Dec. 16, 1930. J. A. SCHWANTES 1,785,532

APPARATUS FOR PRODUCING SHREDDED SOAP

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FIG. 1.

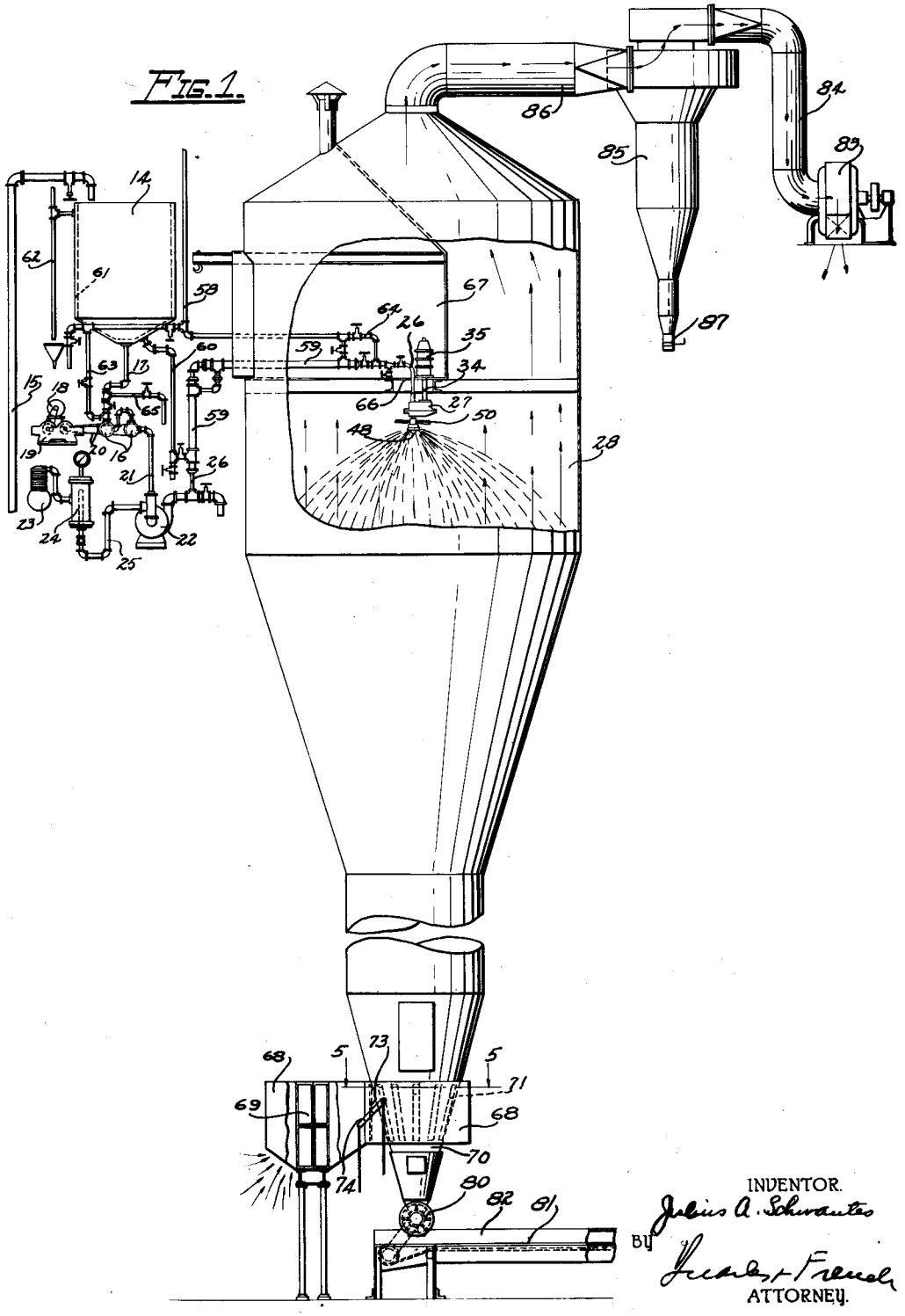

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FIG. 3.

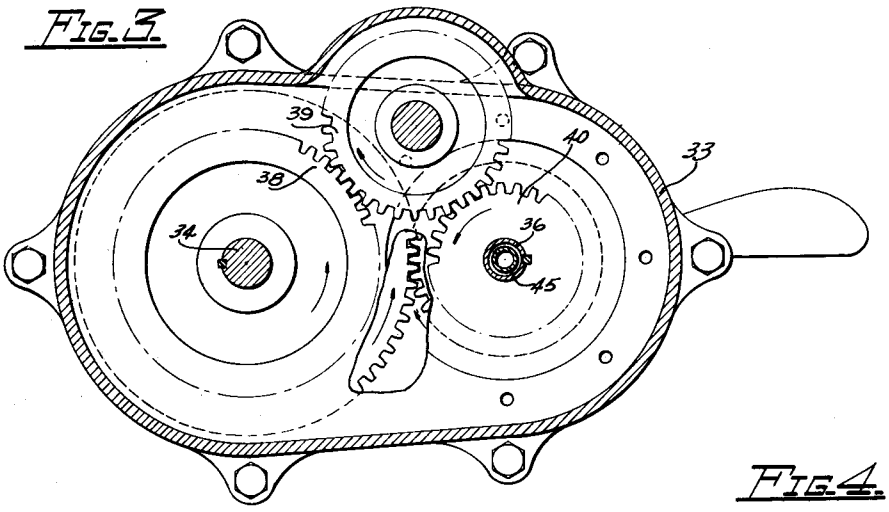

FIG. 4.

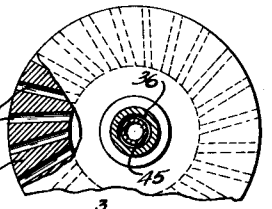

FIG. 2.

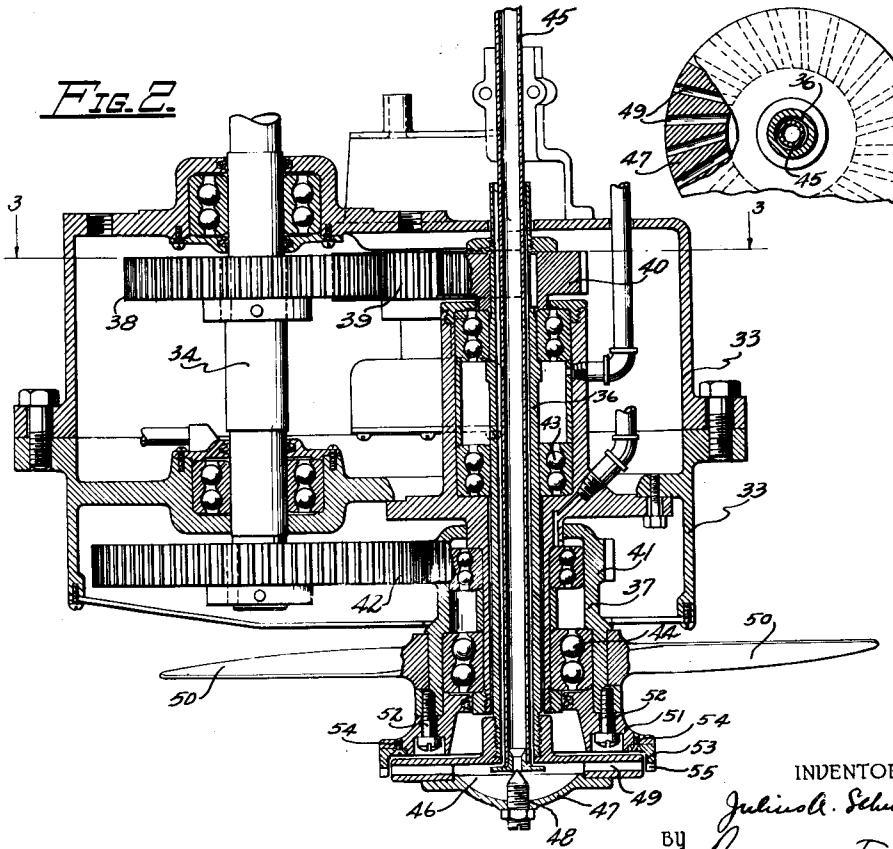

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FIG. 5.

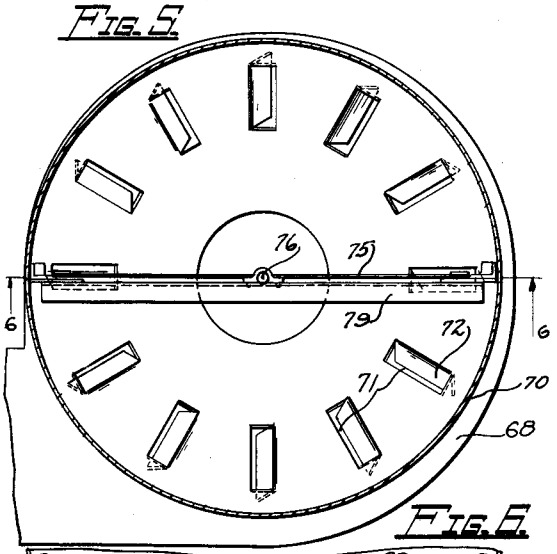


FIG. 7.

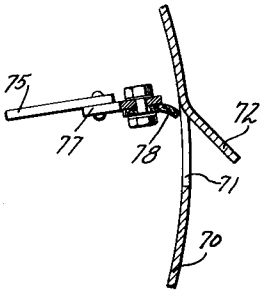


FIG. 6.

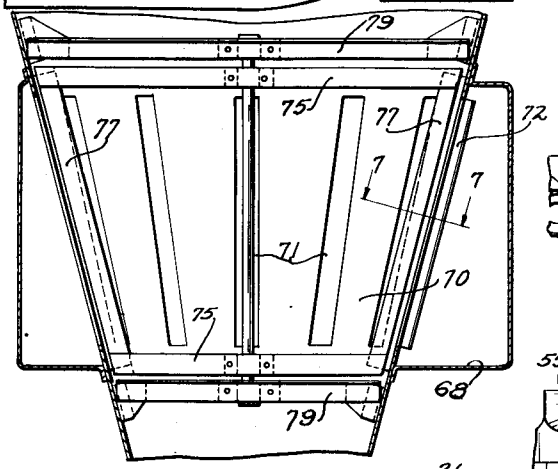


FIG. 12.

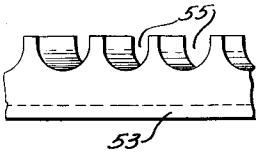


FIG. 10.

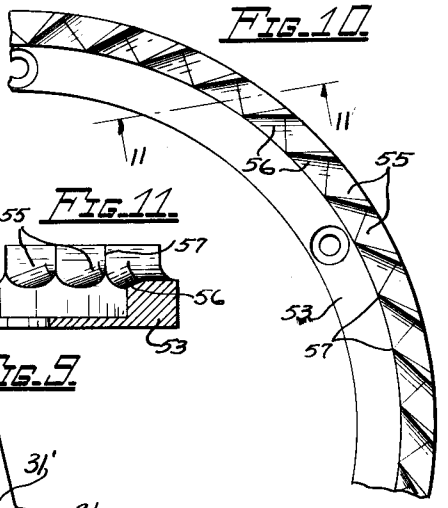


FIG. 11.

FIG. 8.

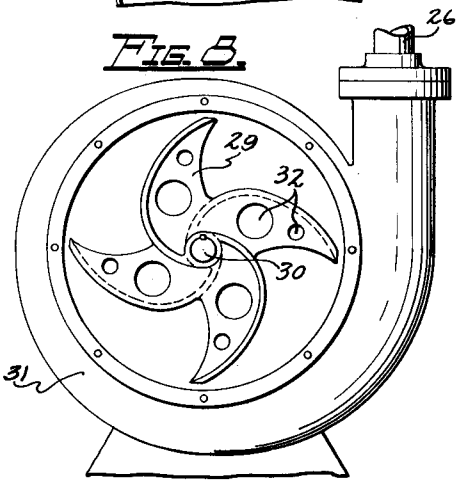
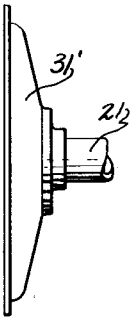


FIG. 9.



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Patented Dec. 16, 1930

1,785,532

UNITED STATES PATENT OFFICE

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APPARATUS FOR PRODUCING SHREDDED SOAP

Application filed June 28, 1928. Serial No. 288,950.

The invention relates to apparatus for producing shredded soap.

The general object of the invention is to provide certain improvements in shredded soap making apparatus over that of my prior Patent No. 1,581,664, dated April 20, 1926. More particularly, the objects are to provide an improved form of shredding apparatus, means for preventing deposition of the soap on the shredder apparatus, means for effecting a greater recovery of the soap, and means for keeping the air inlet ports free of deposition of soap.

The invention further consists in the several features hereinafter set forth and more particularly defined by claims at the conclusion hereof.

In the drawings Fig. 1 is an elevation view of apparatus embodying the invention, parts being broken away;

Fig. 2 is a vertical sectional view through the shredder;

Fig. 3 is a detail sectional view taken on the line 3—3 of Fig. 2;

Fig. 4 is a detail plan view of the discharge head, parts being broken away and parts being shown in section;

Fig. 5 is a detail sectional view taken on the line 5—5 of Fig. 1;

Fig. 6 is a sectional view taken on the line 6—6 of Fig. 5;

Fig. 7 is a detail sectional view taken on the line 7—7 of Fig. 6;

Fig. 8 is a detail elevation view of the agitator with the cover removed;

Fig. 9 is a side view of the cover of the agitator;

Fig. 10 is a detail bottom view of the cutter;

Fig. 11 is a detail sectional view taken on the line 11—11 of Fig. 10;

Fig. 12 is a detail side elevation view of a portion of the cutter.

Referring to the drawings, the numeral 14 designates a steam-jacketed storage tank wherein the soap is kept in a liquid condition by heating it to a suitable temperature, as, for example, 180 degrees Fahrenheit. The soap is introduced into this tank by a pipe 15 connected with a suitable source of supply.

The liquid or semi-liquid soap is drawn off from the bottom of the tank by gravity and in addition by a pair of pumps 16 connected by pipe 17 with the tank 14 and driven by an electric motor 18 through a suitable variable transmission drive 19 including belts 20. The liquid soap is delivered under pressure by the pump which controls its rate of discharge to and through a discharge line 21 to an agitator 22 which is of the rotary type.

Preferably, just before the soap enters the agitator 22 compressed air, from a compressor 23 driven in any suitable manner, as by an electric motor, and delivering to a receiver 24, is introduced into the line 21 by a pipe 25 connected with said receiver. The air pressure is sufficiently in excess of the soap pump delivery pressure to cause the air to enter the discharge line 21 in the proper quantity and proceed with the soap into the agitator or fluffer 22 where the soap is thoroughly whipped into a froth, the air pressure being then the same as the soap pressure. This frothy soap is discharged through a pipe 26 to a shredding apparatus 27. From this apparatus it is discharged into a drying chamber 28 and subjected to a current of upwardly flowing, drying air for such a period of time that the shreds are dried as separate particles by the time they reach the bottom of the drying chamber.

When air is mixed with the soap the agitator 22 may be of any suitable construction but is preferably formed by an impeller 29 mounted on a shaft 30 and working in a volute casing 31, the soap and air mixture being introduced by the pipe 21 into the central portion of said chamber through the removable head 31′, the impeller being provided with a series of holes 32 to assist in the mixing or beating action.

The shredding apparatus shown more particularly in Figs. 1 to 4, inclusive, and Figs. 10 and 11 includes a two-part casing 33, a shaft 34 driven direct by a high speed electric motor 35, a discharge head shaft 36 and cutter head shaft 37, each of said shafts 36 and 37 being driven from the shaft 34 by suitable gearing. As shown, shaft 34 carries a gear 38 meshing with an idler gear 39 which in turn meshes with a gear 40 on shaft 36, while shaft 37 carries a gear 41 meshing directly with a gear 42 on shaft 34. Thus the shafts 36 and 37 are driven in opposite directions. Both of these shafts are tubular, shaft 36 being journalled in ball bearing journals 43 and shaft 37 being journalled in ball bearing journals 44. The discharge pipe 45 from the agitator 22 passes down through the bore of the shaft 36 and discharges into a chamber 46 formed in the discharge head 47 secured to the lower end of the shaft 36, the discharge being regulated by a needle valve 48 in the form of a screw plug adjustably secured to said head. This head has a plurality of holes or bores 49 extending outwardly from the chamber 46 and with their axes approximately tangent to the shaft 36. The shaft 37 has a fan 50 mounted thereon, a cutter head 51 secured to said shaft by screws 52 and an annular cutter 53 secured to said head by screws 54. This cutter has a series of tangentially inclined groves 55 formed therein with flaring inlet ends 56 and provided with cutting edges 57. As the frothy soap mixture is delivered from agitator 22 to the chamber 46 it is forced through the openings 49 under pump delivery pressure and also by the centrifugal force produced by the rapidly rotating head 47 and as it leaves said openings it is cut off into tiny shreds by the oppositely revolving cutter 53.

To insure the soap being maintained at the proper temperature the shredder supply line 26 is steam-jacketed and steam from a live-steam line 58 passes through jacketed portions 59 of this pipe and thence by way of pipe 60 to the jacket space 61 of the tank and the condensate is discharged through an overflow pipe 62. Pipes 63 and 64 connect the line 58 with the soap pipe for blowing or cleaning it out and pipe 65 is a pipe line for drawing the soap from the supply tank, if necessary. The various pipe lines above described are, it will be noted, equipped with valves to control the flow of the liquids or fluids within them.

The shredding apparatus previously described is located centrally in the upper portion of the large drying chamber 28, the support 66 for the apparatus forming part of the flooring of a compartment 67 separate from but extending into the drying chamber and through which the feed pipes associated with the apparatus extend, this compartment permitting ready access to the shredder for servicing the same.

The drying air is drawn into a housing 68 having heating coils 69 therein past which the air flows and by which it is heated to the desired temperature. This housing 68 surrounds or partially surrounds a part of the lower conical end portion 70 of the chamber 28 and entrance of air thereto is through a series of ports 71 formed by stamping out the louvers 72 from the wall of said chamber, whereby the air entering the drying chamber is diverted centrifugally, the amount of air delivered to these ports being controlled by a damper 73 under manual control through a lever 74.

It has been found that eddy currents cause the soap shreds to build up adjacent the ports 71 and eventually the heated air will char the soap and possibly set it a fire so that in order to keep the ports clean a revolving cleaner, consisting of upper and lower frame members 75 mounted on a shaft 76 and side frame members 77 secured to said members 75 and carrying wiper blades 78 of flexible material moving against the side walls of said chamber 28 under the action of the air entering said chamber, is suitably supported therein by a mounting for said shaft on upper and lower transverse frames 79 secured to the side walls of said chamber.

The air drawn into the chamber 28 is preferably heated to quite a high temperature, for example, 260 degrees Fahrenheit, and as it ascends through the chamber 28 comes into intimate drying contact with the small shredded particles of soap that are being projected into the chamber by the shredding apparatus, with the result that these particles are rapidly transformed from an emulsive state into small dried particles of soap having minute air bubbles entrapped therein, which particles gravitate to the bottom of the chamber where they are removed by a positively driven revolving gate or valve 80 which deposits them onto a conveyor 81 upon which they are cooled as they proceed through a cooling chamber 82 and are then led or carried by said conveyor to a place of storage or packaging.

The warm drying air is preferably caused to move upwardly by the action of a suction fan 83 connected by a conduit 84 with the upper end of a cyclone separator chamber 85 which connects by conduit 86 with the upper end of the drying chamber 28 and which has a valved outlet 87 for controlling the discharge of the collected fine soap particles. By this arrangement any fine soap particles carried off by the drying air are deposited in the separator 85 from which they are recovered and thus the air delivered by the fan to atmosphere is substantially clean.

While the general direction of the drying air is upward, the fan 50 acts to direct the air

in the immediate vicinity of the shredder downward so as to prevent adherence of particles to the shredder housing.

I desire it to be understood that this invention is not to be limited to any specific form or arrangement of parts except insofar as such limitations are specified in the claims.

What I claim as my invention is:

1. In an apparatus for producing shredded soap, the combination with a drying chamber, of soap-shredding apparatus for delivering soap shreds thereto in semi-liquid form, means for moving heated drying air upwardly through said chamber, and means for directing said upwardly moving current of air downwardly in the vicinity of the shredding apparatus to prevent soap deposition thereon.

2. In an apparatus for producing shredded soap, the combination of a drying chamber, of soap-shredding apparatus for delivering soap shreds thereto in semi-liquid form, comprising a pair of oppositely rotating members, means for moving heated drying air upwardly through said chamber, and a fan mounted on one of said members for directing the air in the vicinity of the shredding apparatus downwardly to prevent soap deposition thereon.

3. In soap manufacturing apparatus, the combination of a hot soap supply tank, a rotary agitator, means for conveying hot soap from said supply tank to said agitator, means for delivering compressed air to said agitator, a drying chamber, and mechanically-operated means receiving said mixture of soap and air from said agitator and discharging it into said drying chamber in the form of tiny shreds.

4. In soap-manufacturing apparatus, the combination of a hot soap supply tank, a rotary agitator, means including a pump for delivering hot soap from said supply tank to said agitator, means for delivering compressed air to said agitator, a drying chamber, and mechanically-operated means receiving said mixture of soap and air from said agitator and discharging it into said drying chamber in the form of tiny shreds.

5. In soap-manufacturing apparatus, the combination with apparatus for delivering soap in small particles in semi-liquid condition, of a drying chamber into which said particles are discharged, a drying air inlet at the lower end of said chamber comprising a series of ports, and a rotary cleaning device in said chamber to prevent soap particles building up adjacent said ports.

6. In soap-manufacturing apparatus, the combination with apparatus for delivering soap in small particles in semi-liquid condition, of a drying chamber into which said particles are discharged, a drying air inlet adjacent the lower end of said chamber, a discharge outlet for dried soap particles at the lower end of said chamber, an outlet for drying air and finer soap particles at the upper end of said chamber, a separator chamber connected to said outlet, and a suction fan associated with said separator chamber and adapted to induce a flow of drying air through said drying chamber.

7. In soap-manufacturing apparatus, the combination with apparatus for delivering soap in small particles in semi-liquid condition, of a drying chamber into which said particles are discharged, a drying air inlet adjacent the lower end of said chamber, a discharge outlet for dried soap particles at the lower end of said chamber, an outlet for drying air and finer soap particles at the upper end of said chamber, a fan for directing the drying air downwardly adjacent said apparatus, a separator chamber connected to said outlet at the upper end of said chamber, and a suction fan associated with said separator chamber and adapted to induce a flow of drying air through said drying chamber.

8. In soap-manufacturing apparatus, the combination of a hot soap supply tank, an agitator comprising a volute casing and a rotary impeller working in said casing and having apertured blades, means for conveying hot soap from said supply tank to said casing, means for delivering compressed air to said casing, a drying chamber, and means for receiving said mixture of soap and air from said agitator and discharging it into said drying chamber in small particle form.

9. In an apparatus for producing shredded soap, the combination with a drying chamber, of soap-shredding apparatus for delivering soap shreds thereto in semi-liquid form comprising a pair of concentrically disposed, oppositely rotating shafts, a discharge head on one of said shafts provided with discharge openings, means for delivering soap to said head, a cutter head on the other shaft having a serrated cutter for severing the soap into small particles as it is discharged from said openings, and a fan on the shaft carrying said cutter head and positioned above the same to deflect the air in said chamber downward in the vicinity of said discharge openings.

10. In an apparatus for producing shredded soap, soap-shredding apparatus for delivering soap shreds in semi-liquid form comprising a pair of concentrically disposed, oppositely rotating shafts, a discharge head on one of said shafts provided with tangentially inclined discharge openings, means for delivering soap to said head, and a cutter head on the other shaft having a cutter provided with tangentially inclined grooves, adjacent grooves meeting each other at their inlets to form cutting edges.

11. In an apparatus for producing shredded soap, soap-shredding apparatus for de-

livering soap shreds in semi-liquid form comprising a pair of concentrically disposed, oppositely rotating shafts, a discharge head on one of said shafts provided with tangentially inclined discharge openings, means for delivering soap to said head, and a cutter head on the other shaft having a cutter provided with tangentially inclined grooves with flaring inlet ends and adjacent grooves meeting each other at their inlets to form cutting edges.

In testimony whereof, I affix my signature.

JULIUS A. SCHWANTES.