April 26, 1927. 1,626,487

D. WARREN

EMULSIFIER

Filed Jan. 10, 1924

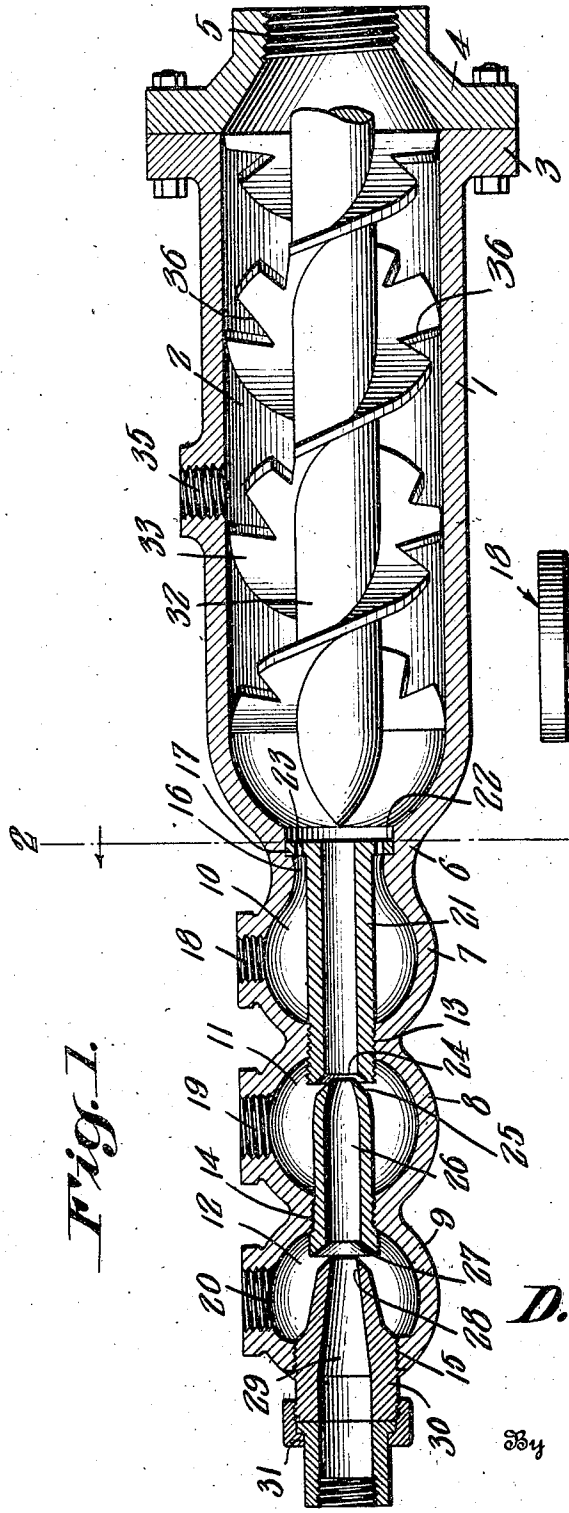


Fig. 1.

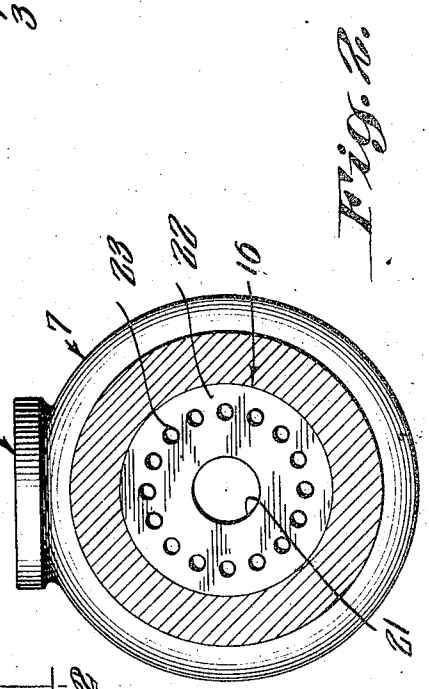


Fig. 1a.

D. Warren, Inventor

By C. A. Snow & Co.

Attorneys

Patented Apr. 26, 1927. 1,626,487

UNITED STATES PATENT OFFICE.

DAVID WARREN, OF LEWISTON, MAINE.

EMULSIFIER.

Application filed January 10, 1924. Serial No. 685,467.

This invention relates to an emulsifier for use in the manufacture of sizing used for giving stability and finish to paper during the process of making the same.

In making sizing it is necessary to thoroughly mix rosin soap, soda ash and silicate of soda. These ingredients must be mixed rapidly and thoroughly as otherwise particles of rosin will pass along into the pulp during the paper manufacture and will clog the wires of the machine with the result that the finish of the paper produced is far from satisfactory.

It is an object of the present invention to provide a means whereby the ingredients making up the sizing can be thoroughly and practically instantaneously mixed without the use of stirring, churning, or like mechanisms.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed may be made within the scope of what is claimed without departing from the spirit of the invention.

In the accompanying drawings the preferred form of the invention has been shown.

In said drawings

Figure 1 is a longitudinal section through the device constituting the present invention.

Fig. 2 is an enlarged section on line 2—2, Fig. 1.

Referring to the figures by characters of reference 1 designates the cylindrical wall of the mixing chamber 2 of the emulsifier, one end of this cylinder being formed with an annular flange 3 for attaching to a coupling ring 4 having an opening 5, the wall of which is threaded as shown. The other end of the cylinder is reduced as at 6 and merges into the first of a series of substantially spherical casings 7, 8 and 9 respectively. These casings are formed with substantially spherical chambers 10, 11 and 12 respectively, the chambers 10 and 11 being connected by an opening 13, the wall of which is screw threaded while another opening 14 connects the chambers 11 and 12 and also has a screw threaded wall. An opening 15 having a screw threaded wall is formed in the outer end of the casing 9 and the chamber 10 communicates with the chamber 2 through a passage 16 counterbored to provide a shoulder 17. Openings 18, 19 and 20 are provided in the walls of the casings 7, 8 and 9 respectively and are adapted to receive the ends of supply pipes, not shown.

Screwed into the opening 13 is one end of a tubular conductor 21 having an annular flange 22 bearing against the shoulder 17 and holding the conductor properly centered within the passage 16, there being an annular series of apertures 23 in the flange whereby communication is established between the chamber 10 and the chamber 2.

One end of the conductor 21 projects into the chamber 11 and the passage through the conductor is flared at said end as shown at 24 so as to receive the tapered end 25 of a tubular nozzle 26. This nozzle is screwed into the opening 14 so as to be supported centrally within the casing 8, the tapered end of the nozzle being spaced from the conductor 21 so that an annular opening is left between the nozzle and the conductor through which the contents of chamber 11 can flow into conductor 21. One end of the nozzle projects into the chamber 12 and the passage through the nozzle is flared at said end as shown at 27. Projecting close to this flared end of the passage is the tapered end 28 of another nozzle 29 which is screwed into the opening 15 and has one end projecting outwardly from casing 9 as shown at 30 where it is provided with a suitable coupling 31 for connecting it to a steam supply pipe.

Supported in any suitable manner within the chamber 2 is a spindle 32 carrying spiral blades 33 extending to the wall of the cylindrical casing 1 and held against rotation in any suitable manner. That end of the spindle nearest the passage 16 is preferably tapered as shown at 34.

The inlet 20 is adapted to be connected to a pipe not shown for conducting cold water to the structure. The inlet 19 is adapted to be connected to a pipe used for conducting a solution of rosin soap and soda ash to the apparatus. Inlet 18 is employed for conducting silicate of soda to the apparatus. An opening 35 is formed in the casing 1 to receive a thermometer.

In using the apparatus live steam of about 120 lbs. pressure or more is directed into the nozzle 29 and the jet thus directed into the nozzle 26 will set up a suction through the chamber 12 so that cold water directed

into said chamber will be drawn into the nozzle 26 where it will be thoroughly mixed with the live steam. This mixture of steam and water is then expelled in the form of a jet into the conductor 21 and will set up a suction through the chamber 11 so as to draw into said conductor the mixture of rosin soap and soda ash. The mixed ingredients will thus be propelled through the conductor 21 into the casing 1, thereby setting up a suction through the openings 23 and drawing silicate soda into the casing 1 from the chamber 10. The several ingredients will be given a swirling action by the spiral blades 33 and will be expelled from the emulsifier in a thoroughly mixed condition so that the sizing can be used efficiently in the manufacture of paper without danger of producing defects such as would result from slow mixing.

It is to be understood that the device can be made of different sizes and proportions. It has been found in practice that the swirling action and high velocity due to the use of live steam and the spiral blades will effect a very thorough mixing of the ingredients and importance is also attached to the fact that the ingredients are not all admitted at one point but are successively introduced as described.

It will of course be understood that when the mixture passes out of the emulsifier at 5 it will be directed into a tank from which it will be drawn into the beaters commonly employed.

For the purpose of facilitating the action of the emulsifier the spiral blades 33 are formed in their peripheries with V-shaped notches 36. As the blades do not rotate within the chamber 2 of the emulsfier the liquid will be forced through these V-shaped notches or openings thereby producing a better mixing action than would otherwise be possible.

What is claimed is:—

An emulsifier of the class described including a mixing chamber having an inlet and an outlet in the respective ends thereof, a non-rotatable spindle extending longitudinally within said chamber and having a tapered end terminating close to the center of the inlet, a spiral blade fixedly mounted on the spindle and attached to the wall of the mixing chamber to provide a spiral passage extending around the spindle from the inlet to the outlet, there being angular notches in the peripheral portion of the spiral blade, and means for feeding material under pressure through the inlet and against the tapered end of the spindle, said tapered end constituting a spreader for the material.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature.

DAVID WARREN.