Nov. 26, 1929. J. R. SENSIBAR 1,737,341

MIXING WELL FOR UNLOADING SAND BOATS AND THE LIKE

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Fig. 1.

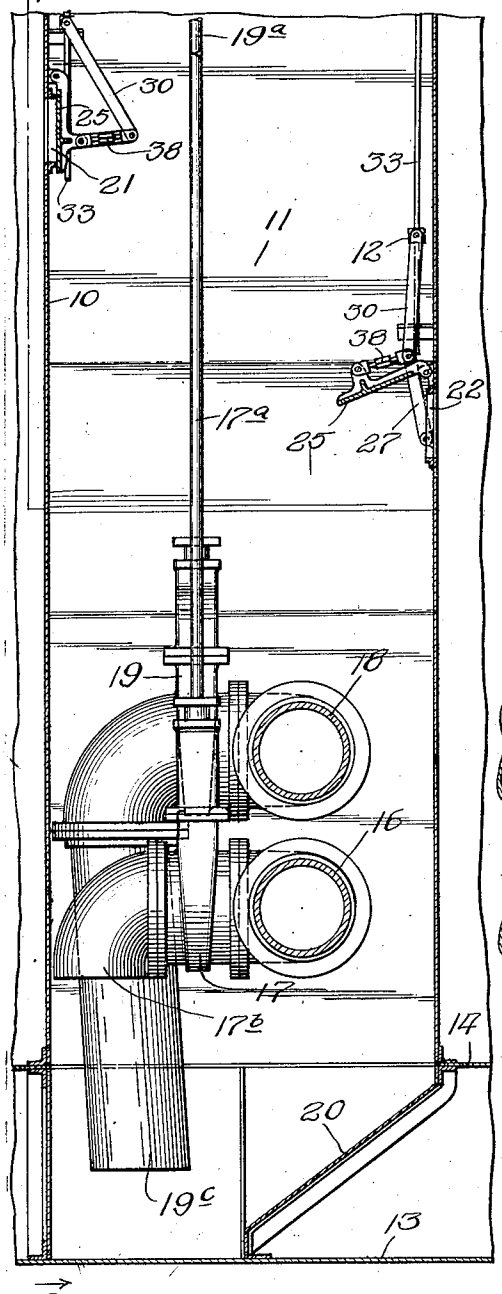
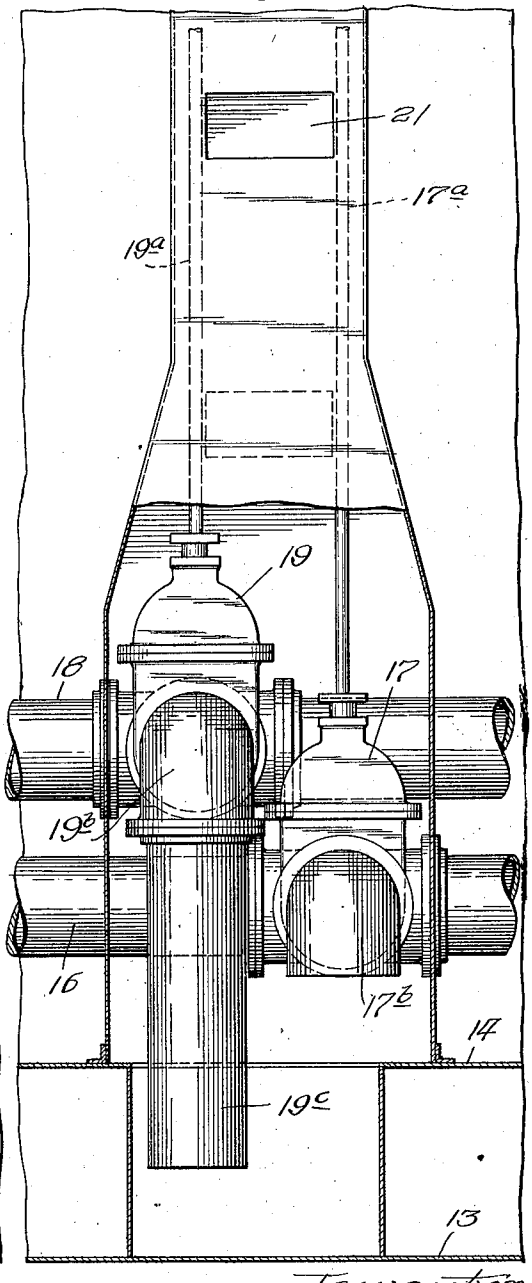


Fig. 2.



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Fig. 3.

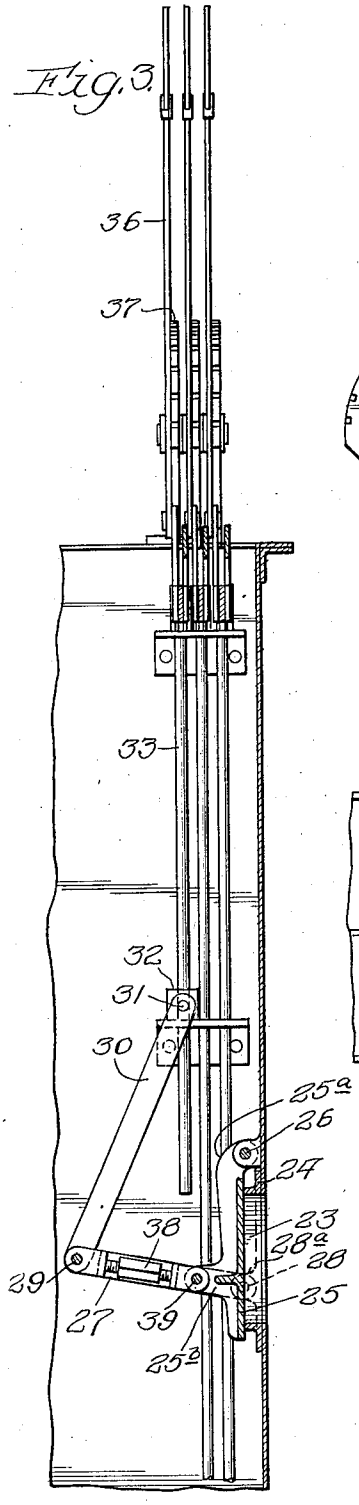
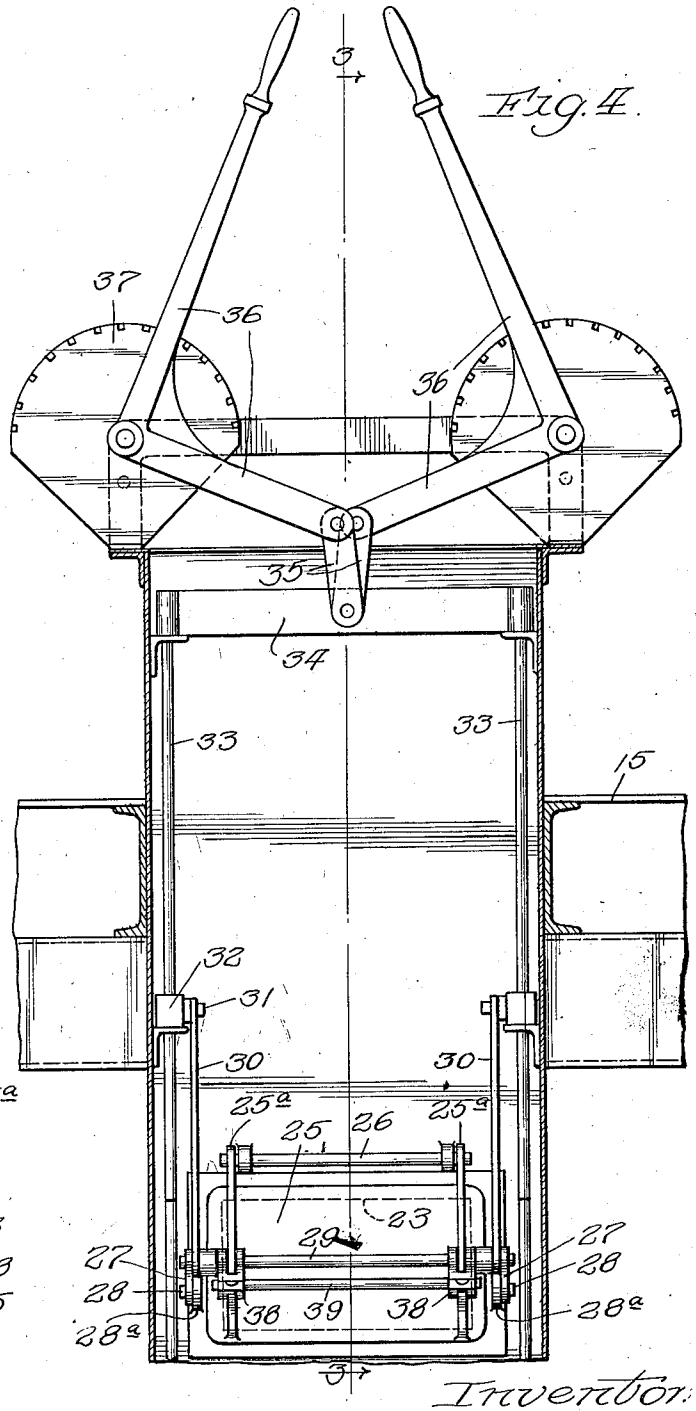


Fig. 4.



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UNITED STATES PATENT OFFICE

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MIXING WELL FOR UNLOADING SAND BOATS AND THE LIKE

Application filed June 24, 1926. Serial No. 118,397.

This invention relates to a mixing well for unloading said boats and the like.

The primary object of this invention is to provide a mixing well for use on boats hauling sand which will enable the sand in the boats to be readily mixed with water so that the mixture of sand and water can be readily pumped out.

Another object is the provision of means for controlling the relative volumes of sand and water which are fed to the intake of the pump.

Another object is to provide an improved sand valve for admitting sand to the mixing well, but which can, with a relatively small effort, be used to close the opening through which sand is being admitted to the well.

These and other objects, as will hereinafter appear, are accomplished by the invention which is fully described in the following specification, and shown in the accompanying drawings, in which:

Figure 1 is a partial transverse vertical section through a boat showing the lower portion of the mixing well in section:

Fig. 2 is a similar view in longitudinal section;

Fig. 3 is a continuation of Fig. 1 on an enlarged scale, showing the upper portion of the well and is taken on the line 3—3 of Fig. 4; and

Fig. 4 is a partial longitudinal section showing the valve operating mechanism of the upper portion of the well.

The embodiment illustrated comprises a mixing well preferably having sheet metal sides 10, 11 and 12, which extend from the boat bottom 13 through the tank bottom 14 and above the main desk 15 (Fig. 4). A water pipe 16 extends into the well and opens thereinto through a valve 17 having a valve operating rod 17ª extending to the top of the well. The pipe 16 connects with an opening in the side of the boat (not shown) below the water line so that when the valve 17 is open, water will flow into the mixing well by gravity. To the valve 17 there is preferably attached a nozzle 17ᵇ for deflecting the water down into the bottom of the well.

Similarly, a suction pipe 18 connects with the intake or a centrifugal pump (not shown) and this has a valve 19 in each well which likewise is controlled by a rod 19ª which extends to the top of the well. This valve is formed with an elbow 19ᵇ cast integral which turns down and to which is attached a suction pipe 19ᶜ which terminates near the bottom of the well. A corner plate 20 is preferably inserted for the purpose of aiding in obtaining a good mixture of sand and water near the end of this suction pipe, as will later appear.

While only one well is illustrated, it will be understood that the pump is preferably placed in a position near the center of the boat and that there are two or more wells forward of this pump and a like number aft of it; the well here shown is an intermediate one since in the last well both fore and aft, the pipes 16 and 18 will not be extended beyond the well, but will terminate therein.

The apparatus previously described explains how water is fed to these wells and is then pumped out by a pump which has an outboard discharge. The hold above the bottom 14 and surrounding the well is filled with sand which is dumped therein in any suitable manner. This sand is fed to the mixing well through a series of openings 21, 22, etc., which extend at intervals along the sides of the mixing well casing. Each of these openings, as 23, (Fig. 3) is surrounded by a cast iron frame 24 which is riveted to the plate, the inner edge of this frame being a straight relatively thin ledge which is machined to fit the flat plate or door 25 which has ears 25ª which are pivotally mounted on the rod 26, above the opening so as to permit said door to swing inwardly with the pressure of sand from the outside.

A side link 27 is pivotally mounted at 28 to a lug 28ª at each side of the frame 24, these links being held parallel at all points, the outer ends of the links being pivotally mounted on a rod 29, which also has pivotally mounted thereon links 30 which are pivotally connected at their opposite ends through pins 31 to blocks 32 which are adjustably carried on vertical side rods 33. The two side rods of each sand valve are connected at their

upper ends to a yoke 34 which in turn is connected at its central points through a link 35 with the bell-crank 36, the lever of which operates a notched quadrant 37 which permits the bell-crank 36 to be locked at intervals throughout its swing.

The movement of the sand door is accomplished by means of adjustable toggle links 38 which are placed one at each side between the rod 29 and the rod 39 which extends across the door and connects thereto through the ears 25[b]. The door is shown open in Fig. 1.

In Figs. 3 and 4 the sand door is shown closed and in this position the toggle link 38 has been forced to or slightly beyond the dead center of the pivot points 28, 29 so that no amount of pressure on the door 25 will tend to raise the rods 33.

To open the door the operator grasps the handle of the bell-crank 36 and moves it so as to lift the yoke 34 which causes the side links 27 to swing above the pivots 28 thereby slightly opening the door 25 for a small movement of the rods 33 from the closed position. As these rods move upwardly, however, the door 25 opens much more rapidly for a given amount of movement of these rods.

Thus it will be seen that a sand door is provided which moves rapidly near its full opening and at a time when little or no pressure is exerted against it, but which moves slowly and is able to exert a great deal of pressure against a body of sand when it is nearly closed. This, combined with the fact that the door closes against a valve seat having a relatively small cross sectional area, enables the door to be shut against a considerable pressure of sand.

It also permits the door to be opened very slightly and by relatively small increments so that the amount of sand which is fed to the mixing well can be regulated as well as the water which is being fed. During the operation of pumping sand out of the boat, enough water is sprayed on the sand surrounding the well, enabling it to flow readily to the opening. The topmost door is opened first and then when the sand no longer flows readily from it, the next door is opened, etc. For the sake of clearness of illustration one or possibly two of these doors has been omitted from the bottom of the well in Figs. 1 and 2. The lowest one is preferably substantially at the level of the bottom plate 14.

This mixing well is of very great importance in pumping sand out of a boat of this kind for the reason that the operator standing on the deck is able to control the proportions of sand and water which are fed to the well, this mixture then being taken up by the centrifugal sand pump and carried by pipes (not shown) to the points where the sand is to be deposited.

This invention applies to any similar material which cannot readily be pumped alone, but which can be pumped when mixed with water.

While I have shown and described but a single embodiment of this invention, it is to be understood that it is capable of many modifications. Changes, therefore, in the construction and arrangement may be made which do not depart from the spirit and scope of the invention as disclosed in the appended claims.

I claim:

1. In a construction of the class described, a compartment, a well therein, a series of gate controlled openings for feeding sand to said well, means for feeding water directly to said well, a suction pipe in said well for sucking out the mixture of sand and water, and a valve on the water feeding means and the suction pipe, said valves being in said well and having valve operating means extending to the top of said well.

2. In a construction of the class described, a compartment, a well therein, a series of gate controlled openings for feeding sand to said well, means for feeding water directly to said well, a suction pipe in said well for sucking out the mixture of sand and water, and a valve on the water feeding means and the suction pipe, said valves being in said well and having valve operating means extending to the top of said well, said gate controlling means extending also to the top of said well.

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