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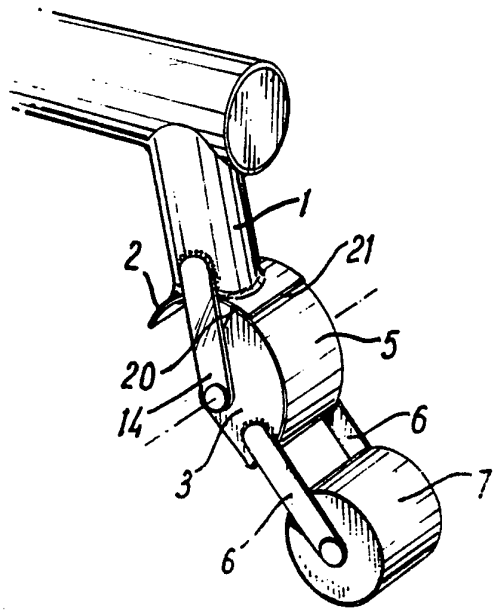

(57) Abstract

A valve for use in a line for transporting slurry comprises a housing (1) defining a valve port through which slurry is to pass. The housing (1) is formed with a concave lower end (2) which forms the valve seat adjacent the valve port and a valve closure member having an outer convex surface (5) complementary in shape to the concave surface of the valve seat is provided to close the valve. A float (7) is connected to the valve closure member (3) and is adapted to float on the surface of the slurry and open and close the valve in response to the slurry surface level. The valve closure member (3) has a sharpened and/or hardened edge to cut through solid matter in the slurry.

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A VALVE

The present invention relates to a valve. The valve is particularly, but not exclusively, intended for agricultural use.

For hygienic reasons, it is now common to store agricultural slurry to a large tank. In one known arrangement a pit is provided adjacent the tank. Slurry may be deposited in the pit prior to being introduced into the tank and slurry may be removed from the tank by way of the pit. An inlet pipe leads from the pit to the top of the tank, and a pump is provided for pumping slurry from the pit through the pipe into the tank. An outlet from the tank leads from the bottom of the tank to the pit. A valve is provided in the outlet to control the flow of slurry from the tank. This valve is very important. If it malfunctions the entire contents of the tank may flow out of the tank into the pit and thence onto the surrounding area with possible adverse consequences, particularly if the tank is disposed near a watercourse. Slurry is by nature a mixture of liquids and solids. The solids may take the form of straw and the like. These solids may be bound together by the liquids to form solid accumulations of larger size which may cause blockages in pipelines and may interfere with the operation of pipeline valves.

According to the present invention, there is provided a valve for use in a line for transporting slurry comprising a housing defining a port and a valve seat, a valve closure member having an edge mounted for movement across the valve seat between a position in which the port is open and a position in which the port is closed off and means for moving the valve closure member between the two positions.

In a preferred embodiment of the invention, the valve seat is concave and advantageously is formed by the internal surface of part of a cylinder. The valve closure member is convex and is also advantageously formed by the external surface of part of a hollow cylinder, the two surfaces being complementary to one another. The wall of the part hollow cylinder forms the edge of the valve closure member. The edge may be hardened and/or sharpened to provide a cutting edge for solids in slurry flowing through the valve. This edge may be angled relative to the edge of the valve seat to produce a scissors type cutting action as the closure member moves across the valve seat to close the valve. The mounting for the valve closure member comprises support members to which the valve closure member is pivotally connected. These supports are connected to the housing. The means for moving the valve comprises a float which is connected

to the valve closure member by support members. The float is cylindrical, spherical or any other suitable shape and is hollow. It is adapted to float on the surface of the slurry and to move up and down with that surface thereby pivoting the valve closure member between open and closed positions. The float may be provided with a non-stick surface to reduce any tendency of matter to adhere to it. This surface may be polytetrafluoroethylene or the like.

In order that the invention may be more clearly understood, one embodiment thereof will now be described, by way of example, with reference to the accompanying drawings, in which:-

Figure 1 show a perspective view of one form of valve according to the invention,

Figure 2 shows a side elevational view of the valve of Figure 1 in the fully open position,

Figure 3 shows a side elevational view of the valve of Figure 1 in the fully closed position, and

Figure 4 shows the valve of Figures 1 to 3 in a typical installation.

Referring to Figure 1, the valve comprises a tubular

housing defining a valve port through which slurry is to pass. The housing 1 is formed with a concave lower end 2 which effectively forms the valve seat of the valve adjacent the port valve. Closure member 3 is disposed on a support beneath the housing . The support comprises two support members 4 (one only visible in Figure 1) connected to the housing 1. Member 3 is pivotally connected to the support members 4 at their lower ends. Member 3 has an outer convex surface 5 which is complementary in shape to the concave surface of the concave valve seat 2. Two members 6 extend from member 3. At the end of these two members 6, a cylindrical hollow float 7 is rotatably mounted.

The float 7 is disposed to float on the surface of the slurry in a slurry pit 10 as shown in Figure 4. The pit 10 is disposed adjacent a slurry storage tank 11. A pipe 12 leads from the pit 10 to the top of the tank and a motor driven pump 13 is provided for pumping slurry from the pit through the pipe 12 into the tank 11. A further pipe 14 is provided leading to the pump 13 to enable slurry to be pumped into (or out of) a tanker out of or into the pit 10. Tankers would normally be driven upto the pit 10 by means of tractors. The pit 10 is filled from the tank 11 via an outlet pipe 15 and the valve described with reference to Figure 1 is disposed on the outlet end of pipe 15. A grid 16 closes off the top

of the pit. The valve operates automatically to maintain the level of slurry in the pit at a predetermined level. When the valve is open (as shown in Figure 2) slurry flows out through pipe 15. As the level of slurry in the pit rises, so also does the float 7, which is floating on the surface. This in turn rotates valve closure member 3 to progressively close the valve. Valve closure member 3 constitutes part of a hollow cylinder and the leading edge of the member, which is referenced 20 in Figure 1, 2 and 3, acts as a cutting edge cutting or severing solid matter such as straw between it and the edge 21 of the valve seat 2. To promote effective cutting, edges 20 and 21 may be sharpened and/or angled with respect to each other.

The valve may be made of metal or synthetic plastics material. To resist any tendency of the slurry to stick to the float and thereby impair its function, the float may be coated with a non-stick material, such as polytetrafluoroethylene.

It will be appreciated that the above embodiment has been described by way of example only and that many variations are possible without departing from the scope of the invention. For example, the shapes of the valve seat, valve closure member and float may be changed as desired. The float may be spherical or any other

suitable shape. Apart from being sharpened and/or hardened the leading edge of the valve closure member could be serrated.

CLAIMS

1. A valve for use in a line for transporting slurry comprising a housing (1) defining a port and a valve seat (2), characterised by a valve closure member (3) having an edge (20) mounted for movement across the valve seat between a position in which the port is open and a position in which the port is closed off and means for moving the valve closure member between the two positions.

2. A valve as claimed in claim 1, in which the valve seat (2) is concave.

3. A valve as claimed in claim 1 or 2, in which the valve seat (2) is formed by the internal surface of part of a cylinder.

4. A valve as claimed in claim 3, in which the valve closure member (3) is convex and is formed by the external surface of part of a hollow cylinder, the said external surface and internal surfaces being complementary to each other.

5. A valve as claimed in claim 3, in which the wall of the hollow part cylinder forms the edge (20) of the valve closure member.

6. A valve as claimed in any preceding claim, in which the edge (20) is hardened and/or sharpened to provide a cutting edge.

7. A valve as claimed in any preceding claim, in which the edge (20) of the valve closure member (3) is angled relative to an edge of the valve seat (2) to produce a scissors type cutting action as the closure member (3) moves across the valve seat to close the valve.

8. A valve as claimed in any preceding claim, in which support members are connected to the housing and to the valve closure member to mount the valve closure member on the housing.

9. A valve as claimed in any preceding claim, in which the means for moving the valve closure member comprises a float.

10. A valve as claimed in claim 9, in which the float is cylindrical or spherical.

11. A valve as claimed in claim 9 or 10, in which the float has a non-stick surface to reduce any tendency of matter to adhere to it.

12. A valve as claimed in claim 11, in which the non-stick surface comprises polytetrafluoroethylene.

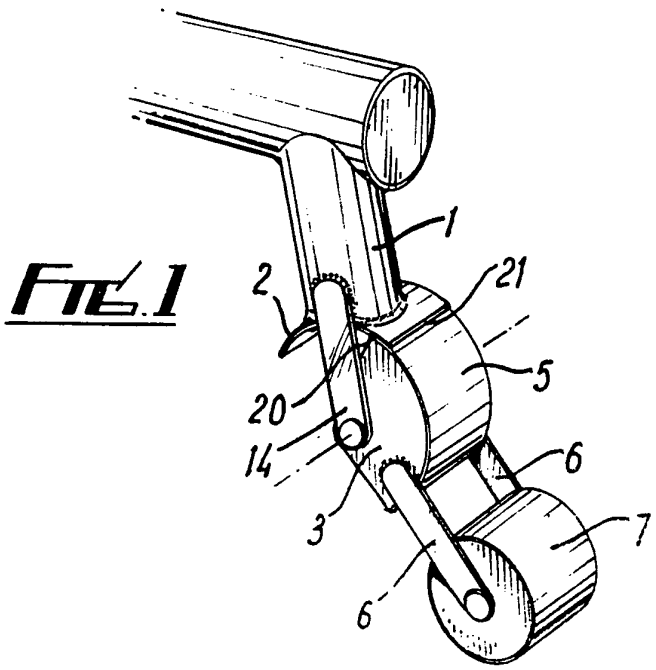

FIG.1

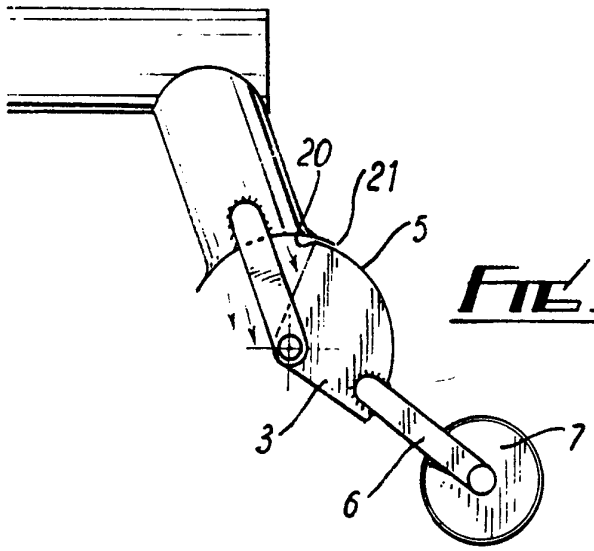

FIG.2

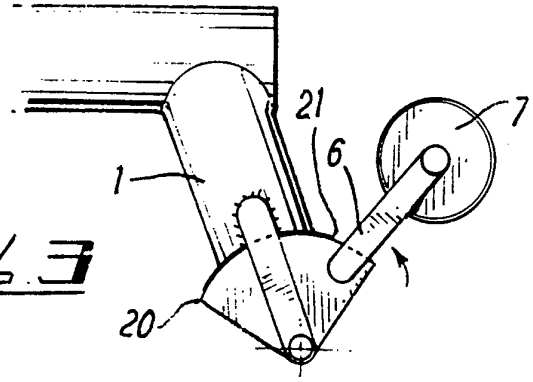

FIG.3

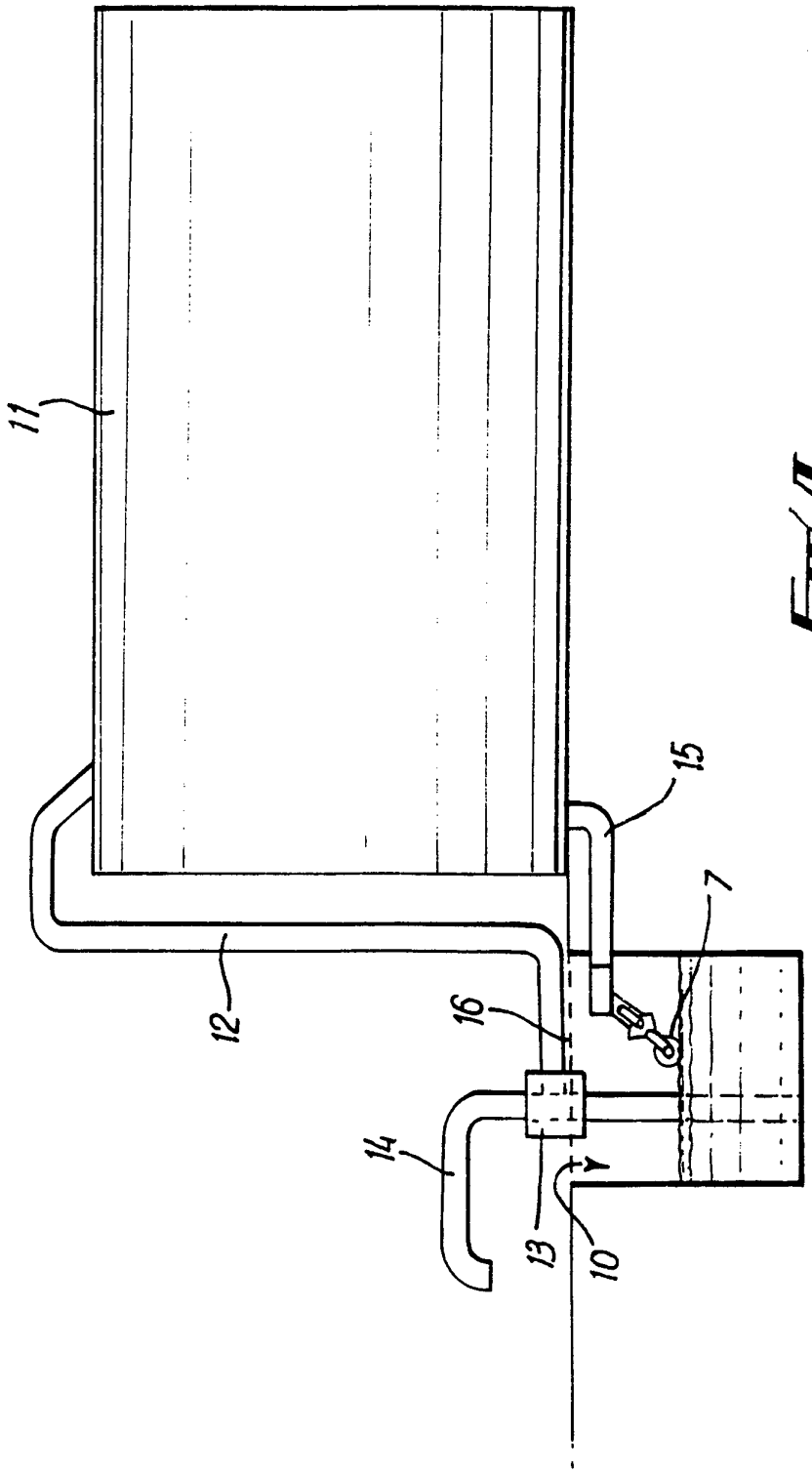

Fig 4

INTERNATIONAL SEARCH REPORT

Inter. nal Application No
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A. CLASSIFICATION OF SUBJECT MATTER
IPC 5 A01C23/00 B65B39/00 B67D5/34

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 5 A01C B65B B67D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE,C,705 456 (HÖRENZ) 20 March 1941 see page 2, line 11 - line 39; figure 1	1-5,8-10
X	FR,A,945 752 (RONOT) 13 May 1949 see the whole document	1-5,8-10
X	DE,U,18 35 666 (OVENTROP) 27 July 1961 see page 3, paragraph 5 - page 4; figure 1	1-5,8-10
A	GB,A,2 196 931 (BROLL) 11 May 1988 see page 2, line 60 - page 3, line 22; figures 1-6	1,3-5,7
A	EP,A,0 079 018 (HOFFMANN) 18 May 1983 see page 3, line 16 - page 9; figures 1-4	1,6,7

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
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Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)		Publication date
DE-C-705456		NONE		
FR-A-945752		NONE		
DE-U-1835666		NONE		
GB-A-2196931	11-05-88	DE-A-	3637550	19-05-88
		FR-A-	2605975	06-05-88
		US-A-	4830236	16-05-89
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