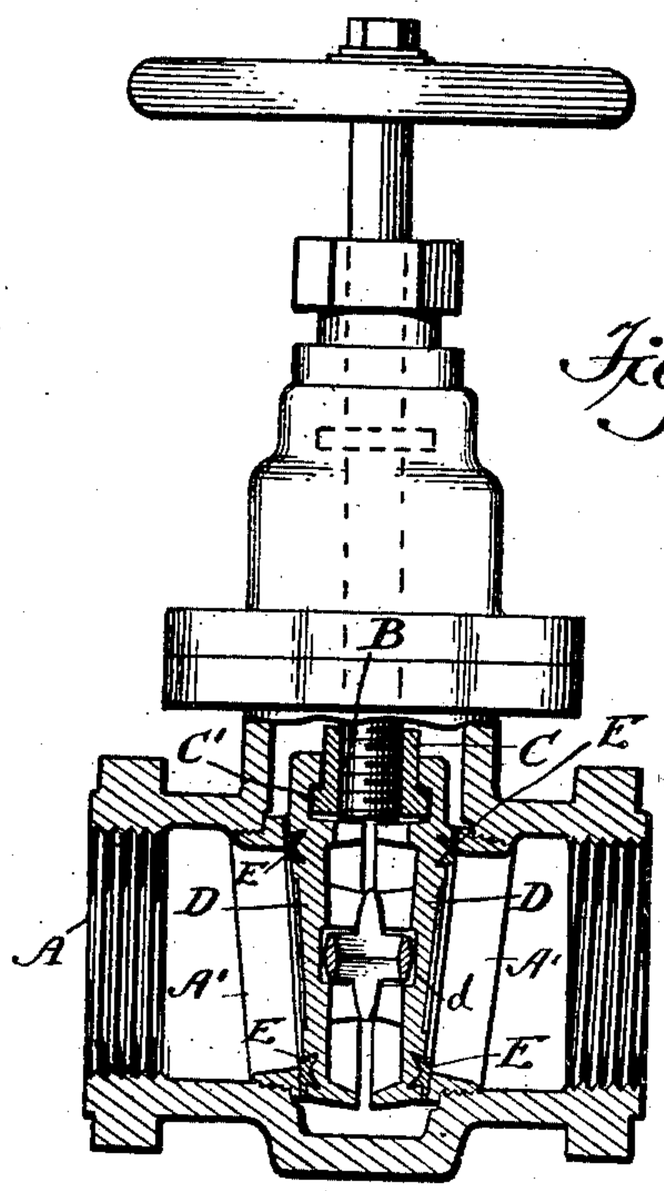

Fig. 1.

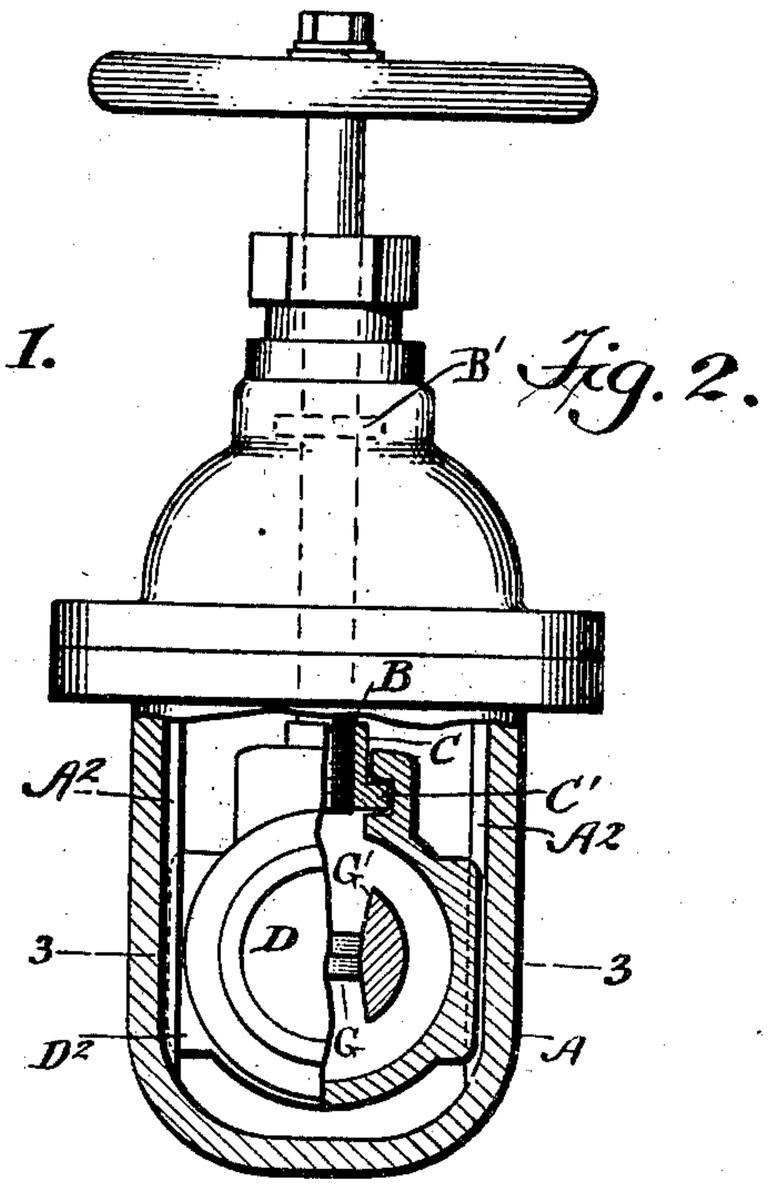

Fig. 2.

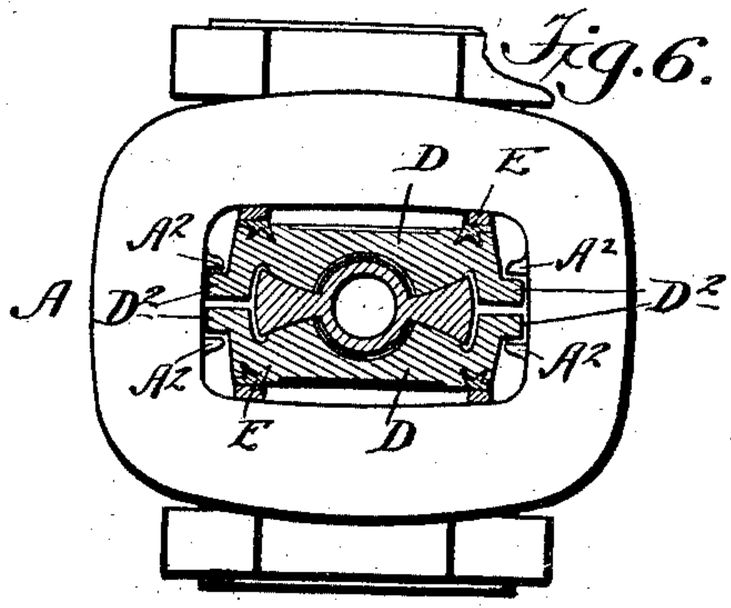

Fig. 6.

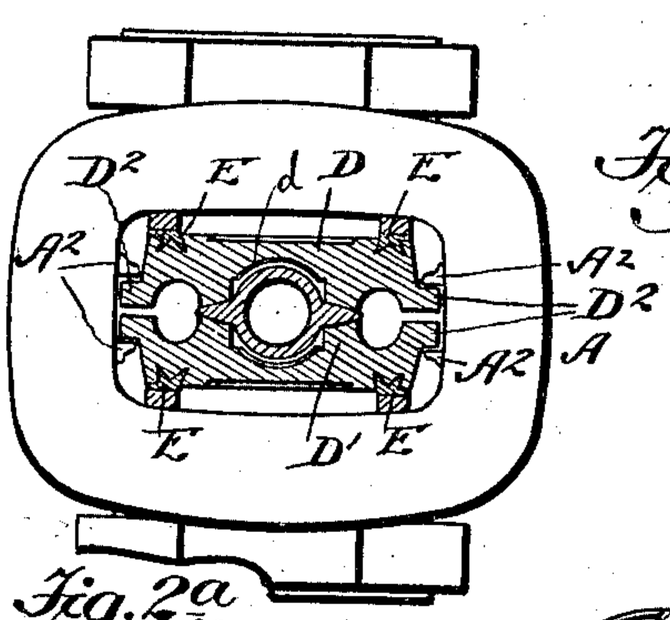

Fig. 3.

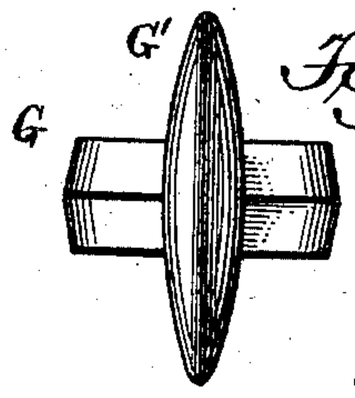

Fig. 1a.

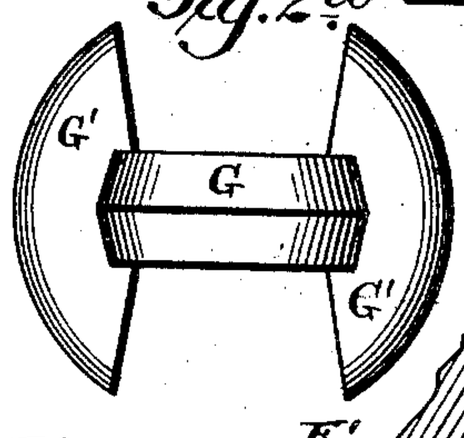

Fig. 2a.

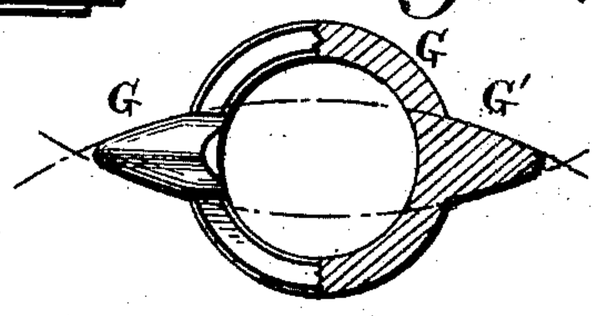

Fig. 3a.

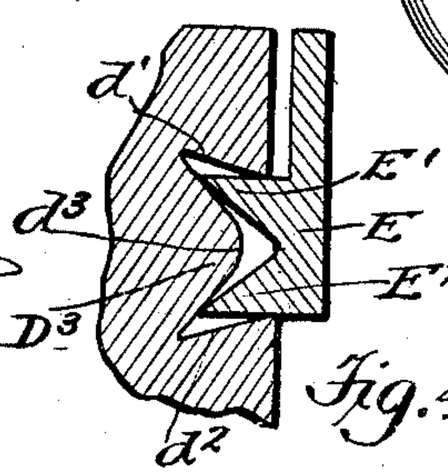

Fig. 4.

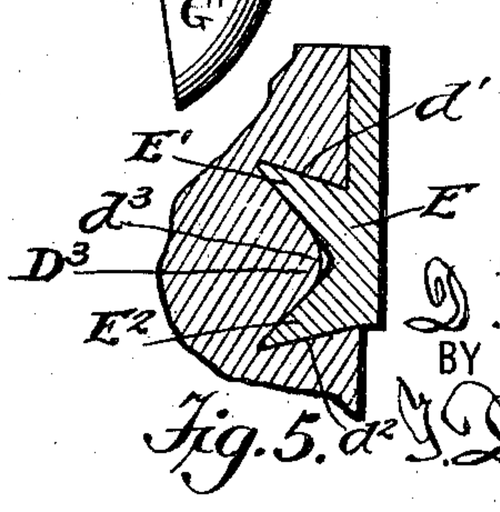

Fig. 5.

WITNESSES:

A. R. Applemann Jr.

M. F. Boyle

INVENTOR

D. Kennedy

BY

Y. D. Watson

ATTORNEY

UNITED STATES PATENT OFFICE.

DANIEL KENNEDY, OF BROOKLYN, NEW YORK.

STRAIGHTWAY VALVE.

SPECIFICATION forming part of Letters Patent No. 709,491, dated September 23, 1902.

Application filed November 16, 1901. Serial No. 82,501. (No model.)

To all whom it may concern:

Be it known that I, DANIEL KENNEDY, a citizen of the United States, residing in the borough of Brooklyn, in the city and State of New York, have invented a certain new and useful Improvement in Straightway Valves, of which the following is a specification.

The invention applies to that class of valves in which the control of the fluid is effected by two disks mounted wedgewise back to back and moved by the mechanism into position between corresponding wedgewise surfaces which form, in effect, the adjacent ends of the fixed pipes. It is common to provide for a small amount of rocking of these disks to compensate for inequalities in the obliquity or for the engagement of a chip or other solid matter which may require either of the disks to tilt on its bearing. I can employ any ordinary or suitable means to move the pair of disks thus united out from their central position in the line of the pipes and back again, as required to open and close the valve.

The improvement relates to the disks and adjacent bearing and rubbing surfaces. It has long been common to provide separately-formed facing-rings for each disk, which may be of a different metal, as brass, while the main body of the valve is iron. It has been proposed to engage them by causing the rings to lock by spreading in undercut grooves. I have discovered an improved form which greatly improves the effect by inducing the spreading effect at the bottom only of the groove. This with little labor or skill preserves the integrity of the metal both of the ring and the grooved iron and holds these facing-rings with unusual tightness and firmness. I also provide for receiving the pressure received through these rings through the wedging action impelled by the strong screw force, in shutting and also for receiving the force, sometimes very great, exerted by the fluid on a large valve. I will refer to the fluid as "water;" but it will be understood that the invention may apply with steam, air, or any other liquid or gas requiring to be tightly stopped and to be easily freed, partly or entirely, at will.

The following is a description of what I consider the best means of carrying out the invention.

The accompanying drawings form a part of this specification.

Figure 1 is a central vertical section in the plane of the axis of the pipes. Fig. 2 is in the right half a corresponding section in a plane at right angles to that of Fig. 1. The left half shows the outer or front face of the other disk in elevation. Fig. 3 is a plan view with a horizontal section of the interior parts on the line 3 3 in Fig. 2. Figs. 4 and 5 show a section through the facing-ring and the adjacent portion of a valve on a larger scale. They are in a plane corresponding to Fig. 1 and show different stages of the construction, as follows: Fig. 4 is a section as these parts are constructed and presented to each other in the act of joining, and Fig. 5 shows the same parts after they have been united by forcibly compressing together. Fig. 1^a is a side elevation of the rolling-ring detached in the position shown in Fig. 1. Fig. 2^a is a side elevation of the rolling-ring detached in the position shown in Fig. 2. The left side of Fig. 3^a is a plan view of half of the rolling-ring detached in the position shown in Fig. 3, and the right side is a horizontal section of the other half. Fig. 6 is a horizontal section corresponding to Fig. 3, but showing a modification.

Similar letters of reference indicate corresponding parts in all the figures where they appear.

A is the main body of the casing, and A′ A′ are removable annular pieces set inclined in opposite directions and finished to serve as valve-seats.

B is the operating-screw, having a collar B′, carried in a suitable top piece, which forms an enlargement of the chamber, into which the valve may be drawn and retained when desired. The operating-screw is equipped with a stuffing-box and hand-wheel.

So far as yet described all may be of an ordinary and long-approved construction.

D and D are disks separately formed and capable of tilting to a small extent. Each is recessed to strongly but loosely take hold of the flange C′ of a nut C, engaged with the screw B, and by the turning of which screw the disks are moved to open and close the passage. The working side of each disk is faced with a ring E, of soft brass, cast with

two annular ridges E′ E², each of V-shaped section. When this ring is cast, these ridges have their outer sides parallel, the obliquity being all on their inner sides, as indicated in Fig. 4. Each disk D is formed with an annular groove only sufficiently wide at the surface to receive the two ridges E′ E² while in their original unspread condition, but diverging beneath the surface, so that the edges d' d^2 are undercut. The mid-width d^3 of the groove is shallow and presents, in fact, a ridge D³ of rounded cross-section. The form is clearly shown in Figs. 4 and 5.

In the manufacture of the valve, the parts being properly prepared, the rings are presented and forced into position, preferably by hammering with an air-hammer. The beveled inner faces of the ridges E′ E² striking the rounded bottom d^3 are spread apart, and the force being continued drives the metal home, engaging it smoothly with the undercut edges d' d^2 of the groove, so that it is strongly locked at the bottom of the V-shaped groove, while by reason of the rounding of the ridge at the center, with the cross-section of the softer ring not so rounded, the metal of the ring is but slightly, if at all, compressed, and the stronger iron receives the locking spread of the annular ridges at the base of the grooves alone, where it is able to withstand it without danger of cracking or weakening. Plane extensions D², which I will term "guide-lugs," on the edges of each disk D travel within guide-flanges A², cast on the interior of the casing A, which insure against the disks becoming much separated and against the plane of travel of the disks becoming changed.

I provide for receiving the pressure of the disks D D on large surfaces, with adequate provision for rocking in any direction to the greatest extent ever required. The central portion of the back of each disk is recessed, as indicated by *d*, (see Figs. 1 and 3;) but this recess does not receive the load. It is simply to provide for loosely receiving the ring to be presently described. The pressure, very great with large valves, is received with liberty to rock on lenticular-shaped bearing parts G′ G′, of hard brass or other suitable material, each thicker at its inner than at its outer edge and received between correspondingly inclined and concaved faces on the ends of posts D′, which extend from the back of each disk. The bearings G′ G′ are held firmly apart by means of a thin but sufficiently stout connecting-ring G, cast integral therewith. The bearing and rolling surfaces are each portions of a large sphere. I have succeeded well by making these surfaces each a portion of a sphere having a radius exactly coinciding with that of the disks, but this may be varied. The construction allows that the bearings shall be, respectively, portions of large spheres, and yet requires the disks to be held only a small distance apart, little more than sufficient to allow the operating-screw to be received.

It is common to provide separately-formed facing-rings; but the means for securing each to its respective disk have been expensive and imperfect. My form of locking carried out with as ufficiently yielding metal, as soft brass, attaches such facing reliably, tightly, and cheaply and without overstraining the metal. It has long been practiced to hold such disks apart with liberty to rock by mechanism between the backs. The provisions for this heretofore employed have been defective, some in encumbering the central portion of the space, so that the choice of operating means is limited, because the operating-screw cannot be allowed to pass the center. None can present so large a surface as mine to receive the pressure. My invention provides for rocking freely in all directions and for leaving a clear space for an operating-screw to be received through the center between the disks. My experiments indicate that the surfaces will remain in good condition for an indefinite period.

Modifications may be made without departing from the principle or sacrificing the advantages of the invention. The areas, as well as the sphericity, of the lenticular bearing parts G′ and of the corresponding receiving-surfaces on the posts D′ may be less or even somewhat greater than shown. The beveling or undercutting of the edges d' d^2 of the groove may be considerably less than shown. The great force applied to the parts in working is always in the direction pressing the ring home, never rending it. The whole construction is economical and durable and greatly reduces the liability of the metal on either the outer or inner faces of the disk to become crushed or abraded.

A modification which is important on some accounts is indicated in the horizontal section in Fig. 6. In this the bearing-surfaces provided by the lenticular bearing portions are concave rather than convex, and the "posts" which are cast on the backs of the disks are correspondingly convex. This form, though widely different in appearance, will allow the disks to rock, while insuring their being carried up and down by the screw in the same manner as the other and preferred form.

I claim as my invention—

1. In a valve having inclined seats, disks with inclined outer faces and an operating-screw which is received between the disks, and posts D′ D′ in the backs having concave bearing-faces arranged on each side respectively of the operating-screw, the combination therewith of two lenticular bearing-pieces G′ G′ matching in the concave seats on such posts, all adapted to serve substantially as herein specified.

2. In a valve having inclined seats, disks with inclined outer faces an operating-screw which is received between the disks, and posts

D′ D′ in the backs having concave bearing-faces arranged on each side respectively of the operating-screw, the combination therewith of two lenticular bearing-pieces matching in the concave seats on such posts, and a ring G connecting such bearing-pieces adapted to hold such bearing-pieces apart, all arranged to serve substantially as herein specified.

3. A stop-valve provided with a ring arranged between the disks and having two lenticular bearing-pieces integral therewith and matching in corresponding recesses in the back of said disks so as to support the same with liberty to rock, all substantially as herein specified.

In testimony that I claim the invention above set forth I affix my signature in presence of two witnesses.

DANIEL KENNEDY.

Witnesses:
J. B. CLAUTICE,
M. F. BOYLE.