

# UNITED STATES PATENT OFFICE.

ADOLF WELTER, OF CREFELD, GERMANY.

## SOAP.

986,527.

Specification of Letters Patent.

Patented Mar. 14, 1911.

No Drawing.

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*To all whom it may concern:*

Be it known that I, ADOLF WELTER, subject of the German Emperor, residing at Crefeld, Germany, have invented new and useful Improvements in Soaps, of which the following is a specification.

This invention relates to a soap or composition containing fat-dissolving substances and yielding with water in every proportion a perfectly clear solution, and to the process of producing such soap or composition.

In recent years it has been endeavored to make soaps which were intended to have specially excellent properties as dissolving and cleansing agents. These soaps or compositions should not be made with the aid of spirits, because the use of such ingredients is not convenient owing to many difficulties arising therefrom. The process described in the United States Patent No. 895,477 therefore is not applicable under ordinary circumstances. Also, oil of turpentine or petroleum, for example, has been added in small quantities both to soda and potash soaps, or mixtures have been made by mixing turkey-red oil or other sulfonated, fatty acids with neutral, organic, volatile liquids, such as, for example, alcohol, ether, chloroform, carbon bisulfid, benzol, petroleum, turpentine, and other similar organic compounds, which mixtures have good cleansing properties and yield absolutely clear solutions with water in all proportions. The employment of carbon tetrachlorid particularly is known. For many reasons, it is, however, desirable to employ other soaps and other fat-dissolving substances for such mixtures. This did not seem to be practicable, for it is not possible, for reasons stated hereinafter, to add to ordinary soap a quantity of oil of turpentine or petroleum exceeding 3%, because the soaps then become inferior and turbid and no longer yield a clear solution with water and obtain physical properties, which make them useless. Further, it was of great importance to make such soaps of fats and oils which are cheaper and better than the expensive turkey-red oils or sulfonated fatty acids. Moreover, soaps made with the latter lather badly and have only small washing value. If one tries to incorporate turpentine, petroleum, or similar solvents in quantities exceeding 3% in a liquid, genuine soap containing 60-64% fatty acid, one does not get the expected result. In order to raise the

percentage of the volatile solvent it is necessary to use a watery solution of sodium soap. These solutions, however, must be diluted to such a degree that they have no importance in practice.

Now I have found that, especially with castor oil soaps, not prepared with sulfonated, castor oil acids, mixtures can be obtained containing a considerable amount of any solvent of fat. Strange to say, I have also found that castor oil or a mixture of castor oil or castor oil acid with almost all other fats and oils can be employed also under suitable conditions for such mixtures. I have further found that, as a rule, potash soaps are better for this purpose, because, firstly, they dissolve a greater quantity of the fat solvents and, secondly, they remain transparent even in concentrated solutions. Nevertheless the process herein described is also applicable to soda soaps, if the fats in these are suitable, *e. g.* if the soaps contain castor oil only. I have further found, that the reasons which prevented a large quantity of turpentine, petroleum, or similar solvents being incorporated into the usual commercial hard or soft soaps were: (1.) The percentage of fatty acid was too great and the percentage of water too small, and (2.) The salts used in the boiling process, particularly in potash soaps, such as soda, potash, chlorid and sulfate of potassium or the like, which must be added to the lyes in order to complete the saponification, prevented a homogeneous mixture. I have also found that it is possible to make transparent, solid or liquid soaps from non-sulfonated castor oil or a mixture of castor oil with other fats or oils containing a higher percentage of petroleum, oil of turpentine, perchlorid of ethylene, or similar solvents and yielding a clear solution with water in all proportions if the following points are particularly observed:

1. The percentage of the fatty acid of the new soap preparations, if prepared with castor oil exclusively, must be reduced to below 50% and the percentage of water must be increased to a corresponding extent. When using a mixture of castor oil with other fats or oils the percentage of fatty acid must be reduced to below 30%.

2. Using a mixture of castor oil and another fat or oil, care must be taken that the soaps contain a high percentage of potash soap. Only soaps made exclusively of castor

oil admit of the exclusive employment of caustic soda or ammonia.

3. In boiling, the addition of salts, such as carbonates and chlorids of sodium and potassium, sulfate of sodium and potassium, or the like, must be limited as much as possible.

In this manner I have been able to make soaps, some of which contain in solution 20-25% ether, acetone, carbonbisulfid, carbon-tetrachlorid, di-chlor-ethylene, tetrachlorid of ethane, pentachlorid of ethane, perchlorid of ethylene, hexachlorid of ethane, dichlorhydrin, epichlorhydrin, benzoin, petroleum-ether, petroleum, turpentine, resin oil, benzol, toluol, xylol, or other organic compounds like these, and consequently have a great, heretofore unattained washing and cleansing value.

Instead of the mentioned chlorid compounds the corresponding bromid and iodid compounds may be used, which may be of advantage particularly for medical purposes.

Examples of making such soaps will now be given:

Example 1: 1000 parts by weight of castor oil are saponified with 400 to 450 parts by weight of pure potash lye, containing 50% potassium hydroxid, in a boiler provided with an agitator. The soap must be prevented from becoming thick by adding sufficient water, say from 2500 to 4000 parts by weight. Care must be taken always to have an excess of potash lye during the boiling process. As soon as the soap is clear and soluble in water, 1000 to 1500 parts by weight of turpentine are added to the warm soap while it is being agitated. According to the quantity of water, which has been used while boiling, transparent soaps, which are solid or liquid when cold are obtained which dissolve clearly in water in every proportion.

Example 2: 500 parts by weight of castor oil acid and 500 parts by weight of sesame oil acid, which contains as high a percentage of fatty acids as possible (about 98 to 100%) are dissolved in 1000 parts by weight of perchlorid of ethylene, and to this solution 3500 parts of water are added. Then 400 parts by weight of 50% potash lye mixed with 500 parts of water are added rapidly; hereby a clear solution of soap is obtained, which can be mixed with water in every proportion.

Example 3: 1000 parts by weight of castor oil acid, 1000 to 1500 parts by weight of tetrachlorid of carbon and 2000 parts of water are placed into a boiler having a suitable agitator. Now while agitating, about 500 parts by weight of 32% of caustic soda lye diluted by 400 parts of water are allowed to flow in rapidly. In this manner a turbid soap is obtained which, however, becomes gradually more transparent, and

finally a liquid soap, is obtained, which, in consequence of its good appearance and great-bleaching and cleansing power, has a high value.

Example 4: In a boiler, having a suitable agitator, 500 parts by weight of castor oil acid are mixed with 200 parts by weight of tetrachlorid of carbon. Now, while agitating, about 200 parts by weight of 50% potash lye diluted by 100 parts of water, are added; hereby a clear semi-liquid soap results, which can be dissolved clearly in water in every proportion.

The consistence of the soaps thus obtained depends substantially on the percentage of water and the kind and quantity of the solvent of fat which has been incorporated with the soap. The percentage of alkali in the soap, however, also plays an important part.

The soaps made according to my invention are to be used for dissolving, cleansing, bleaching and disinfecting purposes and also for medicinal purposes.

I claim:

1. A soap, having the property of dissolving readily and perfectly clear in any proportion in water, consisting of ingredients resulting from a mixture of castor oil with potash lye, and more than three per centum of the soap, thus produced of a solvent of fat, the percentage of water in the soap being so high, that the amount of the fatty acid radical in the completed article is less than fifty five per centum, substantially as described.

2. A soap, having the property of dissolving readily and perfectly clear in any proportion in water, consisting of ingredients resulting from a mixture of castor oil with potash lye and soda lye, and more than three per centum of the soap thus produced of a solvent of fat, the percentage of water in the soap being so high that the amount of the fatty acid radical in the completed article is less than fifty-five per centum, substantially as described.

3. A soap, having the property of dissolving readily and perfectly clear in any proportion in water, consisting of ingredients resulting from a mixture of castor oil with caustic potash, caustic soda and ammonia, and more than three per centum of the soap thus produced of a solvent of fat, the percentage of water in the soap being so high, that the amount of the fatty acid radical in the completed article is less than fifty-five per centum, substantially as described.

4. A soap, having the property of dissolving readily and perfectly clear in any proportion in water, consisting of ingredients resulting from a mixture of castor oil and another non-sulfonated fat or oil with any suitable mixture of potash lye, caustic soda or ammonia and more than three per

centum of the soap thus produced of a solvent of fat, the percentage of water in the soap being so high that the amount of the fatty acid radical in the completed article  
5 is less than fifty five per centum, substantially as described.

In testimony whereof I have signed my

name to this specification in the presence of two subscribing witnesses.

ADOLF WELTER.

Witnesses:

LOUIS VANDORY,

BESSIE F. DUNLAP.