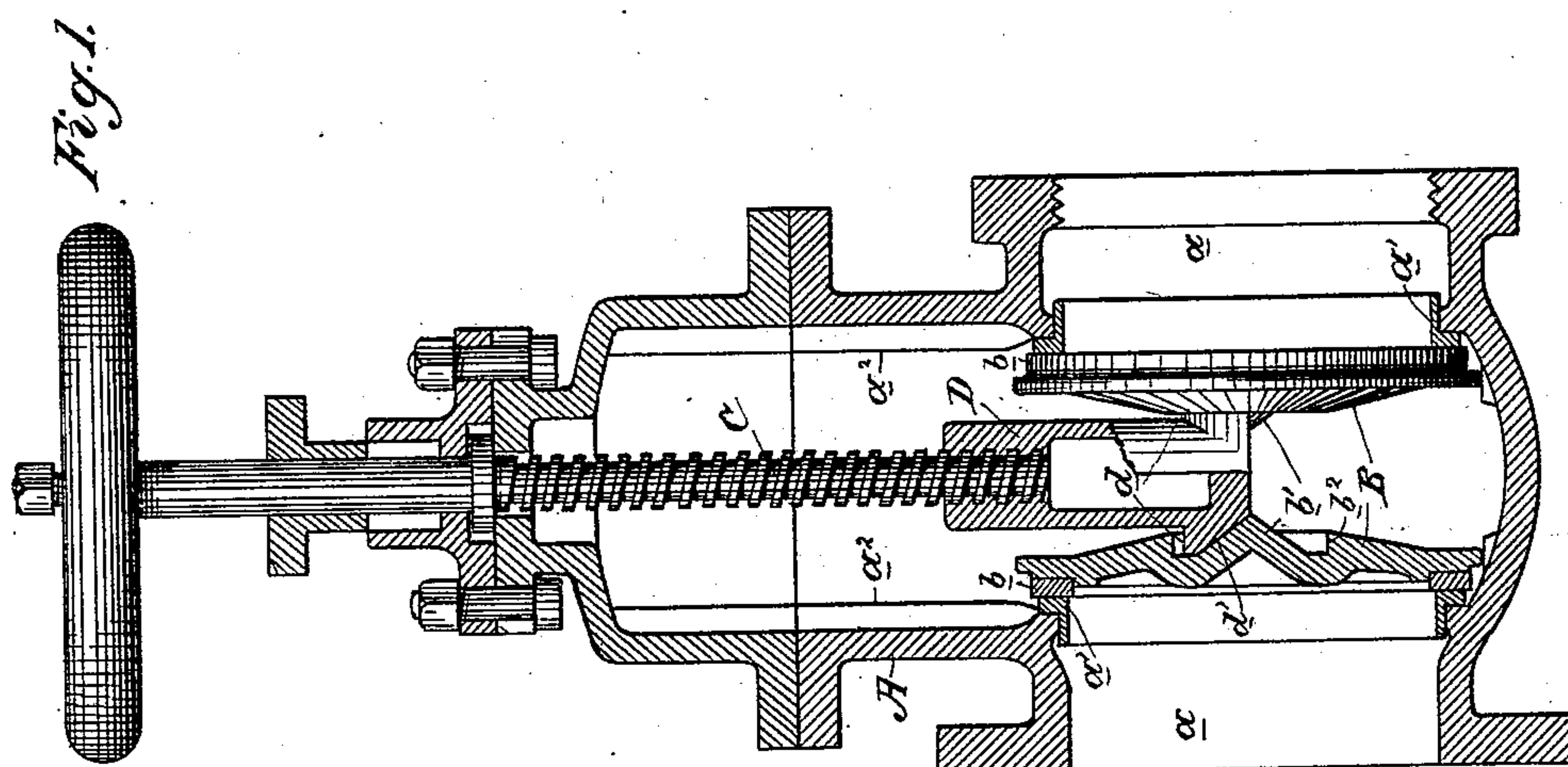
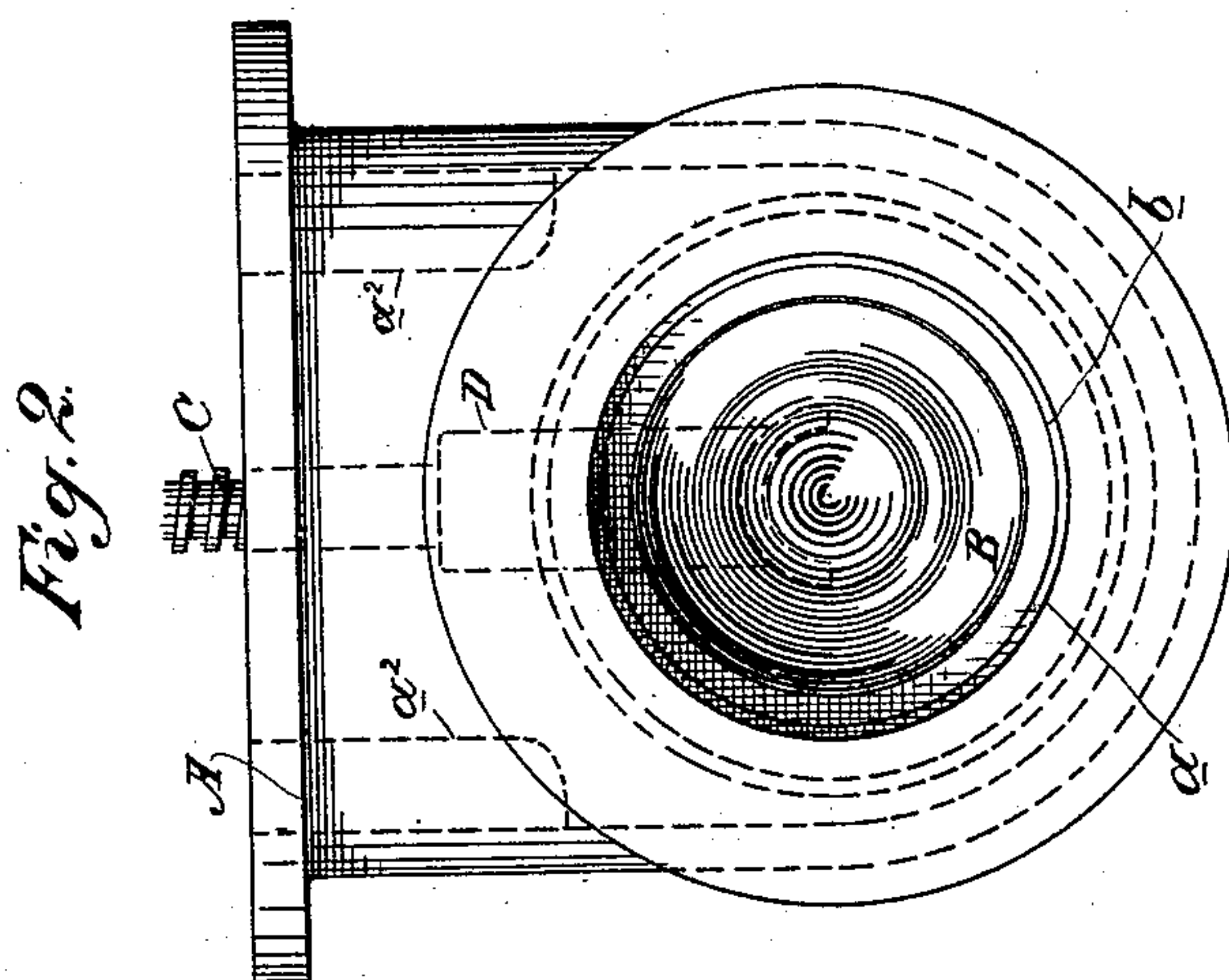


(No Model.)

A. F. L. BELL.  
VALVE.

No. 472,914.

Patented Apr. 12, 1892.



Witnesses,  
Geo. H. Strong,  
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attys



# UNITED STATES PATENT OFFICE.

ARTHUR F. L. BELL, OF SAN FRANCISCO, CALIFORNIA.

## VALVE.

SPECIFICATION forming part of Letters Patent No. 472,914, dated April 12, 1892.

Application filed April 15, 1890. Serial No. 348,056. (No model.)

*To all whom it may concern:*

Be it known that I, ARTHUR F. L. BELL, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Valves; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to that class of valves usually termed "gates," used for water, steam, &c., and in which opposing disks are forced outwardly to and are withdrawn from their seats by means of a plunger operating against or upon their inner sides.

My invention consists in the novel arrangement of the valves in the shell and the novel construction and connection of the plunger therewith, hereinafter fully described, and specifically pointed out in the claims.

The object of my invention is to provide for a sufficient amount of freedom in the connection of the valve-disks with the operating plunger to permit said disks in returning to their seats to present different points of bearing or contact at each operation, whereby they are not liable to uneven wear.

Referring to the accompanying drawings for a more complete explanation of my invention, Figure 1 is a section of my valve, one of the disks B and that side of the plunger B which engages said disk being shown in elevation. Fig. 2 is an elevation looking into the passage *a* of the shell and showing the outer face of disk B.

The shell A is preferably made in two pieces bolted together and having a straight-way passage *a* the full diameter of the pipe. In this passage—one on each side—are located the valve-disks B, wholly separated from one another. Each is faced with suitable rings *b*—say of hard gun-metal—which, when the disks are closed, bear against corresponding gun-metal rings *a'* in the disk-seats. These seats are straight, as shown, and the disks are forced up to them straight. The back or inner side of each disk is formed with a central cone *b'*, the base of which extends deep enough into the disk to leave an encircling lip *b<sup>2</sup>*.

The spindle C, though it may be of any character, is here shown as of the stationary type, having a thread cut on it within the

shell and carrying at its lower end a plunger D, here shown as a loose nut, and which lies between the opposing disks B. The lower end of this plunger is widened out to form a shoulder at *d*, and the faces of this widened portion are concaved to form concave portions of a cone, (represented by *d'*.) This widened out portion of the plunger and the concavities *d'* formed in it do not extend below the apices of the conical projections *b'* of the disks B, but only fit them on their upper or inner side. Its shoulder *d* bears up under the lip *b<sup>2</sup>* of said disks. This forms a connection of a loose character between the plunger and disks. These disks B are mounted in the shell and rest upon its interior walls. They are not carried by the plunger, but are supported or guided by the casing or shell of the valve. The effect of thus mounting and supporting the valve-disks and the loose connection between them and the plunger is to cause the movement of the disks to and from their seats by reason of the movement of the plunger and to allow said disks a rolling action upon the shell-walls during this movement. When the plunger is withdrawn, it relieves the disks of its wedging action and at the same time by the engagement of its shoulder *d* with the lip *b<sup>2</sup>* of said disks it withdraws the latter from their seats. In this withdrawal the disks bearing on the walls of the shell roll or turn axially. When the plunger is again projected, it forces the disks back to the plane of their seats, and then said disks, coming in contact with the end of the shell and being able to move no farther, receive the wedging action of the plunger against their conical projections, whereby they are forced outwardly to their seats, the wedging action taking place after the disks have come to a state of rest. This rolling action of the disks, due to their contact with the interior walls of the shell and being unhindered in any manner by their connection with the plunger, is not of an equal or certain character, as would be the case if the rolling action were due to the engagement of the disk with positive gears, such as a rack or the threads of a screw; but said rolling action, being the result of mere contact with the walls of the shell, results in an unequal and uncertain rotary motion, which is



not likely to return the disks to exactly the same points of contact or bearing against their seats at each operation. In other words, they close in a different position at each operation of the valve, thus insuring them from excessive wear at any one point. When being drawn back, the disks are steadied as they rise or move into a shell and leave their seats by guide-pieces  $a^2$  in the shell corners, which come out about even with the seat planes and receive the edges of the disks, so that they cannot tip outwardly.

Another great advantage of this gate is that the disks are rolled loosely into their closed position before the wedging action takes place, thereby closing them without the usual grinding action of the disks against their seats, whereby cutting of the seats is caused and consequent leaks. This advantage is due not only to the peculiar connection between the plunger and the disks, but also to the straight seats, against which the disks are forced, which said seats are rendered possible by the plunger connection, as the disks do not grind against the seats in coming to position and are not forced upon them until they are fully in position, and then they are forced out squarely.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a valve or gate having a shell with opposing seats, the combination, with the valve, of disks mounted within said shell and resting and adapted to roll directly on its inner walls and limited by the outer end of the shell to a position opposite their seats, said disks having conical centers on their adjacent faces, with lips encircling the bases of the cones, and a reciprocating plunger having a shoulder on its lower end bearing under the lip of the disks to operate them, substantially as herein described.

2. In a valve or gate having the shell with

opposing seats, the combination, with the valve, of disks mounted within said shell and resting and adapted to roll directly on its inner walls and limited by the outer end of the shell to a position opposite their seats and a reciprocating plunger having a wedge-shaped lower end connected with said disks to operate them and permit their rolling action on the walls of the shell, substantially as herein described.

3. In a valve or gate having a shell with seats, the combination, with the valve, of disks mounted in said shell to bear and rest upon its inner walls, whereby they are caused to roll in their movement and limited by the outer end of the shell in a position opposite their seats, said disks having on their inner surfaces the cone-centers with encircling lips at the bases of said centers, and the reciprocating plunger having a shoulder at its lower end bearing under the lip of the disks, and conically-concaved faces fitting only the inner portion of the cone-centers of the disk, substantially as herein described.

4. In a valve or gate, the shell having the opposing seats and the guides  $a^2$  above said seats, in combination with the rolling disks mounted within the shell and bearing on its inner walls and limited by its outer end when closing and supported by the guides  $a^2$  when opening, said disks having the cone-centers on their inner surfaces, with encircling lips at their bases, and the reciprocating plunger having a shoulder at its lower end bearing under the lip of the disks, and conically-concave faces fitting only the inner portions of the cone-centers of the disks, substantially as herein described.

In witness whereof I have hereunto set my hand.

ARTHUR F. L. BELL.

Witnesses:

S. H. NOURSE,  
H. C. LEE.