Patented Oct. 24, 1950 2,527,062

UNITED STATES PATENT OFFICE

2,527,062

METHOD OF CONDITIONING BAR SOAP FOR PRESSING BY MEANS OF INFRARED RADIATION

Robert Franklin Heald, Nutley, and Charles Sutter and Russell Edward Compa, Bogota, N. J., assignors to Colgate-Palmolive-Peet Company, Jersey City, N. J., a corporation of Delaware

No Drawing. Application August 5, 1946, Serial No. 688,419

5 Claims. (Cl. 252—367)

1

The present invention relates to a method of conditioning soap for pressing and more particularly to a method of conditioning soap of high moisture content for pressing by a rapid treatment with infra red radiation and air.

Soaps of high moisture content, such as laundry soaps, houshold soaps, floating soaps, etc., have customarily been prepared by the framing method in which kettle soap is crutched with the desired amounts of builders, fillers, perfume, etc. and then deposited in a frame to cool and solidify without substantial drying. After a period of several days the frame is stripped and a block of soap is cut into slabs and these in turn, into bars and/or cakes. Such freshly cut bars are quite sticky and are not in a condition for pressing in metal dies. It has been customary to condition such bars for the pressing operation by exposing the cut surfaces to air for a considerable period of time. In some cases the air to which the soap is exposed has been ordinary untreated air while in other cases the air has been heated in an attempt to shorten somewhat the time required for the conditioning operation.

Recently a new method of making dense, high moisture bar soap by cooling crutched soap on a cooling roll to form solid ribbons and plodding the high moisture content ribbons under vacuum has been invented by one of the present applicants (Russell Edward Compa, Application Serial No. 688,573, filed August 5, 1946 for Plodded High Moisture Soap). This soap has also been found to require a conditioning treatment prior to pressing.

In accordance with the present invention, bars of high moisture soap are given a rapid conditioning treatment which reduces the time required for the conditioning operation from a matter of hours or even days, which the prior methods have required, to a matter of only minutes. In its preferred form, the invention is carried out as a continuous operation with a minimum of hand labor and produces a substantially standard conditioned product which can be readily pressed to produce a satisfactory, finished cake of soap.

The present invention comprises subjecting bars of soap, which require conditioning to enable them to be satisfactorily pressed, simultaneously to irradiation with infra red rays and to a strong blast of air. The intensity of the radiation and the cooling effect of the air blast are so correlated that the temperature of the soap is prevented from rising above a level at which pressing is adversely affected.

2

The infra red rays may be provided by the use of any source of radiant heat, e. g., radiant heat gas burners or infra red electric lamps. Where lamps are used, whether carbon or tungsten filament, they are preferably provided with reflectors which may be either separate external reflectors of generally parabolic shape or advantageously internal reflectors built into the lamp as a portion of the glass bulb. Satisfactory results are obtained using 375 watt internal reflector bulbs at a spacing of about 6 inches from the cakes of soap being conditioned. It will be understood, of course, that this spacing may vary widely.

The radiation is of such intensity as to cause a rapid rise in temperature of the soap when no air blast is used. Within a few minutes the soap under such radiation softens and even melts if exposure is prolonged. A rise in temperature above a critical maximum where the soap becomes sticky and unsuitable for pressing is prevented by blasting the soap with air while it is subjected to the infra red radiation. By this treatment the surface of the cake of soap is put in a very advantageous condition for pressing. The air blast may be provided by a blower or fan, using suitable conduits and nozzles or by means of compressed air at relatively higher pressure. Considerable variation in the velocity and quantity of the air blown against the surface being irradiated is possible. The air stream is directed toward the surface being irradiated at a substantial angle. The blast of air is not effective when the general direction of its flow is substantially parallel to the surface being irradiated. The essential requirement is that the blast of air be directed against the surface or surfaces of the soap being irradiated in such direction and with such quantity and velocity as to prevent heating the soap above the maximum pressing temperature during the radiation treatment.

The time of the radiation treatment may vary over a wide range but for economical operation the treatment should not be extended beyond the minimum time required properly to condition the soap for pressing. A great advantage of the present process is that it permits the conditioning operation to be carried out in a matter of minutes. A cake of plodded laundry soap having a moisture content between 35 and 40%, for example, is conditioned for pressing in about 3 minutes by exposing its broad surfaces to irradiation from 375 watt internal reflector lamps spaced about 6 inches from said surfaces while blasting them with a stream of compressed air. Ordinarily the

treatment can be completed in less than 5 minutes and some cakes in as short a time as about 1 minute.

The maximum temperature to which the soap can rise without adversely affecting pressing varies somewhat with the composition of the bar. Soaps made from high titre oils can be pressed satisfactorily at a higher temperature than soaps of otherwise the same composition made from low titre oils. The maximum pressing temperature decreases with increase in moisture content. A safe maximum for almost all soaps is about 95° F. which is satisfactory for plodded laundry soap having about 40% moisture. A similar soap having about 20% moisture can be pressed at temperatures up to about 120° F. but it is preferred to keep the cakes below the maximum permissible temperature by air cooling during, and optionally also following, the irradiation treatment.

The cakes of soap being conditioned by the present process may be stationary during the treatment or they may be and preferably are conveyed through a heating chamber where the treatment is carried out during the uninterrupted movement of a succession of cakes therethrough. The surfaces which require conditioning for pressing may be treated simultaneously or successively.

The mechanism of the conditioning operation is not fully understood but it is believed that a physical change is brought about in the surface or skin of the bar of soap, probably accompanied by a decrease in moisture content. The blast of air probably limits rise of temperature of the cake of soap being irradiated not only through the cooling effect due to conduction of heat away from the surface but also by evaporating some of the water in the surface portion of the cake. Regardless of the mechanism of the skin formation there is a distinct difference in the character of cakes of soap before and after the conditioning treatment. Prior thereto the cakes are moist and sticky at the surface and tend to smear on metal. After the conditioning treatment the surface of the cakes feels almost dry to the touch, it has lost its tacky feel and it no longer smears on metal.

The conditioning treatment of the present invention may be applied to any soap which requires conditioning before pressing. This includes freshly cut framed soaps and freshly made soaps produced by other processes which contain moisture of about 20% and higher. The process has particular merit in the treatment of plodded high moisture soap produced by the process of the above mentioned Compa application. Soap produced by this process when subjected to the conditioning treatment of the present invention can be pressed in automatic machinery at a rapid rate without fouling the dies and other metal parts with which the soap comes in contact.

The following is an illustrative example of the present invention as applied to plodded laundry soap:

Ribbons of high moisture laundry type soap are prepared for plodding by thoroughly crutching a liquid mixture comprising 60% kettle soap, 34.415% N-silicate, 3% soda ash, 2.27% tetrasodium pyrophosphate, 0.3% titanium dioxide and 0.015% perfume and chilling the mixture on a cooling roll through which water at about 70° F. is circulated. The ribbons, which are removed from the roll by a slotted knife, are plodded in a vacuum plodder operating at a vacuum of about 25" of mercury. The extruded bar is cut into cakes which are placed edgewise on a conveyor belt which carries them through a treating zone comprising banks of 375 watt internal reflector infra red lamps at both sides of the conveyor belt spaced about 13 inches apart and banks of air nozzles located between the bulbs adapted to direct jets of air onto the irradiated surfaces. The broad surfaces of the cakes are subjected to the radiation from the lamps and the blast of air for about 3 minutes during which time there is no substantial rise in the temperature of the soap. The cakes are then pressed in metal dies in an automatic press of conventional design. No difficulty is experienced in the pressing operation and after 1000 cakes are pressed the dies are still clean and free from soap adhering to the working surfaces.

Although the present invention has been described and illustrated with reference to certain particular apparatus and compositions it will be understood that modifications and variations can be made without departing from the scope of the invention as defined in the following claims.

We claim:

1. The process of conditioning high moisture bar soap for pressing which comprises irradiating such bar soap with infra red rays and blasting the irradiated surface with a sufficiently strong current of air in the general direction of the heat rays that substantial temperature rise is prevented.

2. The method of high moisture conditioning bar soap for pressing which comprises exposing a bar of soap to infra red radiation of sufficient intensity and duration to heat it above the maximum pressing temperature and blowing air on the bar to prevent substantial temperature rise and thereby condition the bar for pressing shortly after radiation thereof has terminated.

3. The method of conditioning bar soap of high moisture content for pressing which comprises exposing a bar of soap having at least about 20% moisture to infra red radiation of sufficient intensity to raise its temperature and simultaneously blowing air on the bar to prevent temperature rise above about 120° F.

4. In the manufacture of bars of high moisture content plodded soap in which chips of soap containing at least about 20% moisture are plodded at a temperature below about 100° F., the steps which comprise cutting the strip of soap extruded from the plodder into bars, subjecting the bar for a period of less than about 5 minutes to infra red radiation of sufficient intensity to raise the temperature of the bars, simultaneously blasting the irradiated surface with air in sufficient volume and at sufficient velocity to keep the temperature of the bars from rising substantially above 100° F., and thereafter pressing the bars.

5. In the manufacture of bars of high moisture framed soap the steps which comprise cutting a frame of soap into bars, subjecting the bars having at least about 20% moisture to infra red radiation of sufficient intensity to raise its temperature, and simultaneously blowing air on the bar to prevent temperature rise above about 100° F.

ROBERT FRANKLIN HEALD.
CHARLES SUTTER.
RUSSELL EDWARD COMPA.

(References on following page)

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
1,557,921	Buel	Oct. 20, 1925
2,186,067	Groven	Jan. 9, 1940
2,281,184	Dykstra	Apr. 28, 1942
2,282,070	Mahannah	May 5, 1942
2,349,300	Olsen	May 23, 1944

Number	Name	Date
2,360,257	Muller	Oct. 10, 1944
2,405,191	Davis	Feb. 24, 1942

FOREIGN PATENTS

Number	Country	Date
328,043	Great Britain	Apr. 24, 1930

OTHER REFERENCES

Modern Soap Making, Thomssen and Kemp MacNair-Dorland Co., publishers, pp. 113, 114.

Certificate of Correction

Patent No. 2,527,062 October 24, 1950

ROBERT FRANKLIN HEALD ET AL.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows:

Column 4, line 33, strike out the words "high moisture" and insert the same in line 35, same column, after "of", first occurrence;

and that the said Letters Patent should be read as corrected above, so that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 27th day of February, A. D. 1951.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.