Patented Jan. 9, 1940 2,186,067

UNITED STATES PATENT OFFICE

2,186,067

METHOD OF DRYING SURFACES AND APPARATUS THEREFOR

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No Drawing. Application January 23, 1939, Serial No. 252,428

4 Claims. (Cl. 34—24)

This application is an improvement of my Patent 1,998,615.

The above-mentioned patent covers a method of drying paint by the use of radiation having a wave length of between 1.6 and .6 microns. The carbon filament radiator disclosed in the patent emits radiation, the major portion of which lies within the above-mentioned band, and reflectors are shown behind each of the radiators whereby the radiating efficiency is increased. However, it has been found that with all conventional reflectors the longer wave lengths are less efficiently reflected than the shorter wave lengths. Thus, radiation of the required wave band is projected on the work directly by the radiator but that portion of the radiation which is reflected lays within a wave band shorter than desired.

The object of this invention is to provide a reflector by means of which the longer wave length will be reflected with a greater degree of efficiency than the shorter wave lengths. With my improved reflector radiation of .6 microns is reflected with an efficiency of approximately 85%, while a radiation of 1.6 microns is reflected with an efficiency of approximately 95%. Thus, a greater proportion of the longer radiation is reflected. Numerous tests have shown a material reduction in the drying time results with these reflectors, that is, the thermal efficiency of the method is increased.

A further object of my invention is to provide a reflector, as above described, which may be periodically cleaned without materially lowering its reflective efficiency. When this apparatus is used in drying the paint on automobile bodies and the like, the paint is invariably sprayed onto the work. Particles of the paint float in the air and deposit upon the reflectors. Dust particles that are carried up by the cloud of vaporized thinners also collect upon the reflecting surfaces and lower their reflecting efficiency. This does not occur immediately but usually takes several weeks of continuous operation to appreciably affect the reflecting efficiency of the unit. It is therefore a requisite that whatever reflecting surface is used, it must be capable of being periodically cleaned so as to retain the reflectors at their original reflecting efficiency.

With these and other objects in view, my invention consists in the method of drying surfaces by the use of direct radiation of specified wave lengths together with the use of reflected radiation of a longer wave length, the reflecting surface being capable of being periodically cleaned so as to retain the reflectors at their original efficiency. The selection of a suitable reflecting surface might be ascertained by data well known in connection with selective wave radiation reflection. Still, because the reflecting surface must be one which may be readily cleaned, this limitation would prevent the selection of certain surfaces which otherwise might be thought preferable.

The following tables illustrate the reflecting efficiency of silver, gold, copper, aluminum and nickel surfaces for reflecting radiation within the wave band claimed in the above-mentioned patent:

Wave length in microns	Efficiency in per cent
SILVER	
.6	92
1.0	96
1.6	98
GOLD	
.6	84
.8	95
1.0	97
1.2	98
1.4	97
1.6	95 (estimate)
COPPER	
.6	72
1.0	93
1.6	95
ALUMINUM	
.6	72
1.0	73
1.6	80
NICKEL	
.6	65
1.0	74
1.6	80

From the above table it would normally be expected that a silver surface would be considerably more efficient than the other surfaces listed. However, silver oxidizes rapidly so that the initial efficiency only lasts for a few hours under the heat and fumes unavoidable in drying paint. In practice the maximum working efficiency of a silver surface is fully 40% less than that given in the table. Aluminum as a reflector is much

less efficient than silver surfaces but retains its reflecting powers longer. Copper likewise has an original reflecting efficiency of 72% to 95% but oxidizes so rapidly that this condition can only be maintained for a short period. Nickel retains its efficiency longer than either copper, aluminum or silver but has a comparatively low reflecting efficiency being but 65% to 80% so that nickel reflectors get abnormally hot in operation.

A gold surface has a deflecting efficiency of 84% for radiation of .6 micron wave length while the reflecting efficiency is increased to approximately 95% for radiation of 1.6 microns. Consequently, when the gold reflecting surface is used the reflector stays comparatively cool. An unexpected result from the use of a gold reflecting surface is that the thinners which may condense on the reflector due to its cooler surface may be periodically removed with a weak caustic solution without in any way impairing the reflecting efficiency of the surface. The result is that a high degree of working efficiency is not only initially obtained but is maintained indefinitely. Any other reflecting surface known to the applicant is objectionable either because of its lower efficiency of reflection or because of the inability of the reflector to retain its initial efficiency or because of the inability of the reflector to be cleaned from the condensed products unavoidably deposited thereon.

My improved method therefore comprises simultaneously drying the surface by the use of direct radiation having a wave length of .6 to 1.6 microns and with radiation of similar wave length which has been reflected from a gold surface.

In carrying out my improved process I provide conventional paraboloidal shaped reflectors which are plated on their inside surfaces with gold and the gold buffed to a high polish. Standard 250 watt carbon filament lamp bulbs are used within the reflectors. The reflectors are focused on the work so that radiation of from .6 to 1.6 microns is projected directly by the bulbs while radiation averaging slightly longer in wave length is projected upon the work by the reflectors. The wave length of the combined radiation averages slightly longer than the average of that emitted by the bulbs.

After the reflectors have been in use in most installations for three weeks to a month the reflectors are removed and dipped in a weak caustic solution which cleans the gold surfaces of all foreign material. Replating is not required, the reflectors being in condition for replacement to operate at their original efficiency.

Some changes may be made in the method of carrying out my improved process without departing from the spirit of my invention and it is my intention to cover by my claims such changes as may reasonably be included within the scope thereof.

I claim as my invention:

1. A method of drying surfaces comprising, exposing the material to be dried to radiation of a wave length between .6 and 1.6 microns which is projected thereon directly from a radiating source, and simultaneously exposing said material to radiation from said source which has been reflected from a gold surface.

2. The method of drying point comprising, exposing a wet painted surface to radiation of a wave length between .6 and 1.6 microns which is projected thereon directly from a radiating source, and simultaneously exposing said surface to radiation from said source which has been reflected from a gold surface.

3. The method of drying paint comprising, exposing a wet painted surface to radiation, the major portion of which is of a wave length between 1.6 and .6 microns, and simultaneously exposing said surface to reflected radiation which averages slightly longer in wave length, said reflected radiation being obtained from a gold surface.

4. An apparatus for drying surfaces comprising, a radiating source emitting radiation uniformly in substantially all directions disposed adjacent to said surface, the major portion of which radiation is of a wave length between 1.6 and .6 microns, and a gold reflecting surface disposed behind said source which reflects a portion of said radiation upon the surface to be dried.

FREDERICK J. GROVEN.

CERTIFICATE OF CORRECTION.

Patent No. 2,186,067. January 9, 1940.

It is hereby certified that error appears in the above numbered patent requiring correction as follows: In the grant, line 1, and in the heading and signature to the printed specification, name of inventor, for "Frederick J. Groven" read Fredrick J. Groven; page 2, first column, line 10, for "deflecting" read reflecting; second column, line 24, claim 2, for the word "point" read paint; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 9th day of April, A. D. 1940.

(Seal)

Henry Van Arsdale,
Acting Commissioner of Patents.

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