

UNITED STATES PATENT OFFICE

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BATTERY BOX ASPHALT AND METHOD OF MAKING THE SAME

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This invention relates to an improved asphalt of petroleum origin suitable, after compounding with appropriate fillers, for the manufacture of molded articles such as battery boxes, insulators and other molded articles which have to meet high requirements for mechanical strength.

Battery boxes for automobiles and similar articles have been manufactured by molding hot mixtures of asphalts, fine fillers and fibrous materials. The following composition may be considered typical for battery boxes—

	Per cent
Asphalt blend	52
Cotton Fibres	15
Ground asbestos	33

Up to now, it has been the general practice in the industry to blend appreciable proportions of Gilsonite with blown asphalts in order to make a box having both toughness and hardness, as well as good moldability and improved appearance. The usual asphalt-Gilsonite blend contains as much as 30-40% of Gilsonite, a natural asphalt of limited availability and high cost. Such practice is reflected in U. S. Patent 1,752,917 to A. R. Lukens, assignor to the Richardson Company. To the best of our knowledge, no asphalt of purely petroleum origin has met the requirements of cohesion and mechanical characteristics necessary in the battery boxes.

We have found that oxidation of solvent extract tars from residual petroleum oils, such as "Duo-Sol tar," to a blown bituminous material having a ring and ball softening point in the neighborhood of 250-300° F., preferably 275-285° F., yields products of unique characteristics. Such products are capable of replacing the Gilsonite-asphalt blends and even surpassing them in quality.

A plant sized batch of Duo-Sol tar having the following physical tests was blown with air at 400 to 500° F.

Specific gravity @ 77/77° F.	1.012
Softening point (R. & B.)°F..	90
Flash, COC°F..	500
Viscosity furol @ 210° F.seconds..	323
Penetration @ 32° F., 200 gr., 60 sec.	52

The properties of the resulting product were as follows:

Softening point (R. & B.)°F..	279
Penetration @ 77° F., 100 gr., 5 sec.	2
Penetration @ 115° F., 50 gr., 5 sec.	2½
Penetration @ 150° F., 50 gr., 5 sec.	9

Experimental production results from a battery box manufacturer on the above described new asphaltic material, in comparison with two Gilsonite-asphalt blends, are given below. Storage

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battery boxes were all made in the same manner, using the same proportions of bituminous matter, fiber and filler, the variation being limited to the kind of asphalt used.

Composition of Asphalt Compound	90% 270° S. P. Blown Venezuelan Asphalt—10% Gilsonite	60% 270° S. P. Blown Venezuelan Asphalt—40% Gilsonite (Present commercial compound)	100% Blown Duo-Sol Tar
Tests on Asphalt Compound:			
Soft. Point (R. & B.)	275	268	279
Penetration 77/100/5	3	0.5	2
Penetration 115/50/5	1.5	1.5	2.5
Penetration 150/50/5	14	12	9
Tests on Battery Boxes:			
Tensile strength, lbs./sq. in.	873	1195	1240
Elongation, per cent.	2.36	1.56	1.56
Tensile Product.	2060	1865	1935
Test Piece, Impact.	67	60.7	68

The box made using only 10% Gilsonite had a low tensile strength, was tacky and stuck to the molds and could not be made commercially for this reason. Where no Gilsonite was used in blend with the 270° S. P. Venezuelan asphalt, it was still harder to mold. It will be noted that the box made with 100% blown Duo-Sol tar has a better tensile strength, better impact resistance, and equal elongation, compared with the blend containing 40% Gilsonite. No difficulty in molding was observed.

The test procedures used in obtaining characteristics of the battery boxes are those described in the ASTM Standards for 1942, part III, p. 1405, Tests for asphalt battery containers (D639-41T) and p. 1389, Tests for hard rubber products (D530-39T).

The "Duo-Sol tar" is an asphaltic extract obtained by solvent refining of reduced crudes with liquid propane and cresylic acid. Other extracts obtained similarly from residual petroleum oils by solvent refining with propane, phenol, clorex and other selective solvents known to the art are suitable for the purpose of this invention provided the extract as such, or after reduction by topping prior to air blowing, conforms to the following approximate characteristics:

Softening point (R. & B.)°F. min..	80
Specific gravity @ 77/77° F.min..	1.00
Penetration @ 32° F., 200 gr., 60 sec.	20 to 150
Viscosity furol @ 210° F. secs.	100 to 750
V. G. C.min..	.890

The desirable properties of the oxidized asphalt suitable for direct compounding with the fillers

into the battery box material should be within the following limits:

Specific gravity @ 77/77° F.....min..	1.03
Softening point (R. & B.).....°F..	250-300
Penetration @ 77° F., 100 gr., 5 sec.....	0 to 4
Penetration @ 115° F., 50 gr., 5 sec.....	1 to 6
Penetration @ 150° F., 50 gr., 5 sec.....	5 to 16

As pointed out hereinbefore, the preferred form of the product is one which has been blown to a ring and ball softening point of 275 to 285° F.

We claim:

1. That method of making an asphalt suitable for use, together with filler and fibre, in the production of molded battery boxes which comprises the following steps: solvent refining a reduced crude to produce therefrom a solvent extract tar, reducing said tar by distillation to a material of the following properties:

Softening point (R. & B.).....°F. min..	80
Specific gravity @ 77/77° F.....min..	1.00
Penetration @ 32° F., 200 gr., 60 sec.....	20 to 150
Viscosity furol @ 210° F. secs.....	100 to 750
V. G. C.....min..	.890

and then oxidizing the reduced tar to an asphalt having the following properties:

Specific gravity @ 77/77° F.....min..	1.03
Softening point (R. & B.).....°F..	250-300
Penetration @ 77° F., 100 gr., 5 sec.....	0 to 4
Penetration @ 115° F., 50 gr., 5 sec.....	1 to 6
Penetration @ 150° F., 50 gr., 5 sec.....	5 to 16

2. That method of making an asphalt suitable for use, together with filler and fibre, in the production of molded battery boxes which comprises the following steps: solvent refining crude to produce therefrom a solvent extract tar, reducing said tar by distillation to a material of the following properties:

Softening point (R. & B.).....°F. min..	80
Specific gravity @ 77/77° F.....min..	1.00
Penetration @ 32° F., 200 gr., 60 sec.....	20 to 150
Viscosity furol @ 210° F. secs.....	100 to 750
V. G. C.....min..	.890 45

and then oxidizing the reduced tar to an asphalt having the following properties:

Specific gravity @ 77/77° F.....min..	1.03
Softening point (R. & B.).....°F..	275-285
Penetration @ 77° F., 100 gr., 5 sec.....	0 to 4
Penetration @ 115° F., 50 gr., 5 sec.....	1 to 6
Penetration @ 150° F., 50 gr., 5 sec.....	5 to 16

3. An asphaltic material, suitable for the making of molded battery boxes when blended only with fibre and filler, having the following properties:

Specific gravity @ 77/77° F.....min..	1.03
Softening point (R. & B.).....°F..	250-300
Penetration @ 77° F., 100 gr., 5 sec.....	0 to 4
Penetration @ 115° F., 50 gr., 5 sec.....	1 to 6
Penetration @ 150° F., 50 gr., 5 sec.....	5 to 16

4. An asphaltic material, suitable for the making of molded battery boxes when blended only with fibre and filler, having the following properties:

Specific gravity @ 77/77° F.....min..	1.03
Softening point (R. & B.).....°F..	275-285
Penetration @ 77° F., 100 gr., 5 sec.....	0 to 4
Penetration @ 115° F., 50 gr., 5 sec.....	1 to 6
Penetration @ 150° F., 50 gr., 5 sec.....	5 to 16

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