May 6, 1947. F. G. D. MULLER 2,420,053

SWING JOINT

Filed Sept. 21, 1944 2 Sheets-Sheet 1

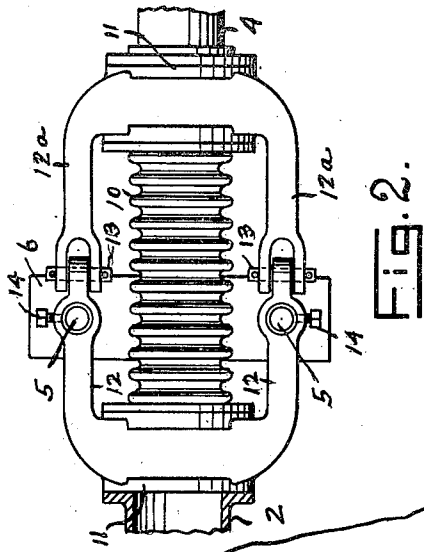


Fig. 2.

Fig. 1.

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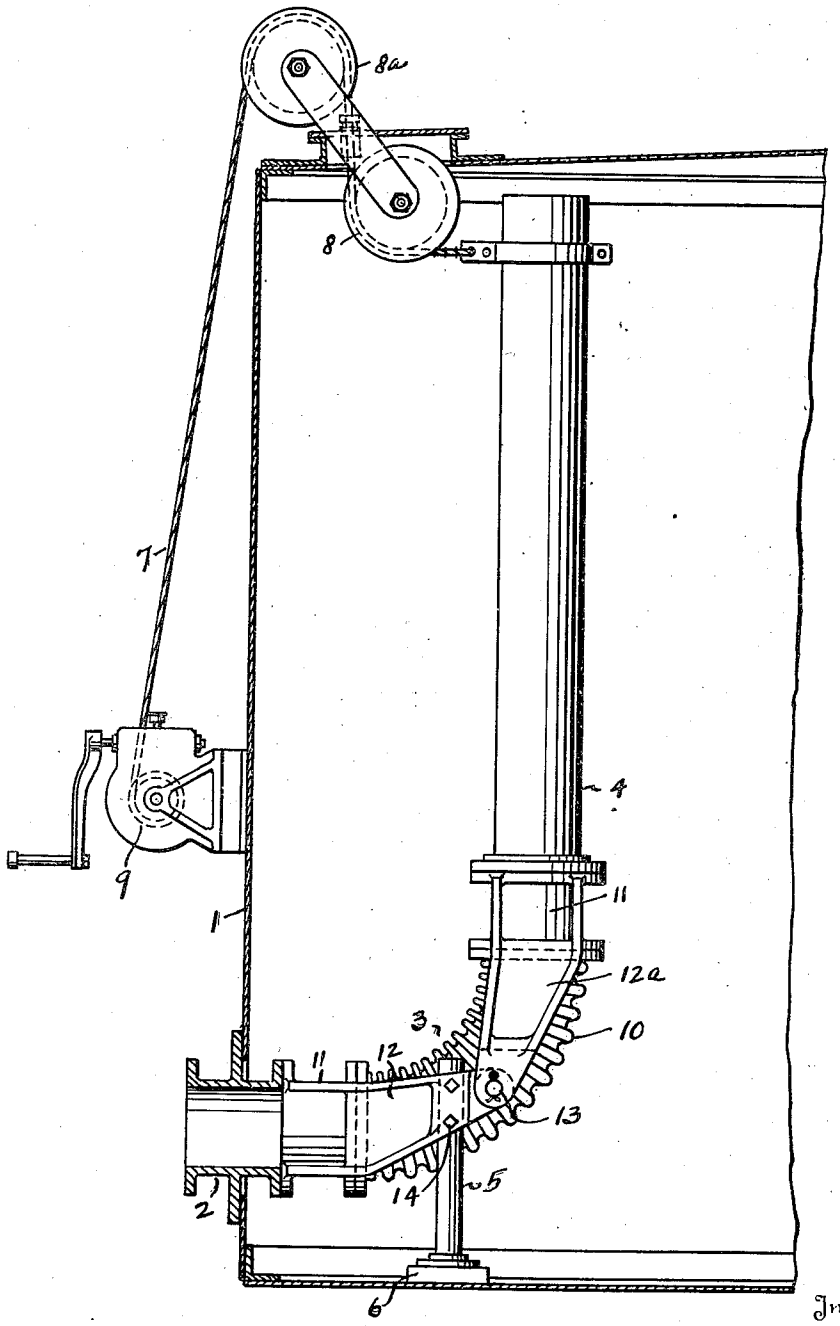


Fig. 3.

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SWING JOINT

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Application September 21, 1944, Serial No. 555,164

6 Claims. (Cl. 285—90)

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This invention relates to a swing joint.

An object of the invention is to provide a swing joint specially designed for use in connecting two sections of pipe together so as to permit one of said sections to swing, as on a hinge joint, with respect to the other.

The type of joint herein described has been specially designed for use in tanks or reservoirs for connecting the swing pipe to the inlet or outlet line proper. The swing pipe is pivoted to swing up or down in a vertical plane so that any selected stratum of the liquid in the tank may be drawn off, or the open end of the swing pipe may be elevated entirely above the liquid to prevent the out flow, and loss of the contents of the tank in case a break should occur in the tank connections.

The invention is not necessarily confined to a swing pipe for tanks but is equally applicable to swing pipes for loading racks, pump suction lines and the like.

Another object of the invention is to provide a swing joint of the character described composed of few demountable parts which may be easily handled and readily passed one at a time through the manhole opening of the tank.

A further object of the invention is to provide a low friction loss, central type, swing joint constructed in such manner that the liquid will pass through a single elbow of variable degree in an undivided stream. It has no sliding surfaces or packing to wear out or leak.

With the above and other objects in view, the invention has particular relation to certain novel features of construction, operation and arrangement of parts, an example of which is given in this specification and illustrated in the accompanying drawings, wherein—

Figure 1 shows a fragmentary, vertical sectional view of a tank showing the swing pipe assembly with the swing pipe in horizontal position.

Figure 2 shows a plan view of the swing joint.

Figure 3 shows a fragmentary, vertical sectional view of the tank with the swing pipe raised to a vertical position after having passed through an arc substantially ninety degrees from its original position.

Referring now more particularly to the drawings wherein like numerals of reference designate the same parts in each of the figures, the numeral 1 designates a tank and the numeral 2 designates the tank nozzle which is located near the bottom of the tank and suitably secured thereto.

Connected to the inner end of the nozzle 2 there is a swing joint indicated generally by the numeral 3. Connected to the other end of this swing joint is a swinging section referred to as the swing pipe and designated by the numeral 4.

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There are suitable pipe supports 5, 5 which are supported on and which upstand vertically from a transverse supporting base 6, on the bottom of the tank and which transfer the vertical forces acting upon the swing joint to the bottom of the tank as will be more specifically explained hereinafter.

There is a lifting cable 7 one end of which is connected to the free end of the swing joint 4 and this cable passes around the sheaves 8, 8a, maintained at the tank roof, and whose other end is connected to a suitable windless 9.

It is apparent that the free end of the swing pipe 4 may be so disposed as to draw-off liquid or discharge liquid at any desired level; or by withdrawing the free end of the swing pipe 4 to a point above the oil level the oil will be prevented from running out of the tank in case of an outside break in the line or while working on outside connections.

The swing joint 3 includes a flexible tube 10 which may be flanged at each end, and bolted to each end of the tube 10 there is a tubular section 11 also flanged at each end and these sections 11, 11 are bolted, or otherwise secured, one to the tank nozzle 2 and the other to the swing pipe 4.

Each tubular section has two arms 12, 12 and 12a, 12a one set on each side of the tube 10. The arms of each section extend toward those of the other section and to the center of the swing joint where the two pairs of arms are pivoted together by the two pins 13, 13 to form a hinge joint and through which all the forces acting upon the swing pipe will be transmitted. One set of arms 12 are supported on the pipe supports 5 by means of suitable set screws 14, 14 so that, as is obvious, the flexible tube 10 will not be subjected to any external forces as all of these forces are transmitted through the hinged frame formed by the arms 12, 12a and the pipe supports 5 to the supporting base 6 and the bottom of the tank.

It is also advantageous to insure uniformity of bend with the resultant uniform and minimum stresses in the inside and outside arc of the flexible tube when it is bent ninety degrees as shown in Figure 3. This result is attained by maintaining the length of the center line of the flexible tube when it is in straight line position the same as it will be when in a right angular or ninety degree position. This is accomplished by locating the hinge pins at the intersection of two lines

drawn at an angle of approximately fifteen degrees with the center line from the ends of the effective length of the tube 10, when it is in a straight position as in Figure 1.

In the illustration shown the flexible tubing 10 is of a flexible, corrugated metal but it is obvious that other forms of flexible tubing may be used for this purpose.

The drawings and description are illustrative merely and it is understood that mechanical changes may be made within the scope of the appended claims.

What I claim is:

1. A joint for connecting two tubular sections comprising, a flexible tube connecting said sections, spaced arms rigidly connected to each of said sections and whose free ends are pivoted together to swing about an axis transverse with respect to the axis of the flexible tube and midway between the ends of said tube supporting means on a fixed base and attached to and supporting the arms of one section.

2. A joint for connecting two tubular sections comprising, a flexible tube whose ends are connected to said sections, a pair of arms rigidly connected to said sections, at one end, and whose other ends are pivoted together to swing on an axis which is perpendicular to the longitudinal axis of the tube and approximately midway between the ends of the tube and means for supporting one pair of arms in fixed position.

3. A joint for connecting two tubular sections comprising, a flexible tube whose ends are connected to said sections, a pair of arms rigidly connected to said sections, at one end, and whose other ends are pivoted together to swing on an axis which is perpendicular to the longitudinal axis of the tube and approximately midway between the ends of the tube, the axis about which said arms swing being off-set from the longitudinal axis of the tube.

4. A joint for connecting two tubular sections comprising, a flexible tube whose ends are connected to said sections, a pair of arms rigidly connected, at one end, to each of said sections on each side thereof and whose other ends are pivoted together to swing on an axis which is transverse with respect to the longitudinal axis of the tube and located approximately midway between the ends of the tube and means for supporting one pair of arms in fixed position.

5. In combination a fixed pipe, a swinging pipe, tubular sections, forming anchors fixed to the respective pipes, a flexible tube whose ends are connected to the respective anchors, two pairs of arms fixed to said anchors, at one end, and pivoted together at their other ends, supporting means mounted on a fixed base and attached to and supporting one set of said arms.

6. In combination a fixed pipe, a swinging pipe, tubular sections, forming anchors fixed to the respective pipes, a flexible tube whose ends are connected to the respective anchors, two pairs of arms fixed to said anchors, at one end, and pivoted together at their other ends to move on an axis which is transverse to and offset from the longitudinal axis of the tube, supporting means mounted on a fixed base and attached to and supporting one set of said arms.

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