

Nov. 15, 1932.

J. A. TENNANT

1,888,053

PUMP

Filed May 5, 1932

2 Sheets-Sheet 1

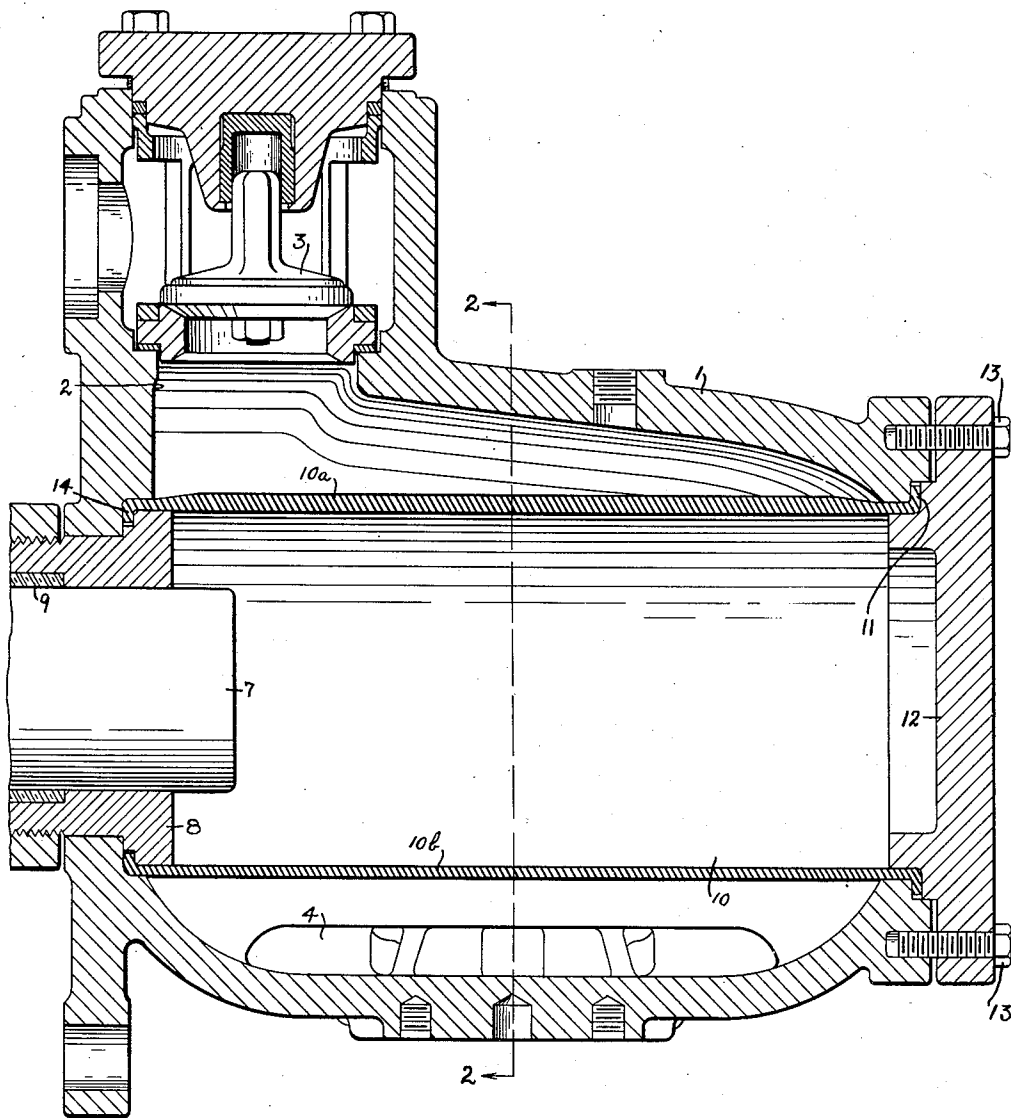


Fig 1.

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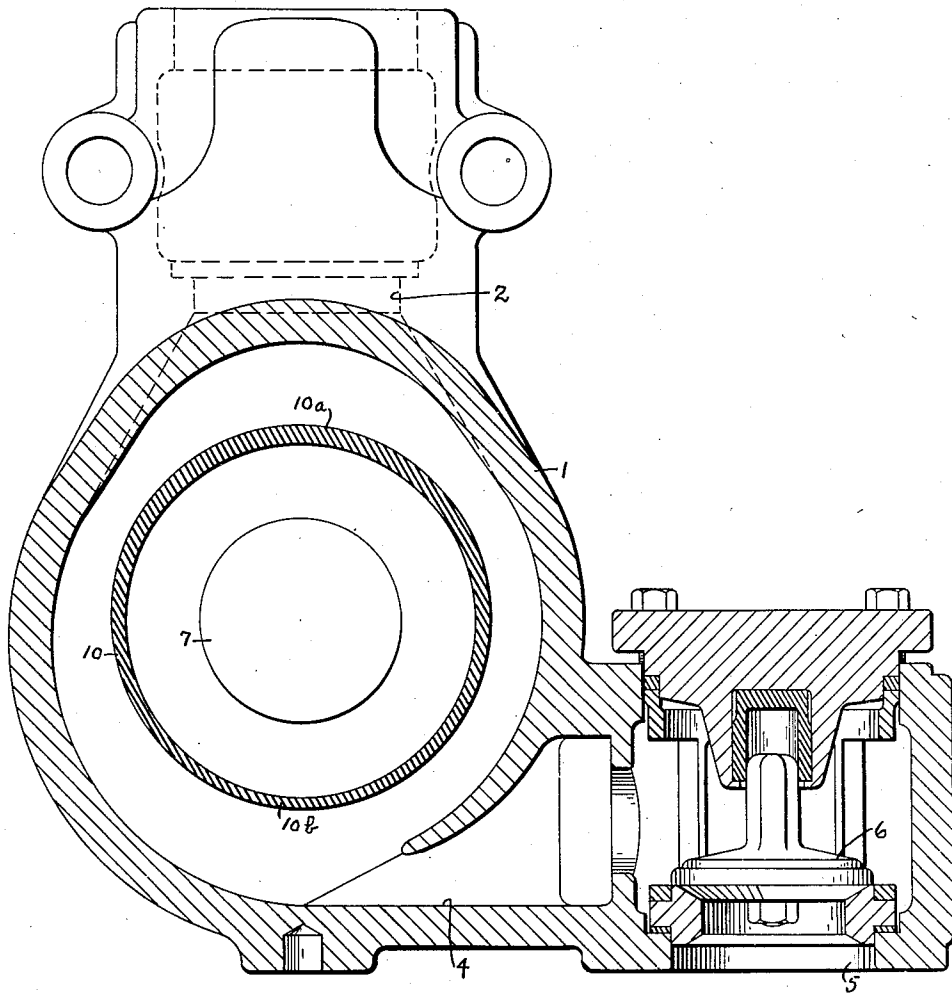


FIG. 2.

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UNITED STATES PATENT OFFICE

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PUMP

Application filed May 5, 1932. Serial No. 609,395.

This invention relates to pumps.

It will be found particularly useful in pumps designed for pumping abrasive and corrosive fluids of the general type disclosed by Letters Patent of the United States to Stephens Number 1,848,441 of March 8, 1932. A conventional pump of this type, adapted for use as a mud or slush pump in deep well drilling, includes a barrel; inlet and outlet valves therefor; a hollow expansible member within the barrel; and a reciprocable piston to actuate fluid confined within the expansible member to cause expansion and contraction thereof, whereby fluid is drawn into and forced out of said barrel. The pumped fluid usually has a specific gravity much higher than that of the actuating fluid within the pumping member. Because of this difference in specific gravity, the pumping member has a tendency to move unwardly. It has also been found that the pumped fluid has a tendency to push the pumping member toward the outlet valve.

To avoid the objectionable results of the foregoing, this invention has for its specific object the provision of a new and improved pumping member constructed to resist expansion in one direction more than in another, so that, when expanded, it will be of the desired shape and in the desired position in the barrel.

However, the invention is not limited to the specific use just referred to. It may be used generally to cause a predetermined expansion of a pumping member into a predetermined shape for various purposes apparent to those skilled in the art.

The preferred embodiment of the pumping member in a pump of the type disclosed by my pending application for Letters Patent of the United States, Serial No. 586,764, filed January 15, 1932, is illustrated by the accompanying drawings of which Fig. 1 is a sectional elevation of the pump; and Fig. 2, a vertical section on the line 2—2 of Fig. 1. In the drawings, the substantially frusto-conical barrel is indicated at 1. It has in its upper portion adjacent its base end an outlet 2 normally closed by an exhaust valve 3. In the lower portion of the barrel is an inlet open-

ing 4 communicating with fluid passageway 5 normally closed by inlet valve 6. A piston 7 extends through the clamp 8 and is packed as indicated at 9.

The new and improved expansible member provided by this invention is indicated at 10. It has on one end an external annular flange 11, compressed by and held between the small end of the barrel 1 and the head 12 which is secured in place by bolts 13; and at the other end an internal annular flange 14 compressed by and held between the base end wall of the barrel 1 and the clamp 8. The ends of the expansible member 10 are thereby connected and sealed to the ends of the barrel 1.

The member 10 is preferably made of rubber and has an upper portion 10a which is, from end to end, thicker than the lower portion 10b so that the member will resist radial expansion upwardly more than it will resist radial expansion downwardly. As hereinabove stated, the member 10 has a tendency to move upwardly and toward the outlet 2 because of the difference in specific gravity between the pumped fluid and the actuating fluid in the member, and the pushing force of the pumped fluid. The forces tending to move the member 10 toward the outlet 2 are overcome by the resistance offered to such movement by the thicker upper portion 10a, so that the member, when expanded, is substantially concentric with the barrel.

The invention is not limited to the preferred embodiment and use herein disclosed.

I claim:

1. A hollow expansible pumping member having one portion of a greater thickness than another portion to resist expansion in one direction more than in another.

2. A substantially cylindrical hollow expansible pumping member having one side of a greater thickness than the opposite side, substantially from end to end, so that said member will resist radial expansion in one direction more than in the opposite direction.

3. A substantially cylindrical hollow rubber pumping member, having one side of a greater thickness than the opposite side, substantially from end to end, so that said

member will resist radial expansion in one direction more than in the opposite direction.

4. A pump having a barrel; inlet and outlet means for said barrel; a hollow expandible pumping member in said barrel; and means to expand and contract said member to draw fluid into said barrel through said inlet means and to expel it from said barrel through said outlet means; that portion of said member adjacent said outlet means being of a greater thickness than that portion of said member remote from said outlet means so that said member will resist expansion toward said outlet means more than it will resist expansion from said outlet means.

5. A pump having a barrel; inlet means in the lower portion of said barrel; outlet means in the upper portion of said barrel; a substantially cylindrical hollow rubber pumping member in said barrel; and means to expand and contract said member to draw fluid into said barrel through said inlet means and to expel it from said barrel through said outlet means; the upper portion of said member being of a greater thickness than the lower portion of said member so that said member will resist expansion toward the upper portion of said barrel more than it will resist expansion toward the lower portion of said barrel.

6. A hollow expandible pumping member having one portion constructed to resist expansion more than another portion so that said member will resist expansion in one direction more than in another.

7. A pump having a barrel; inlet and outlet means for said barrel; a hollow expandible pumping member in said barrel; and means to expand and contract said member to draw fluid into said barrel through said inlet means and to expel it from said barrel through said outlet means; one portion of said member being constructed to resist expansion more than another portion so that said member will resist expansion in one direction more than in another.

8. A pump having a barrel; inlet and outlet means for said barrel; a substantially cylindrical hollow expandible pumping member in said barrel; and means to expand and contract said member to draw fluid into said barrel through said inlet means and to expel it from said barrel through said outlet means; one portion of said member being constructed to resist expansion more than another portion so that said member will resist expansion in one direction more than in another.

9. A pump having a barrel; inlet and outlet means for said barrel; a hollow expandible pumping member in said barrel; and means to expand and contract said member to draw fluid into said barrel through said inlet means and to expel it from said

barrel through said outlet means, that portion of said member adjacent said outlet means being so constructed that it resists expansion more than that portion of said member remote from said outlet means so that said member will resist expansion toward said outlet means more than it resists expansion from said inlet means.

In testimony whereof, I hereunto affix my signature.

JOSEPH A. TENNANT.