

# UNITED STATES PATENT OFFICE

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## FLUID COMPOSITION

Jules Bebie and George L. Doelling, St. Louis, Mo.,  
 assignors to Wagner Electric Corporation, St.  
 Louis, Mo., a corporation of Delaware

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Our invention relates to a fluid composition suitable for use in fluid pressure devices and systems such as shock absorbers, hydraulic jacks, and hydraulic actuating apparatus for vehicle  
 5 brakes. To be applicable for use as a power transmitting means in hydraulic brakes, a fluid should have quite a number of special characteristics. It should not solidify at the lowest atmospheric temperatures occurring in any locality  
 10 where motor vehicles are used, nor vaporize unless at temperatures much higher than atmospheric. It must be viscous at all temperatures within the range just mentioned, and its viscosity must not be too high at minimum temperatures  
 15 to prevent its flow under relatively low pressure. It should be without chemical or physical effect on rubber and not contain or develop, during the period of its use, any substance corrosive to metals of the kind used in the manufacture of fluid pressure apparatus and fluid conduits (copper, brass,  
 20 and steel, for example). Further, it should have lubricating properties to minimize or prevent wear of relatively moving parts with which it contacts and form a film on these surfaces of such character and durability as will constitute protection  
 25 against atmospheric corrosion of those which may at times be exposed to the atmosphere.

We have discovered that a fluid constituted as follows fulfills the above requirements:

	Parts by volume
Castor oil.....	40
Ethyl ester of ortho toluene sulfonamid.....	18
Ethyl ester of para toluene sulfonamid.....	18
35 Mono ethyl ether of glycerine.....	24

While the proportions may vary considerably, those above given are found to be quite satisfactory.

40 While the toluene sulfonamid ester content of the composition may be entirely of a single ester, the composition given is to be preferred, not only since the solidifying point of the mixture is lower but since the cost is less due to the fact that in

the manufacture of toluene sulfonamids the ortho and para isomers are formed in about equal proportions and the expense of separating the isomers can be saved by using the ethyl ester of the mixture.

While a fluid comprising chiefly castor oil and mono ethyl ether of glycerine, in proportions of approximately 60 parts of the former to 40 parts of the latter, would constitute a fluid having most of the desired characteristics, it would be somewhat hygroscopic and it is, therefore, desirable to also employ a non-hygroscopic fluid element having higher boiling point than the ether of glycerine, which fluid must, of course, also be substantially inert toward rubber and metals. We  
 70 have found that a toluene sulfonamid ester complies with these requirements and that the preferred mixture hereinabove described is non-hygroscopic.

Having fully described our invention, what we claim as new and desire to secure by Letters Patent of the United States is:

1. An operating fluid for fluid pressure apparatus comprising a toluene sulfonamid ester, castor oil, and an alkyl ether of glycerine.
2. An operating fluid for fluid pressure apparatus comprising a toluene sulfonamid ester, castor oil, and mono ethyl ether of glycerine.
3. An operating fluid for fluid pressure apparatus comprising castor oil in approximately 40  
 85 parts by volume, ethyl ester of ortho toluene sulfonamid in approximately 18 parts by volume, ethyl ester of para toluene sulfonamid in approximately 18 parts by volume, and mono ethyl ether of glycerine in approximately 24 parts by volume.
4. An operating fluid for fluid pressure apparatus comprising castor oil, mono ethyl ether of glycerine, and a non-hygroscopic fluid having relatively high boiling point and substantially inert to rubber and metals.

JULES BEBIE.  
 GEORGE L. DOELLING.

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