Patented Jan. 17, 1950 2,494,531

UNITED STATES PATENT OFFICE

2,494,531

SKI LACQUER

Theodore A. Dissel, Hartford, and Isaac Laird Newell, Wethersfield, Conn., assignors to United Aircraft Corporation, East Hartford, Conn., a corporation of Delaware

No Drawing. Application August 9, 1946, Serial No. 689,522

10 Claims. (Cl. 106—173)

1

This invention relates to an abrasion and erosion resistant lacquer or composition that is particularly suitable for skis. The lacquer or composition of the present invention is of such a character that it adheres to the skis and prevents snow and ice from accumulating thereon.

The composition of the present invention operates as a lubricant or parting agent as it adheres to the bottoms of the skis, thus providing a smooth surface which slides over the snow without permitting the snow to adhere thereto. The accumulation of snow and ice on skis which would hinder smooth and even travel thereover is obviated by applying this lacquer or composition to the skis.

Heretofore pitches and waxes of different sorts have been applied to skis in an effort to enable them to slide on the snow more easily without permitting the snow to stick or adhere to the skis. It is well known that when snow or ice adheres to skis their gliding or movement over the snow is retarded.

Lacquers (properly so called) have been used as a base coat on skis and waxes have been applied to such coats. It has been found that waxes which improved the skis for snow in certain conditions were unsuitable or of little use where the snow was in a different condition due to the weather or atmospheric effects.

Also, it has been found that a wax that was suitable for some conditions of snow was unsuitable for other conditions of the snow. For example, paraffin wax on skis is suitable in dry snow where the temperature is as low as about 15° F. to 32° F., but comes off when the weather is warm enough for the snow to be wet. On the other hand, soft pitch on skis is suitable for wet snow but the skis will not slide satisfactorily in snow where the temperature is low enough to cause the snow to be in the form of a dry powder.

Lacquers alone applied to skis have not produced good skiing under all conditions so that waxing of the skis was also needed for some types of snow. Waxes alone applied to skis are not satisfactory because they do not adhere strongly and must be renewed frequently. A mixture of lacquer and waxes seemed to be necessary for a good skiing surface, but until now mixtures of waxes and lacquers have produced non-drying, weak and non-adherent films entirely unsuitable for skiing. Waxes and lacquers would be classed as incompatible.

We have found that certain chemical compounds will act as blending agents when added

2

to mixtures of lacquers and waxes and make these heretofore incompatible materials combine to produce a composition especially adaptable for a skiing surface.

The desired coating for skis is obtained by incorporating a compound of the group which comprises salts of the esters of sulfo-succinic acids with a mixture of waxes and a lacquer which is a solution of an organic plastic material in an organic solvent. The organic plastic materials which have been found suitable for this purpose are nitro-cellulose lacquers, synthetic resins, and mixtures of the same. These compositions give a coating material that (*a*) adheres tenaciously to wood and metal; (*b*) has excellent endurance since it resists abrasion by water, wet and dry snow; (*c*) has a low coefficient of friction against either wet or dry snow; and (*d*) its coefficient of friction with either wet or dry snow is nearly the same.

The salts of the esters of sulfo-succinic acid apparently not only act as plasticizers for the coating compositions, but also as blending agents for the waxes, thus making them compatible with the vehicles chosen. Among the sulfo-succinic acids, the salts of dioctyl sulfo-succinic acid have been found to be satisfactory and of these the calcium and barium salts appear to be especially suitable.

Our composition, while especially suitable for use on the running surfaces of skis is not restricted to this use. For instance, its special qualities such as erosion resistance make it suitable for use on air foil sections such as propellers. Its waxy surface with low coefficient of friction makes it suitable for use as a furniture lacquer. Other uses will become apparent or will be found obvious from the properties of our composition.

The following are given as specific examples of the invention, the parts being by weight.

Example I

10.0 parts by weight of 20% acetate solution of ½ second R. S. nitrocellulose
1.5 parts by weight of a 50% ethyl alcohol solution of the calcium salt of dioctyl sulfo-succinic acid
10.0 parts by weight of toluene .35 part by weight of bayberry wax.

Example II

90.0 parts by weight phenolic resin (liquid)
6.34 parts by weight barium salt of dioctyl sulfo-succinic acid
3.36 parts by weight bayberry wax.

Example III

67.0 parts by weight of nitrocellulose lacquer
0.85 part by weight of barium salt of dioctyl sulfo-succinic acid
0.35 part by weight of bayberry wax.

If the data given in Examples I to VII above be charted so as to indicate the several constituents in groups and to indicate the proportions of the constituents in one group to others, the data will appear substantially as shown on the chart below:

Example	parts by weight of wax	parts by weight alk. earth salt of dioctyl ester of sulfosuccinic acid	parts by weight nitrocellulose (dry)	parts by weight other solids	parts by weight total solids	ratio wax to nitrocellulose	ratio wax to alk. earth salt of dioctyl ester of sulfosuccinic acid	ratio of wax to total solids	ratio wax plus alk. earth salt of dioctyl ester of sulfosuccinic acid to total solids	Remarks
I	.35	.75	2.00	none	3.10	.175 to 1	.47 to 1	.113 to 1	.355 to 1	Nitrocellulose solution contains 20% dry solids salt solution contains 50% dry solids.
II	3.36	6.34	none	90.0	99.7	none	.53 to 1	.034 to 1	.097 to 1	This example not covered by claims as there is no nitrocellulose.
III	.35	.85	unknown	unknown	unknown	unknown	.41 to 1	unknown	unknown	
IV	.33	1.90	do	do	do	do	.17 to 1	do	do	
V	.37	.63	6.0	alkyd 3.0, shellac 3.0.	13.0	.062 to 1	.587 to 1	.028 to 1	.077 to 1	Ratio shellac to total solids .23 to 1.
VI	3.36	6.34	none	none	unknown	none	.53 to 1	unknown	unknown	Not covered by claims as Example II.
VII	.30	.70	3.34	3.45	7.79	.090 to 1	.43 to 1	.039 to 1	.13 to 1	Ratio shellac to total solids .11 to 1.

Example IV

67.0 parts by weight of nitrocellulose lacquer
1.9 parts by weight of calcium salt of dioctyl sulfo-succinic acid
0.33 part by weight of paraffin wax.

Example V

6 parts by weight of nitrocellulose—½ second R. S.
3 parts by weight of alkyd resin—acid No. 27–37—softening point 140°–150° C.
3 parts by weight of shellac (dewaxed)
0.63 part by weight of barium salt of dioctyl sulfo-succinic acid
0.37 part by weight of microwax
20 parts by weight of toluene
20 parts by weight of ethyl acetate
20 parts by weight of alcohol
25 parts by weight of butyl acetate
10 parts by weight of carbon tetrachloride

Example VI

90 parts by weight of liquid alkyd resin
6.34 parts by weight of the barium salt of dioctyl sulfo-succinic acid
3.36 parts by weight of paraffin wax

Example VII

0.70 part by weight of barium salt of dioctyl sulfo-succinic acid
0.20 part by weight of microwax
0.10 part by weight of paraffin wax
12.48 parts by weight of xylol
31.29 parts by weight of butyl acetate
7.70 parts by weight of ethylene glycol mono-ethyl ether
7.70 parts by weight of carbon tetrachloride
1.72 parts by weight of 48% de-waxed shellac solution in alcohol
2.44 parts by weight of butyl alcohol
3.34 parts by weight of 10 second dry nitrocellulose
13.37 parts by weight of ethyl acetate
5.02 parts by weight of ethyl alcohol
2.32 parts by weight of a hard rosin modified maleic acid synthetic resin
9.21 parts by weight of toluol
2.11 parts by weight of wood alcohol
.30 part by weight of dry dye.

When the ratio of total waxes present to the amount by weight of the salt of dioctyl ester of sulfo-succinic acid is calculated from the above examples, it will be found to vary between a minimum of 0.172:1 to a maximum of 0.588:1. Similarly calculating the total weight of wax plus the salt of dioctyl sulfo-succinic acid in the above examples in respect to the total solids present in the compositions given in said examples, this weight of wax plus salt of dioctyl sulfo-succinic acid (wetting agent) will be found to vary from 7.70% to 35.5%. This calculation is based upon variations in total wax present from a minimum of 2.4% to a maximum of 11.3% and a variation in the amount of the salt of dioctyl sulfo-succinic acid present from a minimum of 4.85% to a maximum of 24.2%. The percents in all these cases are based upon the total solids and are independent of any solvents present. In all the examples given the organic plastic material constitutes the balance of the solids present. The organic plastic material in the various examples consists of nitrocellulose, other synthetic resins, and shellac, or combinations thereof. The composition given as Example VII is the preferred form in accordance with the present invention.

While certain specific compositions have been given, embodying the invention, other alternatives will occur to those skilled in the art, so that the scope of the invention should be measured by the appended claims.

We claim:

1. A ski lacquer composition, comprising a wax, an alkaline earth metal salt of a dioctyl ester of sulfo-succinic acid, and a nitrocellulose composition, the ratio of the wax to said salt being from about 0.17:1 to about .587:1, the ratio of wax:nitrocellulose being from about .062:1 to about .175:1, and the total weight percent of said wax plus said salt being from about 7.15% to about 35.5% of the total solids in said composition.

2. A ski lacquer composition in accordance with claim 1, wherein said wax is a petroleum wax.

3. A ski lacquer composition in accordance with claim 1, wherein said wax is paraffin.

4. A ski lacquer composition in accordance with claim 1, wherein said wax is microwax.

5. A ski lacquer composition in accordance with claim 1, wherein said wax is bayberry wax.

6. A ski lacquer composition in accordance with claim 1, wherein said salt is a barium salt.

7. A ski lacquer composition in accordance with claim 1, wherein said salt is a calcium salt.

8. A ski lacquer composition in accordance with claim 1, containing shellac in the ratio of about 10.6% to about 23% of the total solids.

9. A composition of the character described, consisting of the following materials in the weight proportions given:

Material	Parts
nitrocellulose—½ second R. S.	6
alkyd resin—acid No. 27-37—softening point 140°-150° C.	3
shellac (dewaxed)	3
barium salt of dioctyl ester of sulfo-succinic acid	0.63
microwax	0.37
toluene	20
ethyl acetate	20
alcohol	20
butyl acetate	25
carbon tetrachloride	10

10. A composition of the character described consisting of the following materials in the weight proportions given:

Material	Parts
barium salt of dioctyl ester of sulfo-succinic acid	0.70
microwax	0.20
paraffin wax	0.10
xylol	12.48
butyl acetate	31.20
ethylene glycol monoethyl ether	7.70
carbon tetrachloride	7.70
48% de-waxed shellac solution in alcohol	1.72
butyl alcohol	2.44
10 second dry nitrocellulose	3.34
ethyl acetate	13.37
ethyl alcohol	5.02
hard rosin modified maleic acid resin	2.32
toluol	9.21
wood alcohol	2.11
dry dye	.30

THEODORE A. DISSEL.
ISAAC LAIRD NEWELL.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,256,710	McAdam	Feb. 19, 1918
2,028,091	Jaeger	Jan. 14, 1936
2,121,617	Werntz	June 21, 1938
2,275,716	Bachman et al.	Mar. 10, 1942
2,353,978	Weber	July 18, 1944
2,365,297	Schweizer	Dec. 19, 1944
2,382,533	Auer	Aug. 14, 1945
2,414,074	Vitalis	Jan. 7, 1947

FOREIGN PATENTS

Number	Country	Date
129,033	Great Britain	July 10, 1919

OTHER REFERENCES

Bennett: "Commercial Waxes" (1944), pages 522 to 525. Copy in Division 64.

Certificate of Correction

Patent No. 2,494,531 January 17, 1950

THEODORE A. DISSEL ET AL.

It is hereby certified that errors appear in the printed specification of the above numbered patent requiring correction as follows:

Column 2, line 25, for the word "vehicles" read *organic plastic material*; columns 3 and 4, in the table, third and fourth lines under the heading "Remarks", for "dontains" read *contains;* column 4, line 68, for "7.15%" read 7.7%;

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 9th day of May, A. D. 1950.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.