Sept. 13, 1960 L. J. KMIECIK ET AL 2,952,753

FLOW SWITCH

Filed June 27, 1958 2 Sheets-Sheet 1

Fig. 1.

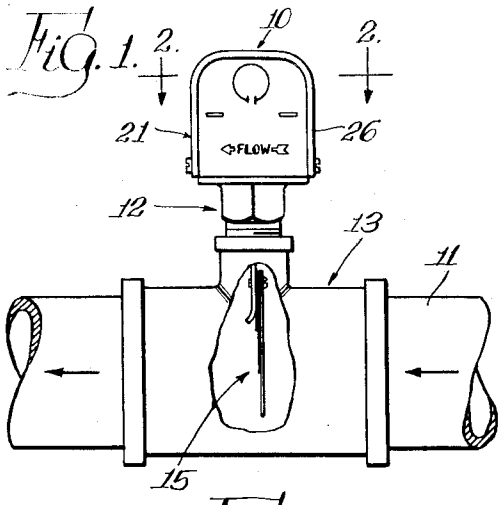


Fig. 2.

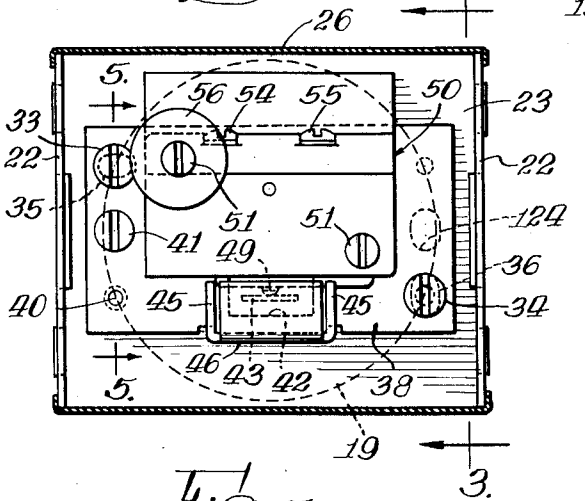


Fig. 3.

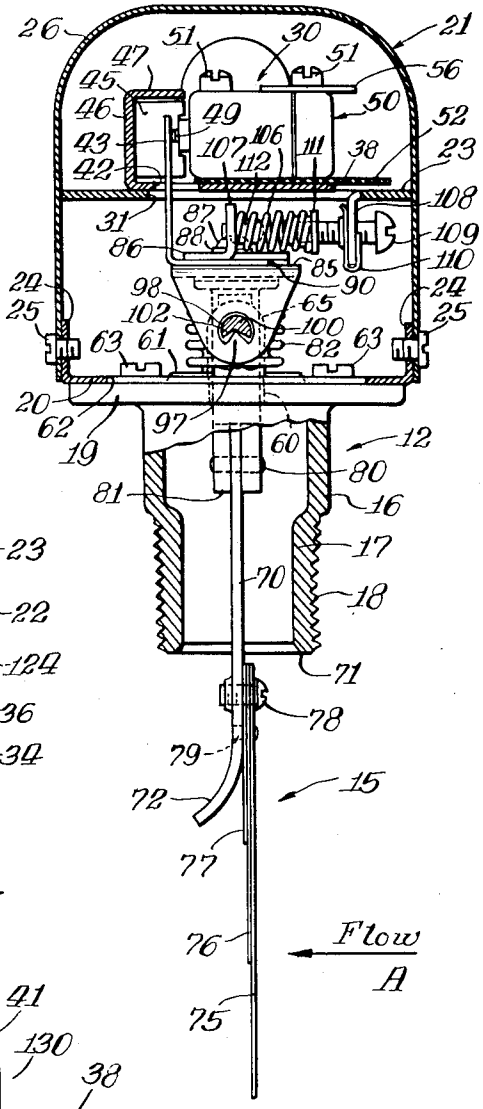
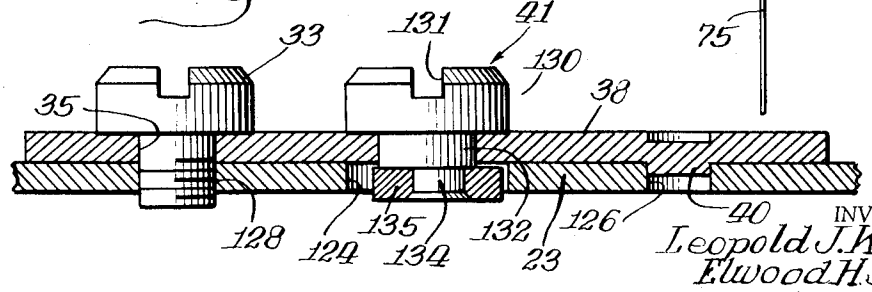


Fig. 5.



INVENTORS.
Leopold J. Kmiecik,
Elwood H. Stonich,
By Brown, Jackson, Boettcher & Dienner Attys.

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FLOW SWITCH

Filed June 27, 1958 2 Sheets-Sheet 2

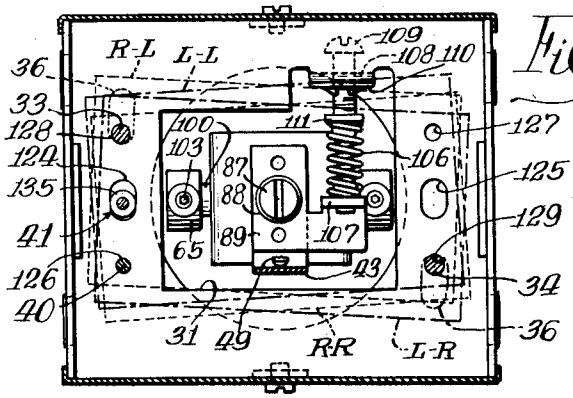


Fig. 4.

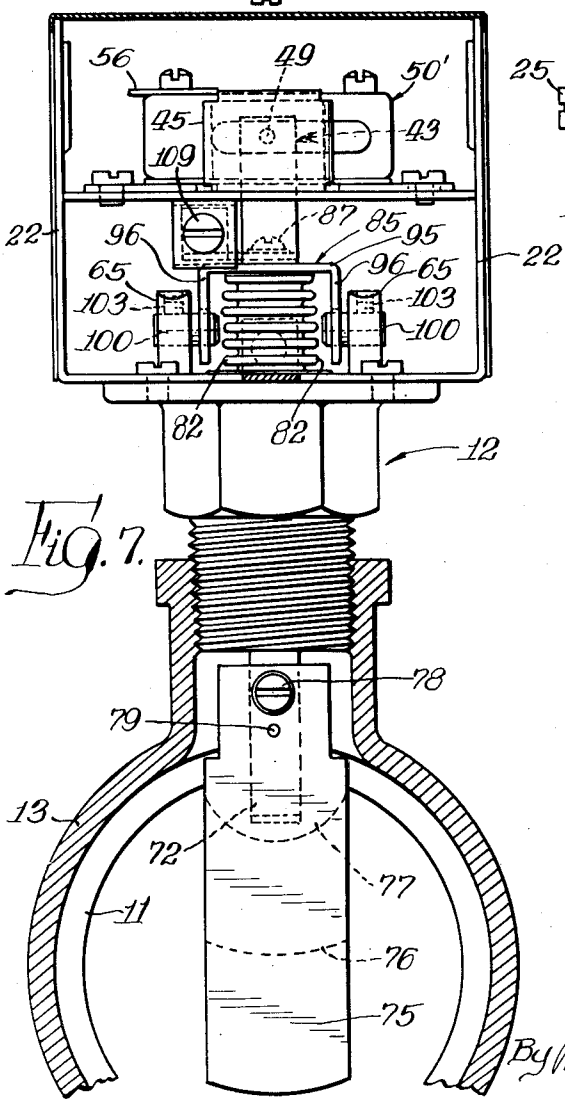


Fig. 7.

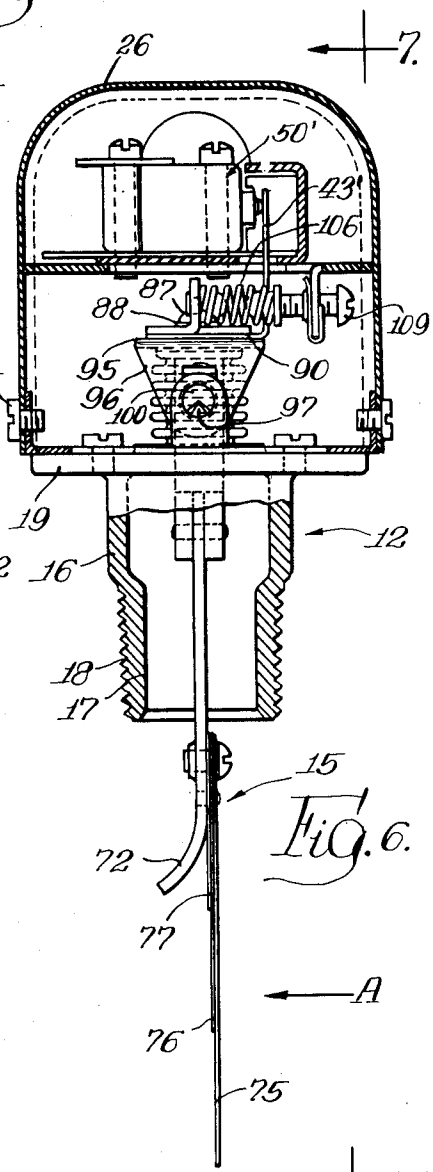


Fig. 6.

INVENTORS.
Leopold J. Kmiecik,
Elwood H. Stonich
By Brown, Jackson, Boettcher & Dienner
Attys.

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FLOW SWITCH

Leopold J. Kmiecik, Lincolnwood, and Elwood H. Stonich, Chicago, Ill., assignors to McDonnell & Miller, Inc., Chicago, Ill., a corporation of Delaware

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10 Claims. (Cl. 200—81.9)

Our invention relates to electrical switches and particularly to an improved switch assembly which is operably responsive to the start or stop of liquid flow.

In general, the switch of our invention provides an economical and dependable control device useful in the activation of pumps, burners, alarm meters, or similar devices where the flow of liquid in a pipe is of critical significance. Some of the more common fields of application are found in the starting or stopping of a burner in commercial water heaters, the control of a compressor in an air circulation system, the energization of a standby pump upon failure of a primary pump, or as a flow indicator in liquid process systems and the like.

In brief, our improved switch is adapted to be fitted in a T-connection associated with a horizontal pipeline where a horizontal run of the liquid is encountered. Suitable paddle means are embodied therein for moving an actuating arm which pivots about an axis located exteriorly of the pipeline and is sealed therefrom by a flexible bellows seal. The actuating arm carries a suitable finger portion at its upper end for engaging the plunger of an electrical control switch and such may be arranged to maintain the switch contacts open or closed in response to the flow of fluid through the pipeline with which it is associated. Other features include a multipart paddle system which readily adapts the same to various diameter pipelines and a unique adjusting system for regulating the throw of the paddle required to operate the switch contacts. Additional means are provided for adjusting the sensitivity of the paddle means to the flow or velocity of fluids in the pipeline.

The main object of this invention is to provide a new and improved switch assembly which is operable in response to flow of liquids or the interruption of such flow, as selected.

Another object of this invention is to provide a new and improved flow switch, as aforesaid, which embodies improved means for adjusting the sensitivity of a flow responsive switch actuating mechanism.

A still additional object of this invention is to provide a new and improved flow switch including a unique multipart paddle means which is adapted to depend into a fluid-carrying conduit and is adjustable to multiple conduit diameters.

A still further object of this invention is to provide a new and improved flow switch which is readily conditioned for either a normally closed or a normally open circuit operation.

The above and further objects, features, and advantages of our invention will appear to those skilled in the art from the following detailed description and specification of a preferred embodiment thereof, as illustrated in the accompanying drawings.

In the drawings:

Figure 1 is a schematic view in side elevation, with parts broken away, illustrating a typical installation arrangement for a switch of our invention;

Figure 2 is an enlarged sectional view of our switch, looking from line 2—2 of Figure 1, and showing the elements therein arranged for normally closed circuit operation;

Figure 3 is a cross-sectional view taken substantially at line 3—3 of Figure 2 and looking in the direction of the arrows thereon;

Figure 4 is another plan view, similar to Figure 2, showing the electrical switch unit removed;

Figure 5 is an enlarged cross-sectional view taken substantially at line 5—5 of Figure 2, to illustrate details of our improved switch adjusting means;

Figure 6 is a sectional view, similar to Figure 3, in which elements of our improved assembly have been rearranged to provide for normally open circuit operation; and

Figure 7 is an enlarged partial end elevation of the switch assembly seen in Figure 6.

Turning now to the features of our improved flow switch and particularly referring to Figure 1, it will be understood that the switch assembly, indicated generally at **10** therein, is adapted to be associated with a horizontal fluid carrying conduit or pipeline **11** by threadingly connecting a mounting base member **12** thereof with a T-fitting **13** in the pipeline. The switch assembly **10** also includes a paddle means **15** which depends into the interior of the pipeline and traverses the fitting **13** so as to respond to the flow of liquid through the pipeline in such a manner that either the start or stopping of fluid flow may pivot the paddle means to operate switch contacts, as will later appear, for controlling an associated electrical circuit, for whatever purposes desired. If a T-fitting **13** is not available, the flow switch may be connected to the pipeline **11** by a fitting selected to be of a minimum length and welded directly to the pipeline about an opening suitable for the passage and operation of the paddle means **15**.

With respect to the paddle means **15**, it is essential that the same be positioned at right angles to the flow of the fluid and that it extend substantially across the interior of the pipeline to be properly responsive to the flow of liquids therethrough.

With reference now to Figures 2 and 3 of the drawings, the base member **12** may conveniently be cast of brass to include a generally tubular body **16** having wrench engaging faces forming a polygonal exterior and a reduced diameter adjacent its lower end to define a connecting cylindrical neck portion **17** having external pipe threads **18** for connection with the fitting **13**, as previously related. The base member **12** also includes a circular flange **19** at its upper end which is attachable to a lower rectangular base wall **20** of a metal switch housing, indicated generally by numeral **21**.

The switch housing, in addition to base wall **20**, includes a pair of upwardly extending end walls **22**, **22** and a platform wall **23** which extends between the end walls **22**, **22** in spaced parallelism to the base wall **20**. Upwardly turned attachment ears **24**, **24** are provided on opposite side edges of the base wall to receive holding screws **25** which serve to lock a removable cover **26** in position; the latter extending between and across the two end walls, as seen best in Figure 3.

Mounted within the switch housing and particularly supported on the platform wall **23** (see Figure 2) is a switch assembly, indicated generally by numeral **30**, which is actuated in response to pivotal movement of the paddle means **15**. The switch assembly is positioned over an enlarged central opening **31** formed in the platform wall **23**, and is attached to the latter by means of a pair of attachment screws **33**, **34** which pass through elongated openings **35** and **36**, respectively, formed in the switch supporting base plate **38**. The base plate **38** comprises a substantially rectangular metal plate having the two

elongated openings 35 and 36, as aforesaid, which have their longitudinal axes directed substantially at right angles to one another. Plate 38 also is equipped with a depending pivot pin 40 adjacent one corner and an eccentric adjusting means 41 near such pivot pin. A suitable rectangular opening 42 is also formed near one edge of the plate for passage of an upwardly extending operating finger 43 associated with the paddle assembly 15. Opening 42 is substantially encased on the upper side of the base plate 38 by a housing which includes a pair of parallel spaced end walls 45, 45, a side wall 46, and a top wall 47 formed integrally with the base plate and folded to protect the plunger button 49 of a plunger actuated switch unit 50.

The switch unit 50 is mounted on the upper face of the base plate 38 and held in place by a pair of holding bolts 51, 51 which pass through the switch unit and thread into openings formed in the base plate. The switch unit is also insulated from the base plate by an intervening insulating shield 52 and presents terminal connectors 54 and 55 (see Figure 2) for connection with electrical leads in a conventional manner. A shield disc 56 is preferably provided beneath the head of one of the mounting bolts 51 to avoid short-circuiting contact with the conductor lead fastened to terminal 54. A switch (not shown) suitable for purposes of unit 50 may be made according to the concepts and teachings found in United States Patent No. 2,232,996, issued February 25, 1941.

With reference now to Figure 3 in particular, it will be understood that the plunger operating finger 43 moves arcuately toward and away from the switch plunger 49 in accordance with movements of the paddle assembly 15, the details of which will now be set forth. As previously related, the base wall 20 of the switch housing 21 is attached to the circular flange portion 19 at the upper end of the cast base member. The flange portion 19 substantially closes over the upper end of the tubular body portion 16 for the base member except for a central opening 60 through which the paddle assembly 15 extends. The upper face of the flange portion is further distinguished by a central raised circular pad 61, which projects into a correspondingly shaped opening 62 formed in the housing base wall 20. Plural screw elements 63 are used to interconnect the base wall of the housing to the flange portion 19. The base member 12 also includes trunnion posts 65, 65 which are cast integrally with the flange portion 19 and project upwardly from the pad 61 into the lower interior of the switch housing to support the paddle assembly, as will appear hereinafter.

The paddle means 15 includes an arm member 70 which depends beyond the lower end 71 of the base member 12 and is formed with a curved lower end portion 72. A plurality of paddle leaf members, herein shown as three in number and indicated at 75, 76, and 77, are attached to the arm 70 by a single bolt means 78 which threads into a suitable opening formed in the arm 70. A pin 79 is also upset from arm 70 to pass through the leaf members 75—77 to locate the same and prevent their turning about the bolt 78.

The several leaf members, as shown in Figure 3, are stacked one on top of the other and are of different lengths to form a cascade structure. It will be noted also that the leaf elements are placed on the upstream side of the arm 70 so as to bend with the flow of the fluid toward the curvilinear portion 72 of the paddle arm for better support. The provision of the plural leaf elements 75—77 readily adapts the paddle assembly to various diameter pipelines, and provides an effective system for regulating pivotal reaction of the paddle assembly to the force of fluid flow by selectively varying the effective paddle area. Thus, with the three leaf elements combined (see Figure 3), the paddle assembly is adapted to larger diameter pipelines, such as 3-inch pipeline and presents a maximum contact area to the flowing fluid. By removing leaf 75 from the assembly, a shorter paddle assembly of intermediate area is defined, suitable for intermediate pipe diameters, as in a 2-inch pipeline, or such may be used in larger pipes to reduce the paddle area and the force tending to pivot the same. The third and remaining leaf element 77, used alone, is suitable for smaller pipelines and provides a minimum paddle area.

To support the paddle arm 70, its upper end is held by pin means 80 in a slot cut through the lower end of a cylindrical retainer member 81 which extends upwardly through the opening 60 in the platform portion of base member 12. Thus, the retainer 81 extends into the interior of the switch housing 21.

In order to provide a seal between the interior of the pipeline 11 and the switch housing, the upper end of the retainer 81 is encased by a flexible bellows 82 which is brazed or otherwise rigidly affixed and sealed to the platform portion 61. The upper end of the bellows is sealed between the upper end of the retainer 81 and an overhanging pivot beam 85, the switch actuating finger member 43 and a retainer bracket 86 which overlies the switch actuating finger 43. In so connecting the upper end of the bellows to the several elements described, a single holding screw 87 is employed over a seal washer 88 (see Figure 4) which passes through a rectangular platform portion 89 of the retainer bracket 86, a lower arm portion 90 of the actuating finger member 43 and through the upper end of the bellows 82 for threaded connection with the upper end of the arm retainer 81. In this manner, an effective seal is provided between the interior of the fluid carrying pipeline and the interior of the switch housing, while permitting movement of the paddle arm assembly with the flow of fluid within the pipeline.

To achieve the desired movements of the paddle assembly, the same is pivotally supported intermediate its ends so that arcuate movement of the paddle leaf elements and paddle arm 70 in one direction, according to the flow of fluid in the pipeline, produces opposite arcuate movement of the plunger contacting finger 43. To this end, the bellows pivot beam is formed with a central platform portion 95 which is flanked at its opposite ends by depending ear portions 96, each provided with a knife-edged projection 97 which extends into a trunnion receptive opening 98 formed near the lower ends of the depending ear portions 96. In particular, trunnion pins 100 are held in the laterally spaced trunnion posts 65 which extend upwardly and from the pad 61 of the base support member 12; such trunnions, as viewed in Figure 3, being formed with lengthwise extending wedge-shaped slots 102 which receive the knife-edged projections 97. The bearing trunnions 100 are held in place in the trunnion posts 65 by means of set screw members 103 with the knife-edge support, so formed, being disposed on the underside of the trunnion members. The bellows 82 is also placed under slight axial compression, thereby serving to resiliently hold the knife-edge projections securely on their trunnion supports. In this manner, the paddle assembly 15 is supported for pivotal movement about a horizontal axis, as defined by the trunnion members 100, and located externally of the pipeline.

In order to control the sensitivity of the paddle assembly to the flow of fluid through the pipeline 11, a simple adjustment means is employed including a coil spring 106 held between an upwardly extending ear portion 107 associated with the finger retaining bracket 86 and a depending ear portion 108 struck downwardly from the platform wall 23 of the housing. An adjusting screw means 109 threads through a sheet metal lock nut 110 mounted on the ear portion 108 to adjust compression of the spring means 106 through a pilot collar 111 which bears against one end of the spring and receives the inner end of the adjusting screw. The other end of the spring is piloted over a nipple member 112 which projects from the upwardly turned ear portion 107 of the finger retaining bracket. It will be appreciated, therefore, that ad-

justing screw means **110** produces a variation in the compression of spring **106** and serves, in turn, to thereby vary or adjust the force required to pivot the paddle assembly **15** about its pivotal axis trunnions **100**; spring **106** opposing the movement of the paddle assembly with the flow of the fluid in the pipeline.

From the foregoing description, it will be recognized that the flow switch assembly of Figures 2 and 3 is designed for normally closed switch operation in response to the flow of fluid through the pipeline, such flow being according to the direction of arrow A or from right to left, as viewed in Figure 3, for example. In this operating condition, the switch **50** is positioned so that its plunger **49** is depressed by the movement of the finger element **43** theretoward, and serves thereby to open contacts of the switch means **50**. However, due to the fact that it is not always possible to achieve uniform contact and plunger throw in a production switch unit, such as switch **50**, it is essential that some means be provided for adjusting the relative position between the extended switch plunger **49** and the switch operating finger member **43**. This is accomplished in a very simple and direct manner by the previously referred to eccentric **41** associated with the switch base plate **38**.

The relationship and operation of the eccentric **41** may best be understood by examining Figures 4 and 5 of the drawings, but to fully recognize its operation, a review of the means employed to interconnect the base plate **38** of the switch assembly **30** and the platform wall **23** of the switch housing will be made at this junction, particular reference being made to Figures 2 and 4. It will be recalled that the base plate of the switch assembly is equipped at its diagonally opposite corners with slotted openings **35** and **36** which receive the mounting screws **33** and **34** and have their longitudinal axes generally at right angles to one another. Adjacent the elongated opening **35** is the eccentric means **41**, as will be described in more detail presently, and next adjacent to the eccentric means is the depending pivot center or projection **40**. This relationship is particularly shown in Figure 5 of the drawings.

As seen best in Figure 4, the intermediate platform wall **23** of the switch housing is equipped with the central opening **31** through which the upwardly extending resilient plunger actuating finger member **43** extends. Adjacent the opposite lateral ends of wall **23** and on the central axis thereof, are a pair of identical elongated oval openings **124** and **125** adapted to receive the eccentric **41**. At substantially diagonally opposite corners of the central opening **31** are additional openings **126** and **127** which are intended to receive the depending pivot member **40** when associated with the switch assembly base plate **38**. Adjacent the opposite diagonal corners of the central opening **31** are additional threaded openings **128** and **129** which receive the mounting bolts **33** and **34**, respectively, for locking the switch assembly and particularly its base plate **38** in a desired position on top of the platform wall **23**.

Referring now to Figure 5, it will be seen that the eccentric member **41** comprises essentially a screw element having an upper head portion **130** equipped with a slot **131** receptive of a screwdriver blade or a like instrument for effecting its rotation. Beneath the head portion **130** and designed to be received concentrically within a suitable opening formed through the switch base plate **38**, is a cylindrical shank portion **132** which is coaxially aligned with the head portion **130**. An eccentrically aligned axle crank portion **134** depends offcenter from the shank portion **132** thereof and is equipped with an annular washer element **135** at its outer end. The washer **135** enters the slotted openings **124** or **125**, as selected, and is disposed beneath the base plate **38** of the switch assembly.

In the arrangement of Figures 2 and 3, for example, the eccentric **41** enters the slotted eccentric opening **124**

of the wall **23** and the pivot pin **40** enters the pivot center opening **126**. With this arrangement, rotation of the eccentric in the opening **124** causes pivotal activity of the switch assembly **30** about opening **126** as a pivot center between the dotted-line positions L—L and L—R in Figure 4.

Such eccentric adjustment of the switch assembly serves to regulate the spacing between the free switch plunger **49** and the actuating finger **43** to accordingly adjust the operational characteristics of the switch and particularly to insure that the contacts of switch **50**, as seen in Figures 2 and 3, are closed when fluid is flowing through the pipeline **11**. This eccentric adjustment, when employed in conjunction with the adjustment means **105**, serves to regulate the switch assembly for both velocity of fluid flow through the pipe and the sensitivity of the switch plunger in response to movement of the actuating finger **43**. Thus, for example, by moving the switch plunger toward the finger **43**, less movement of the paddle assembly is required to close the switch contacts and vice versa.

In Figures 6 and 7 we have shown a modified version of the switch assembly hereinabove described in which the switch unit **50'** is rearranged to provide for a normally open contact operation in response to flow of fluid through the pipeline. To accomplish this reversed operation, it is necessary to position the switch operating finger member **43'** by loosening the screw means **87** and swinging such approximately 180° so that the same is disposed on the opposite side of the central opening **31** in barrier wall **23** from its position illustrated in Figure 3 (see Figure 6). With the operating finger **43'** so rearranged, it is next essential to reverse the positioning of the switch unit **50'**. This is done by removing the holding screws **33** and **34** and rotating the entire switch assembly, including the base plate **38** thereof, 180° to agree with the repositioning of the plunger actuating finger. In this reverse condition, the pivot pin **40** will enter and cooperate with the alternate pivot center opening **127** in wall **23**, while the eccentric **41** will reside in the adjacent eccentric opening **125**. So conditioned, rotation of the eccentric **41** will serve to move the entire switch assembly between the dotted-line limit positions shown at R—R and R—L of Figure 4, respectively.

It will be understood that the alternate assembly of Figure 6 is identical with that shown in Figures 2 and 3, with the exception of the reversal of the switch assembly **50'** therein and the switch operating leaf member **43'**, as above described. It will be noted that the flow of the liquid in the pipeline **11** remains as before, or from right to left, as viewed in Figure 6. Therefore, pivoting of the paddle assembly **15** in response to flow of liquid in the pipeline will serve to move the switch operating leaf member **43'** away from the plunger **49**, maintaining the switch contacts open so long as fluid continues to flow through the pipeline in amounts and at a velocity sufficient to meet the adjusted conditions of the switch.

From the above description, those familiar with the art will readily recognize the novel advancement and versatility which the improved assembly of our invention provides and particularly will appreciate the merit involved in the reversibility of the switch unit **50** to provide for normally open or normally closed circuit operation. Further, the provision of an eccentric adjustment for the switch assembly **30** readily adapts the same to utilization of a production model switch unit in which the throw of the switch plunger may vary, since by providing means for so adjusting the spacing between the switch plunger and the operating finger of the paddle assembly, uniform opening and closing operation of the switch contacts may be achieved in a reasonable, efficient and simple manner.

It is also to be recognized that while we have hereinabove set forth the features and concepts of our inven-

tion as they pertain to a particular embodiment, illustrated in the drawings and above described, such as not necessarily to be limited to the details described, except as may appear in the following appended claims.

We claim:

1. In a flow switch adapted to operatively respond to fluid flowing in a pipeline, a housing including a base portion adapted for connection in the pipeline, the interior of said base portion communicating with the interior of the pipeline, a paddle means mounted in said base portion and having one end depending into the pipeline and the other end projecting outwardly of said base portion, flexible seal means having connection with and encasing said paddle's other end and preventing the escape of fluids from said base portion to the interior of said housing, means within said housing pivotally supporting said paddle means adjacent its said other end and exteriorly of said seal means, an electrical switch assembly including a plunger operated switch unit mounted in said housing and exteriorly of said seal means, finger means extending outwardly from said seal means into said housing and having connection with the said paddle for movement with the latter and operatively engageable with the plunger of said switch unit, means for regulating the pivotal sensitivity of said paddle means to the flow of fluids in the pipeline, and eccentric means within said housing for adjustably pivoting said switch unit about an axis transverse to the pivotal axis of said paddle, operation of said eccentric means serving to position the switch unit and adjust the pivotal throw of said paddle means required to operate said plunger.

2. The combination as set forth in claim 1 in which said switch unit and operating finger means are arranged to depress said plunger in response to pivotal movement of said paddle with the flow of fluid in the pipeline.

3. The combination as set forth in claim 1 in which switch unit and paddle means are arranged to move said operating finger away from said plunger in response to pivotal movement of said paddle with the flow of fluid in the pipeline.

4. The combination as set forth in claim 1 in which said switch unit may be selectively positioned for closed and open contact operation in response to pivotal movement of said paddle with the flow of fluids in the pipeline and in which said eccentric means is operable to adjust the positioning of the switch unit for both open and closed contact operation.

5. In a switch assembly adapted to operatively respond to the flow of fluids in a pipeline and like fluid carrying conduits, the combination comprising, paddle means adapted to have one end thereof engaged by the flowing fluid, pivot means supporting said paddle means intermediate its ends for movement about a substantially horizontal axis, a finger means attached to the upper end of said paddle means and extending upwardly therefrom, a switch housing surrounding said pivot means and the upper end of said paddle means and including a platform wall overlying said pivot means, said platform wall having an opening for the passage of said finger means therethrough, a switch means mounted on said wall and having pivotal connection therewith for movement about a substantially vertical axis disposed laterally of the longitudinal axis of said paddle means, eccentric means for adjustably pivoting said switch means between limits, an operator means on said switch means for operating circuit controlling contacts thereof, the adjustment of said eccentric means serving to regulate the distance between the extending finger means and the said switch operator means, thereby to adjust the pivotal throw of said paddle means necessary to operate said switch means, and means detachably mounting said finger means on said paddle means whereby the same may be disposed on opposite sides of the longitudinal axis of said paddle means and offset therefrom to provide movement of said finger means selectively toward and away from said operator means in response to pivotal movement of said paddle means in one direction.

6. A flow switch comprising housing means, paddle means pivotally mounted intermediate its ends for movement about a fixed axis, said paddle means having one end thereof extending outwardly of an opening of said housing and having its other end lying within said housing, seal means surrounding said other end of said paddle means for closing said opening to prevent fluid from entering the interior of said housing through said opening, switch means including actuating means therefor, means for mounting said switch means within said housing to dispose said actuating means in position to be engaged by said other end of said paddle means, and said mounting means including pivot means and eccentric means for pivotally adjusting the position of said switch means about said pivot means to dispose said actuating means in predetermined position relative to said other end of said paddle means.

7. The flow switch of claim 6 characterized by the provision of spring means having connection with said paddle means to yieldingly oppose movement of the latter about its axis, and means for adjusting said spring means.

8. A flow switch comprising a housing, a base member for said housing having an opening therein, baffle means having one end extending outwardly through said opening and the other end extending into said housing, means between said base member and said other end of said baffle means to close said opening and prevent fluid from passing therethrough into said housing, means within said housing between said other end of said baffle means and said base member affording substantially knife edge pivotal mounting of said baffle means about a substantially horizontal axis, a platform mounted within said housing in spaced relation to said base member and adjacent said other end of said baffle means, switch assembly means including a snap action switch carried by said platform, a plunger for said switch means for actuating the same, switch tripping means carried at said other end of said baffle means and extending through an opening on said platform for engaging said plunger upon pivotal movement of said baffle means about its axis, adjusting means between said switch assembly means and said platform including pivot means therebetween, and eccentric means for moving said switch assembly relative to said platform about said pivot means to dispose said plunger in a predetermined position relative to said other end of said paddle means.

9. A flow switch comprising a housing, a base member for said housing having an opening therein, baffle means having one end extending outwardly through said opening and the other end extending into said housing, means between said base member and said other end of said baffle means to close said opening and prevent fluid from passing therethrough into said housing, means within said housing between said other end of said baffle means and said base member affording substantially knife edge pivotal mounting of said baffle means about a substantially horizontal axis, a platform mounted within said housing in spaced relation to said base member adjacent said other end of said baffle means, switch assembly means including a snap action switch carried by said platform, a plunger for said switch means for actuating the same, switch tripping means carried at said other end of said baffle means and extending through an opening in said platform for engaging said plunger upon pivotal movement of said baffle means about its axis, adjusting means between said switch assembly means and said platform including pivot means therebetween, eccentric means for moving said switch assembly relative to said platform about said pivot means to dispose said plunger in predetermined position relative to said other end of said baffle means, spring means between said other end of said baffle means and said platform to yieldingly oppose movement of said baffle

means about its axis, and means for adjusting said spring means.

10. A flow switch comprising a housing, a base member for said housing having an opening therein, baffle means having one end extending outwardly extending through said opening and the other end thereof extending into said housing, flexible bellows means between said other end of said baffle means and said base member closing the opening in said base member from the interior of said housing, mounting means between said base member and said other end of said baffle means including a pivot beam at said other end of said baffle means having depending ear portions formed with knife edges for cooperating with wedge shaped slots in trunnion pins carried by said base member to provide for pivotal movement of said baffle means about an axis parallel to the plane of said base member, a platform mounted within said housing in spaced relation to said base member and adjacent said other end of said baffle means, switch assembly means including a snap action switch carried by said platform, a plunger for said switch means for actuating the same, switch tripping means carried

at said other end of said baffle means and extending through an opening in said platform means for engaging said plunger upon pivotal movement of said baffle means, adjusting means between said switch assembly means and said platform including pivot means affording a pivotal axis extending normal to the pivotal axis of said baffle means, and eccentric means for moving said switch assembly relative to said platform about said pivot means to dispose said switch tripping means in predetermined position relative to said plunger.

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