Patented May 11, 1937 2,079,827

UNITED STATES PATENT OFFICE

2,079,827

WEED KILLING COMPOSITIONS

William Hunter Volck, Watsonville, Calif., assignor to California Spray-Chemical Corporation, Berkeley, Calif., a corporation of Delaware

No Drawing. Application July 5, 1932, Serial No. 620,984

7 Claims. (Cl. 167—45)

The invention, in general, relates to sprays for the control of noxious plants, and more particularly relates to petroleum base compositions and to the method of preparation thereof for such use.

While a large number of the compositions in present use for destroying weeds are generally effective in that respect, many of the compounds possess inherent qualities which render their use dangerous. For example, weed killing compounds such as arsenical dust and sodium arsenate have been effectively used but cannot be employed with safety in vicinities where cattle feed, because of the danger of poisoning the stock. Other commonly employed compositions such as sodium or calcium chlorate have given satisfactory results in so far as control is concerned, but the treated areas present fire hazards, inasmuch as these compositions oxidize readily and combustion is likely to occur if glass is lying about in the treated areas, as is often the case.

Natural petroleums or fractions thereof also have been used more or less extensively for weed killing, inasmuch as it has been discovered that these oils contain certain amounts of herbicidal ingredients. Further, a liquor containing these herbicidal impurities of oil, in concentration, has been somewhat effectively employed, the liquor being an extract of petroleum distillates containing the unsaturated constituents thereof and obtained by treating the distillates with sulphuric acid. This extract is commercially known as "sludge".

I have discovered that certain fractions, such as gasoline and kerosene, are less herbicidal than stove distillates, and that the latter, in turn, are less herbicidal than lubricating oils and that this less herbicidal property of the lighter fractions is, in the main, due to the greater rapidity with which the herbicidal ingredients of such lighter oils are evaporated and removed from the plant. The use of the natural petroleums, fractions thereof, or of "sludge" is attendant with several disadvantages and unsatisfactory results. In general, an unsightly residue is left in the treated areas and, in the case of sludge, the presence of free acid therein eats the equipment necessary for applying the same. Further, the sludge is of such viscosity as to be unmanageable, and often plugs the equipment.

It is an object of my invention to provide a commercial herbicide which is relatively simple and inexpensive to prepare, which is readily applied to the plants, and which, upon application, does not leave an unsightly residue nor a residue which is injurious to animal or human life, nor which presents a fire hazard.

A further object of the invention is to provide a herbicide which will retain its effectiveness over a relatively long period of time, for a given quantity applied.

Other objects of the invention, together with some of the advantageous features thereof, will appear from the following description of the preferred embodiment of the invention and the preferred process of preparation thereof.

The weed killer of my invention is preferably made from a petroleum base and, in its preferred form, comprises a composition, either emulsified or unemulsified, consisting of natural petroleums, fractions or products thereof, or extracts containing unsaturated and/or aromatic constituents thereof, together with sulphur preferably to the point of saturation.

In the next preceding paragraph, I have referred to extracts of petroleum or petroleum distillates containing unsaturated constituents of such oils as exemplifying one of the types of bases for my composition. The extracts to which I refer and which may form bases for the preferred embodiment of my invention are not the extracts commercially known as "sludge", hereinbefore mentioned, but rather are extracts obtained by treating petroleum distillates with liquefied sulphur dioxide. Extracts of this character and the process of manufacture thereof are described in United States Letters Patent No. 911,553, issued on February 2, 1909 to Lazar Edeleanu, and are commercially known as "Edeleanu extracts".

The addition of sulphur to any oil, that is, to natural petroleums, fractions thereof, or to the aforementioned extracts, materially increases the effectiveness thereof as a weed killer, and I have found that the more sulphur dissolved in the oil, the greater the toxicity of the composition. Accordingly, any of the oils, in accordance with my invention, are sulphur saturated.

At slightly higher than normal atmospheric temperatures only a certain amount of sulphur will dissolve in the oils and the quantity of sulphur which can be introduced varies, of course, in accordance with the basic oil used. For example, I have found that a sulphur dioxide kerosene extract dissolves in the neighborhood of 7.7 grams of sulphur to approximately 500 cc. of the extract, which is 58 grams to the gallon or, in the order of approximately one tenth of a pound of sulphur per gallon of the extract. Increased quantities of sulphur, perhaps in the

form of addition products, may be introduced into the oils by their contact with sulphur at super-atmospheric temperatures, preferably in a closed system, and under super-atmospheric pressures. Such additional sulphur, although not in free or elemental form, has valuable herbicidal properties. Obviously, the introduction of additional sulphur in this form should not be effected at temperatures sufficiently high to cause the formation of such condensation and/or polymerization products as may be precipitated from solution.

While I have found that any sulphur saturated oil is exceedingly effective in the destruction of weeds, in order to provide a herbicide which does not leave an unsightly residue in the treated area and a herbicide which can be readily sprayed with a conventional spray device, I preferably employ, as a base for the composition, the lighter fractions. I have also used successfully a sulphur saturated mixture of sulphur dioxide extract, in the amount of approximately 25% by weight, and Diesel oil 27 plus, in the amount of approximately 75% by weight. Although, as hereinbefore stated, these lighter fractions alone have less phytocidal properties than the heavier fractions due to the greater rapidity with which the herbicidal components of such lighter oils are evaporated and removed from the plant, I have found that these lighter oils, when saturated with sulphur, are of such viscosity as to permit of the formation of films and of the retention thereof for appreciable periods of time upon the plant surfaces, thereby resulting in effective control of the weeds before evaporation of the oils.

In order to use the product of my invention economically as a spray, I may form an emulsion thereof by dissolving an agent in the mixture of oil and sulphur which will permit a uniform mixture of the product and water to take place, and which stabilizes the emulsion. Preferably, a miscible oil is first formed by dissolving in the sulphur saturated oil a soap containing pine oil, although creosote soaps can be used if desired. The miscible oil is then mixed with water, a satisfactory mixture being one part of the solution to approximately eight parts of water, although the amount of water mixed with the solution is not critical.

Instead of incorporating a prepared soap into the weed killer oil mixture, I may add thereto a fatty acid, such as oleic acid, or a mixture of oleic acid and resin, in such proportions that mixtures of the weed killer oil and water will emulsify upon the addition of an alkaline substance, such as caustic soda, caustic potash, sodium carbonate, ammonia, sodium polysulphide, ammonium polysulphide, or a mixture of ammonia and sulphite waste liquor. The character of the emulsion so formed is determined by the percentage of fatty acids in the oil and the alkaline substance added to form normal emulsions in which the oil particles are surrounded by and dispersed in water. The preferable percentage of fatty acid to oil may vary from one to five per cent, and the alkali is preferably sodium hydrate or ammonia. The quantity of alkali preferably is sufficient to saponify the fatty acid and not greatly in excess of this amount.

While I have described the preferred embodiment of my composition and process of preparation thereof, it is to be understood that the appended claims are to be accorded a range of equivalents commensurate with the state of the prior art.

I claim:

1. A weed killing composition comprising uncombined sulphur dissolved in a petroleum oil base containing unsaturated constituents, the sulphur being in amount sufficient to make a substantially saturated solution.

2. A weed killing composition comprising uncombined sulphur dissolved in an extract of a distillate of petroleum which distillate has a sufficient amount of unsaturated constituents therein to render it herbicidal to an appreciable extent, the sulphur being in amount sufficient to make a substantially saturated solution.

3. A weed killing composition comprising uncombined sulphur dissolved in a petroleum oil substantially completely soluble in liquid sulphur dioxide, the sulphur being in an amount sufficient to make a substantially saturated solution.

4. A weed killing composition comprising uncombined sulphur dissolved substantially to the point of saturation in a mixture of approximately 75% by weight of Diesel oil 27 plus and 25% of liquid sulphur dioxide extract of petroleum oil.

5. A weed killing composition comprising uncombined sulphur dissolved in a petroleum oil base, which oil contains a sufficient amount of unsaturated hydrocarbons to render it herbicidal to an appreciable extent but which is sufficiently volatile not to leave a residue injurious to animal life after application, the sulphur being in amount sufficient to make a substantially saturated solution.

6. A weed killing composition comprising uncombined sulphur dissolved in a petroleum oil of kerosene boiling point range substantially completely soluble in liquid sulphur dioxide, the sulphur being in an amount sufficient to make a substantially saturated solution.

7. A weed killing composition comprising uncombined sulphur dissolved substantially to the point of saturation in a liquid sulphur dioxide extract of a petroleum oil.

WILLIAM HUNTER VOLCK.