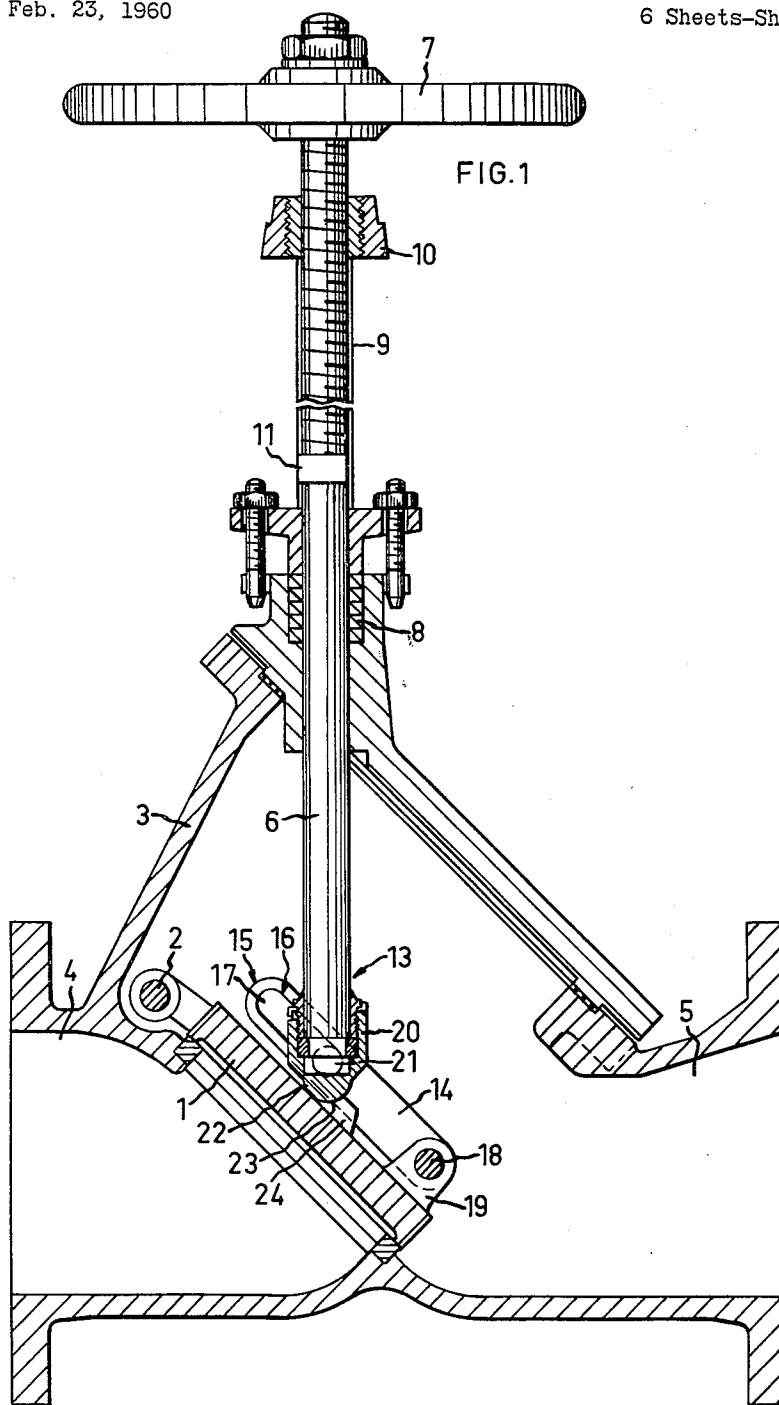


Filed Feb. 23, 1960

VALVES

6 Sheets-Sheet 1



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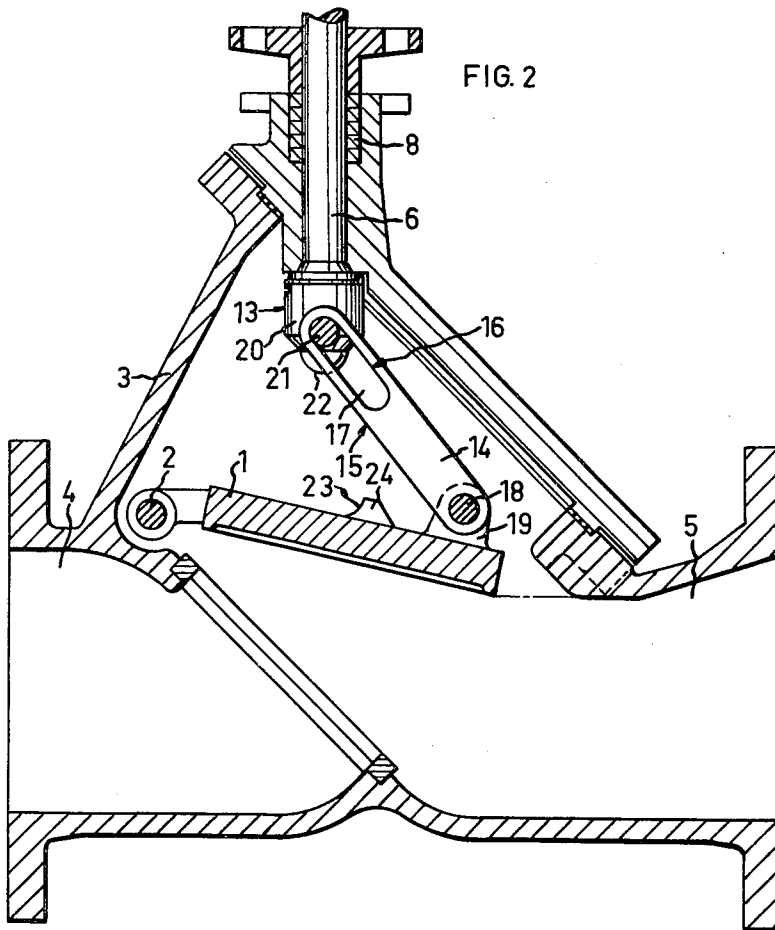
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VALVES

Filed Feb. 23, 1960

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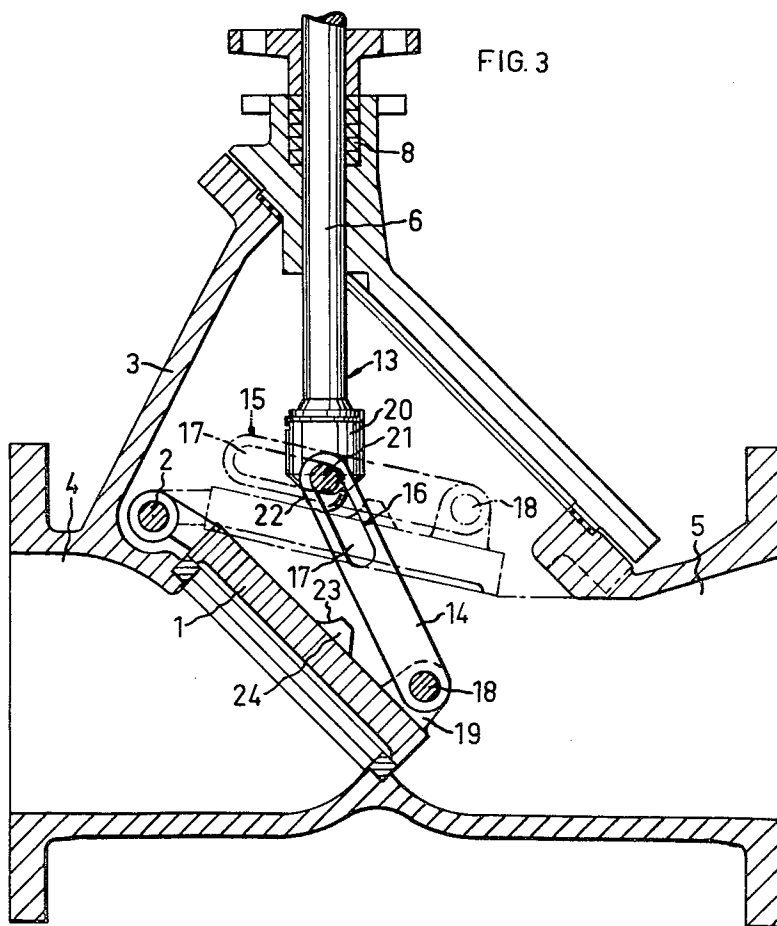
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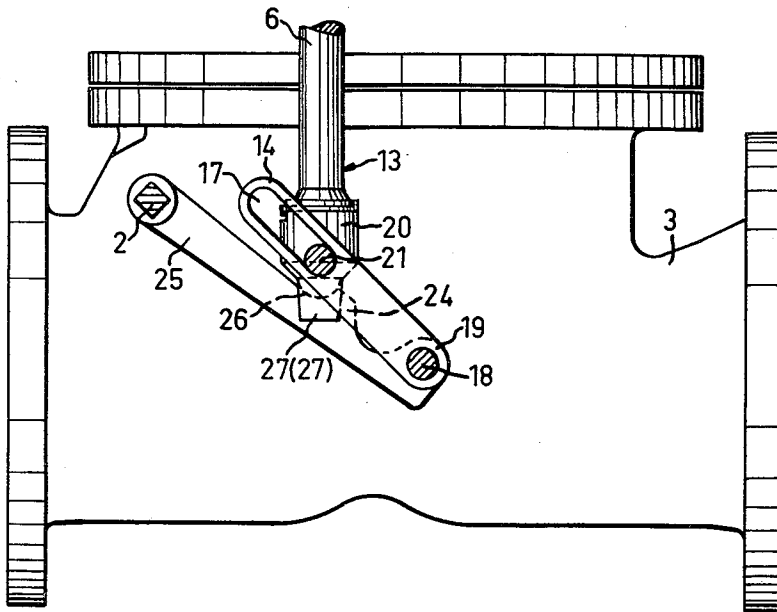
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FIG. 4



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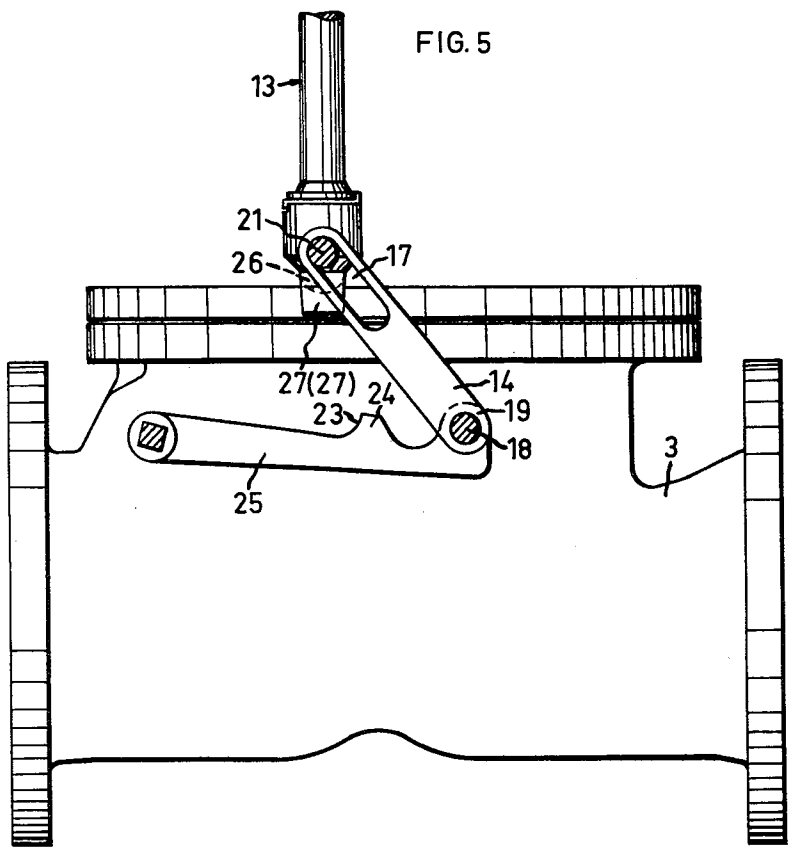
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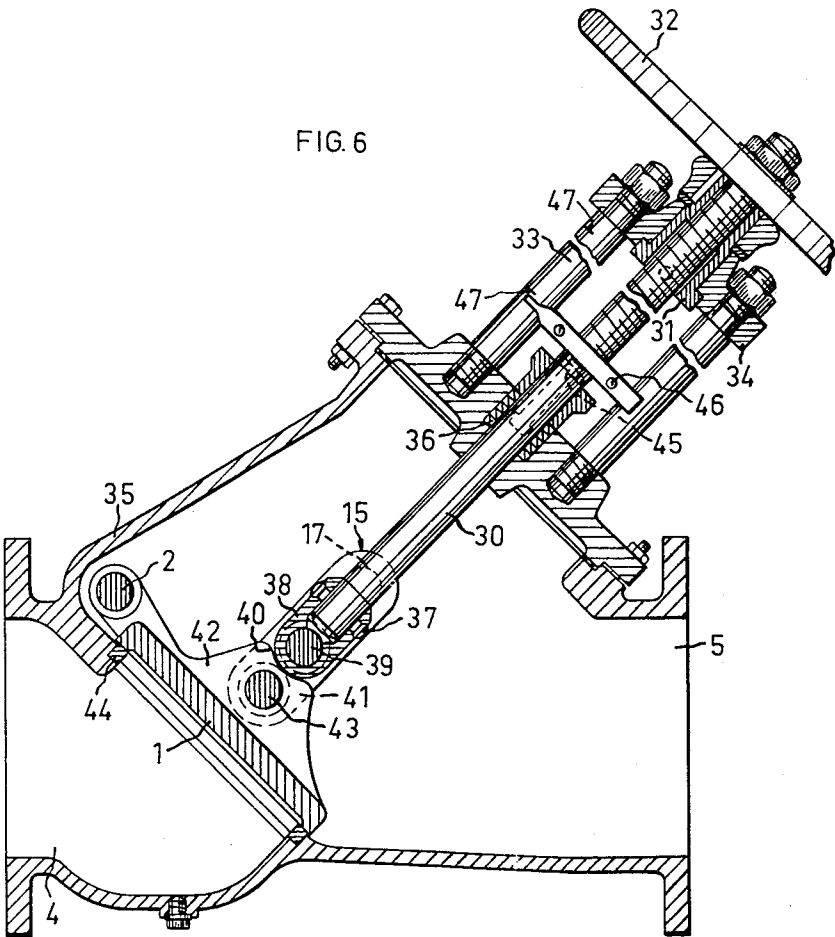
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Filed Feb. 23, 1960, Ser. No. 10,298

5 Claims. (Cl. 251-82)

This invention relates to an improved valve particularly for use with viscous liquids, such as the heavy fuel oils now widely employed.

The principal object of the present invention is to provide an improved, highly simplified and easily operated valve with a minimum of resistance to the liquid flow therethrough.

According to the invention, the valve comprises a pivotally mounted valve member, a valve stem for so actuating the valve member that in response to the position of the valve stem the valve member can be positively held closed or open but is capable, also in an intermediate position of the valve stem, of pivoting freely between fully open and fully closed position under the influence of the flow conditions in the valve, and a pin and slot type connection between the valve member and the valve stem for adapting said valve member and said valve stem to such changes in their relative positions as are caused by axial movements of the valve stem and the pivoting of the valve member as a result of said axial movement. The characteristic novel feature of the invention is the provision of a link mechanism including a link in which said slot is arranged and which connects the valve member or a part fixedly associated therewith to the valve stem, said link having its one end articulated on the member or the part fixedly associated therewith and its other end pivoted to the valve stem by means of a pivot engaged in the slot of said link, whereby said pivot, in addition to transferring pivoting movements caused by the axial movements of the valve stem to the valve member for opening and closing the valve, can be caused to occupy an intermediate position in the slot, in which position the pivot in combination with the articulation of said link permits the valve member to swing freely under the influence of the flow conditions in the valve body.

Further objects of the invention will become apparent from the following description, reference being had to the accompanying drawings which illustrate some embodiments of the invention, chosen by way of example. In the drawings:

FIGS. 1 to 3 show an improved valve according to the invention in cross section and with the movable parts in different positions;

FIGS. 4 and 5 show side elevational views of a modified embodiment;

FIG. 6 shows a valve in a further modification in cross section.

The valve has a valve member 1 pivotally mounted on a shaft 2 in the valve body 3, between the inlet 4 and outlet 5 of which the flow path through the valve body 3 has an essentially rectilinear course. A valve operating means in the form of a valve stem 6 projects with its one end from the valve body 3 and is provided at said end with a handwheel 7. The valve stem 6 is rotatable in the valve body 3 in a stuffing box 8 therein and in a mounting 10 supported by uprights 9. Means 11 is mounted on the valve stem 6 to permit reading the position of the valve member 1 against an index on one of said uprights 9. The valve stem 6 is axially movable in the valve in a known manner by rotation of the handwheel 7 and its end 13 movably engages with a link mechanism 15 constituted by two links 14 and provided with an elongate guide 16 formed by two slots 17, one in each

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link 14. In the closed FIG. 1 position of the valve the end 13 of the valve stem 6 has been brought to bear against the valve member 1, thereby holding it sealingly applied against its seat. The links 14 in said link mechanism 15 are mounted on either side of the valve stem 6 for pivotment around an axis 18 which is disposed in a lug 19 projecting from the valve member 1. At the end adapted to engage the valve member 1 the valve stem 6 has a portion 20 rotatably but axially non-displaceably connected to it and provided with two pins 21. These pins are oppositely directed and engage in the slots 17 of the links 14 disposed on either side of the valve stem 6. The end of the portion 20 which is to engage the valve member 1 is formed with a round surface 22 which, when the valve member is held in closed position by the valve stem 6, bears against a projection 24 which has a curved contact surface 23 for said portion 20 and which is mounted on the valve member 1 between the links 14 pivoted thereto.

In the modification shown in FIGS. 4 and 5 the valve member 1 is rigidly connected to an arm 25 which has its one end attached to the shaft 2 of the valve member 1, more precisely to that shaft end which projects from the valve body 3. The valve member 1 is coupled by means of an arm 25 to the link mechanism 15 which is movably connected to the operating means. Said arm 25 carries the projection 24 against which the valve stem 6 bears in the closed position of the valve member 1. The end of the valve stem which is to bear against the arm 25 has a surface 26 corresponding to the curved surface 23 of the projection 24, and two lugs 27 project from the valve stem end 13 on either side of said surface 26 to guide the arm 25. In this modification, arm 25, link mechanism 15 and valve stem 6 will be situated entirely laterally and outside of the valve body 3, whereby the valve is simplified considerably and the position of the valve member can be established without any auxiliary means being provided.

The function of the valve will be evident from the foregoing description of its construction. In the closed FIG. 1 position the valve member 1 does not permit any flow through the valve. In the open FIG. 2 position the valve member 1 permits a free flow through the valve. In the intermediate FIG. 3 position of the valve stem 6 the latter allows the valve member 1 to move freely, whereby said member can swing from the closed full line position to the entirely open broken line position under the influence of the movements of the medium flowing through the valve. In the broken line position the valve member is thus held raised from its seat by the medium flowing in the desired direction through the valve, while in the full line position the valve member has been lowered into closed position against its seat by reason of an undesired reflux of the medium. As soon as such movements cease and the medium tends to flow again in the desired direction the valve member is raised to its broken line position.

The valve shown in FIG. 6 has an axially movable valve stem 30 the threaded end of which engages with a nut 31 connected to a handwheel 32. Said nut 31 is rotatable but axially non-displaceable in a bearing 34 which is supported by uprights 33 secured to the valve body 35. The valve stem 30 passes in an axially movable manner through a stuffing box 36 in the valve body 35. The end of the valve stem 30 projecting into the valve body and engaging the link mechanism 15 is provided with a portion 38 which is attached to the valve stem 30 by means of a cotter pin 37 and which corresponds to the portion 20 in the embodiment shown in FIGS. 1 to 3. Like said portion 20, the portion 38 engages with said link mechanism in that a pin 39 extending all through the portion 38 has its projecting ends inserted in the slots

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17 of said link mechanism. The portion 38 has a round surface 40 which is in bearing contact with a conforming surface 41 on a projection 42 of the valve member 1 to keep the valve member in closed position. The link mechanism 15 is mounted in said projection 42 by means of a pivot 43. Same as in the embodiment according to FIGS. 1 to 3, the valve member 1 is pivoted at 2 between the inlet 4 and outlet 5 of the valve. 45 denotes an adjustable abutment for a pointer 46 or like means which is secured to the valve stem and cooperates with indexes 44 for indicating the position of the valve member 1. The adjustable abutment 45 on the valve stem 30 permits limiting the axial movement of the valve stem 30 towards closed position of the valve member 1, so that too pronounced a tightening of the valve stem is prevented.

In the embodiment according to FIG. 6 the valve stem 30 is arranged at right angles to the valve seat 44, whereby the forces arising in the valve during operation thereof are more favourably directed than in the embodiment according to FIGS. 1 to 3.

While some preferred embodiments have been described above with reference to the drawings, it is understood that the invention is not limited to these very embodiments, as modifications can be resorted to within the spirit and scope of the appendant claims.

What I claim and desire to secure by Letters Patent is:

1. A valve comprising a pivotally mounted valve member, a valve stem for actuating the valve member, a link means having a slot therein, said link means having one end articulated on the valve member, a pivot on the end of said valve stem engaged in the slot in said link means, said slot being no wider than necessary to permit sliding of said pivot along said slot, whereby said pivot and valve stem, in addition to transferring pivoting movements caused by the axial movements of the valve stem to the valve member for opening and closing the valve, can be positioned to hold the valve member closed or opened, and can be positioned so that the pivot occupies an intermediate position in the slot, in which position the pivot in combination with the articulation of said link means

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permits the valve member to swing freely under the influence of the flow conditions through the valve.

2. A valve as claimed in claim 1, in which said valve member has means for receiving the end of the valve stem engaging said link, whereby in the closed position of the valve, the stem bears against the valve member to relieve the link of load.

3. A valve as claimed in claim 1, in which the link means comprises two parallel links arranged on either side of the valve stem and having their one ends pivoted to the valve member, both of said links having slots therein, and said pin engaging in the slots of said two links extends on diametrically opposite sides of the end of the valve stem which projects between the links, said end of said valve stem having a round surface and a curved surface on the valve member which is engaged by the round end of the valve stem in the closed position of the valve.

4. A valve as claimed in claim 3, in which said valve member comprises an arm projecting from the valve member and to the free end of which the links are pivoted, said arm having the curved surface thereon, against which bears the round surface on the end of the valve stem, said valve stem being located entirely outside the valve.

5. A valve as claimed in claim 4, in which said valve stem has a portion freely rotatably mounted on the end of valve stem on which said round surface is placed, and two guide lugs projecting from either side of the round surface on said portion.

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