

Aug. 3, 1926.

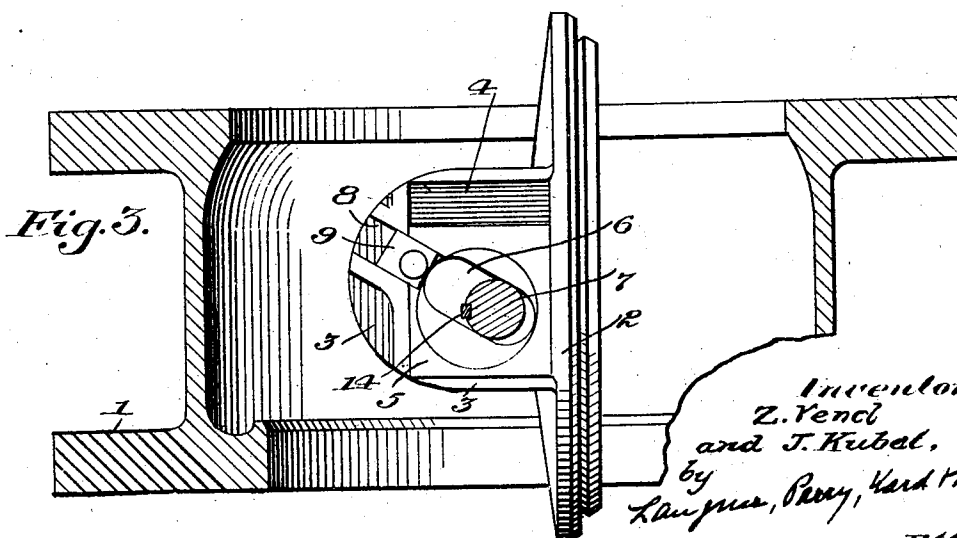
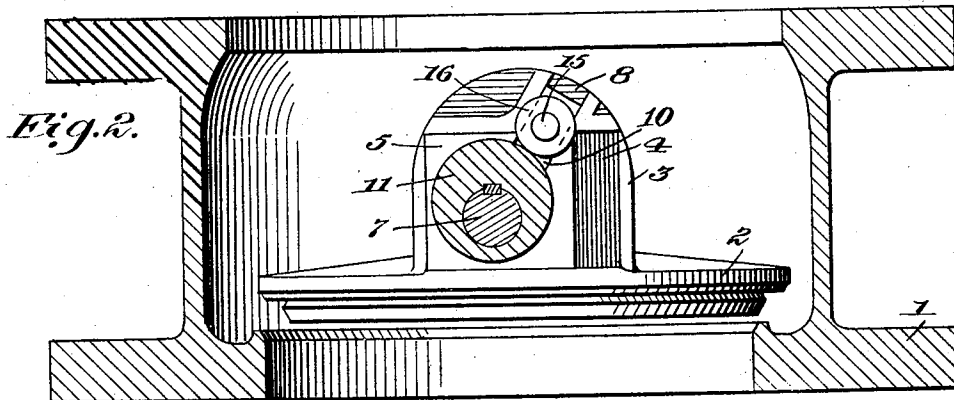
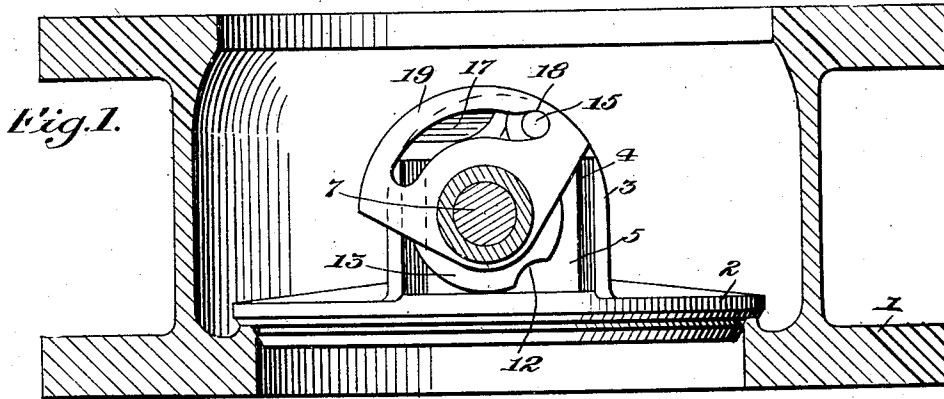
1,595,038

Z. VENCL ET AL

FLAP VALVE

Filed March 20, 1926

3 Sheets-Sheet 1



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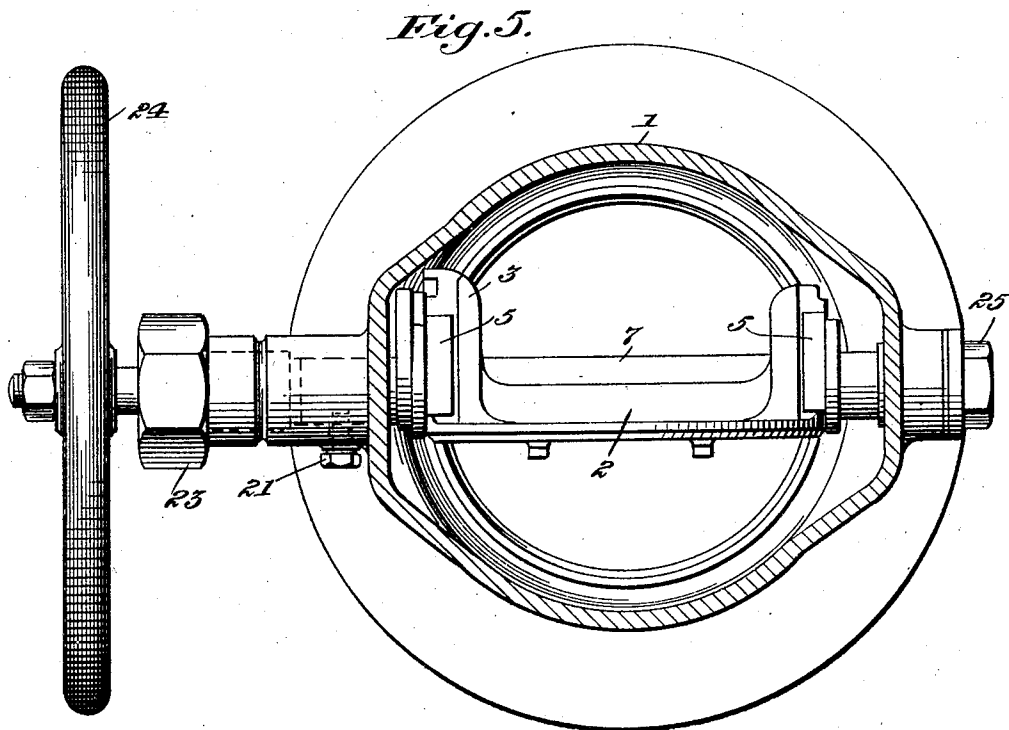
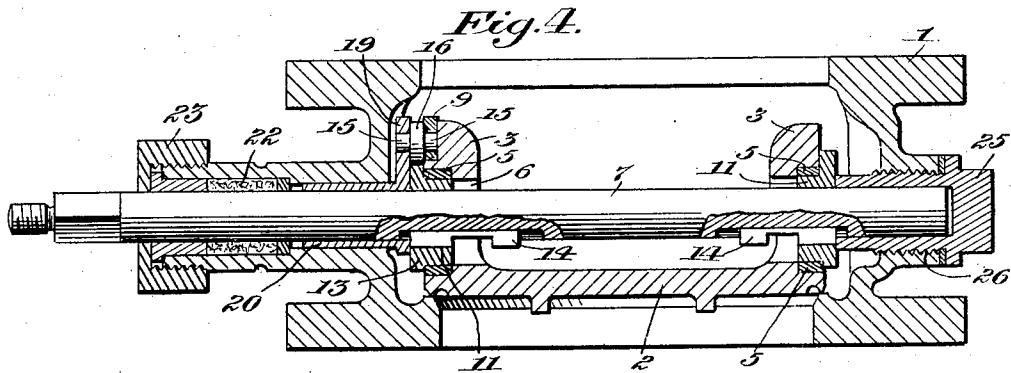
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Z. VENCL ET AL

FLAP VALVE

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3 Sheets-Sheet 2



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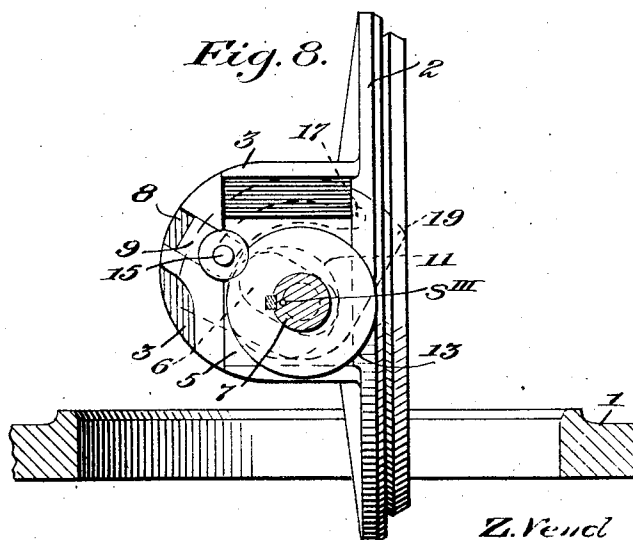
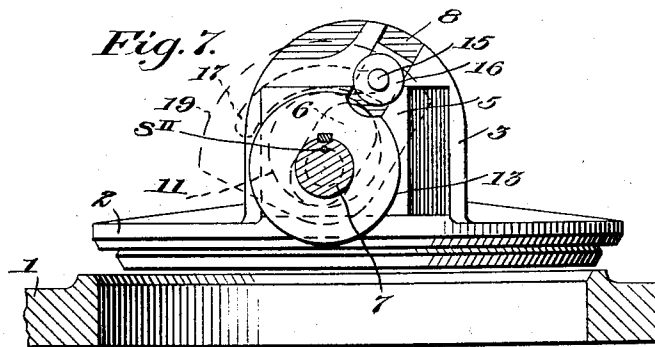
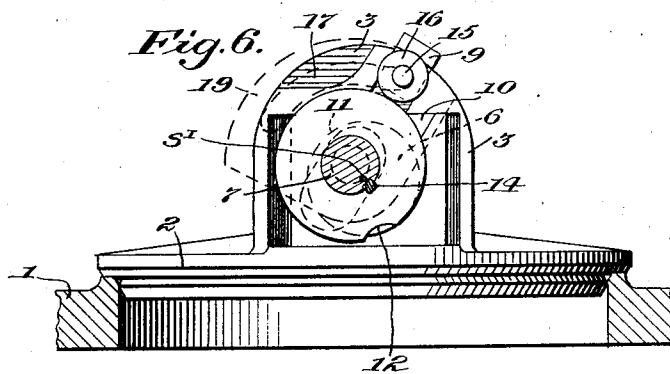
1,595,038

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FLAP VALVE

Filed March 20, 1926

3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE.

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FLAP VALVE.

Application filed March 20, 1926, Serial No. 96,347, and in Czechoslovakia July 10, 1924.

This invention relates to a flap valve.

Flap valves are known in which the valve plate on being opened is first raised from its seat and then rotated approximately 90° by means of an eccentric valve stem, the eccentric portions of which engage in projections from the valve plate.

The present invention provides a very decided improvement in this type of valve. The arrangement according to this invention provides oblique ascending slots in the projections on the valve plate and these slots receive the valve stem. In one of the projections a groove is formed extending parallel to the oblique slots, and receives a movable coupling member. The eccentric portions of the valve stem engage in slide blocks which are guided in sockets formed in the valve plate projections and running parallel to the plane of the valve plate. With this arrangement, on rotation of the valve stem, the valve plate is first moved obliquely upward along the line of the oblique slots in the projections, and it is only after automatic coupling of the valve stem to the valve plate by means of the movable coupling member, that the valve plate is rotated together with the valve stem.

Engaging in the slide blocks 5, are eccentrics 11, and in the left hand slide block, as seen in Fig. 4, at its right upper edge is a groove 10 extending parallel with the groove 8 and the slot 6. Each eccentric has a projecting flange 13 arranged concentric with the valve stem 7 and in the flange on the left hand concentric, as viewed in Fig. 4, there is an arcuate peripheral notch 12. The members 11, 13 are fixed to the valve stem 7 by means of keys 14.

Engaging in the slide block 9, received in the groove 8 of the left hand projection, is one end of a pin 15 which carries centrally of itself a disk shaped coupling member 16, having a diameter corresponding with the notch 12 in the flange 13. The other end of the pin 15 is guided in an arcuate slot 17, concentric throughout the major part of its length with the stem 7 and having its upper end 18 extending upwardly and outwardly from the concentric portion. This slot 17 is formed in a flange 19 carried by a bearing member 20 for the valve stem 7. The bearing member 20, is fixed to the housing 1 by means of a screw 21.

The valve stem 7 projects out of the housing 1 through packing members 22, 23 and is provided at its outer end with an operating hand wheel 24. The other end of the stem 7 is received in a thrust bearing 25 which is attached to the housing by means of a screw thread 26. From the above description it is seen, referring particularly to Fig. 4, that the valve plate 2 has symmetrical projections 3 at its two ends and that in each of these projections is a slot 6, a slide block 5, and an eccentric 11.

The valve stem 7 projects out of the housing 1 through packing members 22, 23 and is provided at its outer end with an operating hand wheel 24.

The other end of the stem 7 is received in a thrust bearing 25 which is attached to the housing by means of a screw thread 26.

From the above description it is seen, referring particularly to Fig. 4, that the valve plate 2 has symmetrical projections 3 at its two ends and that in each of these projections is a slot 6, a slide block 5, and an eccentric 11.

5 This invention relates to a flap valve.
10 Flap valves are known in which the valve plate on being opened is first raised from its seat and then rotated approximately 90° by means of an eccentric valve stem, the eccentric portions of which engage in projections from the valve plate.

15 The present invention provides a very decided improvement in this type of valve. The arrangement according to this invention provides oblique ascending slots in the projections on the valve plate and these slots receive the valve stem. In one of the projections a groove is formed extending parallel to the oblique slots, and receives a movable coupling member. The eccentric portions of the valve stem engage in slide blocks which are guided in sockets formed in the valve plate projections and running parallel to the plane of the valve plate. With this arrangement, on rotation of the valve stem, the valve plate is first moved obliquely upward along the line of the oblique slots in the projections, and it is only after automatic coupling of the valve stem to the valve plate by means of the movable coupling member, that the valve plate is rotated together with the valve stem.

20 One form of the invention is shown in the accompanying drawings wherein:

25 Fig. 1 is a sectional view, taken at right angles to the valve stem, showing the parts when the valve is closed.

30 Fig. 2 is a sectional view, taken at right angles to the valve stem, showing the parts when the valve is partly open.

35 Fig. 3 is a sectional view, taken at right angles to the valve stem, showing the parts when the valve is fully open.

40 Fig. 4 is a longitudinal sectional view taken parallel to the direction of flow, with parts shown in elevation.

45 Fig. 5 is a longitudinal sectional view taken at right angles to the direction of flow.

50 Figs. 6, 7 and 8 are schematic sectional views corresponding respectively to the valve positions of Figs. 1, 2 and 3.

As shown in the drawing, the valve housing 1 receives a valve plate 2 having at each of its ends a projection 3 extending at right

centric 11 having a flange 13 concentric with the valve stem 7. In each case the eccentric 11 and flange 13 is keyed to the valve stem 7. The automatic means for coupling the valve stem 7 to the valve plate 2 for causing rotation of the valve plate, is all carried by the outer or left hand projection 3, as viewed in Fig. 2.

The device as above described operates in the following manner:—

In the closed position of the valve as shown in Figures 1 and 6, the valve plate 2 is tight against its seat in the housing 1. In this position the central point of the eccentric 11 is in the position S^I (Fig. 6) and the pin 15 is positioned in the outwardly directed upper end 18 of the slot 17, in which, by reason of the disk 16 connected to the pin, and bearing against the flange 13, the pin is securely retained in the end of the slot. In order to open the valve the hand wheel 24 is turned counter-clockwise. Since the valve plate is prevented by its seat from rotating, the pin 15 is clamped in the upper end of the slot 17, and the rotary movement of the eccentric 11 first causes an oblique raising of the valve plate 2 from its seat, in the direction of the slots 6 and the groove 8. Simultaneously, the slide blocks 5 are moved in their sockets 4. The lateral or oblique movement which the valve plate 2 describes relative to its seat, presents the decided advantage that a very slight vertical movement from its seat permits subsequent rotation of the valve plate without danger of contacting with the edge of the valve seat. A direct vertical movement of the valve plate from its seat would have to be of considerably greater amplitude in order that the edge of the valve clear the edge of the seat upon subsequent rotation of the valve plate.

The raising of the valve plate 2 from its seat continues until the central point of the eccentric 11 reaches the position S^{II} (Fig. 7). In this position the notch 12 as well as the groove 10 in the slide block 5, pass into line with the slot 6 and the groove 8 and the notch 12 becomes positioned opposite the coupling disk 16 so that the retention of the coupling disk by the edge of the flange 13, is released. The slide block 9 can thus move radially inwardly toward the valve stem 7 in the groove 10, under the influence of gravity. The coupling disk 16 thus engages in the notch 12 of flange 13 and couples the valve plate 2 to the flange 13 and, hence, to the valve stem 7. During this movement of the coupling disk 16, the pin 15 moves out of the upper end 18 of the slot 17 and is free to slide in the concentric portion of the slot 17. At the end of the above described operation the various parts of the valve are positioned as shown in Figures 2 and 7.

On further rotation of the hand wheel 24 the valve plate 2 rotates with the stem 7 and is swung into the position shown in Figures 3 and 8 in which it lies parallel to the direction of flow through the valve housing and thus opposes the least possible resistance to passage of fluid.

On closing the valve the above described operations take place in the reverse order.

Having now described a complete and operative embodiment of the invention what is claimed is:—

1. In a valve, a housing, a valve stem journaled in the housing, a valve plate, projections on the valve plate perpendicular to the plane of the plate, an obliquely ascending slot in each projection for receiving the stem, a guide socket parallel to the plane of the valve plate in each projection, a slide block slidable in each socket, and an eccentric mounted in each slide block and keyed to the valve stem, whereby, on rotation of the stem, the valve plate is first raised obliquely from its seat.

2. In a valve, a housing, a valve stem journaled in the housing, a valve plate, projections on the valve plate perpendicular to the plane of the plate, an obliquely ascending slot in each projection for receiving the stem, a guide socket parallel to the plane of the valve plate in each projection, a slide block slidable in each socket, an eccentric mounted in each slide block and keyed to the valve stem, whereby, on rotation of the stem, the valve plate is first raised obliquely from its seat, a groove in one of the projections in line with the slot in the projection, a coupling means slidable in the groove, and means, upon completion of the oblique raising of the valve plate from its seat, for permitting the coupling means to automatically slide in the groove and couple the valve stem to the valve plate.

3. In a valve, a housing, a valve stem journaled in the housing, a valve plate, projections on the valve plate perpendicular to the plane of the plate, an obliquely ascending slot in each projection for receiving the stem, a guide socket parallel to the plane of the valve plate in each projection, a slide block slidable in each socket, an eccentric mounted in each slide block and keyed to the valve stem, whereby, on rotation of the stem, the valve plate is first raised obliquely from its seat, a groove in one of the projections in line with the slot in the projection, a coupling means slidable in the groove, means upon completion of the oblique raising of the valve plate from its seat, for permitting the coupling means to automatically slide in the groove and couple the valve stem to the valve plate, the coupling means including, a flange fixed to the housing, an arcuate slot in the flange concentric with the valve stem for the major part of its length, and out-

wardly directed at one end, a flange concentric with the valve stem carried by one of the eccentrics, a notch in the periphery of the concentric flange, a coupling disk, a pin projecting from each side of the coupling disk, a block slidable in said groove, one end of the coupling disk pin being

mounted in the slide block, and the other end of the pin being slidably mounted in the arcuate slot.

In testimony whereof we have signed our names to this specification.

ZDENĚK VENCL.
JOSEF KUBÁT.

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