

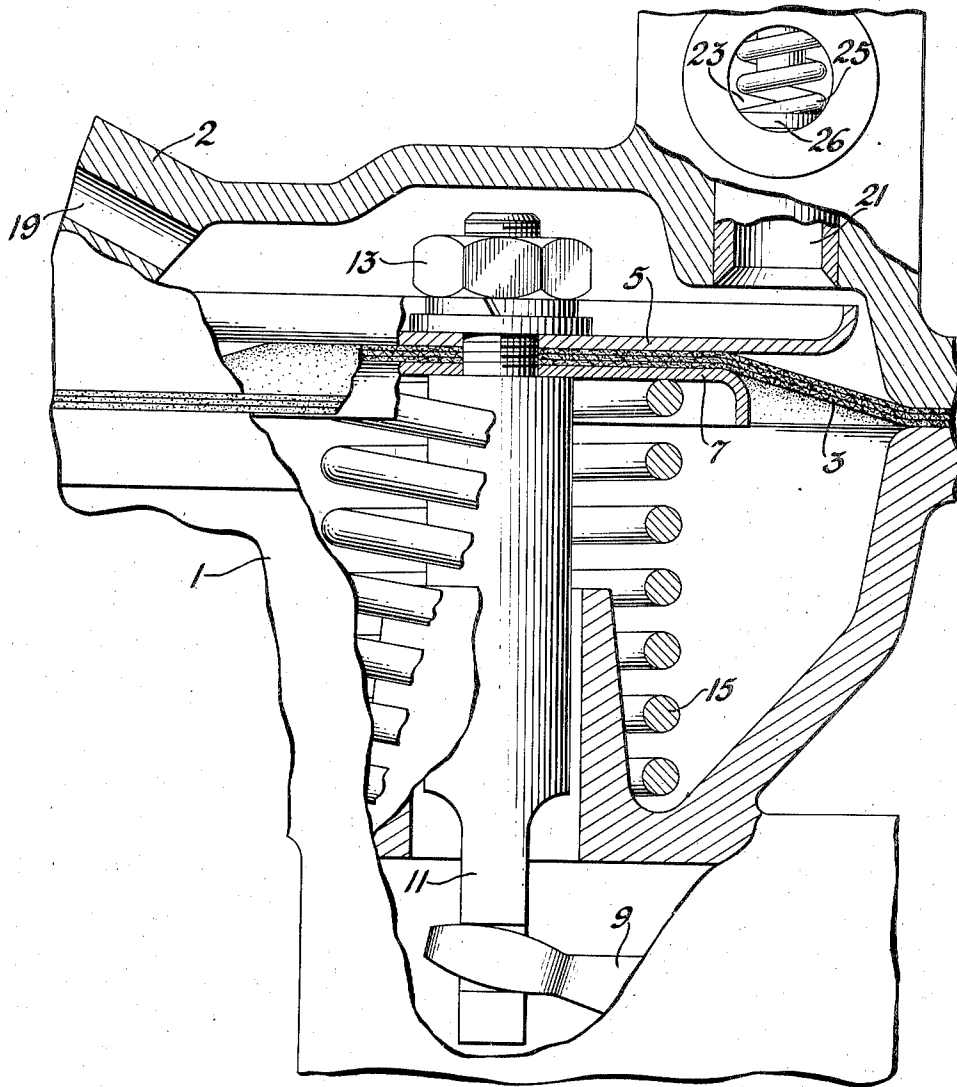
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FABRIC COATING

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FABRIC COATING

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2 Claims. (Cl. 91-68)

This invention relates to fabric coatings and particularly to the coating of fabric which is to be used for making fuel pump diaphragms. Reference is made to our prior applications, Serial No. 190,272, for Fabric coating, filed February 12, 1938, and Serial No. 238,950, for Fabric coating, filed November 5, 1938. This application is a continuation in part and includes matter divided out from our earlier filed applica-
10 tions.

As with the invention of our prior applications it is an object of this invention to so coat diaphragms that they may be and remain flexible for long periods of time and throughout a great
15 range of temperature; and that the coating shall not appreciably dissolve in gasoline or in organic solvents found associated with gasoline.

As a further object the coating should resist damage which may be occasioned by the frictional resistance between the adjacent layers of a laminated diaphragm.

The accompanying drawing shows a sectional view of a conventional fuel pump in its single figure.

In the drawing 1 represents the body of the pump and 2 a cover therefor. At 3 is shown a laminated diaphragm positioned between upper disc 5 and lower disc 7. The diaphragm is adapted to be reciprocated by an engine operated lever 9, the end only of which is shown in the drawing. The lever 9 pulls the diaphragm through the instrumentality of a rod 11 secured to the diaphragm by attaching means 13. The discharge movement of the diaphragm is made
30 by spring 15. The fuel enters the pump chamber through a passage 19 and is delivered through a passage 21 and through an outlet 23. The outlet valve 26 only is shown, its spring being marked 25.

We have found that alkyd resins afford the answer to the objectives recited above. These resins are formed as the reaction products of polybasic acids with polyhydric alcohols, preferably alcohols having at least three hydroxyl
45 groups. Of the polybasic acids we prefer to use one having at least two carboxyl groups separated by five or more CH_2 groups forming a long straight chain, such an acid as sebacic acid, and it is this acid which is believed to be
50 most useful in producing a resin having the desired flexibility and the high degree of non-solubility in organic solvents. We prefer to use glycerine for the alcohol.

A diaphragm coated as above does not possess quite the freedom from solubility that may

be desired. We therefore use another polybasic acid together with the sebacic acid in making the resin. Numerous other acids may be associated with the sebacic acid. Of these others we prefer to use one or more of the polybasic acids having no more than three carbon atoms between the carboxyl groups. Typical of such acids are citric acid, which is now preferred, and tartaric acid. We are aware that when tartaric acid or citric acid is used certain intermediate acids may be produced when the mixture is heated, such as malic acid, methyl succinic acid in the case of tartaric acid and acetic acid in the case of citric acid. These intermediate products might be obtained commercially and used directly with the sebacic acid. We have found that citric acid when used with sebacic acid and glycerine renders the resin less soluble in organic solvents and is therefore highly desirable when the fabric is to be used
20 for fuel pump diaphragms.

It is quite common in the use of coated fabric for fuel pumps to use a plurality of laminations. Perhaps as the result of friction between the layers there has occurred a slight scuffing off of the coating and a consequent development of porosity. To avoid this defect we have found it desirable to add what may be termed a filler. The filler apparently lessens the swelling and softening of the coating and prevents its being
25 scuffed off. For the filler there may be used forms of carbon such as amorphous carbon, lamp black, charcoal or graphite. It has also been found that there may be used powdered aluminum or oxides of iron, copper or manganese. It is also possible to use starches, cornstarch and arrow root having been considered. At present we regard lamp black most favorably as a filler. It will be understood that the use of the filler to prevent scuffing of the coating is in addition to its utility in preventing solubility of the coating in the fuel as set forth in the parent case where it was proposed to use the filler in place of the second resin. In the present case it is used together with a second
45 resin and serves the double purpose described. Moreover, improvement in insolubility of the coating resulting from the addition of lamp black is a characteristic quite apart from and in addition to its utility for preventing the scuffing off of the coating. It has been found that lamp black should be used to the extent of at least 5% by weight. Below 5% the efficiency is not satisfactory. The quantity may be increased up to 20%, but above 20% it is found difficult
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to keep the lamp black in suspension in the liquid resin. It has been determined therefore that 5% and 20% are the limits within which the lamp black should be used.

5 The inventive idea is therefore the coating of fabric with an alkyd resin made from the reaction of a polyhydric alcohol such as glycerine together with a long chain polybasic acid such as sebacic acid to secure pliability, and a second acid such as citric acid to secure maximum insolubility and a filler such as lamp black to prevent the scuffing off of the coating and to aid in preventing solubility.

15 It should be explained that there are many other uses for this invention than its use with fuel pumps. Utility will be found wherever such a coated fabric is to be used in contact with liquid media and especially where the media may contain organic solvents. It is believed the possibility of using diaphragms coated as herein disclosed may lead to the use of such flexible diaphragms in many applications where in the past their use has been thought to be impractical. For this reason it will be understood that

although the immediate occasion for the invention is the making of a more serviceable fuel pump, the invention is by no means limited to that one field of usefulness.

We claim:

1. A flexible fabric imperviously coated with a resinous product of polyhydric alcohol with sebacic acid and citric acid, together with between 5% and 20% by weight of lamp black to prevent solubility and scuffing off of the coating. 10

2. A flexible fabric for fuel pump diaphragms imperviously coated with alkyd resins constituting the reaction products of polyhydric alcohol with sebacic acid and citric acid, the sebacic resin affording a relatively greater pliability but a lesser solubility in organic solvents and the citric resin affording a relatively greater insolubility but a lesser pliability, together with between 5% and 20% by weight of lamp black to prevent solubility and scuffing off of the coating. 15 20

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