

UNITED STATES PATENT OFFICE

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PROCESS OF TREATING OILS AND PRODUCT THEREOF

No Drawing.

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My invention relates particularly to a process of treating drying or semi-drying oils to cause them to dry, set or body faster than oils not so treated, and product thereof.

5 The object of my invention is to provide a process of treating drying or semi-drying oils in such a manner as to cause them to dry, set or body faster, and in a different way and with a different result than in previous processes, due to the treatment to which they are subjected. In carrying out my invention I subject drying or semi-drying oils to the action of electrons or cathode rays emanating from a tube of the type of the 15 Coolidge cathode ray tube, which are called electrons or cathode rays, which is described in detail in the articles entitled "The production of high-voltage cathode rays outside of the generating tube" by W. D. Coolidge, published in The Journal of the Franklin Institute, December 1926, and an earlier form of which is the Lenard cathode ray tube which is described by P. Lenard in Ann. d. Phys. 51, pp. 225-267 (1894). These elec- 20 trons, or cathode rays, are caused to emanate from a metal plate or other window formed in the tube. Preferably, in carrying out my invention I provide a tube of this type having a window of larger area than disclosed in the above mentioned publications, although this is not essential. The effects attained in accordance with my invention may be secured by the treatment of such oils, whether raw or previously heat-bodied or 25 boiled or blown or refined or otherwise processed, and the effect of this treatment is not only to cause them to dry or set or body faster, but in a different way and with a different result, as will hereinafter appear.

40 While the theory of the action referred to is not completely and wholly understood, there are certain actions which take place, due to the impinging of the electrons upon the oil, etc. For example, when the said rays strike against the molecules of oxygen, nitrogen, or other gases, there is an ionization of the molecules of the said gases in addition to the action which is caused by the striking of the oil molecules by said electrons, 45 resulting in the formation of X-rays, which

have a distinct effect in bringing about the drying, setting or bodying of the oil above referred to. Furthermore, the rays passing through the air result in the formation of ozone, oxides of nitrogen and, also, an "active 55 nitrogen". The drying, setting or bodying effect due to the ozone as well as to nitrogen including the "active nitrogen", has been demonstrated by actual test. There is also a "corona" effect due to the strained electro- 60 static field acting upon the oils, or products made from or containing them, which aids in the drying action.

These oils may be subjected to the electrons or cathode rays, in bulk or in films, whether 65 previously untreated or previously partially set, dried or bodied, as hereinafter referred to more in detail. Also, when the films of the oils are exposed to the rays in a position near the window of the tube, peculiar as well as beautiful wrinkled or patterned effects are produced in the films of oil. 70

In this way products of many different kinds may be so obtained, or treated by my process in some stage of their manufacture, 75 as, for example, patent leather, oil cloth, oil fabrics generally, linoleum, window-shade materials, paint, oils, varnishes, enamels, lithographic varnishes, printing inks, lacquers, etc., and in producing such products the surface of drying oil to be treated may be obtained by brushing, flowing, dipping, 80 spraying, and may have been partially dried or set or bodied on the surface, if desired, followed by setting, drying or bodying through the action of the said electrons or cathode rays. 85

While my invention is capable of being carried out in many different ways, for the purpose of illustration I shall describe only certain ways of carrying out the same hereinafter. 90

For example, in carrying out my invention, the oils treated may be of any of the drying or semi-drying oils, as, for example, linseed 95 oil, China wood oil, corn oil, cottonseed oil, etc., the oils used for this purpose being any such oils at any stage from the raw state to the wholly or partially set, dried or bodied, as, for instance, in the form of a film. Also, 100

drying or semi-drying oil materials, by which I mean drying or semi-drying oils or products made from them or containing them, can be exposed in a stationary position before the window of the tube so that the rays strike the surface normally, or at an angle thereto, or they may be moved past the window by some suitable device such as a conveyor, or conveying action arranged to expose the same thereto for the desired length of time. Or, if desired, they may be located in a vessel rotated on an axis located at an angle to the path of the electrons or rays in front of the window. Again, if desired, they may be exposed to the electrons or rays by means of a rotating drum or roller dipping into the oil in a vessel so that the rotation of the drum or roller carries the oil from the vessel through the air or gas in front of the window, and thus exposes it to the rays. Again, if desired, instead, the oil may be sprayed through a chamber in the form of fine droplets or mist, and thus exposed to the action of the rays. It is to be understood that many other methods of subjecting them to the rays may be used, if desired, according to the particular circumstances of each particular treatment. As above referred to, the oils or products made therefrom, or containing them will be acted upon more rapidly the nearer they are located to the window of the tube. Also, if the vessel in which they are contained is evacuated to some extent up to a high degree of vacuum, the effectiveness of the rays is found to be increased in the setting, drying or bodying of the oils. Generally, the effect of the treatment is to increase the temperature of the body exposed to the rays, but for some purposes it may be found advantageous to subject the oils or products made from or containing them to an elevated temperature to speed up the action or change the type of action. Or, in other cases, it may be found desirable to cool them to hinder some reactions and accentuate others. Also, the effectiveness or speed or action may be varied according to the design of the tube used, and particularly the voltage used therein. Generally speaking, however, it is found that by the use of such a tube the setting, drying or bodying takes place with extraordinary rapidity, and may be even completely effected according to the conditions of the particular treatment from within a few minutes to an hour or so in a given instance.

Of course, the speed in the particular instance will be determined to some extent by the many conditions or factors bearing upon the setting, drying or bodying of such oils. For instance, this action will depend to some extent upon whether or not driers are present, or in what percentage they are used in the composition, such, for example, as metallic soaps or other accelerators such as resins or linoleates, or other compounds of

lead, cobalt, manganese, iron or other metals, inasmuch as such accelerators, as well as any other auxiliary setting, drying or bodying agents would to some extent decrease the time of treatment required in the particular instance.

It will also be understood that any other desired constituents may be present in the oils during the treatment, or added thereafter, in making paints, oils, varnishes, enamels, etc., therefrom, or any other of the manifold manufactured products which can be produced thereby or from the use of the materials made in accordance with my invention. For instance, any desired pigments, driers, thinners, solvents, plasticizers, etc., may be added, as well as any desired gums, resins, etc. Thus, it will be understood that my invention is useful in the processing of any of the products hereinabove referred to.

In order that my invention may be better understood, for the purposes of illustration, I give the following specific instances showing how the same has been applied:

Example No. 1.—Patent leather was prepared in the usual manner with three coats of linseed oil finished and dried completely except for the final treatment of sun exposure. This treatment demands eight hours exposure to direct sunlight. Samples of this leather were exposed to the rays generated in a Coolidge cathode tube operated on one milli-ampere at a pressure of 250 kilovolts. The samples were held 10 inches from the window of the tube parallel to the window and exposed for ten minutes. Such exposure gave a more complete and better finish than eight hours exposure to sunlight, so that the samples could safely be faced together and shipped.

Example No. 2.—A rotary drum was positioned horizontal with its curved face at a minimum distance of 3 inches from a tube similar to that referred to in Example No. 1 and operated by a like current. This drum dipped into a dish of linseed oil and rotated very slowly so that the film of oil was exposed to the action of the cathode rays for about 2 minutes. The treated oil was scraped from the drum after such exposure. The resulting product was bodied approximately to "F" on the Gardner scale, but dried far faster than oil which had been bodied to a similar extent by the usual heat treatment.

Example No. 3.—Printed linoleum was exposed to a similar tube using a like current to that described in Example No. 1 for 10 minutes at distances ranging between 4 and 6 inches from the window. This exposure produced a drying equivalent to 8 hours in the usual stove.

Example No. 4.—A standard varnish was applied to panels which were exposed at a distance of 3 inches from the same type of

tube referred to, for from 8 to 10 minutes. Such exposure gave a drying effect equivalent to 10 hours of air drying.

Example No. 5.—Sand paper of the waterproof type was produced by applying a varnish base to the paper and dusting on the abrasive. This was exposed at a distance of 4 inches from the window of the same cathode tube for a period of 4 minutes and then was pronounced dry. Additional samples were left over night at room temperature and then exposed under like conditions for 2 minutes and were pronounced dry.

Example No. 6.—Paper was printed with usual colored lithograph inks. On exposure for 2 minutes to the cathode tube described, at a distance of 3 inches from the window, the ink had set sufficiently to permit the sheets to be bound together and to an extent approximately equal to one hour's drying under usual conditions.

While I have described my invention above in detail I wish it to be understood that many changes may be made therein without departing from the spirit of the same.

I claim:

1. The process which comprises subjecting a drying or semi-drying oil material to the action of impinging rays of electrons.
2. The process which comprises subjecting a drying or semi-drying oil material to the action of impinging cathode rays.
3. The process which comprises subjecting a drying or semi-drying oil material to the action of impinging cathode rays of the nature produced by a Coolidge cathode ray tube.
4. The process which comprises subjecting a drying oil to the section of impinging rays of electrons.
5. The process which comprises subjecting a drying oil to the action of impinging cathode rays.
6. The process which comprises subjecting a drying oil to the action of impinging cathode rays from a Coolidge cathode ray tube.
7. The process which comprises subjecting a drying oil in the form of a film to the action of impinging rays of electrons.
8. The process which comprises subjecting a drying oil in the form of a film to the action of impinging cathode rays.
9. The process which comprises subjecting a drying oil in the form of a film to the action of impinging cathode rays from a Coolidge cathode ray tube.
10. The process which comprises subjecting a drying or semi-drying oil material which has been previously partially set, dried or bodied, to the action of the impinging rays of electrons.
11. The process which comprises subjecting a drying or semi-drying oil material which has been previously partially set, dried or bodied, to the action of impinging cathode rays.
12. The process which comprises subjecting a drying or semi-drying oil material which has been previously partially set, dried or bodied; to the action of impinging cathode rays from a Coolidge cathode ray tube.
13. The process which comprises subjecting a drying oil which has been previously partially set, dried or bodied, to the action of impinging rays of electrons.
14. The process which comprises subjecting a drying oil which has been previously partially set, dried or bodied, to the action of impinging cathode rays.
15. The process which comprises subjecting a drying oil which has been previously partially set, dried or bodied, to the action of impinging cathode rays from a Coolidge cathode ray tube.
16. The process which comprises subjecting a drying oil which has been previously partially set, dried or bodied, in the form of a film, to the action of impinging rays of electrons.
17. The process which comprises subjecting a drying oil which has been previously partially set, dried or bodied, in the form of a film, to the action of impinging cathode rays.
18. The process which comprises subjecting a drying oil which has been previously partially set, dried or bodied, in the form of a film, to the action of impinging cathode rays from a Coolidge cathode ray tube.
19. The process which comprises subjecting a drying oil which has been previously partially set, dried or bodied, in the form of a film, to the action of impinging rays of electrons so as to obtain a patterned effect.
20. The process which comprises subjecting a drying oil which has been previously partially set, dried or bodied, in the form of a film, to the action of impinging cathode rays so as to obtain a patterned effect.
21. The process which comprises subjecting a drying oil which has been previously partially set, dried or bodied, in the form of a film, to the action of impinging cathode rays from a Coolidge cathode ray tube so as to obtain a patterned effect.
22. The process which comprises subjecting a drying oil which has been previously partially set, dried or bodied, in the form of a film, to the action of impinging rays of electrons so as to obtain a wrinkled effect.
23. The process which comprises subjecting a drying oil which has been previously partially set, dried or bodied, in the form of a film, to the action of impinging cathode rays so as to obtain a wrinkled effect.
24. The process which comprises subjecting a drying oil which has been previously partially set, dried or bodied, in the form of a film, to the action of impinging cathode rays

from a Coolidge cathode ray tube so as to obtain a wrinkled effect.

25. The process which comprises subjecting a drying or semi-drying oil material to the action of X-rays.

26. The process which comprises subjecting a drying or semi-drying oil material to the action of impinging rays of electrons, said material being maintained under pressure less than that of the atmosphere.

27. The process which comprises subjecting a drying or semi-drying oil material to the action of impinging cathode rays, said material being maintained under pressure less than that of the atmosphere.

28. The process which comprises subjecting a drying or semi-drying oil material to the action of impinging cathode rays from a Coolidge cathode ray tube, said material being maintained under pressure less than that of the atmosphere.

In testimony that I claim the foregoing, I have hereunto set my hand this 2nd day of March, 1929.

JAMES SCOTT LONG.

CERTIFICATE OF CORRECTION.

Patent No. 1,818,073.

Granted August 11, 1931, to

JAMES SCOTT LONG.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, line 39, claim 4, for the word "section" read action; page 4, strike out lines 3 to 5, comprising claim 25, and for the ordinals of claims 26, 27 and 28 read 25, 26 and 27; 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 3rd day of November, A. D. 1931.

(Seal)

M. J. Moore,
Acting Commissioner of Patents.

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