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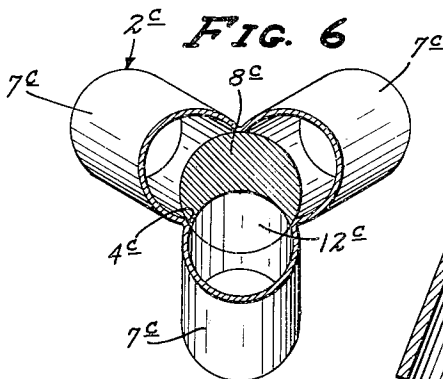
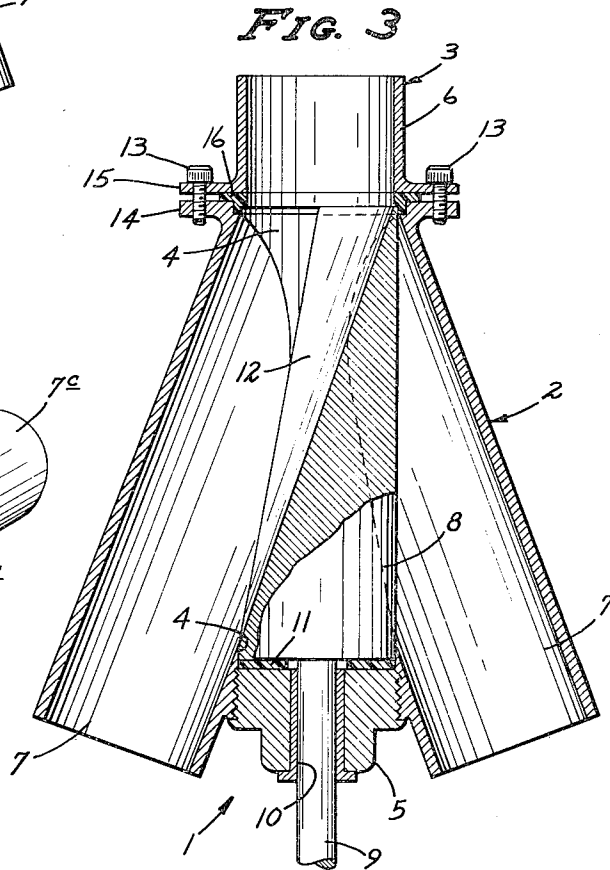
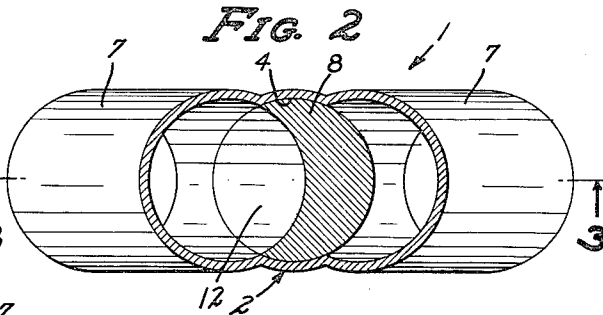
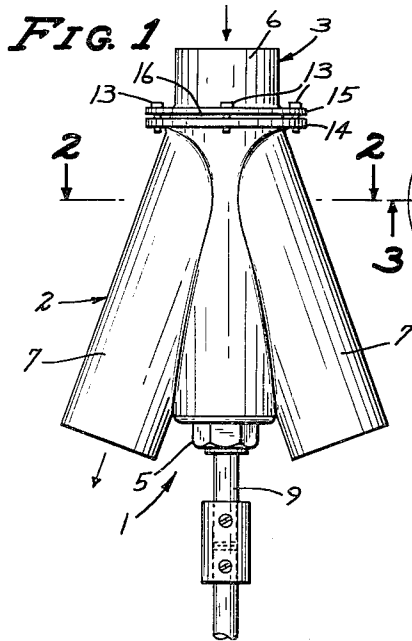
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DIVERTER VALVE

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2 Sheets-Sheet 1



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DIVERTER VALVE

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1 Claim. (Cl. 137—625.11)

My invention relates generally to diverter valves of the type used in main transport lines or conduits to divert a solids-gas mixture to a selected one of a plurality of branch lines.

The primary object of my invention is the provision of a diverter valve of the type above described which, because of its design, offers a minimum resistance to the flow of solids-gas mixture being transported there-through and diverted thereby and, as a result, does not materially change the velocity of the flow.

A further object of my invention is the provision of a valve of the class immediately above described which, by virtue of its design, reduces impingement of the solid materials to a minimum, thus minimizing product degradation.

A further object of my invention is the provision of a device of the class immediately above described which, by virtue of its having no pockets or ledges for accumulation of product, eliminates any possibility of contamination.

A further object of my invention is the provision of a device of the class described which, by virtue of its design may, with a minimum of time and expense, and without effecting the efficiency thereof, be changed from a two-way to a three-way, or a four-way valve, and so forth.

A further object of my invention is the provision of a valve of the type above described which may be used for transportation of materials in either direction, to wit: from a multiple source to a single source or from a single source to a multiple outlet.

A further object of my invention is the provision of a device of the class described which has but a single working part and consequently may be produced relatively inexpensively and which is relatively durable and service-free in use.

A further object of my invention is the provision of a device of the class described wherein the rotor may be removed and replaced, if necessary, with a minimum of time, effort and experience.

The above and still further objects of my invention will become apparent from the following detailed specification, appended claims and attached drawings.

Referring to the drawings wherein like characters indicate like parts throughout the several views:

FIG. 1 is a view in side elevation of my novel structure;

FIG. 2 is a view in horizontal section as seen from the line 2—2 of FIG. 1;

FIG. 3 is a view in axial section as seen from the line 3—3 of FIG. 2;

FIG. 4 is a view corresponding to FIG. 2 but showing a modified form of my invention;

FIG. 5 is a view in axial section similar to FIG. 3 but showing the structure of FIG. 4; and

FIG. 6 is a view similar to FIG. 2 but showing a still further modified form of my invention.

Referring with greater particularity to the drawings, and initially to FIGS. 1 to 3 inclusive thereof, the numeral 1 indicates in its entirety a valve body comprising a pair of axially aligned body sections 2, 3. Body section 2, as shown, is formed to define an axial bore 4 which, at one end, is provided with partial closure means

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in the nature of a screw-threaded plug 5. The other end of the bore 4 communicates with a cylindrical conduit element 6 defined by the body section 3.

The body section 2 is formed to define a pair of conveyor legs 7 which are circumferentially spaced about the cylindrical bore 4 and which converge toward the conduit element 6. Mounted for rotation within the cylindrical bore 4 is an axially elongated cylindrical valve element 8 which, at one end, is formed to define a diametrically reduced, preferably integral, shaft 9 which is journaled for rotation in the axial opening 10 in the plug 5. Preferably, and as shown, an annular thrust bearing 11 formed from suitable material such as Teflon is interposed between the plug 5 and the adjacent end of the valve element 8.

Valve element 8 is formed to define a generally axially extended radially opening groove 12, the axis of which is generally coaxial with either of said legs 7 when said groove 12 is aligned with either thereof by rotation of the shaft 9. Such rotation obviously can be accomplished manually or by any suitable mechanical means.

The valve body sections 2, 3 are retained in axial alignment by means of suitable screws 13 which extend through cooperating radially outwardly projecting spaced annular flanges 14, 15 formed respectively by adjacent end portions of sections 2, 3. Effecting a seal between said body sections 2, 3 and additionally serving as a thrust bearing for the other end of the cylindrical valve element 8 is an annular sealing ring 16 also formed from Teflon or other suitable material.

With the arrangement above described, it should be obvious that with a minimum of effort and with maximum speed, the valve element 8 may be rotated so as to cause alignment of the groove 12 therein with either of the legs 7 so as to divert material through either one thereof, or alternatively, to permit passage of material from either of said legs to the single outlet defined by the conduit 6. It is important to note that the opening defined by the removable plug 5 is such as to permit removal of the valve element 8 therethrough for repair or replacement without detaching the sections 2, 3 of the valve body 1.

It should be obvious that to insure registration of the groove 12 of the valve element 8 with a selected one of the legs 7 suitable indicating means, not shown, may be associated with the shaft 9.

In the structure of FIGS. 4 and 5 the valve body section 2a is formed to define four circumferentially spaced conveyor legs 7a which converge toward the conduit element 6a. It will be noted that the diameter of the valve element 8a and its cooperating bore 4a are substantially greater than their counterparts in structures of FIGS. 1 to 3, inclusive. Obviously this is necessitated in order to accommodate a greater number of legs 7a formed in the body section 2a. However, it will be noted particularly with reference to FIG. 4 that the diameter of the legs 7a is the same as that of the legs 7 and the dimensions and contour of the groove 12a is likewise identical to that of the groove 12 in the valve element 8.

In the structure of FIG. 6 the valve body 2c is shown as defining three circumferentially spaced legs 7c. Here again, the valve element 8c and its cooperating bore 4c are increased in diameter proportionately to the number of circumferentially spaced legs 7c formed by the body 2c. However, the dimensions of the groove 12 and legs 7c are identical to their counterparts in structures FIGS. 1 to 3, inclusive.

Finally, with respect to the slightly modified structure of FIGS. 4 and 5, it will be noted that all parts (whether specifically mentioned or not immediately above) bear like numerals as their counterparts in FIGS. 1 to 3, in-

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clusive, with the letter *a* added. Likewise in respect to the structures of FIG. 6, wherein the letter *c* has been added to corresponding parts.

My invention has been thoroughly tested and found to be completely satisfactory for the accomplishment of the above objects, and while I have shown a preferred embodiment thereof, I wish it to be understood that same may be capable of modification without departure from the scope and spirit of the appended claim.

What is claimed is:

A diverter valve comprising:

a valve body having an elongated cylindrical bore formed therein and having a pair of ends;

a conduit element extending from one of the ends of the valve body;

plural conveyor legs extending from the valve body and spaced about the bore thereof;

the conveyor legs having passages formed therein communicating with the bore adjacent the conduit element;

the conveyor legs being of tubular form, and each having a radius;

an elongated cylindrical valve element rotatably mounted in the bore and having opposite top and bottom ends;

the valve element having a generally axially extending, radially opening groove therein, the groove being enlarged in depth adjacent said one end of the valve

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body adjacent the conduit element and linearly diminishing in depth adjacent the other end thereof; the valve element being rotatable to positions wherein the groove is aligned with the conveyors legs, individually;

the groove including a groove face, the face having a surface transversely curved about a radius common to the radius of the aligned conveyor leg throughout the length thereof;

the aligned conveyor leg and groove having a common longitudinal axis; and

means associated with the valve element for rotation thereof.

References Cited by the Examiner

UNITED STATES PATENTS

850,762	4/07	Kolla	137—610
974,409	11/10	Matchette	251—310
2,702,050	2/55	Thomas	251—310
2,755,562	7/56	Shelton	137—625.11 X
2,993,513	7/61	Hyde	137—610

FOREIGN PATENTS

560,531 7/58 Canada.

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