

UNITED STATES PATENT OFFICE.

WALTER O. SNELLING, OF PITTSBURGH, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO
DYER SMITH, OF MONTCLAIR, NEW JERSEY.

DUST-REDUCING MATERIAL.

1,258,637.

Specification of Letters Patent.

Patented Mar. 5, 1918.

No Drawing.

Application filed December 29, 1914. Serial No. 879,447.

To all whom it may concern:

Be it known that I, WALTER O. SNELLING, a citizen of the United States, and a resident of Pittsburgh, county of Allegheny, State of Pennsylvania, have invented certain new and useful Improvements in Dust-Reducing Materials, of which the following is a specification.

My invention relates to dust reducing materials and particularly to the preparation of dusting cloths, floor mops, sweeping compounds, etc., in which advantage is taken of the affinity which oils have for small particles of dust. In such devices, fabric saturated with suitable heavy oils in the form of dusting cloths, or floor mops, or sawdust, or the like, impregnated with such oils, as sweeping compounds, have been used for sweeping and cleaning floors, furniture, etc., the dust being taken up by the oil. These articles as they are commonly used have various defects which it is the purpose of my invention to overcome. Chief among these defects may be noted the great inflammability of many of the compounds used, and the greasiness or stickiness of various of them because of which objects cleaned are likely to be soiled. My invention provides articles of this character which are of as great or greater efficiency as dust removers than those previously known, have less tendency to grease an object against which they are pressed and are either fire-proof or at least slow burning in their character.

I find that the halogen compounds of many hydrocarbons, particularly polychlorinated ethane, propane, ethylene, and the like are both oily in their nature and quite non-flammable, and these substances have other desirable properties for the purpose of forming dusting cloths, sweeping compounds and the like. Examples of the substances referred to are ethane hexachlorid, ethane pentachlorid and ethylene tetrachlorid, and all of these substances may be referred to as poly-halogenated compounds of hydrocarbons containing two or more carbon atoms. By soaking cloth or other fabrics in one or more of these substances or by mixing sawdust with the same and heating until they become absorbed by the sawdust, I can obtain non-flammable articles of the character referred to having decided advantages for the purpose described. These

halogenated hydrocarbons may also be mixed with various heavy oils with results which I consider superior to those attained by the use of the halogenated hydrocarbons alone.

The oils which are commonly used for impregnating fabrics, etc., to act as dust removers perform this function efficiently but are quite greasy or sticky and are highly inflammable, and in the case of drying oils are subject to spontaneous combustion when distributed over cloths, rags, or any similar materials which acts as a heat insulator. Mineral oils, such as heavy lubricating oil, are commonly used for this purpose and sometimes inflammable vegetable oils. My invention contemplates, as stated, treating cloth, sawdust or other carrier for the oily ingredients with a mixture of a mineral oil or other oil commonly used for this purpose with one or more of the poly-halogenated hydrocarbons of the character above referred to. When a proper amount of the halogenated product is used, as for example fifty per cent. of the weight of the mineral or other inflammable oil, the mixture is non-burning, except when heated to very high temperatures. When an amount of the halogenated products is used which is insufficient to make a mixture of the oils, or the fabric impregnated with the same, non-burning, it still affects the combustion of the mass and prevents the other oil from burning with its customary vigor. Even the presence of but a small amount of one of the halogenated products referred to has a considerable flame repressing tendency upon a considerable amount of an inflammable oil mixed therewith.

Furthermore, a cloth or other fibrous or cellular material treated with a mixture of halogenated products and other oils as described above has the further advantages over dust removers carrying only the mineral or other commonly used oil in that there is less tendency for the dust remover to grease an object against which it is pressed, while at the same time it has at least an equal ability to pick up dust and retains this ability longer than the ordinary oily cloth. The halogenated products are, in feel and in general nature, much less greasy or sticky than are the other oils commonly used in the preparation of dust cloths, etc. When the halogenated products

are mixed with the heavy sticky oils, the halogenated oils act as solvents for the other oils so that the halogenated product seems to hold back or keep in solution any excess of oily or greasy matter over that required to be effective in picking up dust. As a result, the cloths or other materials treated in accordance with any invention have less tendency to grease the objects against which they are pressed than if they were treated with the ordinary sticky oil, while at the same time, the ability to pick up dust does not seem to be in any way lessened. I believe this to be because most of the oil except at the very surface of the fibrous or carrying body is held in more or less stable union or solution in the halogenated product, and that this union or solution is sufficiently strong to keep the oily or greasy matter from readily passing out of the fibers or carrier, but is not sufficiently strong to prevent the oil, under the influence of capillarity, from enveloping and sticking to dust particles and the like. As a result of this, a cloth containing halogenated products, together with other oils, feels much less greasy than does a similar cloth containing the other oils alone, the two cloths being of equal ability in picking up dust. Apparently also the cloth containing the halogenated products retains longer its ability for picking up the dust. Probably the two properties referred to are connected, the ordinary oily cloth being too oily when freshly prepared and losing its oil rather rapidly under conditions of use, while when the halogenated product is used in admixture with the other oil, it holds back or retains in dissolved condition most of the oil in excess of that required to pick up dust, and as it loses oil through absorption in dust or through drying, the mixture of halogenated product and oil gradually gives up oil so as to keep the surface fibers of the cloth in a condition of nearly equal greasiness throughout the life of the cloth.

The above may be understood clearly by a consideration of the action which takes place when a fibrous material, such as cotton wool for example, which has been wet with ordinary mineral oil, is pressed into contact with a dry wad of cotton wool of the same size, shape, etc. In this case capillarity would cause the second wad to take up oil from the first wad until equilibrium was established, when the oil was quite evenly distributed between the two wads. If, however, the first wad were wet with a mixture of oil and a solvent for oil, or a non-capillary material having an affinity for oil, equilibrium would be established long before the oil had evenly distributed itself between the first wad and the second or dry wad, since the oil-solvent present would exert a tendency to prevent as much of the oil from

running into the second wad, because of the capillary action. In accordance with the above considerations, it is evident that a cloth or similar body treated in accordance with my invention may be made to retain a greater amount of dust catching oily material than would such a body containing the oil alone, while at the same time the impregnated fabric would have the property of giving up a small amount of the contained oil whenever it was brought in contact with dust particles or the like. It may be mentioned that the saturating compounds comprised in my invention are insoluble in water, which is a property of obvious advantages for the purposes described.

In order to charge cloth or other carrier for the oil very lightly, I find an advisable method of procedure to be to dissolve the desired poly-halogenated mixture in gasoline or other volatile solvent for the oil and halogenized hydrocarbon used, by which means I may make a solution of any desired concentration. The cloth is then dipped into this solution and the gasoline or volatile solvent allowed to evaporate. By this means treated cloths may be made containing any desired amount of the poly-halogenated oil very evenly distributed throughout the cloth. I consider this method preferable to that of saturating the cloth or mop with the oil mixture and wringing the same out, which produces a fabric impregnated rather heavily with oil. As stated above, I consider the poly-chlorinated compounds of ethane, ethylene and similar hydrocarbons containing two or more carbon atoms to be the best adapted for my purpose. With this is mixed a suitable amount of an efficient oil for picking up dust, such as heavy lubricating or other mineral oil, with which it may be desirable to mix a small amount of a drying oil, but if a drying oil is used, the proportion of the halogenated product used should be somewhat increased to counteract the tendency of the drying oil to spontaneous combustion.

As specific examples of suitable substances to be used in impregnation, I may mention a mixture of approximately 60 per cent. of hexachlorethane with 40 per cent. of a light neutral lubricating oil, and a mixture of equal parts of light lubricating oil and chlorinated naphthalene. These may be applied either by partly saturating the porous fabric therewith, or by soaking the fabric in the oily mixture, and removing the excess by wringing, or by dissolving the substances in gasoline, with which the fabric is saturated, as stated above. A particularly satisfactory mixture for a floor mop is made by thoroughly mixing together, while warm, 25 per cent. of highly chlorinated

naphthalene, 25 per cent. of hexachloroethane, 15 per cent. of trichlorethylene, and 35 per cent. of a neutral lubricating oil of about 30° Bé., percentages referring to weight. The cloth to be treated is either saturated, and the excess removed by pressure, or the mixture is diluted with about twice its volume of gasoline, and the cloth soaked in the mixture for a few moments, wrung out carefully, and left to dry. In the above composition the chlorinated substances quickly dissolve in the lubricating oil, to form a homogeneous compound.

It should be noted that the heavy oils included herein and commonly used in dusting clothes are of low volatility, and that the halogenated carbon compounds which I add thereto are of similar low volatility. By absorbing these two admixed products into a porous fabric, or the like, a dust-remover is obtained, as stated, having marked adhesive properties toward dust and being at the same time free from fire hazard. It should also be noted that the product obtained is capable of removing dust from furniture without having any solvent or damaging action upon paint or varnish.

Polychlorinated bodies, such as polychloroethane, mentioned herein, are well recognized as having a solvent effect upon paints, and to be efficient paint removers. My invention, on the contrary, comprises the discovery that, when used in conjunction with mineral oils in suitable proportions, and applied to cloth or other fibrous materials in quantity only sufficient to thoroughly saturate the fibers, the halogenated hydrocarbons described no longer have paint-removing properties. The product of my invention may, on the contrary, be safely used to wipe off the surfaces of painted objects, for which purpose it serves admirably as a cleaning agent and enables painted and varnished articles to be kept free from dust.

Having now described my invention what I claim and desire to protect by Letters Patent is as follows:

1. A dust-remover, comprising a fabric lightly charged with an oil having affinity for dust and a non-flammable oily solvent for said oil, both said oil and solvent being insoluble in water and both of the same being of low volatility.

2. A dust-remover, comprising a fabric impregnated with a mixture of an oily substance, adapted to pick up dust when brought in contact therewith, and a polyhalogenated oil compound of a hydrocarbon containing at least two carbon atoms to the molecule, said oily substance and compound being both of low volatility and the dust-

remover having no solvent or damaging action on paint or varnish.

3. A dust-remover, comprising a fibrous material lightly charged with a mixture of an oily substance adapted to pick up dust when brought in contact therewith and an oily compound of a hydrocarbon containing halogen, said oily substance and compound being both of low volatility.

4. A dust-remover, comprising a fibrous material lightly charged with a mixture of a heavy oil of low volatility adapted to pick up dust when brought in contact therewith and a polychlorinated compound of ethane.

5. A dust-remover, comprising a fibrous material charged with a mixture of an oily substance adapted to pick up dust when brought in contact therewith and a non-flammable, non-capillary oily substance having an affinity for said first-named oily substance, both said substances being of low volatility.

6. A dust-remover, comprising a fibrous material lightly charged with an oily substance adapted to pick up dust when brought in contact therewith, comprising a mineral oil and non-flammable halogenated hydrocarbon substances in solution with said oil, said mineral oil and halogenated substances being all of low volatility.

7. A dust-remover, comprising a fibrous material charged with an oily substance comprising a mineral oil, chlorinated naphthalene, and a polychlorinated hydrocarbon of the series C_nH_{2n+2} .

8. A dust-remover comprising a fibrous material charged with an oily substance comprising a mineral oil, chlorinated naphthalene, and non-flammable halogen compounds of ethane and ethylene.

9. The process of forming a dust remover, consisting in dissolving a poly-halogenated non-flammable oily hydrocarbon, containing at least two carbon atoms to the molecule, in a volatile solvent therefor, to make a solution of desired concentration, dipping a fibrous substance therein, and permitting the volatile solvent to evaporate.

10. The process of forming a dust-remover, consisting in dissolving a mixture of an oil and a non-flammable halogenated oily hydrocarbon in a volatile solvent therefor, to make a solution of desired concentration, dipping a fibrous substance therein, and permitting the volatile solvent to evaporate.

This specification signed and witnessed this 22nd day of December, 1914.

WALTER O. SNELLING.

Witnesses:

M. R. McKEOWN,
K. KELLY.

It is hereby certified that in Letters Patent No. 1,258,637, granted March 5, 1918, upon the application of Walter O. Snelling, of Pittsburgh, Pennsylvania, for an improvement in "Dust-Reducing Materials," errors appear in the printed specification requiring correction as follows: Page 1, line 68, for the word "materials" read *material*; page 2, line 8, for the word "any" read *my*; page 3, line 58, for the word "oil" read *oily*; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 16th day of April, A. D., 1918.

[SEAL]

F. W. H. CLAY,

Acting Commissioner of Patents.

Cl. 87—5.