

UNITED STATES PATENT OFFICE.

DAVID P. CLEVELAND, OF DALLAS, TEXAS, ASSIGNOR TO UNIVERSAL PAINT REMOVER AND MOTOR CLEANING COMPANY, OF DALLAS, TEXAS, A COMMON LAW COMPANY HAVING AS ITS TRUSTEES ED WILKERSON, J. A. BERGFELD, AND DAVID P. CLEVELAND.

PROCESS OF REMOVING SURFACE FINISH.

1,355,074.

Specification of Letters Patent.

Patented Oct. 5, 1920.

No Drawing.

Application filed December 30, 1919. Serial No. 348,472.

To all whom it may concerns

Be it known that I, DAVID P. CLEVELAND, citizen of the United States of America, residing at Dallas, in the county of Dallas and State of Texas, have invented certain new and useful Improvements in Processes of Removing Surface Finish, of which the following is a specification.

The present invention relates to the removal of paint, enamel, varnish, lacquer and the like from surfaces of coated articles, and has special reference to the removal of such coatings after they have dried and have been partly worn out, for the purpose of repainting or refinishing the article. The coated articles under treatment may be carriages, automobiles, furniture, walls, floors, or other coated objects, which it is desired to repaint or refinish, and the process is especially useful in connection with the removal of paint and varnish from automobiles.

Various compositions under the name "paint or varnish remover" have heretofore been employed for this purpose, many of which contain an alkali, these compositions being usually applied with a brush or mop, and after being allowed to stand, the coating may be scraped off with a putty knife, or some similar tool. Another recognized method is by immersing the article in the paint-remover liquid, for a desired period. In accordance with the present invention, the preferred mode is to apply a spray of an alkali solution, this being preferably sprayed or atomized onto the surface under treatment, by means of a jet of steam, and the liquid being thereby applied to the surface at approximately a boiling temperature. The preferred mode is to use a relatively large amount of steam, and a relatively small amount of the alkali solution, the latter being conveniently supplied to the nozzle or sprayer by gravity as from an elevated tank, or in other words the solution reaches the nozzle under some hydrostatic pressure. In this mode of operation wet steam is entirely suitable, and this acts not only to heat and atomize or spray the solution, but also such an excess of steam is used that it heats the surface of the article being treated to about the boiling point of the liquid. This method, especially when using the particular solution or mixture referred

to below, completely loosens the coating, so that it can readily be washed off.

It is preferable to apply steam with the mist of liquid particles, in such an amount as will not only thoroughly heat the work and the paint remover liquid, but also to furnish, by condensation, water in amount capable of washing off a large part, or even all, of the loosened pigment of the paint.

Paints and varnishes, when the same have dried on the surfaces of painted articles, consist largely of oxidized and dried oils, resins, gums, etc., together with insoluble pigments and the like. The action of the hot alkali on such a product is to saponify the organic material. This is, when saponified, in solution in the water contained in the paint remover liquid and the further amounts of water produced by condensation of steam, tend to quite thoroughly wash off the soapy solution and loosened pigment, together with whatever dirt, dust, etc., may also be present. This action is especially useful as applied to vertical or other non-horizontal surfaces. A mode of operation is this:—first to apply the remover liquid by atomization, while supplying a considerable excess of wet steam and supplying the liquid to the atomizer under some pressure, *e. g.*, by gravity. The workman holds the atomizer in his hand, and moves the same horizontally back and forth, across the upper part of a given area of the surface. This operation is continued, gradually working downwardly over the surface under treatment, until a considerable amount of surface has been cleaned. This operation is continued, on each portion of surface, until the paint and varnish are thoroughly removed.

During this treatment, the alkali solution in contact with the work being treated, is maintained substantially at the boiling point, and the surface is constantly kept hot by the continued application of the steam.

Since alkali solutions, especially if hot, would usually injure trimmings and the like (made of leather, artificial leather, cloth, plush and similar materials), it is sometimes advisable to first clean off a strip, say a few inches wide, from the portions of the painted surface adjacent to such trimmings, by any ordinary paint-removing methods.

When the paint and varnish have been loosened and substantially all removed from the surface, or from some part thereof (say the back of an automobile) it is advisable, but not necessary, to shut off the flow of paint-remover liquid to the atomizer, and to then go over the entire surface (which may have cooled more or less in the mean time) with a steam jet, to wash off adhering particles of pigment, flakes of loosened paint, and particularly the adhering film of dried paint remover. Or the entire job may be finally washed with a stream of hot or cold water from a hose, nozzle or atomizer.

In some instances it is advisable to apply to the surface from which the paint has been removed, a material having an acid reaction (acetic acid being suitable) for the purpose of completely neutralizing any residue of alkali. This step is optional, and if used will, of course, be followed by a washing with water.

This leaves the original surface, practically as it stood before the original painting. It is usually unnecessary to sandpaper the work before repainting, although a light rubbing with steel wool or fine sand-paper may be advisable in some cases.

After thoroughly drying the surface, the work is then ready for repainting, reenameling or other like operations.

It has been found that surfaces from which the paint has been removed by this process, will more readily take a new coating of paint.

The paint-remover solution preferably used is a dilute solution of a fixed caustic alkali. It is advisable to also have present in the solution a quantity of an alkaline earth hydrate, such as hydrated lime.

The solution can be varied considerably and a convenient and efficient solution for removing paint from automobiles (the original painted surface being metal) is one made by adding 10 pounds of caustic soda and one and one-quarter pounds of lime, to 25 gallons of water. The lime precipitates any carbonate originally present in the caustic soda and a small amount of dissolved lime in the solution seems to be helpful. Caustic potash could also be used, as a substitute for all or a part of the caustic soda. The mixture is preferably made up, stirred well and settled, after which it may be drawn off from the sediment or precipitate. The proportions and strength can be varied to a considerable extent. Of course, solutions of such a strength that they would injure the metal or wood or other material from which the paint is being removed, should not be used.

The above described solution is merely one of the efficient and suitable mixtures which have been found to give good results in the process, and the invention is not lim-

ited thereto. Any solution of fixed caustic alkalis of suitable degree of concentration can be employed.

The process is one which lends itself readily to the treatment of vertical or non-horizontal surfaces, the liquid reaction products flowing away from the finished work by gravity.

By the use of this invention it is possible to clean the surfaces in a remarkably short time, and with a minimum amount of hand labor. It has been repeatedly demonstrated that all the paint from a 7-passenger automobile can be removed by this process, in less than an hour. This includes removal of the paint from the fenders and hood, as well as from the body.

The present application is in part a continuation of my prior application Serial No. 300,583, filed May 29, 1919.

What I claim is:

1. In the removal of finish coating, the step of maintaining the surface portions of the work undergoing treatment, at a temperature not substantially below the boiling point of water, by directing against such surface, by the agency of a hot vapor-form fluid, a spray jet of finish remover comprising a solution of a fixed alkali, such jet containing steam.

2. In the removal of finish coating, the step of maintaining the surface portions of the work undergoing treatment, at a temperature not substantially below the boiling point of water, by directing against such surface, by the agency of a hot vapor-form fluid, a spray of finish-remover comprising a solution of a fixed alkali, such jet containing steam; and simultaneously supplying hot liquid to the point of application of the finish-remover in amount sufficient to completely remove the products of the reaction of the alkali with ingredients of the finish.

3. A process of removing finish coating from an article, which comprises the step of simultaneously applying steam and a jet finish-remover containing a dilute solution of a fixed caustic alkali, to the surface of said article, the amount of steam being sufficient to maintain the caustic solution on the surface in substantially a boiling condition until the finish is disintegrated.

4. A process of removing finish coating from an article, which comprises the step of spraying by the agency of a jet of steam, onto the surface of said article, a dilute solution in water containing a fixed caustic alkali, the amount of steam being sufficient to maintain the caustic solution on the surface in substantially a boiling condition until the finish is disintegrated.

5. The improvement in the art of removing paint and varnish which comprises atomizing against a non-horizontal surface by

means of a jet of wet steam, a dilute aqueous solution containing as an ingredient a fixed caustic alkali, the amount of steam being sufficient to maintain the solution and the surface of the work at a temperature approximating the boiling point of water, whereby the liquefied products of reaction can flow from the surface by gravity.

6. A process of removing finish coating from an article, which comprises loosening the coating by forcibly directing against the surface of such article a hot elastic fluid comprising steam and a spray of dilute hot solution comprising an alkali metal hydroxid and water, the volume of steam being many times larger than the volume of solution and being sufficiently large to maintain the surface hot during the treatment, and to loosen and wash off at least a large part of the finish coating.

7. A process of removing finish coating from an automobile having non-horizontal painted and varnished metal surfaces, which comprises spraying upon such surfaces by the agency of a relatively large volume of steam, a jet of paint and varnish remover containing a fixed caustic alkali, while moving the jet over the said surfaces, a part of the excess of steam condensing to form water on the surfaces to aid in flowing off the disintegrated paint and varnish material, and reaction products.

8. The process of removing finish coating from an article which comprises the step of directing upon the surface of said article a jet comprising steam and an aqueous solution of a fixed caustic alkali at such a high temperature and in such volume as to effect disintegration and removal of at least the major part of the finish coating.

9. A process of removing finish coating from an article which comprises the step of atomizing by the agency of a jet of steam, onto the surface of said article, a dilute solution in water containing a fixed caustic alkali, such solution being applied to the sur-

face hot and being of sufficient strength to disintegrate the finish coating.

10. A process of removing finish coating from an article, which comprises the step of spraying by a jet of a hot elastic fluid including steam, onto a hot surface of said article, a dilute solution comprising a caustic alkali in water, said solution being of sufficient strength and in sufficient amount to disintegrate said finish coating and to remove at least the greater part thereof.

11. A process of removing finish coating from articles, which comprises the step of spraying by the agency of a jet of steam, onto the surface of said articles, a dilute solution in water containing a fixed caustic alkali.

12. The improvement in the art of removing paint and varnish which comprises spraying against a non-horizontal surface by means of a jet of steam, a dilute aqueous solution containing as an ingredient a fixed caustic alkali.

13. A process of removing finish coating from articles, which comprises the step of spraying, by the agency of a jet of hot elastic fluid onto the surface of said articles, a dilute solution comprising an alkali metal hydroxid and a somewhat soluble alkaline earth metal hydroxid, in water.

14. A process of removing finish coating from articles, which comprises loosening the coating by spraying upon the same by the agency of a hot elastic fluid, a dilute hot solution comprising an alkali metal hydroxid, milk of lime, and water, and washing off the loosened coating.

15. A process of removing finish coating which comprises causing a jet of steam and a jet of alkaline paint remover liquid to mix, and directing the mixed jet against the surface of the work, the amount of steam being sufficient to maintain the surface of the work at about the boiling point of water.

In testimony whereof I affix my signature.
DAVID P. CLEVELAND.