Patented Nov. 20, 1928. 1,692,136

UNITED STATES PATENT OFFICE.

IZADOR J. NOVAK, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO RAYBESTOS COMPANY, OF BRIDGEPORT, CONNECTICUT, A CORPORATION OF CONNECTICUT.

FRICTION ELEMENT AND PROCESS OF PRODUCING SAME.

No Drawing. Application filed February 26, 1923, Serial No. 621,487. Renewed December 22, 1927.

This invention relates to improvements in friction elements and process of producing same and refers more particularly to the binder substance used in connection with the production of friction elements such as brake linings, clutch facings, and other products of a like character.

Friction elements generally used at the present time are usually made up of an asbestos fabric or fibrous mass impregnated with asphalt, drying oils, rubber or resins, either alone or in combination. These saturants comprise the large proportion of friction materials used. Generally these materials require the use of some organic solvent as a carrier or vehicle utilized to impregnate the asbestos fabric or fibre with the binder or saturant. This carrier may be gasoline, benzol, or other solvents of a somewhat similar character. Rubber friction elements may or may not be made with the use of a solvent.

The use of an organic solvent such as those mentioned is always attended, however, by at least two disadvantages: First, the high fire risk, and, second, the loss, either partial or complete, of the expensive solvent. It has therefore been of the utmost importance to find a binder or saturant for friction elements which could be incorporated into the asbestos fibre with a cheap solvent such as water as a carrier. Such a saturant has been found in the dried waste sulphite liquor such as that which is a waste product from paper pulp mills.

This waste sulphite liquor is produced in extremely large quantities by chemical pulp mills using the so-called sulphite process, as a waste product of the separation of the cellulose or fibre from the wood. It is understood to contain as its principal constituents the calcium salts of the lignin-sulphonic acids, and sugars formed in the decomposition, or present in the sap. It has excellent adhesive properties and is perfectly miscible with water in all proportions. It does not melt under heat, but carbonizes and hardens.

Upon incorporation into the asbestos woven stock for use as brake lining, this material when present to the extent of 15% more or less of the total weight gives a hard wear-resisting friction material with a remarkably uniform co-efficient of friction averaging about .33. When used on an automobile in actual service it will give a very effective braking action, smooth and positive under all conditions of temperature obtained in service tests.

The method of producing a friction material from the woven asbestos tape such as is generally used for the manufacture of brake lining consists merely in completely saturating the raw tape in the waste sulphite liquor containing that proportion of solids to water which is found to give the most satisfactory proportion of saturant to the finished tape. This latter proportion has been found to lie between ten per cent (10%) and twenty per cent (20%), although percentages above and below this range have given relatively satisfactory results. Thus fifteen per cent (15%) residual saturant may be obtained by the use of a sulphite liquor containing approximately twenty-five per cent (25%) solids. These proportions and conditions may be most easily determined by trial. However, as a maximum saturation value for raw asbestos tape, from forty per cent (40%) to seventy per cent (70%) of the original weight seems to be substantially correct.

It has been found that equally favorable results are obtained by the incorporation of this binder in woven clutch facings, the method of saturation being identical with that of brake linings. In the case of woven facings it has been noted that the addition of a small amount of molasses, dextrin or several other water-soluble adhesive materials up to about twenty per cent (20%) of the solids in the saturant improves the uniformity of the frictional co-efficient considerably. Too large an excess of these water-soluble gums is undesirable from the standpoint of resistance to wear.

The saturant may be used as a binder in the case of un-woven clutch facings or brake linings which are made from felted asbestos mill board by cutting out the shape desired, saturating with a binding material, curing until sufficiently hard and finishing to size. Particular care must be taken, however, to preserve the form of this type of friction element base, as there is a marked swelling and softening action in the presence of water. Once the material is dry, however, the shape is firmly set by the hard, strong binder. The same high frictional characteristics previously mentioned are also inherent in this type of friction facing. In addition to its use with felted and woven asbestos, friction

elements made from wire tape covered with woven asbestos fibre may also be treated in a like manner.

By the use of waste sulphite liquor in various dilutions or concentrations, it has been possible to obtain a strong binder of easily variable hardness which is adaptable to a large variety of friction elements substituting for the highly inflammable and costly carriers or solvents now used a non-inflammable and cheap one such as the water of the sulphite liquor. The process also eliminates curing as in the case of the drying oils, linseed or asphalt, and vulcanization in the case of rubber binders. It also provides a new use for a waste product, besides providing a very cheap and efficient binder for a frictional material.

I claim as my invention:

1. A friction element having an asbestos base containing as a binder the solid residue of waste sulphite liquor produced by drying of the liquor.

2. Woven asbestos covered wire tape containing as a binder the solid residue from waste sulphite liquor produced by drying of the liquor.

3. In friction elements, the combination with an incombustible fibrous base, of a binder substance containing the solid residue from waste sulphite liquor produced by drying of the liquor.

4. In friction elements, the combination with a fibrous base, of a binder substance impregnated therein comprising a major portion of the solid residue from waste sulphite liquor and a minor portion of a water soluble adhesive gum in predetermined proportions produced by drying of the mixture.

5. In friction elements, the combination with a fibrous base, of a binder substance comprising a major portion of the solid residue from waste sulphite liquor and a minor portion of a water soluble gum.

6. A process of producing friction elements, consisting in impregnating an incombustible fibrous base with waste sulphite liquor extended in water, and heat treating the saturated base to remove the water.

7. A process of producing friction elements, consisting in impregnating a fibrous base with a mixture of waste sulphite liquor and a water soluble gum in relatively smaller proportions to the waste sulphite liquor, the saturating mixture being extended in water, and heat treating the saturated base to remove the water.

IZADOR J. NOVAK.

Published by AsbestosClaims.Law
asbestosclaims.law/library/22404/2