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## PREPARATION OF HIGH GRADE ASPHALTS

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This invention relates to improvements in the manufacture of asphalts and more particularly to methods of synthesizing high grade asphalts from petroleum hydrocarbons and associated mineral hydrocarbons which have heretofore been regarded as unsuited for producing high grade asphalts.

The main identifying and classifying properties of asphalt are penetration, melting point, ductility, and "temperature susceptibility", the last being usually expressed as the ratio of the penetration at an elevated temperature to the penetration at a lower temperature. The present invention is concerned with the production of asphalts having a low temperature susceptibility, with the result that for a given penetration at a specified temperature the melting point is relatively high. For asphalts of a given melting point the penetration at lower temperatures will be higher for asphalts of lower susceptibilities. It is, moreover, a purpose of the present invention to product asphalts having a sufficient ductility to render it suitable for uses where the asphalt is subjected to vibrations or to changes in temperature.

It is generally recognized that asphalts are mixtures of asphaltenes, asphaltic resins, and oil fractions together with smaller quantities of carbenes, carboids, acidic compounds, and in some cases, waxes. The asphaltenes, which are the main constituent of the asphalt, cannot be directly dispersed in the oily constituents, but are considered to be peptized by the asphaltic resins which probably coat the asphaltene particles, whereby a colloidal dispersion in the oil fraction is produced. The resins, therefore, act as protective colloids. It is also recognized that the asphaltenes, the asphaltic resins, and the oily fraction, the last two sometimes being designated as malthenes, exert the predominating influence on the characteristics of the asphalts. The hardness or penetration (as distinguished from susceptibility or change in penetration with temperature) depends mainly on the asphaltene content; the ductility on the asphaltic resins; and the softening point, stability and susceptibility on the asphaltic resins and the oil fraction.

The viscosity or hardness of an asphalt increases with the asphaltene content, but is also influenced by the chemical characteristics of its constituents. It is, therefore, necessary that the asphalt have a sufficiently high concentration of asphaltenes. This can often be attained by extracting non-asphaltenes from asphaltic oils by means of selective solvents, or by distilling or oxidizing asphaltic oils.

Low susceptibility is dependent upon the size of asphaltene particles or molecular size of asphaltenes and is favored by an increase in their size. It has, heretofore, been proposed to increase the molecular size of asphaltenes by blowing the asphaltenes with air, either in the absence or in the presence of a blending oil. For example, the U. S. patent to Haylett 1,948,296, describes a process for air-blowing a blend of an oil and precipitated asphaltenes. The oils which have been proposed for this purpose can not, however, yield an asphalt having a greatly improved temperature susceptibility. Unless the asphaltenes are carefully blended with the proper flux, the blowing can not be carried far enough to cause the desired improvement because it is then difficult to get the asphaltenes properly dispersed and because decomposition of the asphaltenes forms objectionable carbonaceous materials.

It has been proposed to regulate the particle size in an asphalt by a proper selection of the dispersion medium, it being observed that the paraffinic blending oils are less effective to dissolve the asphaltenes, causing a greater particle size, and, therefore, a lower susceptibility. Conversely, it has been proposed to use aromatic blending oils for producing a high susceptibility asphalt because the aromatic hydrocarbons tend to disperse the asphaltenes to extremely small units, so that true solutions are approached. The control of the blending stock has been described in the U. S. patents to Loebel Nos. 1,881,753 and 1,889,365, and in the U. S. patent to Bray No. 1,988,715.

We have discovered that, contrary to expectations, extremely low susceptibility can be achieved by blending the asphaltenes with easy flowing, low viscosity index hydrocarbon mixtures. The resulting blend may then be air blown to improve the susceptibility although in certain cases this blend may be of the desired characteristics. We have found that good results are achieved when using oils having viscosities between 30 and 150 seconds Say. Univ. at 210° F.,

although we have found that best results are obtained when the viscosity is between 50 and 70 seconds Say. Univ. at 210° F. This blending material may occur naturally in certain crude oils, but is preferably obtained by extracting distillate or residual oils with a selective solvent for non-paraffinic hydrocarbons, such as, for example, sulfur dioxide, nitrobenzene, phenol, "Chlorex" ($\beta\beta'$ dichloroethyl ether), furfural, quinoline, isoquinoline, chlorophenols, etc., or their mixtures with these or with other selective solvents, and/or with suitable aromatic diluents. The blending material should be sufficiently non-paraffinic to have a viscosity gravity constant above .900 and/or a viscosity index below 0. It should, preferably, have an A. P. I. gravity below 18°.

In producing our low susceptibility asphalt, we blend an extract of the nature described above with asphaltenes which have been obtained in any manner, such as by the distillation of asphaltic oils or by precipitation from any suitable asphaltene-containing material, such as topped asphaltic base crudes, cracking residues, or cracked tar residues. It is also possible to use as the initial material asphaltic materials which have been subjected to an oxidizing distillation treatment to increase the asphaltene concentration and/or the molecular size, and to improve the quality of these materials in accordance with our process. The precipitation of asphaltenes may be effected by dissolving the oily constituents in light hydrocarbons, such as natural gasoline, various naphthas or solvents containing or consisting largely of propane, or butane or pentane, etc.

To produce a final asphalt of sufficient hardness, it is desirable that the asphaltene content of the asphaltene-bearing material before blending with the low-viscosity extract contain over 20% of asphaltenes, as determined by insolubility in 86° Bé. naphtha, according to the test method No. 46, Department Bulletin 1216, U. S. Dept. of Agriculture. We prefer to use a material containing between about 25% and 35% of asphaltenes. Such material will normally contain certain quantities of asphaltic resins, the amount depending on the degree of fractionation and/or on the nature of the solvent used in their precipitation.

The proportion of asphaltene-bearing material and non-viscous extract to be employed depends upon the concentration and nature of the asphaltenes contained in the former material and upon the desired character of the product. It is generally desirable to use the least amount of extract which will flux the asphaltic material. Excellent results have been obtained by oxidizing a blend containing between about 25 and 85% low viscosity extracts and between about 75 and 15% of asphaltene-bearing material produced by propane precipitation from Mid-Continent distillation and cracking residues. We are not, however, limited to these specific blending ratios, which have been given merely to illustrate the process when using one specific initial material.

When blending low susceptibility asphalts, which may or may not have been previously oxidized, with the low viscosity extracts of our invention it is often possible to obtain a blended product having a high ductility, as well as a low susceptibility, without subsequent oxidation. This is especially practical when the said asphalts contain more than 30% asphaltenes and have melting points above 160° F. In these cases, we have found that the low viscosity extracts are effective in improving the ductility, but that they do not dissolve the asphaltenes to the extent of greatly impairing the susceptibilities. This is illustrated by the following example:

*Example I*

A Mid-Continent residue was extracted with propane to remove the oil from the asphaltenes and asphaltic resins and produce an asphaltic material containing 33.5% asphaltenes and having melting point of 172° F. Four portions of the mixture of asphaltenes and resins were blended with different fractions of an aromatic extract having a viscosity index (Dean & Davis) of minus 100, obtained by extracting a Mid-Continent lubricating oil stock with a selective solvent as shown in the table. The quantities were selected to yield asphalts of about the same penetration at 77° F. A comparison of the properties of the resulting synthetic asphalts with a high grade Mexican asphalt is shown in Table I below. Hard asphalts of about 45 penetration at 77° F. have been chosen for the comparison because the harder asphalts are the most difficult to prepare with a low susceptibility:

*Table I*

| | Blends of Mid-Continent hard asphalt with low viscosity index-Mid-Continent extracts | | | | Mexican Panuco steam reduced asphalt |
|---|---|---|---|---|---|
| Sample No. | 1 | 2 | 3 | 4 | |
| Vis. of extract sec. at 210° F. | 526 | 136 | 66 | 51 | ------- |
| | Say. furol | Say. Univ. | Say. Univ. | Say. Univ. | ------- |
| Solvent used in preparing extract | Cresylic acid | Cresylic acid | Cresylic acid | Furfural | ------- |
| Hard asphalts % by wt. | 27 | 73 | 80 | 83 | ------- |
| Extract % by wt. | 73 | 27 | 20 | 17 | ------- |
| Properties of blends: | | | | | |
| Specific gravity | 1.038 | ------- | 1.039 | ------- | 1.043 |
| Penetration at 32° F. 200 gr. 60 sec. | 6 | 14 | 17 | 14 | 17 |
| Penetration at 77° F. 100 gr. 5 sec. | 41 | 44 | 47 | 43 | 45 |
| Softening point—Ring and Ball | 115° F. | 129° F. | 131° F. | 133° F. | 135° F. |
| Ductility at 77° F. | 110+ | 110+ | 96 | 96 | 110+ |
| Ratio of penetration at 77° F. to pen. at 32° F. | 6.84 | 3.14 | 2.76 | 3.07 | 2.65 |

The ratio of the penetration at 77° F. to that at 32° F. was used as a measure of temperature susceptibility to compare the final products. The above results show that the synthetic asphalts containing the low viscosity extracts are practically the equivalents of Panuco asphalt, while the asphalt containing the more viscous extracts is definitely inferior. Results from more comprehensive tests show that the best results are obtained from extracts having viscosities between 50 and 70 seconds, Say. Univ. but viscosities as high as 150 sec. Say. Univ. may be used.

In the present specification and claims, all properties are to be measured by performing regular A. S. T. M. tests with the exceptions otherwise noted. The loading and time for penetration tests at 32° F. and at 77° F. are as indicated in Table I.

In order to increase the molecular and/or particle size of the asphaltenes, particularly when an extremely low susceptibility is desired, or when the initial asphaltic material does not have the necessary concentration of asphaltenes and has too high a susceptibility, we may blow the blend of the asphaltic material and the low

viscosity extract in any desired manner, as, for example, by warming the blend and blowing air through the fluxed mass. We have found that the use of the low viscosity flux of our invention permits the asphaltenes to be oxidized to a greater degree without the formation of carbonaceous decomposition products which can not be redispersed and that it is thereby possible to produce a blown asphalt of extremely low susceptibility, for example, so low that the above described ratio of penetrations at 77° F. and at 32° F. is less than 1.5, and in some cases, as low as 1.0. These extremely low susceptibility blown asphalts have very low ductility and are, therefore, suitable only when ductility is not important.

We have found that the ductility of the blown material may be materially improved without an excessive increase in susceptibility by blending it with a highly viscous extract, which may itself contain asphaltic bodies. Special resinous materials may, if desired, be added alone or together with the viscous extract; the following have been found to be useful: rosin, gum, polymerization products from treating cracked distillates, in accordance with the Lachman process, described in U. S. Patent 1,790,622, or Gray process, described in U. S. Patent No. 1,340,889, or other similar methods, or asphaltic resins obtained from cracked residues by fractional extraction with light paraffinic hydrocarbons.

The addition of these resinous materials is not, however, necessary when using the viscous extract of our invention to improve the ductility. This blending material may be derived from extracts obtained in the manner described above, i. e., by solvent extraction of hydrocarbon oils, coal tar oils, shale oils, etc., with solvents for non-paraffinic hydrocarbons, and it is preferable to produce the extracts from highly viscous residual oils. The viscosity of the extract should be above 350 seconds and preferably above 500 seconds Say. furol at 210° F. The blending material should be sufficiently non-paraffinic to have a viscosity gravity constant above 0.900. It should, preferably, have a specific gravity at 77° F. above 0.990, a ductility at 77° F. above 110 cm. and a softening point above 90° F.

The quantity of the viscous extract to be used depends upon the desired susceptibility and ductility, and may be determined by those skilled in the art, guided by the following examples, which do not, however, define the scope of our invention. The purpose of increasing the amount of the viscous blending stock is to increase both the ductility and susceptibility.

To avoid an undue increase in the susceptibility of the asphalt after blending with the viscous extract, it was found desirable to use an asphaltic material in which the ratio of the penetration at 77° F. and 32° F. is not more than 3.0 and, preferably between 1.5–2.5, and which contains at least 30% asphaltenes, as determined by the 86° Bé. naphtha insolubility test method No. 46 Department Bulletin 1216, U. S. Dept. of Agriculture. Such a material is readily produced by blowing the above described blends of asphaltenes and low viscosity extract.

We have, moreover, found that the high temperature characteristics of the finished asphalt may be improved by adding a small quantity of naphthalene to the blown or hard asphalt, in addition to the above described highly viscous extract. From 1.0% to 15.0% of naphthalene computed on the final blend have given excellent results in improving the float test at elevated temperatures. The addition of naphthalene was found to increase the penetrations at low temperatures and to lower the melting point of the final asphalt, making it necessary to start the final blending operation with a harder asphalt, and/or to use smaller amounts of the highly viscous extract when hard asphalts are desired.

In order to more fully describe our invention there are set forth, hereinafter, several additional examples of our invention, which it is understood are exemplary only.

*Example II*

To illustrate the effect of blowing blends of asphalts and extracts, hard Mid-Continent propane precipitated asphalts of penetration 5 at 77° F. were blended with various proportions of Mid-Continent extracts used in Example I, and oxidized by blowing with air at 430° F. at atmospheric pressure for the periods shown in the table. The results are shown in Table II:

*Table II*

| | Blends of Mid-Continent hard asphalt with low viscosity index-Mid-Continent extracts | | |
|---|---|---|---|
| Sample No. | 1 | 2 | 3 |
| Duration of oxidation | 1 hr. | 4 hrs. | 6 hrs |
| Percent asphalt by wt. | 25 | 25 | 50 |
| Percent extract by wt. | 75 | 75 | 50 |
| Vis. of extract sec. at 210° F. | 526 | 66 | 51 |
| Properties of oxidized blend: | Say. furol | Say. Univ. | Say. Univ. |
| Specific gravity | 1.059 | 1.013 | 1.052 |
| Penetration at 32° F. 200 g. 60 sec. | 3 | 27 | 15 |
| Penetration at 77° F. 100 g. 5 sec. | 15 | 27 | 26 |
| Softening point—Ring and Ball | 140° F. | 284° F. | 156° F. |
| Ductility at 77° F. cm. | 110+ | 0 | 10 |
| Ratio of penetration at 77° F. to pen. at 32° F. | 5.00 | 1.00 | 1.73 |

These results show that upon oxidation, asphalts which were made with low viscosity extracts yield products having decidedly lower temperature susceptibilities than do asphalts containing more viscous extracts. The results further show that according to our invention it is possible to obtain asphalts having the same penetration at 77° F. and at 32° F. The ductility of such products was, however, low.

*Example III*

To illustrate our procedure of preparing a finished asphalt of better ductility characteristics than those shown in Table II, we present the following data: A Mid-Continent residual stock was treated in a single stage at 100° F. with a liquid propane-propylene mixture to dissolve the oily constituents. The asphaltic material was precipitated, separated, freed from the propane-propylene mixture, and blended with an equal volume of cresylic acid extract as used in blending sample 3 in Example I and sample 2 in Example II. The blend was blown with air at 430° F. at atmospheric pressure until the asphaltene content of the blend became 33% (as determined by insolubility in 86° Bé. naphtha) to produce a low susceptibility asphalt similar to those described in Example II. The duration of the oxidation was six hours. To 75% of this low susceptibility asphalt we added 25% of a heavy extract (obtained by propane-cresylic acid extraction of a heavy Mid-Continent residual oil) having a Say. furol viscosity at 210° F. of 500 seconds to

improve the ductility. The properties of the oxidized and of the oxidized and blended materials, and of a high grade steam reduced Mexican Panuco asphalt are shown in Table III.

*Table III*

| | Blown blend | 75 percent blown blend 25 percent heavy extract | Mexican Panuco |
|---|---|---|---|
| Spec. gravity | 1.050 | 1.045 | 1.043 |
| Penet. at 32° F., 200 gr. 60 sec. | 15 | 18 | 17 |
| Penet. at 77° F., 100 gr. 5 sec. | 26 | 42 | 45 |
| Softening point—Ring and Ball | 156° F. | 138° F. | 135° F. |
| Ductility at 77° F., cm. | 10 | 110+ | 110+ |
| Ratio of penetration at 77° F. to pen. at 32° F. | 1.73 | 2.33 | 2.65 |

These results clearly show that an asphalt superior to Panuco, one of the best known petroleum asphalts, can be prepared from Mid-Continent crude oil which heretofore has not ordinarily yielded satisfactory asphalt. Blowing not only increased the asphaltene particle size, but also increased the content of total asphaltenes. However, the asphaltenes and resins can also be concentrated by repeated precipitation treatments using low-boiling hydrocarbons as diluents. Although we have in this example used liquid propane-propylene mixture to separate the asphaltic material in the first step, we have found that any light hydrocarbon or combination of hydrocarbons from propane to A. S. T. M. naphtha can be used.

*Example IV*

To illustrate the effect of the addition of naphthalene to improve the high temperature characteristics, one sample of a blown low susceptibility asphalt having a penetration of 10 at 77° F. was blended with an extract having a viscosity 490 seconds furol at 210° F., and obtained by extracting Mid-Continent residual oil with propane-cresylic acid to produce a blended asphalt having a penetration 26 at 77° F. A second sample of the same asphalt was blended with the same extract and with naphthalene to produce approximately the same hardness at 77° F. The proportions and properties of the blended asphalts are shown in Table IV.

*Table IV*

| Sample No. | 1 | 2 | Mexican Panuco |
|---|---|---|---|
| Composition: blown asphalt pen. at 77° F. 100 g. 5 sec. | 54 | 66.5 | |
| M. C. residual oil extract % | 46 | 28.5 | |
| Naphthalene % | 0 | 5. | |
| Properties: | | | |
| Pen. at 32° F. 200 g. 60 sec. | 8 | 10 | 17 |
| Pen. at 77° F. 100 g. 5 sec. | 26 | 25 | 45 |
| Softening point—Ring and Ball | 136° F. | 139° F. | 135° F. |
| Ductility at 77° F. cm. | 110+ | 92 | 110+ |
| Say. furol vis. at 275° F., sec. | 252 | 381 | 486 |
| Float test at 176° F., sec. | 198 | 297 | 219 |

The above tests show that a smaller amount of extract had to be used in sample 2 to get approximately the same hardness, with the result that the ductility was slightly less. The viscosity at 275° F. and the float tests, however, indicate a marked improvement in the high temperature characteristics.

Although we have described our invention in connection with the preparation of paving asphalt, we do not wish to be limited thereto. It is apparent that the characteristics of the final asphalt may be altered within wide limits to produce a final product of the required grade. Moreover, we do not wish to be limited to any theory discussed herein, but to claim the combination of steps and the asphalt produced thereby, as set forth in the appended claims.

We claim as our invention

1. The process of producing asphalt comprising the steps of blending asphaltic bituminous material with an easy flowing low viscosity index hydrocarbon oil, treating the resulting blended mixture with an oxidizing gas under conditions to oxidize asphaltic material, and blending the blown mixture with a highly viscous low viscosity index hydrocarbon oil.

2. The process of producing asphalt from an oil containing asphaltic bituminous material comprising the steps of concentrating asphaltenes to produce an asphaltic material containing at least 20% asphaltenes, blending said concentrated asphaltic material with an easy flowing low viscosity index hydrocarbon oil, blowing the resulting blended mixture with an oxidizing gas under conditions to oxidize asphaltic materials, and blending the blown materials with a highly viscous low viscosity index hydrocarbon oil.

3. The process of producing asphalt from an oil containing asphaltic bituminous material comprising the steps of treating said oil with a light hydrocarbon solvent to dissolve oily constituents and precipitate asphaltic bituminous material, separating the precipitated material from the soluble material, blending the precipitated material with an easy flowing low viscosity index hydrocarbon oil, blowing the resulting blended mixture with an oxidizing gas under conditions to oxidize asphaltic materials, and blending the blown materials with a highly viscous low viscosity index hydrocarbon oil.

4. The process of producing asphalt comprising the steps of blending asphaltic bituminous material with a low viscosity index hydrocarbon oil having a viscosity between 30 and 150 seconds Say. Univ. at 210° F., blowing the resulting blended mixture with an oxidizing gas under conditions to oxidize asphaltic materials until the blown materials have a low temperature susceptibility, and blending the blown materials with a bituminous ductility improving agent.

5. The process of producing asphalt comprising the steps of blending asphaltic bituminous material with a low viscosity index hydrocarbon oil having a viscosity between 50 and 70 seconds Say. Univ. at 210° F., blowing the resulting blended mixture with an oxidizing gas under conditions to oxidize asphaltic materials until the blown materials have a low temperature susceptibility, and blending the blown materials with a bituminous ductility improving agent.

6. The process of producing asphalt comprising the steps of blending asphaltic bituminous material with a low viscosity index hydrocarbon oil having a viscosity between 50 and 70 seconds Say. Univ. at 210° F., blowing the resulting blended mixture with an oxidizing gas under conditions to oxidize asphaltic materials until the blown materials have a low temperature susceptibility, and blending the blown materials with a bituminous ductility improving agent and naphthalene.

7. The process of producing asphalt comprising the steps of blending asphaltic bituminous material with an oil, oxidizing the blended mixture, and blending the oxidized material with a highly viscous low viscosity index hydrocarbon

oil having a softening point above about 90° F. and soluble in selective solvents for non-paraffinic hydrocarbons.

8. The process of producing asphalt comprising the steps of blending asphaltic bituminous material with an oil, oxidizing the blended mixture, and blending the oxidized material with a highly viscous low viscosity index hydrocarbon oil and naphthalene.

9. The process of producing asphalt comprising the steps of blending asphaltic bituminous material with an oil, oxidizing the blended mixture, and blending the oxidized material with a highly viscous low viscosity index hydrocarbon oil having a viscosity greater than 350 seconds Say. furol at 210° F. and soluble in selective solvents for non-paraffinic hydrocarbons.

10. The process of producing asphalt comprising the steps of blending asphaltic bituminous material with an oil, oxidizing the blended mixture, and blending the oxidized material with a highly viscous low viscosity index hydrocarbon oil having a viscosity greater than 500 seconds Say. furol at 210° F. and soluble in selective solvents for non-paraffinic hydrocarbons.

11. The process of producing asphalt comprising the steps of blending asphaltic bituminous material with a fraction of low viscosity index hydrocarbon oil having a viscosity between 50 and 70 seconds Say. Univ. at 210° F., blowing the resulting blended mixture with an oxidizing gas under conditions to oxidize asphaltic materials, and blending the blown materials with a highly viscous low viscosity index hydrocarbon oil having a viscosity greater than 500 seconds Say. furol at 210° F.

12. The process of producing a low susceptibility asphalt comprising the steps of blending asphaltic bituminous materials with a low viscosity index hydrocarbon oil soluble in selective solvents for non-paraffinic hydrocarbons, having a viscosity above 30 seconds Say. Univ. at 210° F. and substantially below that of cylinder oil, and oxidizing the blended mixture to produce a low susceptibility asphalt.

13. A low susceptibility asphalt containing between 30% and 50% asphaltenes and having a ratio of penetrations at 77° F. and at 32° F. of less than three, substantially free from carboids and produced by oxidizing a blend of asphaltic bituminous material and an easy flowing low viscosity index hydrocarbon oil soluble in selective solvents for non-paraffinic hydrocarbons having a viscosity above 30 seconds Say. Univ. at 210° F. and substantially below that of cylinder oil.

14. A process for improving the ductility of low susceptibility asphalt comprising blending an asphalt containing between 30% and 50% asphaltenes with a highly viscous low viscosity index hydrocarbon extract having a viscosity greater than 350 seconds Say. furol at 210° F. and naphthalene.

15. The process of lowering the temperature susceptibility of asphalt, which comprises removing oily constituents from an asphaltic material to produce an asphaltic concentrate containing over 30% asphaltenes, and blending asphaltic concentrate with a low viscosity fraction of a low viscosity index extract obtained by extracting a hydrocarbon oil with a selective solvent for non-paraffinic hydrocarbons and having a viscosity substantially below that of cylinder oil.

16. The process according to claim 15 in which the low viscosity extract has a viscosity above 30 seconds Say. Univ. at 210° F.

17. The process according to claim 15 in which the low viscosity extract has a viscosity between 50 and 70 seconds Say. Univ. at 210° F.

18. The process of producing low susceptibility asphalt which comprises precipitating asphalt material from an asphalt-bearing mixture with a light liquid hydrocarbon solvent to produce an asphaltic material containing more than 30% asphaltenes and blending the precipitated asphaltic materials with a low viscosity fraction of a non-paraffinic extract obtained by extracting a hydrocarbon oil with a selective solvent for non-paraffinic hydrocarbons and having a viscosity above 30 seconds Say. Univ. at 210° F. and substantially below that of cylinder oil.

19. The process of producing low temperature susceptibility asphalt which comprises subjecting an asphaltic oil to an oxidizing distillation to remove oily constituents and to increase the asphaltic content to produce an asphaltic material containing more than 30% asphaltenes and blending the asphaltic materials with a low viscosity fraction of a non-paraffinic extract obtained by extracting a hydrocarbon oil with a selective solvent for non-paraffinic hydrocarbons and having a viscosity above 30 seconds Say. Univ. at 210° F. and substantially below that of cylinder oil.

20. The process of producing asphalts which comprises blending a low susceptibility asphaltic material containing over 30% of asphaltenes with a fraction of a low viscosity index extract having a viscosity above 30 seconds Say. Univ. at 210° F. and substantially below that of cylinder oil obtained by extracting a hydrocarbon oil with a selective solvent for non-paraffinic hydrocarbons.

21. The process of producing asphalts which comprises blending a low susceptibility asphaltic material containing over 30% of asphaltenes with a fraction of a low viscosity index extract having a viscosity between 50 and 70 seconds Say. Univ. at 210° F. obtained by extracting a hydrocarbon oil with a selective solvent for non-paraffinic hydrocarbons.

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