

July 14, 1925.

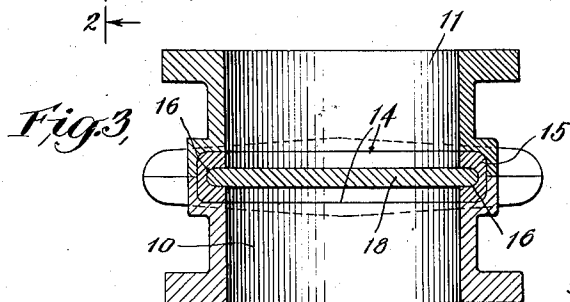
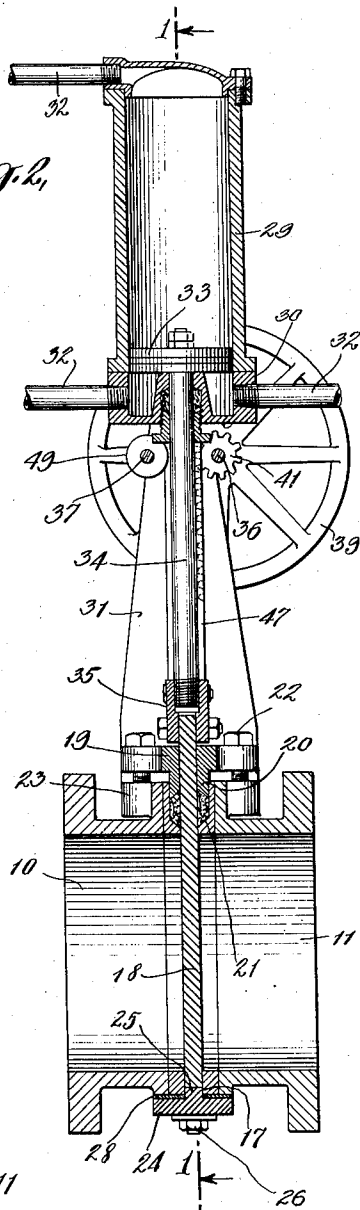
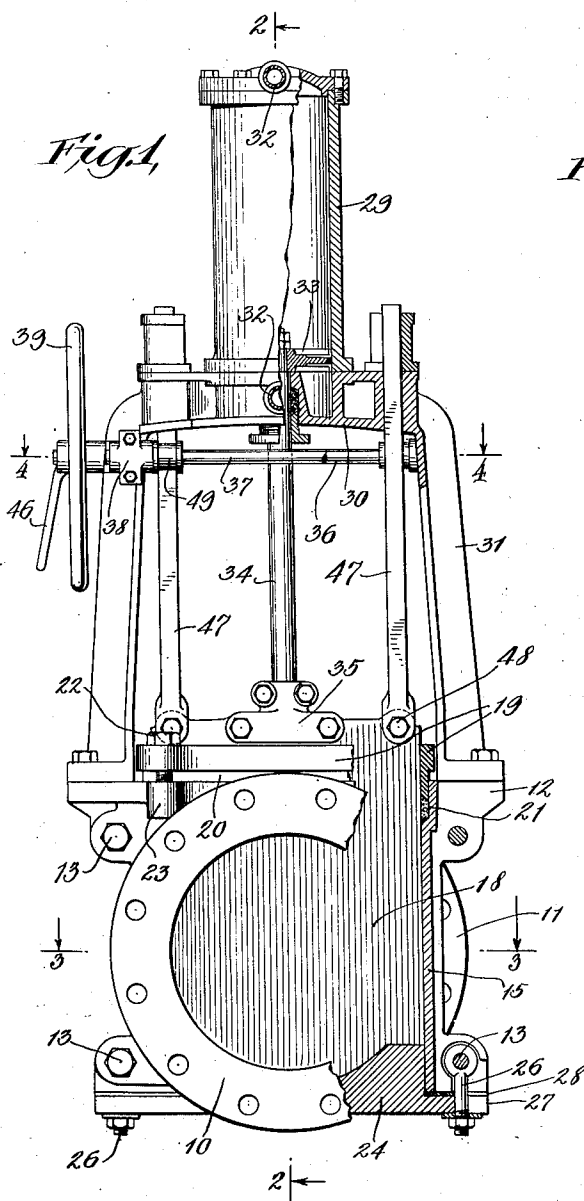
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VALVE MECHANISM

Filed Jan. 7, 1924

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

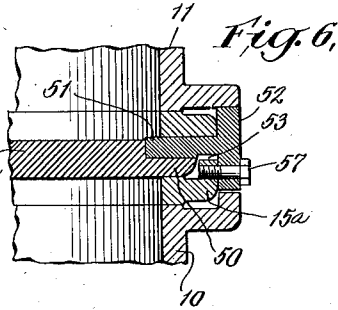
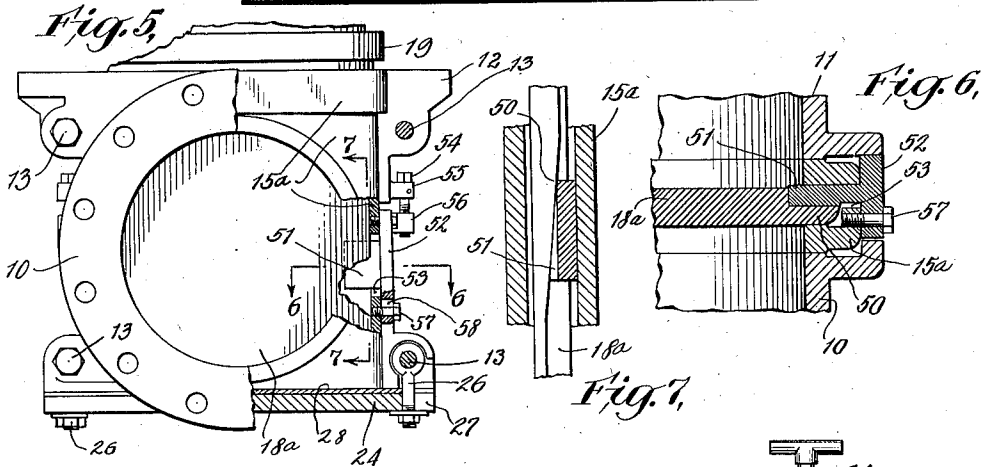
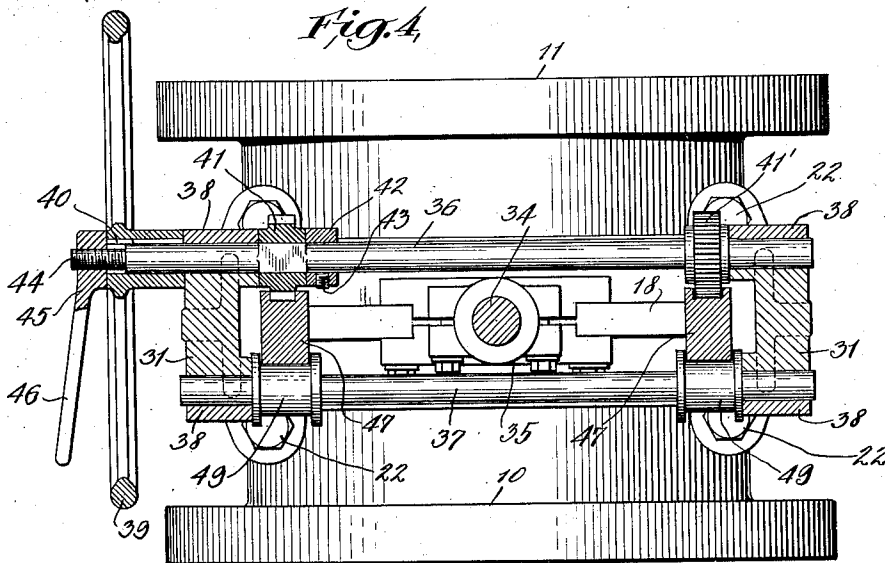
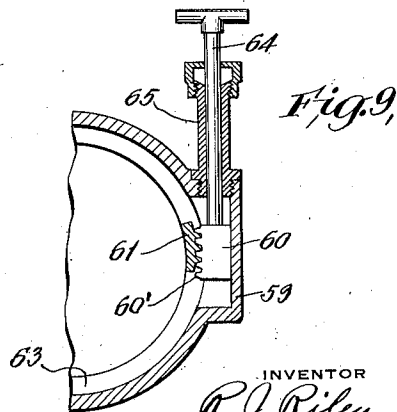
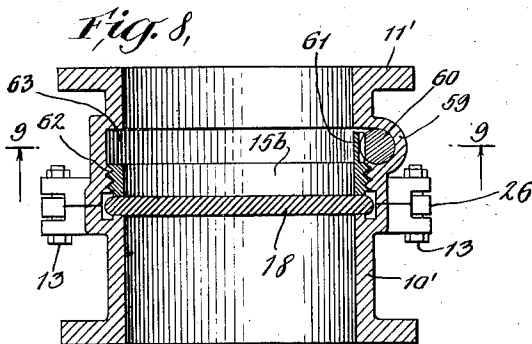


Fig. 7,



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UNITED STATES PATENT OFFICE.

RALPH JAMES RILEY, OF LIVERMORE FALLS, MAINE.

VALVE MECHANISM.

Application filed January 7, 1924. Serial No. 684,705.

To all whom it may concern:

Be it known that I, RALPH J. RILEY, a citizen of the United States, residing at Livermore Falls, in the county of Androscoggin and State of Maine, have invented certain new and useful Improvements in Valve Mechanisms, of which the following is a specification.

This invention relates to cut offs or valves for the control of fluids, and while it has particular reference to valve structures employed particularly in the practice of wood pulp operations, it is to be understood that the scope of the invention is not to be unnecessarily restricted to any particular usage.

Among the objects of the invention is to provide a valve structure in which there is a combined mechanism for power and hand manipulation of the slidable valve member or gate, the gates of these large valves being so ponderous that power operation is desirable but in the event of failure of power for such purpose hand means may be utilized for the purpose in an emergency.

A further object of the invention is to provide means for so locking the gate mechanism as to hold it from movement at any desired position.

Other objects of the invention are to provide an improved valve body structure with respect to the means for keeping the valve gate perfectly fluid-tight; to provide improved clean-out means for the bottom end or free edge portion of the gate remote from the power means, the clean-out devices being manipulatable without disturbing the position of the gate at such time; to provide improved packing means for the outer end portion of the gate, the type of valve shown being what is commonly referred to as "bonnetless," and other advantages and purpose of the invention will be pointed out as this description progresses.

With the foregoing and other objects in view the invention consists in the arrangement and combination of parts hereinafter described and claimed, and while the invention is not restricted to the exact details of construction disclosed or suggested herein, still for the purpose of illustrating a practical embodiment thereof reference is had to the accompanying drawings, in which like reference characters designate

the same parts in the several views, and in which—

Figure 1 is a front elevation of a preferred embodiment of the invention, parts being in substantially central section on about the line 1—1 of Fig. 2.

Fig. 2 is a central section at right angles to Fig. 1 and on the line 2—2 of Fig. 1.

Fig. 3 is a horizontal section on the line 3—3 of Fig. 1.

Fig. 4 is an enlarged horizontal section on the line 4—4 of Fig. 1.

Fig. 5 is a view corresponding practically to the lower portion of Fig. 1 and indicating a slidable wedge means for tightening the gate.

Figs. 6 and 7 are sectional details of the wedge mechanism on the correspondingly numbered lines of Fig. 5.

Fig. 8 is a sectional view of the general character shown in Fig. 3 but indicating a further modification of valve seat tightening.

Fig. 9 is a vertical sectional detail on the line 9—9 of Fig. 8.

Referring now more specifically to the drawings I show my improved valve construction as embodying a main body portion comprising two parts 10 and 11 having cooperating lugs or flanges 12 through which fasteners such as bolts 13 may be passed in the usual manner for locking them in operative position. On their adjacent or mating faces the body members are recessed at 14 to accommodate a specially designed seat 15 grooved along its central portion at both sides as at 16 and slotted at its bottom at 17. The cavity for the seat structure 15, moreover, is preferably open at the bottom of the body members.

The gate 18 is shown as slidable vertically in the seat member 15 with its side edges guided in the grooves 16 and with its bottom edge in closed position seated in the slot 17. Surrounding the upper end portion of the gate is a packing gland or cap 19 having a flange or skirt portion 20 projected into a pit 21 filled with packing material, and when the cap 19 is tightened as by means of lag screws 22 entering lugs 23 on the body members, a suitable degree of tightness will be provided on the gland so as to make the normally open end portion

of the gate fluid-tight. At the bottom of the body is a clean-out plate 24 having a tongue 25 entering the slot 17 and against which the bottom edge of the gate is adapted to abut. This clean-out cap or plate is held removably to the body structure by hanger bolts 26 shown as supported upon the lowermost bolts 13 and entering end slots 27 in the clean-out plate or cap. A gasket 28 may be used if desired between the plate and the bottom of the valve seat 15 to facilitate the tightening of the joint.

While I indicate the gate as being arranged to open vertically, it is to be understood that such terms are to be considered relative rather than absolute for the valve is adapted for assemblage and use in any desired position.

For the operation of the large gates a power cylinder 29 is provided, the same being erected upon the bridge portion 30 of a yoke structure 31 supported upon the body on opposite sides of the gate, the axis of the cylinder being preferably in alignment with the center or axis of the gate. Any suitable means may be provided to control the admission or exit of power fluid with respect to the cylinder such as indicated at 32 and for the power fluid to operate upon a piston 33 slidable in the usual manner in the cylinder and attached to the piston rod 34 clamped at its lower end by means of a frog 35 to the upper open end of the gate.

As a means for manually operating the gate and for locking the gate from movement there are provided two parallel shafts 36 and 37 journaled in suitable bearings 38 on opposite sides of the yoke and preferably in the same horizontal plane. A hand wheel 39 or its equivalent is connected as by means of a spline 40 to one end of the shaft 36 on the outside of a bearing 38, and adjacent to the other side of the same bearing is shown provided a pinion 41 secured as upon a squared portion of the shaft 36, and adjacent to or bearing against the pinion is a collar 42 fixed rigidly as by a set screw 43 to the shaft. The end of the shaft at the wheel hub is threaded at 44, and fixed to the threaded portion of the shaft is a locking member such as a nut 45 having a handle 46. Another pinion 41' is fixed to the remote end of the shaft 36 adjacent to the bearing 38 on that side of the yoke. A pair of racks 47 have constant meshing engagement with the pinions 41 and 41' and are secured on their lower ends as by bolts 48 to the upper end of the gate. The free upper ends of the racks are guided through the bridge portion 30 of the yoke and are thereby held in steady position, while opposite the pinions are arranged anti-friction rollers 49 on the shaft 37, and these rollers have main co-operative support to resist the action of the pinions tending to bend

the racks. The nut 45 being sufficiently loose to permit the shaft 36 to rotate, the gate may be lifted either by means of the power cylinder 29, or in the event of failure of the power for any reason the shaft 36 may be rotated by hand power applied to the wheel 39, and after the gate is lifted as high as desired, by tightening the nut 45 the wheel hub and pinion 41 will be caused to grip upon the opposite end portions of the adjacent bearing 38, thereby fastening the gate in the desired position. Obviously the lag screws 22 will be tightened from time to time to keep the packing gland sufficiently tight, and whenever desirable the clean-out plate 24 may be detached by loosening the hanger bolts 26 therefrom. The valve seat 15 is made of suitable material to resist wear and because of the packing devices at the upper and lower ends thereof the seat 15 will be continued in operative condition for a long time, but if desired it may be renewed simply by detaching it after removing the cap 19 and substituting a fresh one.

In Figs. 5 to 7 is shown a type of gate 18^a having formed along its side edges a pair of beveled surfaces 50, preferably at the remote side from which the flow of fluid is supposed to approach the gate, and co-operating with each of these beveled surfaces is a wedge 51 or reversely beveled surface formed on a wedge block 52. Each wedge 51 projects inward toward the center of the gate through a slot 53 formed in the side or edge portion of the gate seat 15^a, and the wedge block to which such wedge is attached is adjustable vertically along the seat 15^a by means of a screw 54 journaled in a lug 55 formed on the valve body and having threaded engagement with a lug 56 on one end of the wedge block. Guide screws or pins 57 extend through slots 58 in the wedge block for holding the wedge block against the edge of the seat 15^a. It is obvious that by the tightening of the wedge from time to time the gate is adjustable toward the upper side of the gate seat 15^a or the side to which the flow is approaching.

In Figs. 8 and 9 I indicate a further modification of means for adjusting the renewable valve seat, this seat being shown in the form of an annulus 15^b having an opening registering with the opening through the valve body and bearing directly against one side of the gate 18. The body in this form is indicated as comprising two parts 10' and 11', the latter being provided with a housing at 59 for a reciprocating member 60 having teeth 60' co-operating with a short segmental rack 61 extending rearward from the annular seat 15^b. The two parts of the body being separable, the seat 15^b will be screwed into place by means of

the co-operating threads 62 formed on its periphery and on the interior of the body portion 11', the rack member 61 at such time moving around in the clearance 63 in the plane of the housing 59. After the seat is thus put in place the parts of the body are assembled and the gate will be introduced. By reciprocating the block 60 up or down as by means of a handle 64 extending along a neck or guide 65, the seat annulus 15^b will be given sufficient rotation to cause the threads 62 thereof to produce the desired tightening of the gate.

I claim:

1. In valve mechanism, the combination with a body, and a gate slidable therein, of an adjustable movable seat of U-form, said seat having a pit at its upper end, a gland member having a flange co-operating with said seat within the pit thereof, means for securing said gland member to exert a downward force upon said seat, said body being slotted at its lower end to receive said seat, and a member co-operating with said seat through said slot to exert an upward force thereon to balance the downward force of the gland member.

2. In valve mechanism, the combination with a body, and a gate slidable therein, of

an adjustable seat movable within the body, a pair of external members located transversely of said body upon opposite ends thereof, and screw means co-operating with said body and said members to cause the same to exert forces directly upon said seat in opposite directions and thus to retain said seat in fixed predetermined position within said body, the body being slotted transversely at its upper and lower ends to permit said members to act upon said seat, the upper slot being free to permit the seat to be moved therethrough while being acted upon by one of said members.

3. In valve mechanism of the nature set forth, the combination of a valve body, a seat member removably fitted in the body, a slidable gate having direct co-operation with the seat member, and means co-operating with the seat member for tightening the contact between it and the gate, said seat member being provided with a pit through which the gate is slidably projected and a gland cap surrounding an adjacent portion of the gate and having a skirt portion projected into the pit and screw threaded means for tightening the cap.

In testimony whereof I affix my signature.

RALPH JAMES RILEY.