

UNITED STATES PATENT OFFICE.

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PROCESS OF TREATING HOT REFUSE SOAPSUDS.

SPECIFICATION forming part of Letters Patent No. 743,959, dated November 10, 1903.

Application filed December 18, 1902. Serial No. 135,728. (No specimens.)

To all whom it may concern:

Be it known that we, SAMUEL TURNER, residing at Sowerby Bridge, and FREDERICK WILLIAM AKEROYD, residing at Batley, in the county of York, England, subjects of the King of Great Britain, have invented certain new and useful Improvements in Processes of Treating Hot Refuse Soapsuds; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

In the common treatment of hot refuse soapsuds run off from washing-bowls, milling, fulling, and other washing or finishing machines employed in the process of washing or removing oil or grease from raw wool, silk, and other fibers or fibrous substances, yarns, or textile piece goods and milling and fulling textile piece goods the suds are conveyed to large separating-tanks, each capable of holding, say, half a day's supply, and allowed to stand therein until cold, when hydrochloric acid (HCl) or sulfuric acid (H₂SO₄) is added to curd or crack the suds, and the mixture then thoroughly stirred and afterward allowed to stand for a few hours to admit of the solids separating from the liquids. The liquid is subsequently run off into the drain or sewer for conveyance to the nearest river, and the solids are filtered, packed in bags or canvas cloths, and subjected to pressure to squeeze out the grease or oil. In this treatment of hot refuse soapsuds the length of time required to cool the suds in the tanks to the proper working temperature is such that it frequently turns sour, fermentation setting in and injuriously affecting the grease or oil ultimately recovered. In such treatment also there is incomplete separation of the solid matters from the liquid, and therefore the effluent water which is run off from the tanks contains a percentage of solid matter which is objectionable and putrid, giving the water a milky or muddy appearance and polluting the drain or sewer and the river into which it empties to such an extent as to constitute a public nuisance, which the authorities cannot allow to continue and manufacturers and extractors have so far been unable to modify.

The objects of our invention are to expedite

the process of treating the suds in order to avoid fermentation and unnecessary waste of time, thereby reducing the number of tanks required and occupying less area of land and to effect complete separation of the solid matters from the liquid, so that the effluent water run from the tank into the drain or conduit shall be clear and free from all impurities, this complete separation of solids from liquids giving a larger percentage of grease or oil extracted and being brought about by the use of a less quantity of acid than has heretofore been necessary.

The mode of practicing our invention is as follows: The hot refuse soapsuds from the wash vessels or machines are caused, as usual, to pass to the separating-tank through a small tank or vessel to allow any sand which may be in the suds to deposit itself in said small tank, so as not to be carried into the separating-tank. In our process when the suds is very thick or dense we run into the separating-tank along with the suds a quantity of water (not necessarily clean water) in order to bring the density or specific gravity of the suds to a density slightly greater than that of water. From the time of commencing to charge the tank with the hot suds we blow or force through perforated pipes or nozzles located at the bottom of the tank finely-divided currents of cold air, which pass through and mingle with the whole of the suds as it fills into the tank, and thus oxidize it and also cool it rapidly to the desired temperature for working. In our experiments we have found that the dilution of the thick suds with water may of itself be sufficient to bring about complete separation of the solids from the liquids; but if this does not take place we add thereto a quantity of fine soil, soot, or other similar finely-divided earthy substance or material the particles or molecules of which have the property of attracting or collecting the solid matters around them, thus increasing the specific gravity of the solids sufficiently to cause them to separate from the water and sink to the bottom of the tank. When the hot refuse soapsuds run into the tank are not so rich in or thick with fatty matters as to render dilution with water desirable, the fine soil or soot is added alone. The quantities necessary in

either case may be easily determined by the workman. We subsequently add to the mixture in order to curd or crack the suds hydrochloric or sulfuric acid or a suitable metallic salt or oxid, those commercially known as "alumina sulfate" or "ferric sulfate" answering very well and being preferred because they are more easily obtained and less expensive than other salts or oxids which might be employed for the same purpose. During the whole of the treatment currents of cold air are forced through the suds, and this is continued for two hours or more after the addition of the hydrochloric or sulfuric acid or metallic salt to the suds to thoroughly oxidize it and assist separation of the solids from the liquid. The mixture is then allowed to stand for a time to thoroughly settle, the solid matters being precipitated to the bottom of the tank and the liquid left above the solids quite clear and free from impurities. This clear liquid or water is run off into the drain or outfall-conduit; but in order to neutralize any acidity of the water we preferably first run it over a limestone bed or otherwise allow a small stream of alkaline solution stored in a vessel to run into the outfall-conduit along with the water from the suds-tank. The water can also be passed through a filter as a further safeguard. The solids in the bottom of the tank are afterward run through filter-beds in the usual way and then packed in bags or cloths and subjected to pressure to squeeze out the grease or oil.

In severe frosty weather when there is liability of the suds being frozen while standing in the tanks we force a jet or jets of steam

along with the atmospheric air into the suds to bring it rapidly into working condition and prevent freezing.

In thus obtaining clear effluent water from our improved process of treating soap suds all pollution of the drain and stream or river is avoided, while the percentage of grease or oil extracted is considerably greater than has up to the present been obtainable from equal quantities of suds.

If a metallic salt or oxid be used instead of an acid to crack the suds, the solid matter remaining after the water is run out of the tank is neutralized by any suitable acid.

What we claim, and desire to secure by Letters Patent, is—

1. The process of treating hot refuse soap suds, which consists in reducing the density of the suds until it is slightly above that of water, blowing cold air through the suds to oxidize it and to reduce its temperature, and curdling the suds with an acid.

2. The process of treating hot refuse soap suds, which consists in reducing the density of the suds until it is slightly above that of water, blowing cold air through the suds to oxidize it and to reduce its temperature, adding finely-divided insoluble material, and curdling the suds with an acid.

In testimony whereof we affix our signatures in presence of two witnesses.

SAMUEL TURNER.

FRED. WILLIAM AKEROYD.

Witnesses:

E. W. HINCHLIFFE,

ERNEST A. STEELE.