

# UNITED STATES PATENT OFFICE.

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## TREATMENT OF FIBER AND FIBROUS MATTER.

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*To all whom it may concern:*

Be it known that I, FRANK B. GREENE, of Providence, in the county of Providence and State of Rhode Island, have invented certain  
5 new and useful Improvements in the Treatment of Fibers or Fibrous Matter; and I 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  
10 which it appertains to make and use the same.

My invention relates to an improvement in the treatment of fibers or fibrous matter.

By employing the methods now in common use for the disintegrating of vegetable fibers  
15 much time is consumed. In many cases the fibers of plants are obtained by rubbing or pounding by hand. The preparation of one or two pounds of fiber by this method frequently constitutes a day's work for one person. Decortivating-machines have been employed with  
20 varying success as an improvement upon this method. Though an increase of production has resulted from this substitution of mechanical for manual labor, the amount of fiber obtained is disproportionate to the amount of  
25 time consumed. Another method often employed, notably in the production of flax and jute, is that known as "retting" or "rotting." The stalks or leaves of the plant, as the case  
30 may be, are by this method subjected to the action of water and the extraneous matter decomposed or loosened by fermentation. The exact form of treatment varies. The fibrous portions of the plant are sometimes immersed in  
35 still or running water, sometimes exposed to the action of dew, and sometimes wetted or dampened by artificial means; but whatever the form of treatment much time is consumed in extricating the fiber. In some cases months are re-  
40 quired to complete the process. A very common practice is to treat the vegetable matter with strong alkalies, acids, or other chemical reagents; but even by this means a long time is required to procure the prepared fiber.

45 By any of the ordinary methods of treatment the fiber itself is imperfectly prepared, discolored, and injured in strength and weight by the means employed. Fibers prepared by hand or by decorticators always retain to  
50 a greater or less extent some of the gummy matter of the plant, frequently so much that

subsequent treatment is necessary to give the fiber any practical value. Fibers prepared by rotting are always more or less injured by the process of fermentation.

55 The development of certain acids has a tendency to weaken and discolor the fiber, and the discoloration is further produced by the introduction of foreign matter from the water. The treatment of fibrous matter with  
60 the chemicals ordinarily employed always results disastrously, so far as the strength and weight of the fiber are concerned. When the reagents are strong enough to remove the silicious matter, the tars, resins, and other  
65 extraneous substances which enter into the structure of the plant, they also destroy or weaken the fiber itself.

The cleansing, scouring, or ungumming of animal fibers—such as wool and silk—are  
70 also frequently conducted at great disadvantage. Much unnecessary time is consumed by the use of chemicals, oils, or soaps, which at the best are ill adapted to the purpose. The fibers are often only partially cleansed,  
75 while their strength and beauty are frequently impaired.

In cleansing goods or fabrics composed of fibrous material preparatory to the processes of bleaching, dyeing, or printing much time  
80 is consumed and great injury is done to the goods by the use of lime, acids, soda or potash alkalies, or other strong reagents.

By the use of a detergent recently invented by me, I have been able to ungum or wholly  
85 disintegrate vegetable fibers in a few hours, time. The fiber is uninjured in strength and suffers no loss from destructive chemical action. It is softened and perfectly cleansed, and is in  
90 much better condition for use than when prepared by the ordinary methods. This detergent may also be used successfully for cleansing animal fibers or goods or fabrics manu-  
95 factured from fiber. No deterioration in quality or appreciable loss in weight is sustained by the goods or fabrics, and a great saving in time is effected. It affords a most valuable substitute for the destructive chemicals heretofore employed. The detergent when properly  
100 made contains about twenty-five per cent. of the fatty hydrocarbon, the balance consisting, mainly, of alkaline salts of the fatty acids,



glycerine, and possibly small quantities of free fat and water.

To prepare the mixture I usually employ in bulk about one-third of any heavy fatty hydrocarbon—such as solid paraffine, paraffine-oil, oil of tar—and which is heated gently. To this is added about an equal bulk of any oil or fat containing the ordinary fatty acids—such as cotton-seed oil, rape-seed oil, tallow, beef fat, &c.—also gently heated. To these must be added an aqueous solution of any alkali—such as caustic soda or potash. The solution should be of such strength as to have the whole compound neutral. The order in which the ingredients are brought into contact is not essential. The compound should be stirred till cool, to insure thorough intermixture.

I do not limit myself to the exact proportions or ingredients named, as crude petroleum or others similar bodies containing many of the fatty hydrocarbons may be employed, and for some purposes—such as the treatment of animal fibers—the lighter hydrocarbons containing possibly naphtha may be used to advantage.

Instead of employing the fat and alkali, as named above, the mother-liquor from soap-vats may be employed. As this contains glycerine and free alkali, it is necessary to add sufficient oil or fat or alkali to make a proper mixture. As the strength of commercial alkalies varies, the quantity required for a neutral reaction will frequently vary. It is not a soap, but a new compound, in which the fat is reduced to an emulsion or becomes partially saponified. Its cleansing and disintegrating properties and its solvent power for coloring-matters seem to depend largely on the action of the hydrocarbon and glycerine. By the use of this compound the fiber of the plant is liberated from the ligneous or woody portion, and the intercellular matter is either dissolved or completely loosened and separated from the fiber; or, in the case of goods or fabrics, the natural oils, tars, resins, or other similar coloring-matters and impurities, or those introduced in the process of manufacture, are likewise removed. Many fibers appear to be covered by a protecting pellicle, which resists the action of chemicals or yields only at a sacrifice of the strength of the fiber. This pellicle appears to yield readily to the action of this solvent, while no injury is done to the inclosed cellulose.

In the treatment of vegetable fibers and most goods or fabrics it is necessary merely to boil for a few hours in water containing a quantity of this detergent and then rinse thoroughly in warm or boiling water.

In ungumming or scouring animal fibers the compound may be used substantially in the manner of the ordinary soaps or cleansing baths. This compound does no injury to the fiber, and is productive of great economy in the time required to cleanse the fiber or fibrous material and to prepare it for other processes. The fiber, goods, or fabric when

thus prepared may be more readily bleached by any of the ordinary bleaching agents—such as “chloride of lime,” (so called,) and with much less injury than when prepared by other methods. The fiber or goods do not become yellow in time, nor do they require “bluing” in the finishing process to cover the defects of ordinary bleaching.

In dyeing or printing, much brighter and faster colors are obtained with many dyes when the fiber, goods, or fabrics have been previously prepared by the use of this compound than when the preparatory work has been performed by the ordinary processes. The tubes of the fibers appear to be thoroughly opened and cleansed from the matter ordinarily obstructing the entrance of the dyes, and minute particles of the compound adhering to the fiber appear to act as a mordant.

I am aware that Letters Patent have been granted for the mixture of petroleum-oil and the expressed oil of mustard-seed as a lubricant.

I am also aware that certain patents have been issued for the manufacture of commercial soaps containing hydrocarbon oils; but as these are either a modification of soaps already made by the addition of hydrocarbon oil, or are shown by the specification to be prepared only in certain fixed and definite proportions, and also to be dependent upon the specific action of other ingredients for a successful result, and as they are prepared by certain stipulated processes, to which I make no claim, and as they are to be further refined and finished as commercial hard soaps from which the glycerine is necessarily eliminated, and as, moreover, my compound is not a finished or commercial soap, nor in any proper sense of the word a soap, but a compound in which one of the components is partially decomposed by the chemical reaction known as “saponification,” these soaps are not and cannot be the compound which I desire to patent.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A new composition of matter consisting, essentially, of a fatty hydrocarbon of vegetable or mineral origin and a vegetable or animal fat or oil in composition with the glycerine set free from the fat or oil by the addition of an alkali.

2. A new treatment for disintegrating the fiber from the stalk, leaf, or other fibrous portions of plants, consisting in boiling or washing the same in a solution of a compound composed of a fatty hydrocarbon of vegetable or mineral origin and a vegetable or animal fat or oil in composition with the glycerine set free from the fat or oil by the addition of an alkali.

3. A new treatment for removing from vegetable and animal fiber, either in the crude or manufactured state, the natural gums, tars, resins, or protecting pellicle of such fibers, either for cleansing or for the processes of



bleaching, dyeing, or printing, consisting in  
boiling or washing the fiber in a compound of  
a fatty hydrocarbon of vegetable or mineral  
origin and a vegetable or animal fat or oil in  
5 composition with the glycerine set free from  
the fat or oil by the addition of an alkali.

4. A new composition of matter consisting  
of a fatty hydrocarbon of vegetable or mineral  
origin and a vegetable or animal fat or oil in  
10 composition with glycerine and an alkali.

In testimony whereof I have signed this  
specification in the presence of two subscrib-  
ing witnesses.

FRANK B. GREENE.

Witnesses:

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