UNITED STATES PATENT OFFICE.

HIPPOLYTE MÉGE, OF PARIS, FRANCE.

IMPROVED PROCESS OF TREATING FATTY BODIES FOR THE MANUFACTURE OF CANDLES.

Specification forming part of Letters Patent No. **42,901**, dated May 24, 1864.

To all whom it may concern:

Be it known that I, HIPPOLYTE MÉGE, of Paris, in the Empire of France, professor of chemistry, have invented certain new and useful Improvements in Treating Fatty Bodies for the Manufacture of Candles; and I do hereby declare that the following is a full, clear, and exact description of the principle or character which distinguishes it from all other things before known, and of the usual manner of making, modifying, and using the same.

My invention refers to certain improvements in the saponification and distillation of fatty bodies, by which means I obtain better and more economical results than those hitherto produced from the aforesaid processes.

I have ascertained by experiments that the manufacture of stearic acid is complicated and costly on account of the fatty bodies not being sufficiently saponified; nevertheless it is by an operation of that kind that I fully modify the manufacture of stearic acid, and thereby obtain new results, by which I require only, first, one pressure of the fatty bodies at the ordinary temperature; secondly, one fusion of the stearic acid; thirdly, I obtain within a short period stearic acid, always pure and of the first quality, without any bleaching or exposure to the air; and, fourthly, I produce a real oleic acid, superior to all kinds of oils for manufacture of soap.

These improvements are carried out by known and new means. The known means are the saponification, such as it is performed in the most improved soap-factories, and its decomposition within a time long enough to insure a sufficient saponification. The new means are the known operations producing new results by the modes they are performed according to my invention, and, being costly and long, I modify the usual saponification by the following means:

First. Before the acting of the lye I cause the fatty body to assume a peculiar globular state, and not the emulsive one; but the state of oleostearate of glycerine and of soda in a globular state, into which the fatty body, being no longer visible and combined, cannot be separated by lyes either hot or salted. Such state of combination is obtained by mixing the liquid fatty body with a sufficient quantity of soapy water, or by forming the soap into the mixture by combining fatty acids with neutral fatty bodies and adding the alkaline water.

Secondly. The aforesaid combination necessitates only one salted lye, which is rendered more economical by quickening the lime and extracting the glycerine.

Thirdly. The saponification is so complete that the only coction required is obtained by the mere coagulation produced by the heat, serving to separate the lye from the soap.

Fourthly. The soap can be rapidly divided and afterward decomposed by means of weak acid waters, and the formed sulphate of soda is collected to produce other soda.

Fifthly. The modification relating to the colored fatty bodies will be hereinafter described.

In the manufacture of candles fatty bodies of all kinds, but chiefly animal and vegetable greases, are employed. I take, for instance, tallow for the colorless and palm-oil for the colored fats, and I proceed to carry out my invention by means of the well-known operations—viz., the lye saponification, decomposition of the soap, the crystallization and washing, the pressure, purification, and running-off of the stearic acid or solid fatty acids—which operations, however, are subject to the several modifications or improvements hereinbefore stated and constituting my invention, and which operations I will now proceed to describe according to the order generally followed for the said operations.

I. *Lye.*—All alkalies or earthy bases are suitable for saponifying fatty matters; but I prefer to make use of soda, and, instead of preparing, as usual, soft and salted or weak and strong lyes, I use only one lye, and quicken the carbonate of lime as follows: To prepare the lye, I put the lime, carbonate of soda, and chloride of sodium into water, as usual; but when that lye has already been used for one operation I again add carbonate of soda and lime to it, until it becomes overcharged with glycerine, I then evaporate and obtain pure glycerine by clarification and purification of alcohol or distillation. The carbonated lime which is deposited is allowed to drain off, and is converted into quicklime in a suitable kiln, and the small quantity of soda it may contain is not even lost. I generally compose this lye of five parts of pure soda and chloride of sodium, with one hundred parts of water. These pro-

portions, however, may vary; but in all cases, if the lye contains any sulphurets, they are precipitated by means of a metallic oxide.

II. *Saponification.*—This is performed in a rapid, economical, and complete manner by causing the fatty body to take the globular state before heating it with lye. For this process I mix the fatty body with water and alkaline soap. I heat and agitate until all traces of fat have completely disappeared, and this is ascertained by mixing a part in water and letting it deposit. The globules very soon appear on the surface of the water, and when cold are easily separated and converted into molecules. The tallow which composes them does not become rancid, and is susceptible of receiving particular chemical reactions. Such combination is most favorable for the saponification. In adding by degrees luke-warm lye to these globules and gently agitating them, it naturally follows, as the globules have the property of swelling in the tepid lye without separating, that the lye acts on a very large surface and in such favorable conditions that the saponification is entirely perfect within a few hours instead of several days; but in all cases the lye must contain a proportion of alkali sufficiently large to remove entirely the glycerine from the fatty body. To agitate the liquid I make use of any suitable apparatus. At the end of a few hours the liquid becomes, while thick, homogeneous, and the soap, being perfect, I proceed to the operation of boiling or coction.

III. *The coction.*—This is rapidly performed in raising the temperature by degrees. The globules, by separating from the lye, liquefy and melt into a homogeneous mass of soap, which retains only its composing water entirely free from soda, salts, and foreign matters. By the rapidity of the operation I avoid also the decomposition of the fatty bodies by the alkali, which always produces a notable loss, besides troublesome alterations. To obtain the soap in still more pure state, I wash it in hot salt water, and I leave it to rest. I draw off the liquid and pour the soap into vessels, in which it is divided and allowed to cool.

IV. *Decomposition.*—Instead of using hot and strong acid waters, I pour the cold soap in a quantity of acidulated water. The strength of the acid is sufficient to neutralize the soda, and I leave the mixture to rest. The processes employed until now to divide and decompose the soap require much time. To save it I pour water containing sulphate of soda into the hot soap, which becomes fluid, as milk, and is run into cold water, containing also sulphate of soda. In that water it divides, and I have only to add the necesary quantity of acid, which acts immediately. Any other salt beside the sulphate of soda can be employed, though this salt is the most convenient, especially as the decomposing operation enables always the manufacturer to utilize the water saturated with that salt; but whatever salt has been employed, the water having scarcely any acid reaction, and the soap offering no longer any resistance to the fingers, I raise the temperature until the melting of the fatty acids and their complete transparency be obtained. Finally, I pour them into the molds to have them crystallized. When the water is saturated with sulphate of soda it is crystallized, for the purpose of collecting the sulphate, which can be usefully employed.

V. When it is necessary to add to the soda-lye a certain quantity of quicklime to produce a lime soap, which is made complete by soda, care must be taken to prevent the losses arising from the deposits of the sulphate of lime. For this purpose I decompose the soap with chlorhydric acid. The chloride of calcium is afterward decomposed by its equivalent weight of sulphuric acid. By this operation the chlorhydric acid is constantly quickened. This acid can be replaced by any other capable of forming soluble salts of lime.

VI. *Pressure.*—The fatty acids produced by a complete and well decomposed soap are in such conditions that instead of requiring a cold and hot pressure I merely press them at the ordinary temperature, and thereby obtain on one side and at once oleic acid having the color of ordinary oils, perfectly pure, free from oxidation and noxious smell, causing the rapid crystallization of the last particles of solid fatty acids, and on the other side producing the stearic acids of a very brilliant color.

VII. The stearic acid thus manufactured is pure enough to be merely melted in pure water, and after some rest it is violently agitated in any suitable apparatus to break up the crystallization, and it is fit to be cast into the molds.

VIII. When the stearic acid has become solid, taken out from the molds, and crystallized, but still warm, I render it whiter by plunging it into cold water during a few moments, or I place the candles or stearic acid in a cold state in a warm medium and I suddenly replace them in a cold one. By such simple means I obtain a finer and whiter color than can be produced by a lengthened exposure to the damp air.

IX. If an extra quality of stearic acid be required, I dissolve the cakes which have been pressed in oleic acid or in any other very fluid fatty acid, provided it is perfectly purified. I crystallize and press again. The stearic acid does not contain any longer the smallest trace of coloration. The same fluid fatty acid is again employed for subsequent operations, if previously purified.

X. Palm-oil or other colored fatty bodies are treated according to one of the two following modifications in the operations hereinbefore described:

First. As the soap is colored, I bleach it by means of oxygen by plunging the pieces in water containing about from three to five per

cent. of a discoloring chloride. The soap is afterward taken off and exposed to the air. It acquires in a very short time a very white color. After being decomposed, it is then treated according to the operations already described.

Secondly. If the bleaching does not take place with the view of obtaining a larger quantity of solid fatty acids, I add to the fatty acids obtained from palm-oil soap, and which had been decomposed by the acidulated water, some hypoazotic acid in a sufficient quantity to insure their complete solidification, and I distill the product. To stimulate the action of the azotic compound, I preferably add to it either some aqua-regia or a mixture of nitric and lusphurous acid, or a sulphite, instead of the sulphurous acid. It may be remembered that I can alter and modify the proportions as well as the order of the operations I have hereinbefore described without deviating from the principle of my invention; but

I claim—

1. The application of a perfect alkaline soap, (a soap in which the fatty body is completely saponified,) whatever may have been the process for its being manufactured, to simplify and improve the whole of the manufacture of stearic acid.

2. The use of one soda lye, the quickening of the carbonate of lime, the extracting the glycerine from the exhausted lyes.

3. The reducing the fatty bodies to a complete globular state before causing the lye to act, the rapid saponification at a lukewarm temperature, and the performing the boiling or coction by the mere coagulation of the globules.

4. First, the decomposing of the soap by rapid and easy means and the collecting the sulphate of soda to quicken the soda; secondly, using hydrochloric acid when the soap or a part of the soap has the lime for base, and the quickening that acid by decomposing the chloride of calcium by sulphuric acid.

5. The employing of only one pressure at the ordinary temperature.

6. The suppressing water-washings and the clarification of the stearic acid by one fusion only, the plunging that acid into cold water after the complete solidification.

7. The employment of a solution of a hypochlorite and the atmospheric contact to discolor colored fatty bodies, and their distillation after being acted upon by a nitric compound, as hereinbefore described.

H. MÉGE.

Witnesses:

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MONNIER.