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METHOD AND AN APPARATUS FOR BLENDING VISCOSE SOLUTIONS

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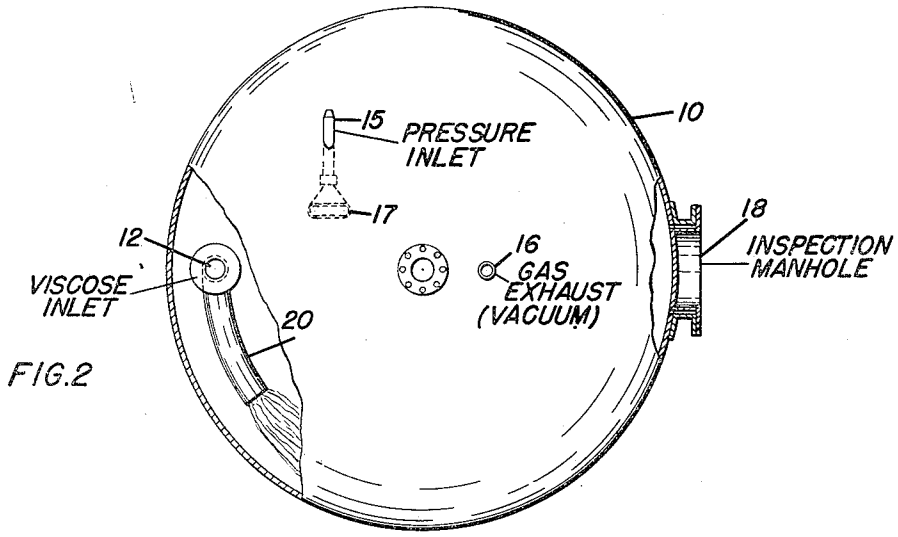


FIG. 2

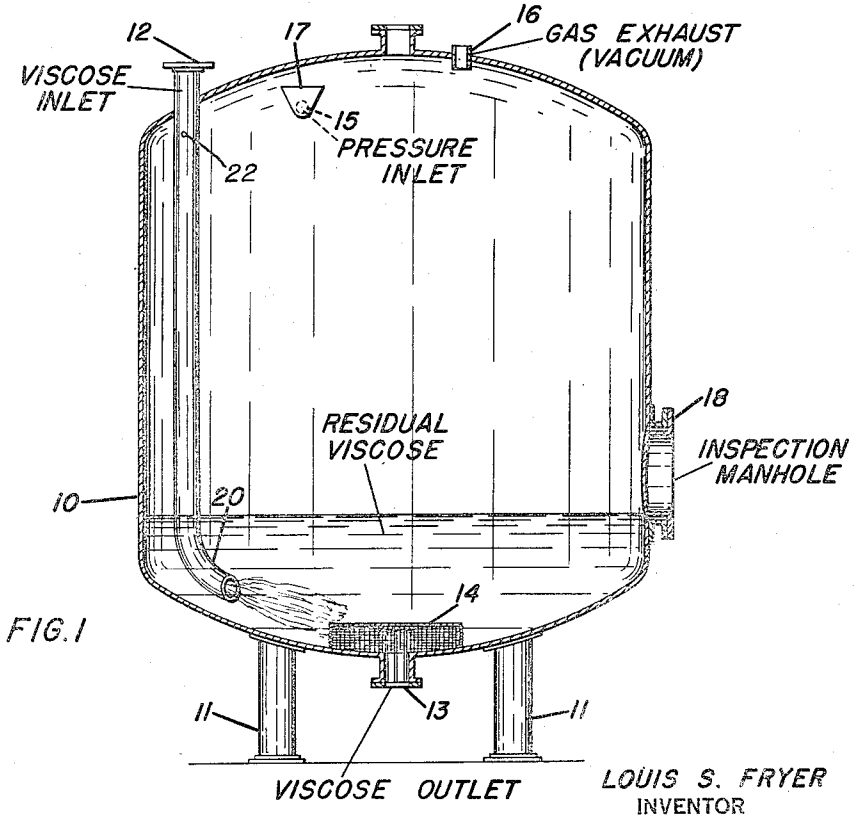


FIG. 1

LOUIS S. FRYER
INVENTOR

BY Frederick L. Bunny
ATTORNEY

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METHOD AND AN APPARATUS FOR BLENDING VISCOSE SOLUTIONS

Louis S. Fryer, Shaker Heights, Ohio, assignor to Industrial Rayon Corporation, Cleveland, Ohio, a corporation of Delaware

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2 Claims. (Cl. 106—165)

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This invention relates to a method and apparatus for blending fresh and residual viscose solutions in spin tanks so that the outcoming solution has a substantially uniform and desired degree of ripeness for spinning purposes. More particularly, the invention concerns an effective commingling of that quantity of viscose left in the spin tank with the newly charged viscose solution.

Generally spin tanks supply viscose solutions to the spinning machines. Usually the viscose is permitted to rest in them for further ripening. After a predetermined time the spin tanks are substantially emptied except for a small quantity of viscose which is left behind to keep the exhaust openings of the spin tanks covered with viscose. The reason for keeping the spin tank outlets covered is to keep the air out of the viscose pipe lines to the spinning machines. In view, therefore, of the fact that a certain amount of viscose is always left behind in the spin tanks, and, as a result, ripens for a longer time than the newly charged viscose the two batches must be thoroughly intermixed and blended so that the entire batch within the spin tank has the same ripening index.

It is, of course, not desirable to spin viscose having a variable degree of ripeness since the final product will be one of poor quality. The spinning of a good quality product is therefore dependent not only upon the quality of the viscose solution, but also upon a uniform ripeness of the total mass of a viscose solution within the spin tank which mass is a mixture of the residue and new viscose.

Various methods have been proposed for mixing the heel with the new viscose coming into the spin tank, or for removing the heel entirely. One of such methods proposes to feed viscose into the very base of the spin tank, thus causing the heel to rise or float on top of the new viscose. Another method proposes that the viscose be fed through an open channel positioned at an angle determined by the opposing sides of the spin tank. The new viscose will thus tend to cover different portions of the heel as the spin tank is filled up. Still another method has been proposed where the viscose heel is pumped out and fed into the charging line. These methods and some others which are being practiced have been found not to be entirely satisfactory inasmuch as an undesirable non-uniform ripeness from batch to batch would occur.

The invention provides for an apparatus and a method which substantially fully causes a commingling of the heel with the new viscose to effect a substantially uniform mixing of the viscose heel with the new viscose and thus insure a more uniform ripening of the viscose batch in the spin tank. The new viscose is advantageously charged into the interior of the heel in a circulatory manner throughout the tank filling period. A substantially thorough mixing or blending is thus effected.

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The apparatus comprises a spin tank and a viscose inlet pipe which extends substantially to the bottom of the tank where it is curved so as to be, generally, in a parallel relation with the base of the tank, and for a desirable distance with the side of the tank. The outlet of the inlet pipe is advantageously submerged in the viscose heel. The incoming viscose is thus forced out of the inlet pipe in a circulatory manner into the viscose heel. The pressure of the incoming viscose causes a gentle circling of the viscose heel as well as a permeation of the new viscose into the old, the two substantially thoroughly intermixing and commingling.

During the charging by viscose the spin tank is under a vacuum, and all air given up by the viscose is continually withdrawn. Air is also sometimes carried by the viscose in the charging line. This air is likely to be entrained by the viscose in the tank if it is not previously withdrawn. There is advantageously provided a means in the viscose inlet pipe substantially adjacent the top of the spin tank for the escape of such air from the charging line. An air hole of a desirable diameter is positioned in the viscose inlet pipe substantially adjacent the top of the spin tank for the escape of such air from the charging line. An air hole of a desirable diameter is positioned in the viscose inlet line which permits the escape of air from within the pipe as the spin tank is charged. A pressure that is not great enough to force viscose through the hole in the inlet pipe is utilized in charging the spin tank. The air hole, further, not only continually deaerates the charging viscose but continues to do so when the tank is substantially fully charged. Furthermore, during spinning the air hole permits an equalization of pressures within the viscose inlet pipe and the tank, otherwise the inlet pipe would continue to stay full.

The apparatus and the method will be described in further detail in the following specification and in the accompanying drawing, where:

Figure 1 represents a spin tank in cross section; and

Figure 2 is a plan of the spin tank.

As shown in Figure 1 a spin tank 10, adapted to hold a large quantity of a viscose solution, is supported by a plurality of legs 11. A viscose inlet conduit 12 enters the spin tank top and extends downwardly into substantially the lower portion of the tank. The tank is also provided with an exhaust conduit 13 whose entry within the base of the tank 10 is desirably screened by a cylindrical screen 14. A high pressure air conduit 15 is also positioned in the top of the tank 10. The air conduit 15 has an air diffusing deflector 17 facing the upper inner portion of the tank. There is further provided an exhaust conduit 16 in the top of the tank, and an inspection manhole 18 in the side of the tank in substantially its lower section.

As shown, the viscose conduit 12 extends downwardly into the spin tank to substantially adjacent the base of the tank. The lower portion of the conduit 12 is desirably curved in a manner so as to follow the curvature of the tank in both a horizontal and vertical plane. Viscose is generally forced from a full spin tank by air pressure. The air is discharged into the tank usually through a conduit such as the conduit 15 of the drawing. The air forces the viscose out through the screen 14 into the outlet 13. The outlet 13 is adapted to be joined to a viscose spinning line which feeds the viscose to a spinning machine. Not all of the viscose solution is forced out of the spin tank 10 inasmuch as it is not desired to get air into the viscose spinning lines. A quantity of viscose is generally left behind to substantially submerge or cover the outlet 13 to keep out the air from the spinning lines. The quantity of viscose that is left behind is generally called a "heel."

A substantial interval of time usually elapses before the spin tank 10 is refilled. As a result the quantity of viscose left behind is ripened to a greater degree than the incoming viscose. It is, of course, advantageous to mix the incoming viscose with the heel substantially thoroughly so that the entire solution within the spin tank 10 is a blend having the same quality of ripeness. The apparatus shown in the drawing is adapted to effect a substantially thorough mixing of the new viscose with the heel so that the quality of the entire tank after a filling is substantially the same. The viscose inlet conduit 12 advantageously has a curved portion that is submerged in the heel which follows the tank contour. Because of the curved outlet of the conduit the new viscose is discharged into the heel in a circulatory manner permeating the heel and mixing with it as the viscose mass gently circulates and rises.

While a new batch of viscose is fed to the spin tank 10 the interior of the tank is, of course, desirably evacuated through an exhaust conduit 16. Air is also sometimes entrained in the charging viscose, and also in the heel into which the viscose is charged. Such entrained air in the heel is difficult to evacuate unless some means

are provided for removing it before it is lodged therein. There is advantageously provided such a means by this invention. An opening 22 is made in the viscose inlet conduit 12 substantially adjacent to the top of the spin tank 10. As the viscose drops downwardly in the conduit any air carried with it escapes through the opening 22 being drawn into the interior of the tank from which it is exhausted. The pressure of the viscose in the inlet conduit 12 is not great enough to force the flowing viscose through the opening 22 so air is never occluded. Thus only the air in the viscose escapes through it.

The deaeration of the viscose continues through the opening 22 throughout the blending and charging period of the new incoming viscose. The opening, further, provides for an equalization of pressures in the inlet conduit and the spin tank during spinning.

Thus there is provided by this invention an apparatus and a method which is adapted to substantially thoroughly mix a viscose heel with new viscose, the blended viscose solution having a generally uniform ripeness throughout.

I claim.

1. The method for blending a fresh viscose solution with an older residual viscose solution retained in the base of an enclosed circular space which comprises charging the fresh solution into the residual solution in an enclosed circular space in a circulatory manner and at a pressure adapted to effect a non-turbulent circulation of the solutions, and subjecting the solution mixture to a vacuum during the charging.

2. An apparatus for blending newly admitted viscose solutions with the solution remaining in a spin tank comprising, a vertically cylindrical enclosed spin tank, means for subjecting said spin tank to a vacuum, an inlet to said spin tank for charging solutions, an outlet for said spin tank, said solution inlet extending substantially into the base of said spin tank into the remaining solution in the tank, the discharging portion of said inlet following for a substantial horizontal distance the contour of the tank, and a pressure equalizing means in the side of said inlet substantially adjacent the top of said spin tank being adapted to equalize the pressure within the solution inlet to that of the spin tank.

LOUIS S. FRYER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,706,418	Sissom	Mar. 26, 1929
1,895,192	Kampf	Jan. 24, 1933
1,992,261	Traudt	Feb. 26, 1935
2,057,019	Evans	Oct. 13, 1936
2,068,136	Hulbert	Jan. 19, 1937
2,084,682	Guenot	June 22, 1937
2,136,201	Whitehead	Nov. 8, 1938