Sept. 3, 1935. C. H. EGAN 2,013,177

CONTAINER CLOSURE

Filed Nov. 27, 1931

Fig. 1

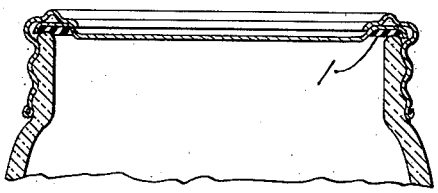


Fig. 2

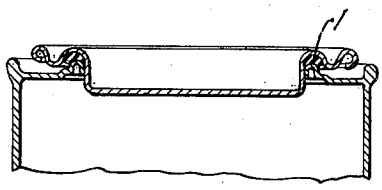


Fig. 3

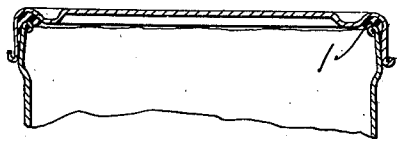
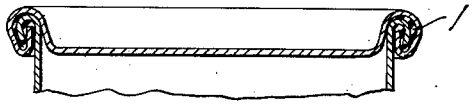


Fig. 4



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CONTAINER CLOSURE

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7 Claims. (Cl. 220—81)

This invention relates to improvements in container closures for effecting either gas- or liquid-tight seals and it comprises a container closure provided with an asphaltic sealing composition deposited thereon.

There are many usual types of container closures to which the improvements of this invention are applicable. Reference is had to the drawing in which—

Figure 1 is a cross section of a screw top closure exemplifying the invention;

Figure 2 is a cross section of a friction plug closure exemplifying the invention;

Figure 3 is a cross section of a slip cover closure exemplifying the invention;

Figure 4 is a cross section of a can closure adapted to double seaming exemplifying the invention.

When employing closures of the types illustrated in the drawing it is necessary to insert a plastic or resilient sealing material between the body and cover of the container in order to obtain therebetween a gas- or liquidtight joint. To this end a gasket or ring of resilient material, indicated by the numeral 1 in the several drawings, is commonly formed on the periphery of the closure by extruding thereon a plastic sealing material.

Different types of container closures, however, such as those illustrated, require sealing compositions of different characteristics. For example, containers of the double seam type require sealing material only sufficiently plastic to flow under the very great pressure encountered and the momentarily increased temperature developed in the double seaming operation; while containers such as the friction plug, slip cover, and screw top types require sealing material which will flow without the aid of heat under the relatively slight pressure developed in the respective sealing operations. Furthermore, as is well known, the packaging of many materials presents special sealing problems which make special demands on the plastic sealing material.

To meet these demands many different kinds of plastic sealing compositions have been proposed or used, practically all of which, however, have relied on rubber in one form or another as the plastic and resilient sealing medium. Thus, rubber was used either as an aqueous suspension such as occurs in rubber latex compounds or rubber dissolved in a suitable solvent such as benzol. Depending on the characteristics required in the finished sealing material various softening agents were incorporated in the rubber. For the latter purpose were commonly employed paracoumarone resin, rosin, various oils, etc. While such sealing compositions generally possessed of the properties of rubber have proved highly satisfactory for some purposes, they have proved quite unsatisfactory for other purposes. For example, compounds comprising essentially rubber are successfully used in double seam type closures which are to be employed in the packaging of watery materials but are not at all satisfactory for use in double seam type closures which must yield a dry, gastight seal such, for example, as that required in dry vacuum sealing. The failure of rubber compounds to yield a satisfactory seal in the absence of moisture is probably due to the fact that the surfaces of the closures are not "wet" by the rubber. In the presence of moisture, however, it is believed that the water forms a film between the rubber and substance of the closure mutually wetting both surfaces and so insuring a gas- and liquidtight joint. Furthermore, compounds comprising essentially rubber have been found generally unsatisfactory for use with closures such as the screw top, slip cover, or friction plug type closure where a more plastic material is required. This is because attempts to plasticize rubber by introducing usual softening agents result in a tacky, viscous or fluid type of product instead of a material of the desired plasticity characteristics. Finally, all essentially rubber sealing compositions, and particularly those containing softening agents, tend to deteriorate under the influence of oxygen and adverse atmospheric conditions.

A general object of the present invention is to provide a new type of sealing composition adapted to give a seal satisfactorily effective with all kinds of container closures and free from the disadvantages attending prior sealing compositions. A specific object of the invention is to provide a sealing composition adapted for use in the absence of moisture, particularly for use in dry vacuum sealing in connection with double seam can closures. Another specific object is to provide sealing compositions of suitable consistency or plasticity for use with screw top, slip cover, and friction plug closures which, as stated, require a plastic sealing material which will flow and conform to the minute irregularities of the seam space closure under the relatively low pressure encountered in these types of sealing operations. Still other specific objects of the invention are to provide sealing compositions which do not in any way rely on water for their operative effectiveness and do not deteriorate un-

der the influence of oxygen and adverse atmospheric conditions. Other objects and advantages of the invention will become apparent with its more detailed description.

In pursuance of the above recited objects I have discovered a new class of sealing compositions which are generally and advantageously applicable to all types of closures of the above named and illustrated description but are particularly valuable for use in connection with the so-called dry vacuum sealing process. While prior sealing compositions have relied on the natural or modified plastic properties of rubber, my new class of sealing compositions relies on the plastic properties of asphalt with or without the addition thereto of other modifying agents. By employing asphalt in place of rubber I am able to prepare sealing compositions which unlike those comprising essentially rubber are very resistant to oxygen and adverse atmospheric conditions. Furthermore, by properly selecting the melting point range of the asphalt which is employed, I am able to produce sealing compositions of any desired plasticity and hence adapted to any type of can closure. I have discovered that asphalt, when under the influence of the pressure always encountered in sealing operations, "wets" the tinplate or the other materials of which can closures are generally made; and for this reason, a tight seal is always assured regardless of whether the contents are dry or contain moisture. This latter property is of particular advantage in dry vacuum sealing.

While asphalt forms the essential ingredient of my new class of sealing compositions, and while I may employ asphalt per se as a suitable sealing material, for some purposes, such as appear below, it is frequently desirable to modify the properties of the asphalt by incorporating therein modifying agents. For this purpose I may employ other plastic materials, such as rubber, paracoumarone resin, stearic acid, etc.; or I may employ inert fillers such as clay, finely divided zinc oxide, aluminum oxide, titanium oxide, etc.; or I may employ the latter two types of modifying agents simultaneously and in combination with asphalt. Those materials which are plasticity modifying agents are employed to modify in degree the plastic properties of the asphalt; while inert fillers are employed to lend bulk and body to the compound. Inert fillers are most advantageous when employed with very low melting asphalts. It will be understood, however, that in all cases where modifying agents are used, the general advantageous properties of the asphalt are retained; otherwise, the objects of the invention would be defeated. Hence modifying agents will be used only in such proportions as to change in degree but not in kind the desirable sealing properties of asphalt on which this invention relies. The detailed mode in which various combinations of asphalt and modifying agents may be employed will appear from the description and examples given below.

While asphalt per se or asphalt in combination with modifying agents may be applied to the periphery of a closure, the process of application is generally simpler and more practical when the sealing ingredient (or ingredients) is contained in a suitable vehicle. For this purpose, the sealing ingredient (or ingredients) either may be dispersed in water, in which case an emulsion of asphalt is employed, or may be dissolved in a suitable organic solvent such as benzol. These two general methods of applying rubber container sealing compounds are too well known to require further description. In passing it may be stated, however, that when employing asphalt dissolved in an organic solvent it is possible to obtain sealing compositions of much greater solids content for a given viscosity than is possible with rubber solutions heretofore commonly used. This is of great advantage particularly when dealing with closures, such as those illustrated in Figures 1, 2, and 3, where a very high bulking compound is desired, i. e., where it is essential to apply a relatively large amount of effective sealing constituent with as small a quantity as possible of accompanying vehicle.

By way of more detailed description, when preparing sealing compositions adapted for use with double seam can closures I generally employ an asphalt of relatively high melting point. Materials melting between 110° and 150° F. are preferred but asphalts having much higher melting points are adaptable because the very great pressure encountered in the double seaming operation is momentarily productive of sufficient heat to cause the asphaltic material to soften, flow into and "wet" the minute crevices and interstices of the closure walls. Asphalts of the high melting point type, however, become hard and brittle at low atmospheric temperatures and consequently may break or crack if used per se in the seams of cans frequently subjected to rough handling at low temperatures. It is, therefore, generally desirable and sometimes necessary to employ a suitable softening or toughening agent for the asphalt. For this purpose a variety of materials may be used; but rubber has proved most satisfactory. It imparts resiliency, toughness, and elasticity to the asphalt without at the same time conveying the disadvantages of rubber. Mixtures of asphalt and rubber with or without inert fillers may be applied in the conventional manner as indicated above to double seam can closures.

The following formulas are illustrative:

Example I

	Parts
Asphalt, melting point 130° F.	14
Rubber, milled crude	10
Benzol	about 76

Example II

Emulsion of asphalt, melting point 130° F. to produce asphalt solids	14
Rubber dispersion to produce rubber solids (either natural latex or an artificial aqueous dispersion)	10
Clay (bentonite)	2.5
Ammonia 28° Bé	4
Water to a computed solids of about 35% depending on service conditions familiar to the art.	

Sealing compositions prepared according to the above formulas are particularly well adapted for use with double seam can closures which must maintain a dry gastight seal, such as that used in dry vacuum sealing.

When preparing sealing compositions adapted for use with closures such as the friction plug, the screw top, or the slip cover closure it is generally necessary to employ asphalts of lower melting points than are used with the double seam type closure. For this purpose materials melting between 75° and 110° F. are very satisfactory. The following examples are illustrative of

compositions adapted for use with closures such as the friction plug, the screw top, or the slip cover closure.

Example III

	Parts
Rubber	10
Asphalt, melting point 80° F.	10
Aluminum oxide	20
Benzol	60

Example IV

Asphalt emulsion, melting point 80° F. to yield asphalt solids	23
Rubber dispersion, solids (either natural rubber latex or an artificial aqueous rubber dispersion)	32
Aluminum oxide	18
Water	27

The term "asphalt" as used in this specification and in the appended claims is generic and is intended to include all fusible, substantially oxygen-free, bituminous materials which are soluble in benzol or carbon bisulfide, whether of artificial or natural origin.

It should be understood that the present disclosure is for the purpose of illustration only, and this invention includes all modifications and equivalents which fall within the scope of the appended claims.

I claim:

1. A container for substantially dry contents and a closure therefor provided with a plastic sealing composition in its closure joint, said composition comprising as its components a substantial proportion of rubber and a sufficient proportion of asphalt intermingled therewith to create within the composition in its solidified form when in intimate contact with the container parts an adhesive or wetting action therewith.

2. A container for vacuum packing of substantially dry contents and closure therefor provided with a plastic sealing composition in its closure joint, said composition comprising as its components a substantial proportion of rubber and a substantially equal proportion of asphalt intermingled therewith to create when the composition is in its solidified form and in intimate contact with the container parts, a wetting by the asphalt of said parts.

3. A container for substantially dry contents having joined parts, and a plastic sealing composition in the joint between said parts, said composition comprising as its components a substantial proportion of rubber and a sufficient proportion of asphalt intermingled therewith to create within the composition in its solidified form when in intimate contact with the container parts an adhesive or wetting action therewith.

4. A closure for a container adapted for packing dry contents and a sealing compound constituting a joint element deposited on a surface of said closure, said compound comprising as its components a substantial proportion of rubber and a sufficient proportion of asphalt intermingled therewith to create within the composition in its solidified form when in intimate contact with the container and closure parts an adhesive or wetting action therewith.

5. A closure for a container adapted for packing dry contents and a sealing compound constituting a joint element deposited on a surface of said closure, said compound comprising a water dispersion of rubber and a sufficient proportion of asphalt dispersed therein to create, when the composition is in its solidified form and in intimate contact with the container and closure parts, a wetting of said parts.

6. A closure for a container adapted for packing dry contents and a sealing compound constituting a joint element deposited on a surface of said closure, said compound comprising as its components a solution of rubber and a sufficient proportion of asphalt dissolved therein to create within the composition in its solidified form when in intimate contact with the container and closure parts an adhesive or wetting action therewith.

7. A closure for a container adapted for vacuum packing of dry contents and a sealing compound constituting a joint element deposited on a surface of said closure, said compound comprising as its components a substantial proportion of rubber and a substantially equal proportion of asphalt interminged therewith to create within the composition in its solidified form when in intimate contact with the container and closure parts an adhesive or wetting action therewith.

CHARLES H. EGAN.