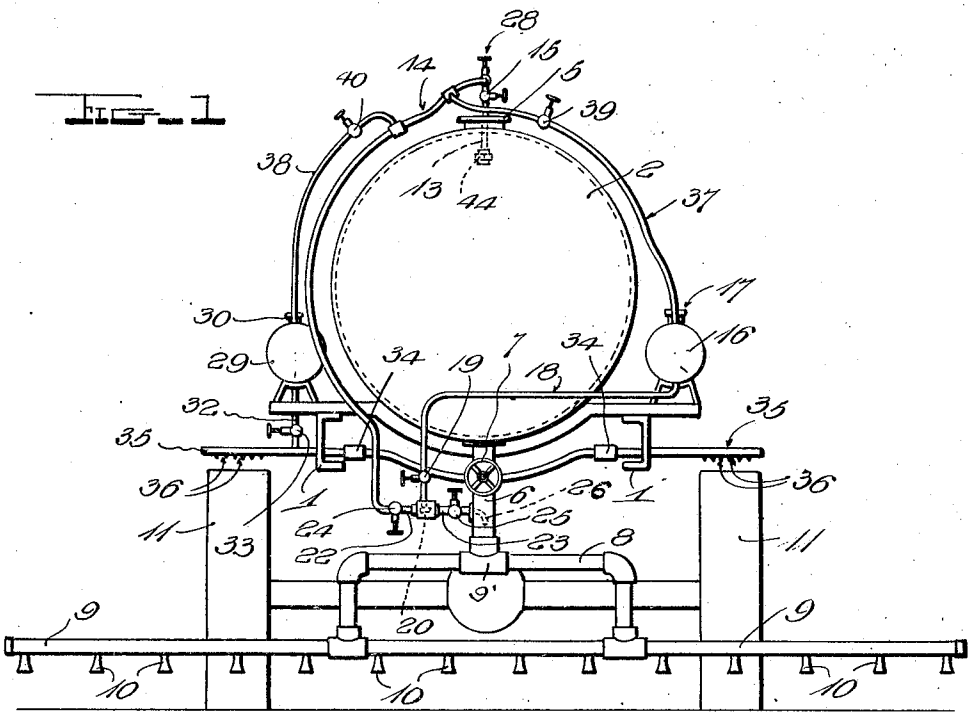
Aug. 20, 1929. N. V. HENDRICKS 1,725,581

TANK DISTRIBUTOR

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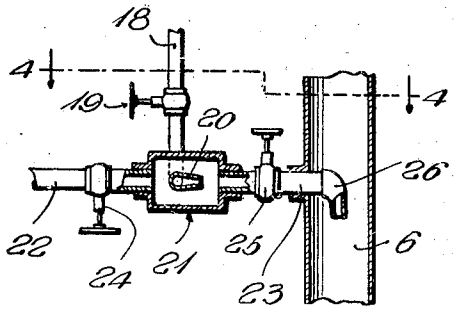


FIG. 3

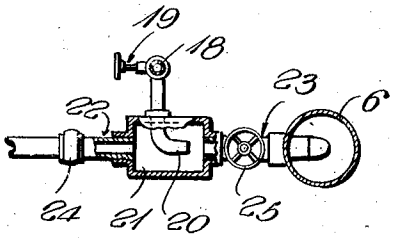


FIG. 4

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TANK DISTRIBUTOR

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Fig. 2

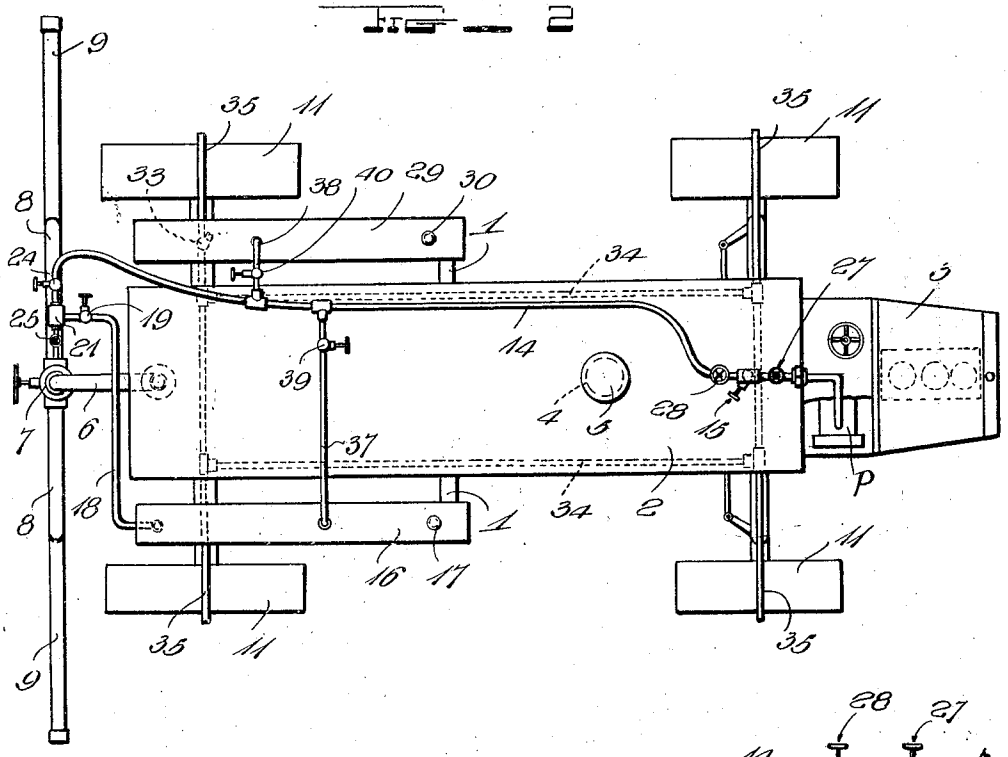


Fig. 5

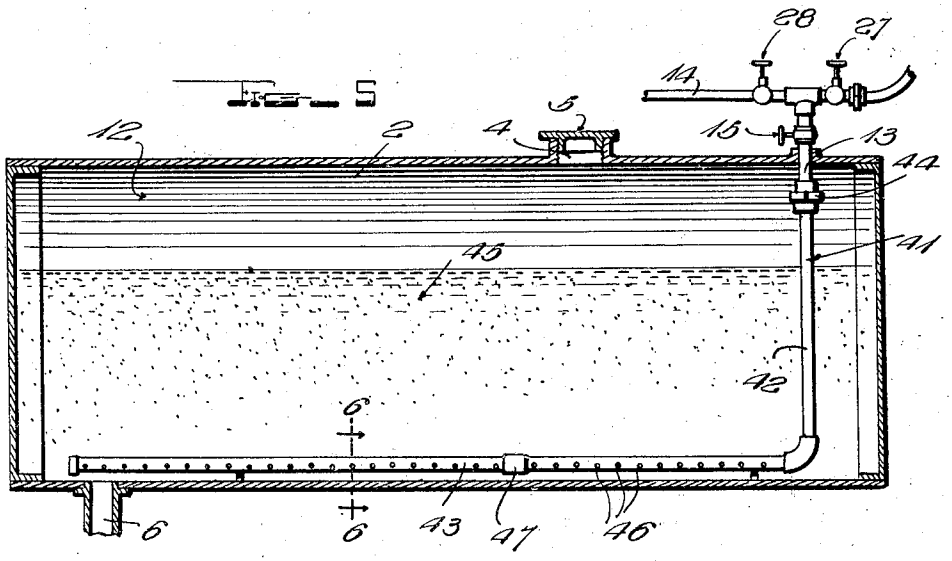
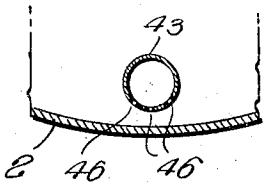


Fig. 6



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UNITED STATES PATENT OFFICE.

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TANK DISTRIBUTOR.

Application filed November 23, 1928. Serial No. 321,527.

This invention relates to tank distributors, and has particular reference to tank distributors of that class in which a storage tank containing liquid asphalt, cement or like surfacing material to be applied to a roadway, is mounted upon a truck or wheeled vehicle adapted to be self-propelled or suitably drawn along the roadway over the surface of which the material is to be distributed. More particularly my invention relates to a tank distributor of this character in which the tank is charged with compressed air acting on the material for a force-feed action, and in which the material passes through a discharge pipe line leading to a transverse distributor having discharge nozzles arranged for the spraying of the material over the road surface.

One object of my invention is to provide simple, reliable and efficient means whereby a solvent, properly heated and placed under pressure, may be conducted to and caused to act upon any accumulations of asphalt or like material in the pipe line and distributor, whereby the same may be cleared of any deposits and prevented from clogging.

Another object of the invention is to provide a construction of means whereby, through the application and removal of a simple attachment, one and the same tank distributor may be rendered convertible for use at will for containing and distributing a bituminous material, such as liquid asphalt, or a cementitious material, such as grout or liquid cement, for interchangeable use in the construction or resurfacing of different types of roadways.

Still another object of the invention is to provide means whereby the road engaging surfaces of the wheels of the vehicle may be sprayed with water, oil or the like for the purpose of preventing sticking of the laid road material thereto.

Still another object of the invention is to provide means whereby air pressure from one and the same source may be supplied for the various purposes mentioned and for agitating and maintaining a proper mixture of the cement and water when the apparatus is used for the distribution of grout or liquid cement.

With these and other objects in view, the invention consists of the features of construction, combination and arrangement of parts, hereinafter fully described and claimed, reference being had to the accompanying drawings, in which:—

Figure 1 is a rear end elevation of essential parts only of a truck or wheeled tank distributor embodying my invention.

Figure 2 is a top plan view of the same.

Figure 3 is a vertical section through the material outlet pipe from the tank and the parts of the distributor clearing means associated therewith.

Figure 4 is a sectional plan view on line 4—4 of Figure 3.

Figure 5 is a vertical longitudinal section through the tank showing the agitator or sprayer arranged therein to adapt the apparatus for use as a cement distributor.

Figure 6 is a detail vertical transverse section on line 6—6 of Figure 5.

In carrying my invention into practice, I provide a traveling vehicle, herein fragmentarily and conventionally shown, the body supporting frame 1 of which vehicle carries a tank 2 in which the material to be distributed to the roadway is stored. This traveling vehicle may be of automobile truck type equipped with a propelling motor 3, or it may be constructed to be drawn by draft animals or as a trailer behind a truck or other motor driven vehicle.

The tank 2 may be of suitable containing capacity and is provided at its top with a filling inlet 4, normally sealed by a cap or other closure 5, and in its bottom with an outlet with which connects the upper end of an outlet pipe 6. This outlet and outlet pipe are arranged at or near the rear of the tank, and said outlet pipe 6 is provided with a controlling and cut off valve 7 and communicates at its lower end through a U-shaped branch pipe or yoke 8 with a distributor head or pipe 9 provided with a series of conical or other suitably shaped discharge nozzles 10. The head or pipe 9 is preferably of a length to extend across and beyond the opposite sides of the vehicle, and the nozzles 10 are adapted to discharge fan-shaped sprays of the material to be distributed down upon the roadway surface. The wheels 11 of the vehicle are preferably of a suitably broad gage to properly sustain the weight of the vehicle and its load without sinking into the road surface.

The apparatus is adapted primarily for the distribution of asphalt or other bitumi-

nous material in a fluent or liquefied state. This asphalt or bituminous material is suitably heated in practice to maintain it at a desired degree of fluidity for proper flow and efficient distribution. The tank is initially filled in practice up to a predetermined level, below the top of the tank, so as to leave a space or chamber 12 at the top of the tank to receive a charge of air under a predetermined pressure, under which air pressure, when the valve 7 is opened to a greater or less extent, the material will be supplied under combined gravity and superimposed air pressure to the header or distributor 8 for discharge at a proper pressure through the nozzle 10.

The reservoir space or chamber 12 is supplied with air pressure through an intake pipe 13 having its lower delivery end extending through the top of the tank a certain distance downwardly into said chamber. This pipe 13 is connected at its upper end to a longitudinally extending air line or main air supply pipe 14 and is provided with a controlling and cut off valve 15. The pipe 14 extends longitudinally of the tank, upon the exterior thereof, and may be connected in practice with a compressor pump P actuated by the motor 3, or with a main storage reservoir kept supplied with air by said air compressor. Where the apparatus is mounted upon an animal drawn vehicle or trailer of the type described, it may be, and preferably is, provided with a main storage tank supplied by a motor driven compressor mounted upon the vehicle or trailer itself or upon a motor truck employed for transporting the vehicle or trailer. Any suitable means may, in practice, be employed for maintaining the air pressure in the pipe line or main air reservoir at a predetermined working pressure, and suitable gages or other means used for indicating the pressure at any time in the chamber 12 and other portions of the air supply system. By means of the valve 15 it will be evident that the supply of air to the tank may be governed as desired, according to the amount of the asphalt or other material contained in the tank for distribution, so that the proper amount and pressure of air may be regulated as required to act upon the material for its discharge through the nozzles with the required degree of spraying force. In the normal use of the apparatus for distributing liquid asphalt or other fluent material not required to be agitated, the delivery end of pipe 13 opens and discharges directly into the chamber or space 12. This pipe 13 is also adapted for the application thereto of an attachment, as shown in Figure 5, and as will be fully hereinafter described, for supplying currents of air for keeping a body of material in the tank in agitation and also supplying pressure to the chamber or space 12.

In the distribution of liquid asphalt or similar materials a quantity of the material often clogs in the pipes 6 and 8, distributor head 9 and the nozzles 10, and it is desirable to provide means whereby this material may be rendered fluent and discharged, in order to prevent choking of such parts of the apparatus. To this end I provide a reservoir 16 for containing kerosene or some other suitable vaporizable solvent, which is provided with a suitably closed filling inlet 17 carried by the vehicle body frame 1 at one side of the tank 2. Leading from this tank 16 is a solvent feed pipe 18 which is provided with a controlling and cut off valve 19 and which connects at its delivery end with a discharge nozzle 20 disposed within a blast chamber or mixing chamber 21. The pipe 18 connects with this chamber 21 at one side thereof, and said chamber is threaded at its opposite ends to receive pipes 22 and 23, having controlling and cut off valves 24 and 25 therein, the pipe 23 extending into the pipe 6 and being provided with a downwardly projecting discharge nozzle 26 disposed therein. The pipe 22 has an air supply pipe connected with some suitable part of the compressed air supply system, as the main air supply pipe 14. In carrying out a clean out operation of the pipes 6 and 8 and the distributor 9 and nozzles 10, the valve 19 is first opened to permit a predetermined quantity of the solvent, ordinarily about one-half gallon, to pass from the tank 16 to the chamber 21 and thence into the pipe 6, pipe 8 and distributor head 9, whereupon the valve 19 is closed to cut off the further supply of solvent and the valve 24 is opened for the supply of air under pressure. This compressed air passes into and through the chamber 21, and forces any kerosene left remaining therein through the pipe 23 and nozzle 26 into the pipe 6, at the same time inducing a suction in the nozzle 20, causing any solvent remaining between it and the valve 19 to be entrained and carried with the air into the pipe 6. The construction of the apparatus is preferably such that, in such clearing action, air contained in the space or chamber 12, and heated by the body of heated bituminous material in the tank, may be employed, to which end the pipe 14 is provided on opposite sides of the pipe 13 with controlling and cut off valves 27 and 28 respectively. It will thus be understood that by closing the valve 27, to cut off communication between the pipe 14 and the compressor or main air storage tank, and opening the valves 15, 28 and 24, direct communication between the space or chamber 12 and the chamber 21 will be established, so that heated air from the chamber 12 will pass into the pipe 6 and over parts of the distributing mechanism. This heated air will partially vaporize the solvent and soften

the bituminous material, thus loosening up the material and rendering it sufficiently fluent to be discharged by the air pressure through the nozzles 10. If desired, the sprinkler header 9 may be so constructed that it may be revolved a half revolution upward to bring the nozzles 10 to an elevated position so that any small amount of fluent material left remaining therein will drain back into the distributor head. As one way of securing this result, for example, pipe 8 may be mounted to turn in a suitable arc in the T-connection 9′, so that the sprinkler head as a whole may be swung upwardly and forwardly to bring the nozzle 10 into an inverted position. It will, of course, be understood that pipe 8 under these conditions, if made of a single piece, will be suitably slotted within the T-connection 9′ for communication with pipe 6, or, if pipe 8 be made of two pieces, that the inner ends of the pipe sections journaled within the T-connection 9′ be suitably spaced; and that in either case a proper sealing conection between the pipe 8 and the T-connection 9′ be supplied in order to prevent leakage. By the construction of the solvent and air supplying means just described, simple, reliable and efficient means are provided whereby the distributor and pipes connected therewith may be quickly and efficiently cleared of all deposits whenever desired and prevented from choking. At the conclusion of a clean out action, upon the closing of the valves 24, 25 and 28 and the opening of valves 15 and 27, the clean out mechanism will be cut out of action and communication established between the compressed air supply pipe 14 and the chamber 12 for replenishing the latter with air pressure to a required degree.

I also provide means whereby water, oil or other fluid may be sprayed over the tread surfaces of the wheels 11 for the purpose of preventing deposited road surface material from adhering thereto. The mechanism provided for this purpose consists of the water or oil supply tank 29 provided with a suitably closed filling inlet 30 and mounted upon the frame structure 1 at the side of the tank 2 opposite the reservoir 16. This reservoir 29 is provided with a discharge pipe 32 having a controlling or cut off valve 33 therein, which pipe is connected with longitudinally and transversely extending pipes 34 and 35 connected with sprinkler heads or spray pipes 36 arranged above the respective wheels 11, whereby, when valve 33 is opened, water or oil from the reservoir 29 will be supplied to flow over the surfaces of the wheels 11 to prevent the sticking of any of the road surfacing material thereto. Solvent from the tank 16 and water or oil from the tank 29 may be caused to flow therefrom to the parts to be supplied thereby by gravity, but, if desired, the fluids in these tanks may be placed under air pressure to ensure the flow of the fluid under any working pressure desired. To this end, the tanks 16 and 29 may be respectively connected by pipes 37 and 38 with the main air supply pipe 14, for the supply of air pressure from the air pressure system, said pipes 37 and 38 being provided with controlling and cut off valves 39 and 40 for letting on and cutting off the flow of air as desired.

The apparatus constructed as above described for use in distributing asphalt or other bituminous materials, may also be employed for the distribution to a road surface of other materials of a character required to be agitated in order to prevent settling of components thereof and to maintain such components in a more or less mixed condition. The apparatus, for example, may be adapted for the distribution of grout or liquid cement, to wit, a mixture of water and Portland cement or the like, without any change in its structure and by merely the simple addition of an agitating attachment 41. This agitating attachment may consist of an elbow pipe having a vertical limb 42 and a horizontal limb 43, which vertical limb 42 is adapted to be connected at its inlet end with the delivery end of the pipe 13 by a suitable type of coupler 44. As shown in Figure 5, the agitator when applied will be so disposed that the limb 41 extends downwardly to near the bottom of the tank 2 through the body of material 45 contained therein and to be discharged for distribution therefrom, with the horizontal limb 43 lying longitudinally of and close to the bottom of the tank. This limb 43 is provided with a plurality of rows of jet openings or nozzles 46, preferably three rows being employed at the center of its bottom and on opposite sides thereof, so that streams of air jetting downwardly therethrough will strike the bottom surface of the tank in alinement with the limb 43 and on opposite sides thereof and sweep outwardly against the sides of the tank before passing upwardly through the body of material 45. These streams of air will prevent the solid particles of the mixture, to wit, the cement, from adhering to the bottom and adjacent portions of the sides of the tank and will pass upwardly through the body of the material 45 into the reservoir space or chamber 12. By this means the constituents of the mixture will be kept in motion or agitated, so that the solid particles or cement will be at all times kept in suspension in the water, the air streams after agitating the mixture being confined in the chamber or space 12 and placing the body of the mixture under pressure if desired. Agitation of this character has been found simpler and more efficient than mechanical agitation requiring the use

of operating mechanism, and it has also been found that the material is maintained in a more uniformly mixed condition for discharge. The coupler 44 employed may consist of a swivel nut, permanently swiveled to one or the other of the pipe members 13 or 41, and adapted for threaded engagement with the other pipe member. The attachment is adapted to be inserted and removed through the filling opening 4 upon the detachment of the cap or closure 5, through which opening 4 a hand of the operator may be introduced for the purpose of placing the attachment in position and connecting or disconnecting the coupling member 44. In order to facilitate this operation, and to render it easier, the limb 43 may consist of any desired number of detachably connected sections, two of such sections being shown in the present instance detachably united by a threaded coupling 47. In applying such a construction of sectional agitator, the members may first be introduced in an inverted position so that the parts of the limb 43 are disposed in the chamber 12 in position to be coupled by a hand or the hands of the operator inserted through the opening 4, after which the agitator is swung downward and set in proper position and the coupler 44 applied to connect it with pipe 13. It will be evident from this construction that the arrangement of pipe 13 is such that it may be used as the injector terminal of an air pressure system for injecting air directly into the chamber 12, for the supply of a charge of air under pressure when the tank is to be used for the storage and discharge of liquid asphalt or other bituminous materials, or said pipe section 13 may be employed as a connector between an agitator and the air pipe system for the use of an agitator in the manner described when a liquid cement or other material requiring agitation is to be stored and dispensed. It will thus be seen that by the described construction and arrangement of parts and the use of the agitator attachment one and the same apparatus may be employed for distributing different materials at different times in different road operations, the provision of an apparatus convertible for such purposes being highly advantageous in reducing the amount of equipment required to be carried by a municipality or road contractor for the construction or maintenance of different kinds of roadways.

From the foregoing description, taken in connection with the accompanying drawings, the construction and mode of operation of my improved distributing apparatus will be readily understood by those versed in the art without a further and extended description. While the structure shown is preferred, it will of course be understood that the invention is not restricted thereto, as many changes in the form, construction and arrangement of parts may be made within the scope of the appended claims, without departing from the spirit or sacrificing any of the advantages of the invention.

Having thus fully described my invention, I claim:—

1. In a road surfacing apparatus, a tank for containing a fluent material to be distributed, a valved delivery pipe leading therefrom, a distributor communicating with said pipe, a source of supply of air under pressure, a valved air feed pipe leading therefrom, a source of supply of a solvent, a valved solvent feed pipe leading therefrom, a blast chamber into which said air and solvent feed pipes discharge, the delivery end of said solvent feed pipe consisting of a discharge nozzle in said chamber arranged in the line of flow of the air from the air feed pipe to the discharge from said chamber and having its outlet facing toward the last-named discharge, a valved solvent and air discharge pipe communicating with said chamber discharge and extending into the delivery pipe and provided therein with a discharge nozzle.

2. The combination with a tank having a valved discharge outlet at its bottom, and a distributor connected with said outlet, of an air pressure supply pipe having a delivery end extending into and terminating near the top of the tank, and an agitator detachably coupled to said delivery end of the air pressure supply pipe and including a perforate member disposed adjacent the bottom of the tank.

3. The combination with a tank having a suitably closed filling inlet at its top and a valved discharge outlet at its bottom, and a distributor connected with said outlet, of an air pressure supply pipe having a delivery end extending into the tank and terminating adjacent the top of the tank, and an agitator disposed in said tank and comprising an elbow-shaped pipe having a vertical limb and a horizontal limb, said horizontal limb being disposed along the bottom of the tank and provided with discharge apertures, and a coupler for detachably connecting said vertical limb with said delivery end of the air pressure supply pipe, said agitator adapted to be inserted and withdrawn through said filling inlet and comprising a plurality of detachably connected sections.

4. The combination with a tank having a valved discharge outlet at its bottom, and a distributor connected with said outlet, of an air pressure supply pipe having a delivery end extending into the tank and terminating adjacent the top of the tank, and an agitator disposed in said tank comprising an elbow pipe having a vertical limb and a horizontal limb and constructed of a plurality of detachably connected sections, said horizontal

limb being disposed along the bottom of the tank and provided with discharge apertures, and a swiveled coupling for detachably connecting said vertical limb of the elbow pipe with the delivery end of the air pressure supply pipe.

5. The combination with a tank having a suitably closed filling inlet at its top and a valved discharge outlet at its bottom, and a distributor connected with said outlet, of an air pressure supply pipe having a delivery end extending into the tank and terminating adjacent the top of the tank, and an agitator attachment disposed in the tank and comprising an elbow-shaped pipe having a vertical limb and a horizontal limb, said horizontal limb being disposed along the bottom of the tank and provided in its underside with central and side rows of apertures, and means for detachably coupling said vertical limb of the agitator pipe with said delivery end of the air pressure supply pipe.

In testimony whereof I affix my signature.

NATHAN V. HENDRICKS.