

Oct. 31, 1933.

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1,933,346

STORAGE TANK AND MIXING MACHINE

Filed July 20, 1932

Fig. 1.

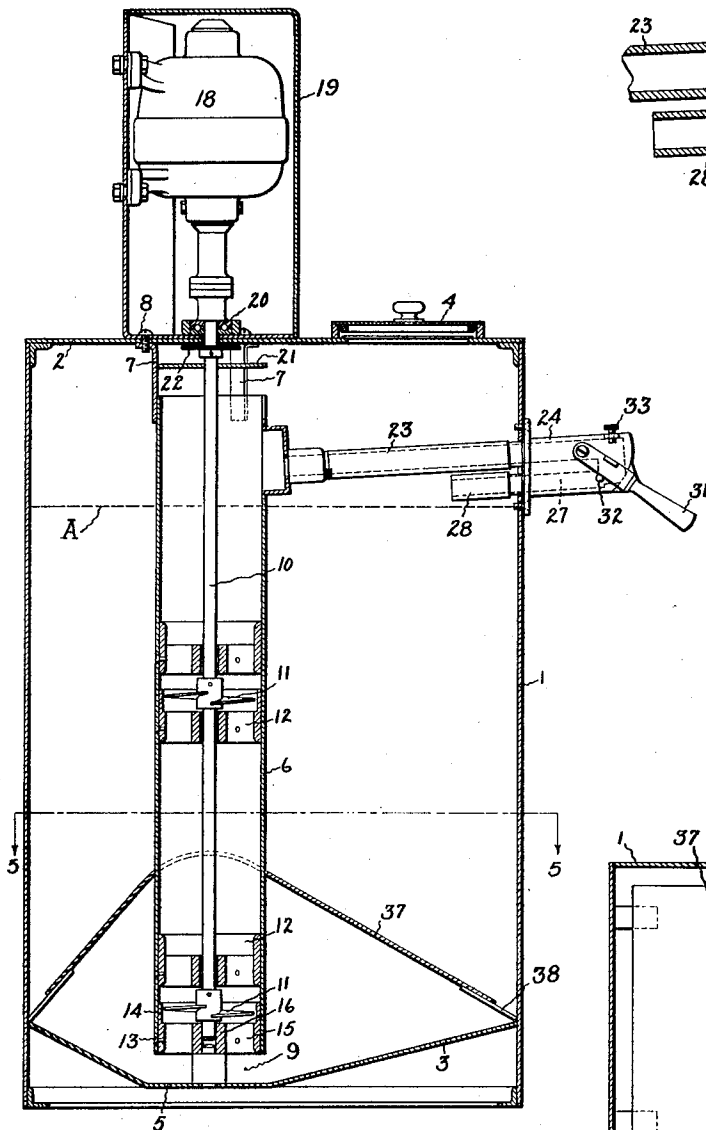


Fig. 2.

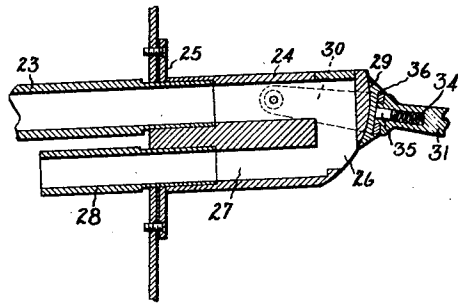


Fig. 3.

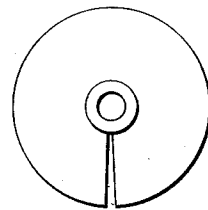


Fig. 4.

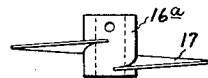
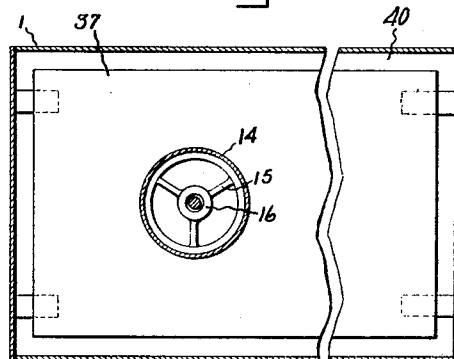


Fig. 5.



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UNITED STATES PATENT OFFICE

1,933,346

STORAGE TANK AND MIXING MACHINE

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Application July 20, 1932. Serial No. 623,551

3 Claims. (Cl. 259—97)

The present invention relates to combined storage tanks and mixing machines. It is especially well adapted for use as a storage tank and mixing machine for paint and in the following specification and in the drawing, I have specifically described and illustrated this application of my invention. It is to be understood, however, that this is only by way of example and that the invention is not limited thereto necessarily.

The object of the invention is to provide an improved construction and arrangement in a machine of this type which will effect rapid mixing and from which a well mixed portion will be drawn off when the mixed material is to be used.

For a consideration of what I believe to be novel and my invention, attention is directed to the following specification and the claims appended thereto.

In the drawing, Fig. 1 is a vertical sectional view of a storage tank and mixing machine embodying the invention; Fig. 2 is a detail sectional view through the discharge valve; Fig. 3 is a top plan view and Fig. 4 is a sectional view of one of the impellers; Fig. 5 is a sectional view taken on the line 5—5, Fig. 1.

Referring to the drawing, 1 indicates the side walls of the storage tank which may be rectangular in cross section, 2 indicates the top wall and 3 indicates the bottom wall. The top wall 2 is provided with a filling opening closed by a removable cover 4. The bottom wall 3 is dish shaped, providing a centrally located low portion 5 to which the adjacent sloping walls direct the flow of paint or other material to be mixed.

Located in the tank is an impeller tube or mixing tube 6 supported from cover 2 by a plurality of straps 7. Straps 7 may be suitably welded to tube 6 and fastened to the cover by screws 8. Tube 6 is supported in spaced relation to central portion 5 so as to leave a space 9 at the bottom of tube 6 through which material may flow into the tube. Inside tube 6 is an impeller shaft 10 on which is mounted a plurality of impellers 11, two being shown in the present instance. One impeller is located at the lower end of tube 6 and the other is located about centrally thereof. On each side of impellers 11 are suitable bafflers 12 which may be fastened to tube 6 by set screws such as are indicated at 13. Each baffle comprises an outer wall 14 connected by spokes 15 and a central hub 16. The lower end of shaft 10 makes a nice fit with the lowermost hub 16 which forms a bearing for the lower end of the shaft. The

shaft passes loosely through the hubs of the other bafflers. Hub 16 of the lowermost baffle is supported on bottom wall 3, being suitably fastened thereto. By this arrangement, it forms also a rigid support for the lower end of tube 6. Each impeller comprises a hub 16^a on which is mounted a spirally extending disk 17. Hub 16^a is fastened to shaft 10 by a set screw or other suitable means.

The upper end of shaft 10 is connected to the shaft of an electric motor 18 which is vertically mounted in a casing 19 supported on tank top 2. At 20 is a step bearing on which shaft 10 is hung.

Fastened to straps 7 is a disk 21 located in spaced relation to the upper end of tube 6 and serving as a baffle for directing outwardly fluid flowing from the top of tube 6. Fastened to shaft 10 above disk 21 is a disk 22 which functions as a bearing guard for step bearing 20.

Connected to tube 6, adjacent to its upper end and above the normal maximum liquid level in the tank, is a discharge pipe 23, which at its outer end is connected to a discharge valve or faucet 24. Faucet 24 is provided with a flange 25 which is suitably attached to the side wall 1 of the tank. The faucet has a discharge port 26 and a passage 27 which connects with a pipe 28 leading back into the tank. Attached to faucet 24 is a suitable hand valve for closing and opening port 26. In the present instance, it is shown as comprising a shoe 29 carried by a yoke 30 pivoted on the casing of faucet 24. Attached to the yoke is a handle 31 for moving the valve. 32 and 33 are stops for limiting the movement of the valve, stop 33 being made adjustable so that the opening movement may be adjustably controlled. Shoe 29 is pressed into engagement with the end wall of the valve casing by a spring 34 located in a recess in handle 31, the spring pressing against a spacing block 35 which in turn engages the adjacent wall of shoe 29. Shoe 29 is provided with a flange 36 which slides on the yoke to form a guide and supporting means for the shoe. Spring 34 serves to press the shoe tightly against the end of valve casing and hold it in such position. In Fig. 1 the valve is shown closed and in Fig. 2 it is shown open.

At the lower end of the tank is an inverted cone shaped deflecting wall 37 supported by ears 38 attached to side walls 1 adjacent to their lower ends, it being provided with a central opening through which tube 6 extends. Tube 6 serves to hold the edges of wall 37 in spaced relation to side walls 1 providing thereby a mar-

ginal passage 40 through which paint flows to bottom wall 3.

In the use of the device, paint in a mixed or partially mixed state or ingredients in suitable proportions to form paint are introduced through the opening in top wall 2, dotted line A indicating the maximum height to which the tank is to be filled. Motor 18 is then started, rotating impellers 11 in a direction to effect an upward flow of paint through tube 6. The paint is caused to flow rapidly up through tube 6 to its upper end where it is discharged partly over the end of the tube beneath disk 21 and partly through pipe 23, casing of valve 24 and pipe 28. The paint is circulated continuously, flowing down wall 37 to wall 3 and then down wall 3 to the lower end of tube 6. This circulation and the beating action of the impellers effects rapid and complete mixing of the ingredients. When it is desired to utilize some of the paint, it is drawn off by opening valve 24, the valve being opened partially or entirely as found desirable.

Ordinarily, after the paint has been once mixed, motor 18 is shut down, it being run only when it is desired to draw some paint from the tank. Whenever the motor is started up to draw paint, a rapid circulation and mixing of the contents of the tank is effected by the impellers. Only a small amount of the total paint being circulated is drawn off when the valve is opened. This means that when paint is being drawn from the tank, it is thoroughly mixed as it is drawn off. In other words, whenever the motor is being operated and paint is being drawn off, a relatively large stream of paint is put into circulation while a relatively small portion of such stream is discharged through valve port 26. This means that always a uniform mixture will be discharged through the valve. In this connection, it is to be noted that the paint drawn off is a part of the paint being circulated, this result being obtained because pipe 23 is connected to tube 6 above the normal maximum paint level. This means that always the motor must be started up and the paint put into circulation before paint can be drawn off.

With the above described arrangement, the paint is stored in a tank from which it may be drawn readily. No hand mixing of the paint is necessary, a thing which saves considerable time, and always a uniform product is discharged through the faucet.

The device is simple in structure, clean and efficient in operation, prevents waste of paint, and is capable of being manufactured at low cost.

While I have shown two impellers with bafflers on each side of them, it will be understood that

the device may be operated with a single impeller or with more than two impellers and that the bafflers may be omitted, if found desirable.

In accordance with the provision of the patent statutes, I have described the principle of operation of my invention together with the apparatus which I now consider to present the best employment thereof. It is to be understood, however, that the construction shown is only illustrative and that the invention may be carried out by other means.

What I claim as new and desire to secure by Letters Patent of the United States, is:

1. In a mixing machine, the combination of a tank, a tube in the tank in spaced relation to the walls of the tank at each end, the upper end of the tube terminating above the normal liquid level in the tank, means for effecting circulation of materials to be mixed upwardly through the tube, the material being discharged over the upper end of the tube, a branch conduit connected to the tube below its upper end, but above the normal liquid level, said branch conduit extending from the tube through the wall of the tank for discharging liquid outside of the tank, and a valve in said branch conduit.

2. In a mixing machine, the combination of a tank, a tube in the tank in spaced relation to the walls of the tank at each end, the upper end of the tube terminating above the normal liquid level in the tank, means for effecting circulation of materials to be mixed upwardly through the tube, the material being discharged over the upper end of the tube, a branch conduit connected to the tube below its upper end, but above the normal liquid level, said branch conduit extending from the tube through the wall of the tank for discharging liquid outside the tank, a pipe connecting the outer end of the branch conduit to the interior of the tank, and a valve in said branch conduit.

3. In a mixing machine, the combination of a tank, a tube in the tank in spaced relation to the walls of the tank at each end, the upper end of the tube terminating above the normal liquid level in the tank, means for effecting circulation of materials to be mixed upwardly through the tube, the material being discharged over the upper end of the tube, a branch conduit connected to the tube below its upper end, but above the normal liquid level, said branch conduit extending from the tube through the wall of the tank for discharging liquid outside the tank, a valve in said branch conduit, and a deflecting wall surrounding the lower end of the tube.

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