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PRODUCTION OF WAXES OF IMPROVED QUALITY

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4 Claims. (Cl. 208—21)

This invention relates to new and useful improvements of paraffin wax blends and more particularly to a method of preparation of improved paraffin waxes of high tensile strength.

In manufacturing lubricating oils, waxes are obtained as by-products. Paraffin waxes are obtained by the solvent dewaxing of lubricating oil distillates while microcrystalline waxes are obtained from the residuum or still bottoms. Paraffin waxes are generally softer and lower in melting point than microcrystalline waxes and are less expensive. To increase the marketability of paraffin waxes having low tensile strength properties, several methods have been heretofore proposed. These methods have involved the addition of a small proportion of microcrystalline wax to a low tensile strength paraffin wax, as in Adams et al., U.S. Patent 2,127,668, or by distilling a paraffin wax into a number of distillate cuts and blending non-consecutive cuts, as in Bowman et al., U.S. Patent 2,467,959.

It is an object of this invention to provide an improved method of preparing paraffin wax compositions of relatively high tensile strength.

Another object of this invention is to provide an improved process for preparing paraffin wax compositions of improved tensile strength which does not require the addition of microcrystalline wax or the use of non-consecutive cuts of a fractionated, de-oiled paraffin wax.

A feature of this invention is the provision of a process for preparing paraffin wax compositions of improved tensile strength by fractionating a crude oil to produce a heavy lubricating oil distillate, a medium lubricating oil distillate, and a light lubricating oil distillate, dewaxing each of said distillates, deoiling the waxes, and mixing a small amount of wax obtained from the heavy distillate with wax obtained from a lighter distillate.

Other objects and features of this invention will become apparent from time to time throughout the specification and claims as hereinafter related.

In accordance with our invention, a non-asphaltic crude, i.e., a paraffinic or naphthenic crude, or a deasphalted crude, is fractionated to remove the more volatile fractions (gasoline, naphtha, kerosine, gas oils, etc.) and to produce a heavy lubricating oil distillate, a medium lubricating oil distillate, a light lubricating oil distillate, and a residuum. The heavy lubricating oil distillate is dewaxed, by solvent dewaxing or by refrigerating and filtering, to produce a high-melting paraffin wax, M.P. of 140°–160° F. (preferably about 150° F.). From the medium lubricating oil distillate, there is obtained a paraffin wax having a melting point of about 136° F., while the wax from the light lubricating oil distillate has a melting point of about 123° F. When the wax obtained from the light distillate or the medium distillate, or a mixture thereof, is blended with a small proportion of the wax obtained from the heavy distillate, a wax blend is produced which has a substantially improved tensile strength.

The following non-limiting examples are illustrative of the scope of this invention.

EXAMPLE I

A Van Zandt, Texas, crude oil was distilled to remove the more volatile components, e.g., gasoline, naphtha, kerosine, etc., and heavy, medium, and light wax distillates were obtained. A heavy wax distillate is one having a viscosity of 800–1200 S.U.S. at 100° F., and is used in the production of 650 vis. neutral oil. The medium wax distillate is a less viscous oil from which a 200 vis. neutral oil is obtained. The light wax distillate is a still less viscous oil from which an 85 vis. neutral oil is obtained. The wax distillates which were thus produced were each subjected to methyl ethyl ketone-toluene dewaxing and the resulting waxes de-oiled using the same solvent. The physical properties of the waxes thus obtained are shown in Table I.

Table I

Paraffin Wax From	85 Vis. Neutral	200 Vis. Neutral	650 Vis. Neutral
Melting Point, °F	123.0	136.8	150.6
Oil Content, Wt. Percent	0.6	0.2	0.3
Penetration at 77 °F	19	13	21
Tensile Strength, #/sq. in	95	308	280
Viscosity, SUS, at 210 °F	36	40.1	51.2
Gravity at 190 °F	54.3	53.0	48.5
Distillation, °F:			
I.B.P	717	735	793
5%	732	751	832
10%	734	760	857
30%	738	802	906
50%	742	827	942
70%	751	848	981
90%	767	885	1,037
95%	775	898	1,053
E.P	810	920	1,066

A small amount of the 150° F. M.P. paraffin wax was added to portions of the lower melting waxes and a very substantial improvement in tensile strength of the wax blend was observed. For example, when 150° F. M.P. paraffin wax of 276 p.s.i. tensile strength was added to 136° F. M.P. paraffin wax of 308 p.s.i. tensile strength, a series of blends was obtained having the tensile strengths indicated in Table II. The tensile strengths of the individual waxes are also included in Table II for purposes of comparison.

Table II

Composition, Percent by wt.		M.P., °F., of blend	Tinius Olsen Tensile Strength, #/sq. in.
136 M.P. wax	150 M.P. wax		
100	--------	136.8	308
--------	100	150.6	276
99	1	136.4	308
97	3	136.6	324
95	5	136.4	348
93	7	136.6	384
91	9	136.6	400

As is apparent from Table II, the addition of very small amounts of 150° F. M.P. wax to a lower melting wax, or mixture of lower melting waxes, will produce a blend having a tensile strength higher than that of any component used in the blend.

We have also found that blends of waxes containing the 150° F. M.P. paraffin wax reach a maximum tensile strength upon addition of 7–11% of the higher melting point wax. Beyond this concentration of the higher melting point wax, blends are obtained which have improved tensile strength but which are of less tensile strength than blends containing 7–11% of the higher melting point wax. These findings are illustrated by the blends in Table III.

Table III

Blend	Composition, percent by wt., ° F. 123 M.P. wax	136 M.P. wax	150 M.P. wax	M.P., °F. of blend	Tensile Strength, #/sq. in.
	100			123.0	95
		100		136.8	308
			100	150.6	276
A	56	44	0	128.1	228
B	54.32	42.68	3	127.8	316
C	52.08	40.92	7	128.0	348
D	49.84	39.16	11		328
E	47.60	37.40	15	128.6	320
F	45.31	35.64	19		308

In this series of blends, it is seen that a mixture of 123° F. and 136° F. M.P. waxes has a tensile strength intermediate the individual components. However, the addition of even a small amount of 150° F. M.P. wax, see blend B, produces a wax blend having a tensile strength higher than any component in the blend. As was pointed out above, the addition of further amounts of 150° F. M.P. paraffin causes an increase in tensile strength up to a concentration of about 7%. At higher or lower concentrations of the 150° F. M.P. paraffin wax, the tensile strength is lower. Obviously, the amount of 150° F. M.P. wax required to give maximum tensile strength will be different for different wax blends according to the relative proportions of the lower melting point components. The addition of a small amount of the 150° F. M.P. wax produces a similar improvement in the tensile strength of the 123° F. M.P. wax.

As previously set forth, this invention does not rely on close-cut fractions of a distilled wax or the addition of microcrystalline waxes, but is predicated on the discovery that high tensile strength wax blends may be produced by first fractionating an oil into heavy, medium, and light wax distillates, dewaxing each of said distillates, de-oiling the waxes, and mixing the higher melting point wax (150° F. M.P.) with one or more or the lower melting point waxes.

In carrying out this invention, the waxes which are prepared from the individual wax distillates are de-oiled to an oil content of not more than 2% and preferably less than about 0.5%. The amount of the high melting point wax used in the blend may vary between 1 and 30% of the blend, but preferably lies between about 5 and 20% of the blend.

Blends made in accordance with this invention have better color and produce a higher gloss than blends made with microcrystalline wax, and have a high melting point and higher tensile strength than microcrystalline wax blends. Additionally, this invention enables the use of substantially all the wax from neutral lubricating oil distillate as contrasted with the necessity of discarding a portion thereof when following certain prior art procedures.

While we have described this invention with particular emphasis upon a preferred embodiment thereof, we wish it understood that within the scope of the appended claims, this invention may be practiced otherwise than as specifically described.

This application is a continuation-in-part of our copending application, Serial No. 576,535, filed April 6, 1956, for Production of Waxes of Improved Quality, now abandoned.

What is claimed is:

1. A high-tensile-strength wax blend consisting essentially of 70 to 99% by weight of waxes of the group consisting of (1) wax having a melting point of about 123° F., a penetration at 77° F. of about 19, and a viscosity at 210° F. of about 36, said wax having been obtained by solvent dewaxing a petroleum fraction to produce a lubricating oil having a viscosity of about 85; and paraffin wax having a melting point of about 136° F., a penetration at 77° F. of about 13, and a viscosity at 210° F. of about 40.1, said wax having been obtained by solvent dewaxing a petroleum to produce a lubricating oil having a viscosity of about 200 (2) and mixtures thereof, said blend containing not less than about 35% by weight of paraffin wax (2), and about 1 to 30% by weight of a paraffin wax having a melting point of about 150° F., a peneration at 77° F. of about 21, and a viscosity at 210° F. of about 51.2, said wax having been obtained by solvent dewaxing a petroleum fraction to produce a lubricating oil having a viscosity of about 650, each said wax having an oil content of less than about 0.5%.

2. A wax blend in accordance with claim 1 in which the last named wax is present in the amount of about 5 to 20% by weight.

3. A wax blend in accordance with claim 1 in which the enumerated waxes are present in the amounts of about 52%, about 41%, and about 7%, by weight, respectively.

4. A wax blend in accordance with claim 1 in which said 136° F. melting point wax is present in the amount of about 91% by weight, and said 150° F. melting point wax is present in the amount of about 9% by weight.

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UNITED STATES PATENT OFFICE

CERTIFICATION OF CORRECTION

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It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 4, line 13, before "wax" insert -- paraffin --; column 4, line 17, after "85" strike out the semicolon; same line 17, after "and" insert -- (2) --; line 22, for "200(2)" read -- 200; --; line 26, for "peneration" read -- penetration --.

Signed and sealed this 24th day of April 1962.

(SEAL)

Attest:

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