

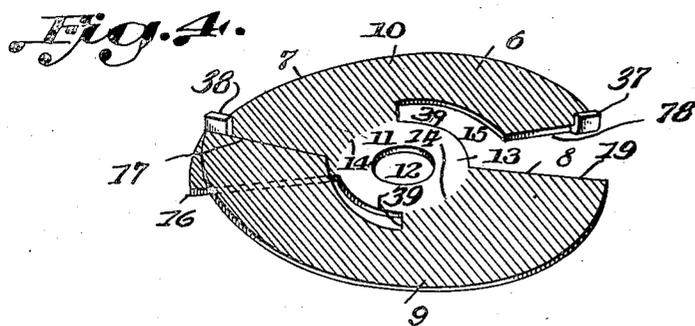
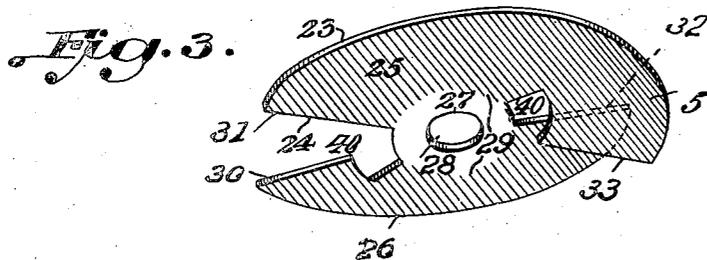
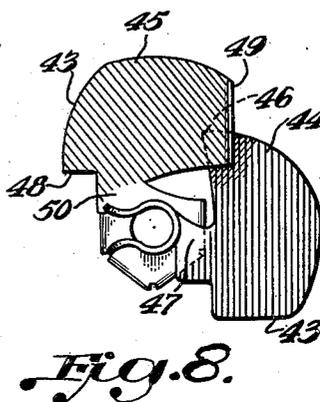
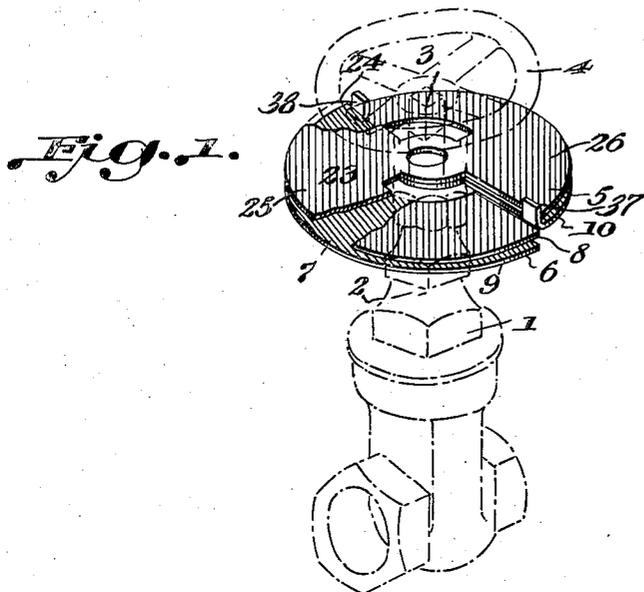
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VALVE POSITION INDICATOR

2,485,942

Filed June 20, 1945

2 Sheets-Sheet 1



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VALVE POSITION INDICATOR

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2 Sheets-Sheet 2

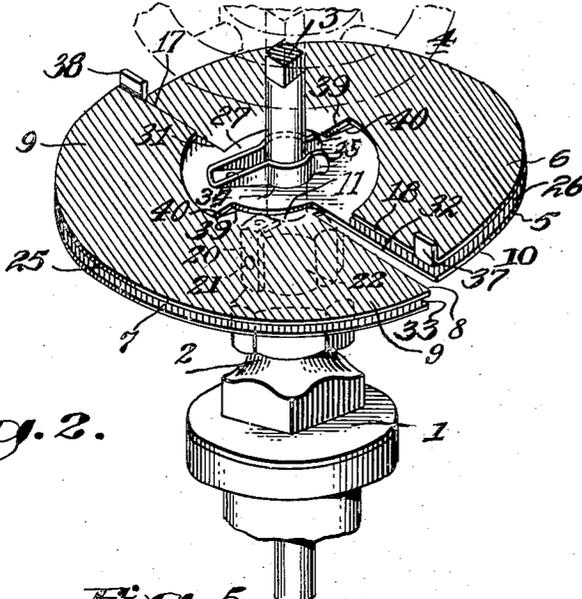


Fig. 2.

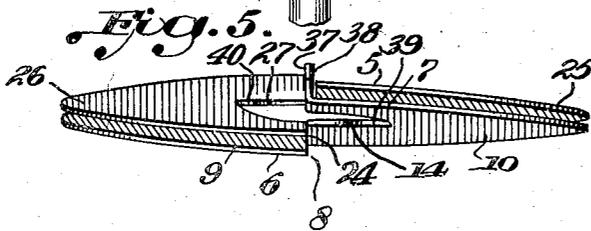


Fig. 5.

Fig. 6.

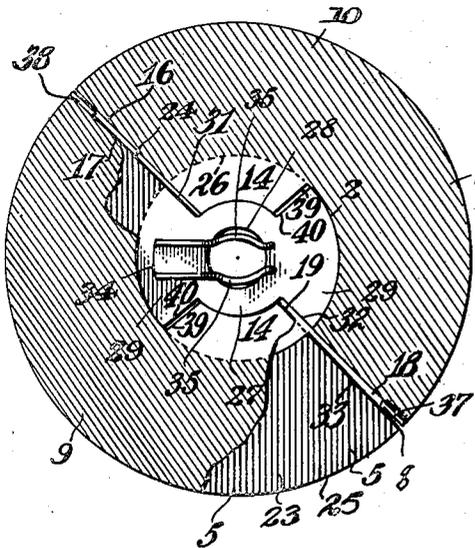
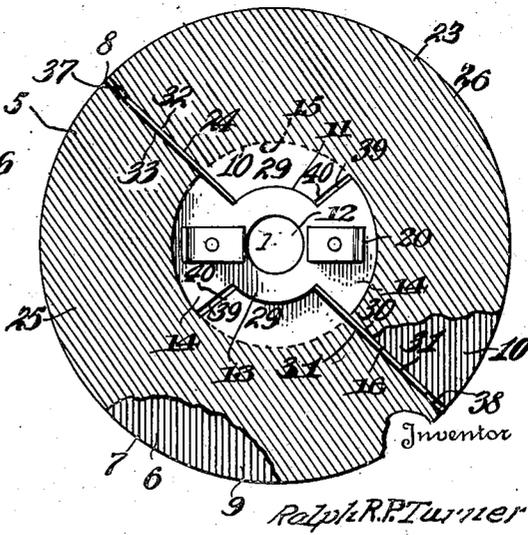


Fig. 7.



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VALVE POSITION INDICATOR

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4 Claims. (Cl. 116—125)

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This invention is directed to an improvement in valve signals wherein the position of the valve is automatically indicated as a result of valve operation.

The primary object of the present invention is the provision of a plurality of vanes, one held fixed with the valve bonnet and the other responsive to the valve stem movement, the respective sets of vanes being particularly formed so that a vane carried by the valve stem will, in one position of the valve, be superimposed on one side of the fixed vane and in another position of the valve will be superimposed on the other side of the fixed vane, with the respective vanes having relatively different markings, as for example, different colors, on their respective sides to indicate the position of the valve by the markings of the exposed vane surfaces following a particular valve operation.

A further object of the invention is the provision of a valve signalling assembly including at least one vane fixed against movement with respect to the valve stem and the other vane frictionally cooperating with the valve stem to follow the movement of the valve stem until the vanes are in superimposed relation, with the fixed vane being for example, colored green on the upper surface and red on the lower surface and the movable vane being colored red on the upper surface and green on the lower surface.

A further object of the invention is the provision in the aforementioned type of signal of means whereby the movable vane is limited in movement in both directions to accurate signalling positions and, through frictional cooperation with the valve stem, held in that position regardless of further movement of the valve stem in the same direction.

The invention is illustrated in the accompanying drawings in which:

Figure 1 is a perspective view of the improved signal applied to a valve shown in dotted lines, the signal being positioned to indicate that the valve is closed;

Figure 2 is a similar but enlarged view of the signal positioned to indicate that the valve is open;

Figure 3 is a detail perspective view of the upper signal section viewed from the under side;

Figure 4 is a similar view of the lower signal section viewed from the top;

Figure 5 is a diagrammatic edge view of the signal in valve closed position;

Figure 6 is a top plan view of the signal showing the parts in the position shown in Figure 2;

Figure 7 is a bottom view of the signal shown in Figure 6; and

Figure 8 is a plan view illustrating a slightly different form of signal.

The invention is illustrated in connection with a globe valve indicated at 1 having threaded bonnet extension 2, through which the valve stem 3

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extends and is terminally provided with an operating wheel or head 4.

The invention is not limited to the particular type of valve shown though obviously, it is restricted to a valve stem which opens and closes the valve merely by rotation and without endwise movement.

The invention comprises an upper indicator 5 and a lower indicator 6, as best shown in Fig. 1. The lower indicator is in the form of a circular disc 7 divided diametrically at 8 to provide vanes 9 and 10. The vanes are centrally connected by web 11 having a central opening 12 of a diameter to loosely receive the valve stem 3, the web 11 including a narrow annular section 13 concentric with the opening 12 and outwardly flaring sections 14 joined to the respective vanes 9 and 10. One edge of each section 14 coincides with the diametric division 8 and the opposite edge 39 terminates short of the other diametric division to provide arcuate spaces 15 for at least half of the circular length of the inner margin of each vane. The vanes 9 and 10 of this indicator 6 are, according to the preferred type of signalling employed, colored green on the upper surface and red on the lower surface. The respective vanes are tilted from a horizontal plane and in relatively opposite directions so that the end 16 of the vane 10 is on a plane below the end 17 of the vane 9, while the opposite edge 18 of the vane 10 is on a plane above the edge 19 of the vane 9, as clearly shown in Figure 4. Edge flange section 14 is provided with a depending angle strip 20 through the depending arm of which the lower indicator 6 is removably secured as by screws 21 to the bonnet nut 22 of the valve body, whereby the lower indicator is fixed against movement during valve manipulation.

The upper indicator is substantially identical in form to the lower indicator and, as best shown in Fig. 3, comprises a disc 23 of a diameter corresponding to that of the disc 7 of the lower indicator. The disc 23 is diametrically divided at 24 to provide vanes 25 and 26 which are carried by sections 29 flaring from a central annular section 27 having an opening 28 for loosely fitting around the valve stem 3. One edge of each of the flaring sections 29 coincides with the diametric division 24 and the other edge 40 of each terminates short of the opposite side of the diametric division 24. The central section 27 is provided with a securing member 34 terminating above the opening 28 in spring clips 35 which are spaced to frictionally grip the opposite sides of the valve stem 3 and thereby secure the upper indicator 5 to the valve stem for movement therewith through the permitted limit and thereafter slip on the stem if the rotation of the stem is continued.

The vanes 25 and 26 are each inclined from the horizontal plane throughout their lengths so that the edge 30 of vane 26 is on a plane below

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the edge 31 of vane 25 and the edge 32 of vane 26 is above the edge 33 of vane 25. The adjacent edges of the upper and lower indicators are identical and the spacing between the adjacent edges of the vanes of one indicator is such as to permit the passage therethrough of the vanes of the other indicator. The upper surfaces of the vanes of the upper indicator 5 are, for signalling purposes, provided with suitable indicia, which preferably may be colored red, while the lower surfaces of said vanes of the upper indicator are provided with contrasting indicia and may be colored green.

In addition, the lower surfaces of the vanes of the lower indicator 6 are marked with indicia similar to the indicia of the upper surfaces of the upper indicator 5 and, for instance in the given example, may be colored red. Similarly, the upper surfaces of the vanes of the lower indicator 6 are provided with contrasting indicia similar to those of the lower surfaces of the vanes of the upper indicator 5 and, for example, may be colored green. Therefore, in the extreme positions of the indicators, the exposed surfaces of the vanes are provided with similar indicia, or color, so that the indicia is clearly visible from both above and below the valve and will indicate the position of the valve. The signal thus cooperates with both normally positioned and overhead valves.

As will appear from the following described operation, the respective vanes of the upper indicator move in the turning movement of the valve stem 3 through the openings between the edges 16 and 17 and 18 and 19 of the fixed lower indicator. The vanes of the upper indicator move in one direction of valve stem movement below the vanes of the lower fixed indicator and in the other direction of valve stem movement above said vanes. The movement of the vanes of the upper indicator must be limited in at least one direction of valve stem movement to insure vertical registry of the vanes for signalling purposes. To secure this result, the edge 18 of the vane 10 of the lower indicator 6 is provided with an upstanding lip 37 near its extreme outer end while the edge 17 of the vane 9 of such lower indicator is provided with an upstanding lip 38 near its outer end.

The upper and lower indicators are secured to the valve as described, the upper indicator 5 having a frictional engagement with the valve stem 3 and the lower indicator being fixed to a stationary part of the valve, such as the nut 22, as shown in Fig. 2. When the valve is closed the vanes 25 and 26 of the upper indicator 5 are in vertical registry with and overlying the vanes 9 and 10 of the lower indicator 6, as shown in Fig. 1. As the upper surface of the upper indicator and the under surface of the lower indicator which, in the example given, both are colored red, the signal visible from above or in the plane of the valve shows that the valve is closed.

When the valve stem 3 is turned to open the valve, the upper indicator 5 moves from the described closed valve position and the edge 30 of the vane 26 of the upper indicator passes through the space between the edges 16 and 17 of the vanes 9 and 10 of the lower indicator while the edge 33 of the vane 25 of the upper indicator passes through the space between the edges 18 and 19 of the vanes 9 and 10 of the lower indicator. The opening movement continues until the vanes of the upper indicator are disposed fully beneath the vanes of the lower indicator, as shown in Fig. 2.

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As previously stated, the vanes of the respective indicators are inclined from the horizontal so that the edge 39 of the opening 15 of the lower indicator 6 is necessarily inclined with respect to the edge 40 of the corresponding opening of the upper indicator 5. Therefore, in the valve opening movement of the valve stem and the corresponding movement of the upper indicator 5, the movement will continue until the vanes of the upper indicator are below the vanes of the lower indicator and when this registry occurs, the edge 39 will contact with the edge 40 and further movement of the upper indicator is interrupted. As the upper indicator is frictionally held to the valve stem 3, the movement of the valve stem may be continued for further opening of the valve while the upper indicator is held stationary. The indicator is now understood to indicate an open position of the valve in which position of the indicator the upper surfaces of the vanes 9 and 10 of the lower indicator 6 are visible from above and the lower surface of the vanes 25 and 26 of the upper indicator 5 visible from below. As these respective surfaces are colored green, the indicator will indicate both from above and below the fact that the valve is open.

Of course, the signal, while shown as having two vanes in each indicator, may, obviously, include any other number of vanes that is deemed advisable. The vane formation and operation where a greater number of the vanes are provided for operation than is illustrated, are identical in form and operation to the vanes above described except that the relative movement between the discs will be varied in accordance with the number of vanes thereon. The invention is not concerned with the means for securing the indicators in place as any conventional means may be employed for this purpose so long as the connection of the upper indicator to the valve stem is such as to permit continued movement of the valve stem after the upper indicator has reached its limit of movement in either direction. The indicators per se are preferably constructed of thin metal sufficiently rigid to hold its shape and position and may, obviously, be constructed of any material and in any desired or relative diameter which will insure the clear visible signal following the respective operations of the valve stem. The signal as a whole may be applied to any type of valve so long as the stem is prevented longitudinal movement in the valve operation.

In Figure 8, in lieu of the discs, substantially semi-circular elements 43 are shown.

The element 44 frictionally engages the valve stem 3, while the companion element 45 is secured to the bonnet of the valve. The tip end 46 of the element 44 is bent downwardly to ride under the element 45, as shown in Figure 8. The element 44 has a neck portion 47 which acts in one movement to form a stop. The end 48 of the element 45 is bent downwardly while its opposite end is provided with a flange 49. This element 45 also has a neck 50 which cooperates with the neck 47 of element 44 to limit the movement of the element in one direction. The flange 49 limits the movement of element 44 in the opposite direction.

What is claimed as new is:

1. An indicator for valves of the type having a valve stem that is rotatable relative to the valve housing, said indicator comprising a pair of elements each including a hub portion for positioning in close parallelism and axially relative to

the valve stem, means on one of said hub portions for securing the respective element to the valve housing to be supported in fixed position, means on the other of said hub portions for securing the respective element to the valve stem to be movably supported relative to the fixed element, an arm portion extending radially from each of said hub portions, vanes carried by said arm portions and substantially parallelly angularly inclined transversely the radii of their respective hub portions, said vanes each extending laterally from one side of their supporting arm portions and respectively from the opposite sides of their respective arm portions to permit their superposition in registry on opposite sides of each other by rotation of the valve stem and consequent revolving of the element carried thereby, and contrasting indicia on opposite sides of said vanes with the indicia on the relative opposite sides of said vanes coinciding so that the exposed indicia will coincide when said vanes are superposed in registry.

2. An indicator for valves of the type having a valve stem that is rotatable relative to the valve housing, said indicator comprising a pair of elements each including a hub portion for positioning in close parallelism and axially relative to the valve stem, means on one of said hub portions for securing the respective element to the valve housing to be supported in fixed position, means on the other of said hub portions for frictionally securing the respective element to the valve stem to be movably supported relative to the fixed element, an arm portion extending radially from each of said hub portions, vanes carried by said arm portions and substantially parallelly angularly inclined transversely of the radii of their respective hub portions, said vanes each extending laterally from one side of their supporting arm portions and respectively from the opposite sides of their respective arm portions to permit their superposition in registry on opposite sides of each other by rotation of the valve stem and consequent revolving of the element carried thereby, the said opposite sides of said arm portions forming cooperative abutments for limiting the relative movement of said elements in one direction with said vanes in superimposed registry, a stop on the laterally extending portion of one of said vanes for abutment with the coinciding edge of the other of said vanes to limit the relative movement of said elements in the other direction and with said vanes in superimposed registry, and contrasting indicia on opposite sides of said vanes with the indicia on the relative opposite sides of said vanes coinciding so that the exposed indicia will coincide when said vanes are superimposed in registry.

3. An indicator for valves of the type having a valve stem that is rotatable relative to the valve housing, said indicator comprising a pair of discs each including a hub portion for positioning in close parallelism and axially relative to the valve stem, means on one of said hub portions for securing the respective disc to the valve housing to be supported in fixed position, means on the other of said hub portions for securing the respective disc to the valve stem to be movably supported relative to the fixed disc, diametrical radial slots in said discs and extending to said hub portions to provide segmental vanes of corresponding size and shape, diametrical arcuate slots concentrically in said discs and re-

spectively extending from one side only of each of said radial slots to half the arcuate width of said vanes to separate said vanes from their hub portions and form arm portions therebetween, said segmental vanes being substantially parallelly angularly inclined relative to the normal plane of their respective discs, the vanes of each of said discs respectively extending laterally from the opposite sides of their respective arm portions to permit their superposition in registry on opposite sides of each other by rotation of the valve stem and consequent revolving of the disc carried thereby, and contrasting indicia on opposite sides of said vanes with the indicia on the relative opposite sides of said vanes coinciding so that the exposed indicia will coincide when said vanes are superposed in registry.

4. An indicator for valves of the type having a valve stem that is rotatable relative to the valve housing, said indicator comprising a pair of discs each including a hub portion for positioning in close parallelism and axially relative to the valve stem, means on one of said hub portions for securing the respective disc to the valve housing to be supported in fixed position, means on the other of said hub portions for frictionally securing the respective disc to the valve stem to be movably supported relative to the fixed disc, diametrical radial slots in said discs and extending to said hub portions to provide segmental vanes of corresponding size and shape, diametrical arcuate slots concentrically in said discs and respectively extending from one side only of each of said radial slots to half the arcuate width of said vanes to separate said vanes from their hub portions and form arm portions therebetween, said segmental vanes being substantially parallelly angularly inclined relative to the normal plane of their respective discs, the vanes of each of said discs respectively extending laterally from the opposite sides of their respective arm portions to permit their superposition in registry on opposite sides of each other by rotation of the valve stem and consequent revolving of the disc carried thereby, the said opposite sides of said arm portions forming cooperative abutments for limiting the relative movement of said discs in one direction and with said vanes in superimposed registry, a stop on the radial slot edges of the laterally extending portions of the fixed disc vanes for abutment with the coinciding edges of the movable disc vanes to limit the relative movement of said discs in the other direction and with said vanes in superimposed registry, and contrasting indicia on opposite sides of said vanes with the indicia on the relative opposite sides of said vanes coinciding so that the exposed indicia will coincide when said vanes are superposed in registry.

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