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COMPOSITION FRICTION ELEMENT

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This invention relates generally to the art of braking and more particularly to the manufacture of a novel friction element for use in brakes, clutches and other assemblies.

The object of the invention is to provide a composition brake element which is relatively rigid but yet has sufficient elasticity to enable it to be readily fitted to a brake head or shoe, a brake band, or other support.

My invention is more especially useful in making composition brake liners in strip form in a generally arcuate shape to fit brake heads or shoes and brake bands or other supports, and I will describe the invention as used for this purpose, although it may also be used in making relatively thick brake blocks and other braking elements for various purposes.

It has been common practice heretofore to use a binder, generally a drying oil, in friction compositions, but it has not been practicable to use a sufficient amount of oil to produce a liner having any material flexibility and at the same time thoroughly cure the liner in any available commercial baking process. I have overcome this difficulty and enabled the use of a sufficient amount of oil to produce a relatively flexible liner by adding sulfur to the composition mixture. I have added sulfur in the proportion of from 2% to 20% by weight of the amount of oil in the composition. For example, to 18 parts of oil I have added sulfur over a range from 0.36 part to 4.5 parts and I have found that added sulfur in the proportion of 15% of the amount of oil present appears to be the most desirable proportion to use. That is to say, 3 parts of sulfur are added to 20 parts of drying oil. When less than 15% of sulfur is used there is apt to be some difficulty in properly curing the material; if more than 15% of sulfur is used the excess will distill out and be lost. Different compositions may enable or require a variation in the proportion of sulfur to oil and different binders may enable or require similar variations in the sulfur proportion. In all cases, however, it is desirable to use as much added sulfur as the amount of binder will permit without adversely affecting the curing step. To increase the flexibility of the finished product small quantities, up to 5 parts, of castor oil, cylinder stock oil, rosin, free fatty acids, or like materials, may be added to the mixture.

The following is an example of a composition which may be used in making a composition friction liner embodying my invention:—

	Parts
Asbestos, short fibre	65
Pyrobituminous material, such as bituminous coal	25
Binder, such as raw linseed oil	18
Sulfur, 15% by weight of oil	2.7

The sulfur is first added to the oil and mixed by stirring; the oil-sulfur mix is then added to bituminous coal and mixed; then the asbestos is added, and the whole is thoroughly mixed in any suitable mixing machine. I use ordinary flowers of sulfur or other finely divided sulfur, comminuted bituminous coal, and short fibre asbestos. Other quantities of these materials and other mixing procedure may be employed which will produce results equivalent to the materials and procedure indicated.

The mixture, without heating, can be rolled into a limp strip and cut into sections for curing, or it can be made in block form in a mold under pressure, and then cured or baked in an oven. A suitable heating schedule is four or five hours at approximately 125° F. and then five to six hours at 300° F.

In practice it is desirable in quantity production to cut the strip into sections of standard lengths as it comes from the strip machine and to place these sections upon arcuate forms by which they are supported in the curing oven. The limp sections will conform to the shape of the forms which are standardized in a general way to the shape of heads or shoes or bands, or other supports, in commercial use, or they may be pressed to the forms easily and held thereon by means of clips. It is not necessary to shape the liner to the precise curvature of the support on which it is to be used because the liner has some flexibility and can be shaped snugly to the support in mounting it thereon. This applies to continuous strip liners which are referred

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to as such as well as to those made in the form of relatively short and thin blocks. The composition may be molded in relatively thick blocks in accordance with my invention and they will have the advantage of that flexibility which my improved composition affords.

My invention is of special importance from a production standpoint because it enables liners to be made quickly and at relatively low cost by rolling in continuous lengths which can be cut up into sections of any length required; and it is also specially important because it provides a composition braking element having sufficient flexibility to enable it to be fitted to its support.

Where I have referred to the product of my invention herein as a composition brake liner it is to indicate a useful embodiment, but it can be made as a friction element in many different forms, including clutch facings and the like, and in such sizes and shapes as may be required.

I claim:

1. A flexible friction element for brakes and clutches consisting of the product formed by the chemical reaction of sulfur and a drying vegetable oil combined with asbestos and natural pyrobituminous material.

2. A flexible friction element for brakes and clutches consisting of a mixture of natural pyrobituminous material, asbestos, a drying vegetable oil, and added sulfur in the proportion of approximately 15% of the oil.

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