

April 10, 1962

W. H. GOODING

3,028,895

BULK BAGS

Filed Nov. 27, 1959

FIG. 1.

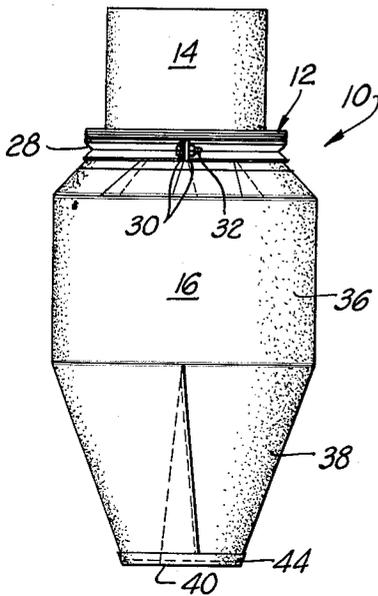


FIG. 2.

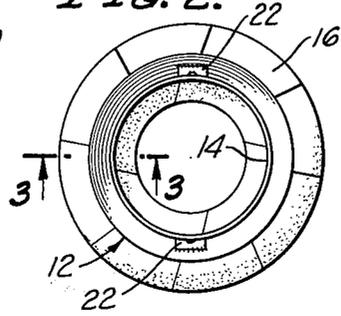


FIG. 4.

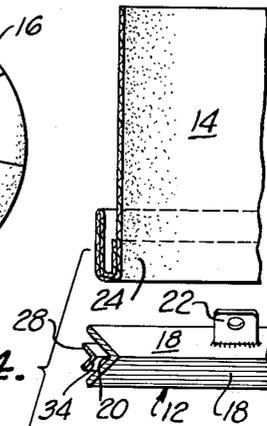


FIG. 3.

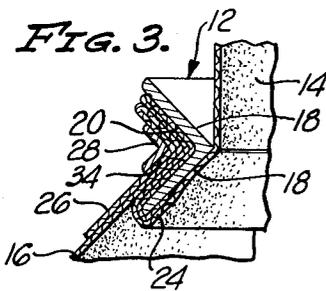


FIG. 7.

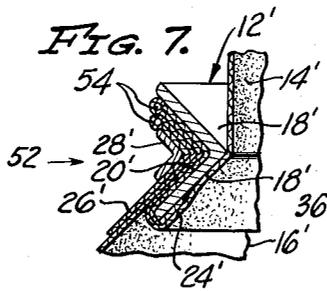


FIG. 5.

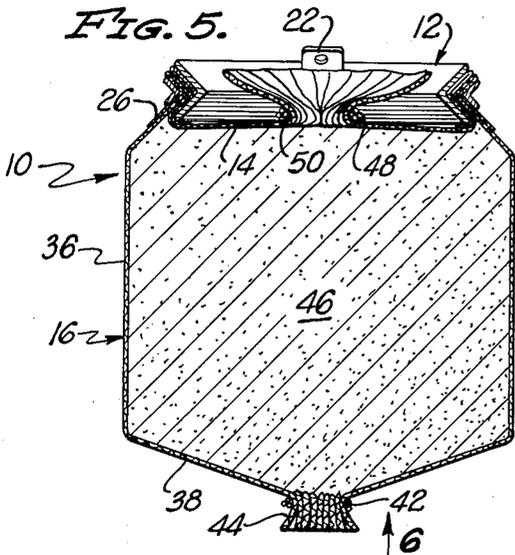
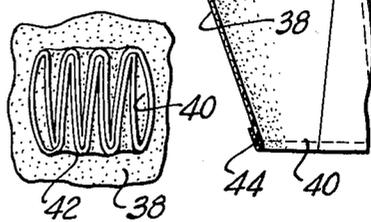


FIG. 6.



INVENTOR.
WILLARD H. GOODING

BY

Edna D. Brown

ATTORNEY

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3,028,895
BULK BAGS

Willard H. Gooding, Los Angeles, Calif., assignor to
Western Velo & Cement Specialties Company, Los Angeles, Calif., a corporation of California
Filed Nov. 27, 1959, Ser. No. 855,580
5 Claims. (Cl. 150—1)

This invention pertains to new and improved bags for handling comparatively large quantities of materials. Such bags are commonly referred to as "bulk bags."

The cost of supplying cement, sand and other various products and materials to customers is very important commercially. Comparatively large quantities of such goods are still frequently supplied to customers in relatively small packages, such as sacks or fiberboard drums holding up to about 100 lbs. of material. Such containers are used since they can be readily handled. Such containers, however, are disadvantageous inasmuch as they are relatively costly per pound of material carried in them, and inasmuch as it is very seldom practical to reuse them because of cost considerations.

In order to cut down the cost of supplying materials to customers a large number of firms have developed specialized equipment, such as trucks, railroad cars or the like which are designed or intended to be used in handling and supplying only one type of commodity. Such specialized equipment frequently can be used economically only with larger quantities of material than many customers normally desire. Also, such specialized equipment of this type is disadvantageous inasmuch as it represents a comparatively substantial capital investment.

In order to lessen the cost of supplying comparatively large quantities of material to customers, attempts have been made to provide large reusable sacks for use in shipping such materials. It is considered that these prior efforts, while of a commercial category, have not been as acceptable and successful as could be desired for a number of reasons.

Prior sacks for handling large quantities of material frequently have tended to be comparatively difficult to utilize. Often they have not provided adequate protection against environmental influences for the materials shipped within them. Further, these prior sacks for shipping materials in bulk have frequently not been constructed in such a manner as to withstand wear and normal abrasion encountered during their use. Not infrequently with them there has been a material danger of spillage. Often the weight and volume of these prior bulk sacks in being returned to an initial point of origin for reuse has been a substantial problem.

An object of the present invention is to provide new and improved bulk bags. More specifically an object of this invention is to provide bulk bags which possess various desired characteristics as indicated in the preceding paragraph which characteristics are not considered to have been combined into a single bag of the type to which this invention pertains prior to this invention. A still further object of this invention is to provide bulk bags as indicated which can be easily constructed at a comparatively nominal cost and which are desirable in that they possess various characteristics or qualities indicated in the preceding paragraph.

These and further objects of this invention as well as many specific advantages of it will be fully apparent from a detailed consideration of the remainder of this specification, including the appended claims and the accompanying drawing in which:

FIG. 1 is a side elevational view of a bulk bag of this invention;

FIG. 2 is a top plan view of the bag shown in FIG. 1;

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FIG. 3 is a cross-sectional view taken at line 3—3 of FIG. 2;

FIG. 4 is an exploded sectional view illustrating the construction of the bag shown in FIG. 1;

FIG. 5 is a cross-sectional view of this bag in use;

FIG. 6 is a partial bottom plan view taken in the direction of the arrow 6 in FIG. 5;

FIG. 7 is a cross-sectional view similar to FIG. 3 of a modified bulk bag of this invention.

The accompanying drawing is primarily intended so as to clearly illustrate several presently preferred embodiments or forms of this invention. Those skilled in the art to which this invention pertains will realize that differently appearing bulk bags utilizing the essential features of this invention described in this specification and set forth in the appended claims may be designed through the use of routine engineering skill on the basis of the disclosure embodied in the drawing and in this specification.

As an aid to understanding this invention it can be stated in essentially summary form that it concerns bulk bags, each of which is preferably constructed so as to include a continuous ring, a tubular closure, a tubular sack and a clamping member which secures ends of the closure and of the sack with respect to the continuous ring so as to form a complete bag capable of being used in transporting and discharging comparatively large quantities of material such as, for example, 1,000 to 2,000 lbs. of granular material. Although the bags of the present invention can be used with a wide variety of different materials they are primarily intended for use in transporting cement, sand, gravel or the like.

The actual details of this invention are best more fully described by referring to the accompanying drawing in which there is shown a bulk bag 10 of the present invention. The bag 10 includes a top ring 12, a tubular closure 14 and a tubular sack 16 of larger dimension than the closure 14. Preferably the ring 12 is of a continuous nature and is formed out of common angle iron or the like so as to have walls 18 located at an angle to each other. These walls 18 form or define an external, continuous channel 20 facing outwardly from the center of the ring 12. To the upper one of the walls 18 it is preferred to attach in any convenient manner, such as by welding, diametrically opposed, perforate lugs 22 which may be used in supporting the entire bag 10. As indicated in FIGS. 2 and 4 these lugs 22 extend generally from the top of the ring 12 and are located between the inner and outer edges of this ring.

Both the closure 14 and the sack 16 may be formed out of any suitable convenient, flexible material. Preferably these parts are formed out of a heavy grade of fabric which has been coated with a natural or synthetic rubber or the like. When formed of such materials both the closure 14 and the sack 16 are comparatively strong in a physical sense. Further, they are water tight so as to provide adequate protection for any material located within the bag 10 from environmental influences, such as rain, and are of such a flexible character as to permit movement and deformation as required during the use of the bag 10 as hereinafter described.

Preferably the closure 14 is formed so as to have a uniform diameter throughout its length. Further, it is preferably formed so that an end 24 of it is composed of material doubled back along the exterior of the closure 14 as indicated in FIG. 4 and is bent to a generally U-shape as indicated in this same figure. The closure 14 is located so as to pass through the ring 12 so that the end 24 extends around the ring 12 and fits within the channel 20. Preferably with the present invention the end 26 of the sack is also folded back on its exterior as indicated

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in FIG. 4 and is folded slightly and located generally on top of part of the end 24 within the channel 20 as shown in FIG. 3 of the drawing.

When this is done both the closure 14 and the sack 16 may be easily and conveniently secured in place by tightening a split ring 28 used for clamping purposes within the channel 20 as shown. In the embodiment of the invention illustrated this ring 28 has flanged ends 30 which are pulled together through the use of a common bolt 32. Other equivalent structures for this purpose may be used. It is preferred to form the split ring 28 of angle iron or the like so as to have a shape corresponding to the shape of the ring 12. When this is done, the ring 28 has walls 34 which are parallel to the walls 18. Thus, the internal configuration of the ring 28 corresponds to the internal configuration of the ring 12.

As a consequence of this when the ring 28 is tightened in place the portions of the closure 14 and the sack 16 secured by it are subjected to substantially uniform pressure completely around the ring 12. Such uniform pressure prevents undesired minor amounts of shifting of the closure 14 and the sack 16 in use. This is desirable since even a comparatively small amount of such shifting will tend to cause abnormal wear on both the closure 14 and the sack 16.

Wear of these two parts is also effectively minimized because of the overlapped ends 24 and 26 which present a double layer of material in contact with the ring 12 or the ring 28. With the assembly shown the sack 16 and the closure 14 proper are not in contact with the ring 12 and the ring 28, respectively. Only the overlapped or exterior terminal portions of the sack 16 and the closure 14 are thus exposed to wear or abrasion by these metal members. Hence, in the event the rings 12 or 28 wear through the material adjacent to them the sack 16 and the closure 14 are not affected.

Preferably the sack 16 includes a top section 36 of a uniform diameter extending from the ring 12 and a tapered bottom section 38 leading to a bottom opening 40. This bottom section 38 is designed so that it may be used essentially as a discharge spout or the like during emptying of the material from the complete bag 10. It is also designed so as to provide a comparatively small opening 40 which must be easily and effectively closed during the use of the bag 10.

The bottom opening 40 is preferably secured so as to be closed as indicated in FIG. 6 of the drawing by the section 38 being pushed so as to assume a flat configuration and then by being folded along its length in a manner resembling common pleats, each of such pleats having a double wall thickness because of the initial configuration of the bottom section 38 at the start of the operation closing this bottom opening 40. At this point a common rope 42 or cable or the like may be passed around the bottom section 38 so as to be adjacent to but spaced from the bottom opening 40 and manipulated in a conventional manner so as to tie this bottom opening closed.

Preferably the end 44 of the bottom section 38 defining the opening 40 is turned or folded back on itself as indicated in FIG. 4 and is secured in this position so as to provide a comparatively small ridge immediately below where the rope 42 is attached. This ridge aids in preventing this rope 42 from moving off of the sack 16 during the use of the bag 10.

When the bottom opening 40 of the bag 10 has been secured in this manner the sack 16 may be conveniently filled with material, such as the material 46 indicated in FIG. 5 of the drawing. During such a filling operation preferably the closure 14 is held so as to extend as indicated in FIG. 1 of the drawing. In this configuration this closure 14 acts essentially as an inlet chute for the entire bag 10 and aids in preventing dust loss or the like. During the filling operation the bag 10 is, of course, supported by the lugs 22. After the sack 16 has been filled

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with material such as the material 46 it may be conveniently closed by twisting the closure 14, so as to form a knot or twist as indicated in FIG. 5 within the ring 12. This knot or twist 48 may be tied in place through the use of a rope 50 or the equivalent so as to form a substantially water tight joint. When the closure 14 is secured in this manner it defines a substantially waterproof diaphragm located within the ring 12 in an unexposed position sealing the top of this ring 12 so as to adequately protect the material 46 from environmental influences.

When the bag 10 has been filled with material as indicated in FIG. 5 it may be conveniently shipped by virtually any means of transportation from one location to another. When it reaches its desired destination it is preferably supported through the use of the lugs 22 above a bin or the like which is to receive the material 46. At this point the rope 42 may be untied and the bottom section 38 directed so as to serve as a discharge chute to discharge this material 46 into such a receptacle.

After the bag 10 has been emptied in this manner it may be easily collapsed and folded up into a comparatively small, light weight package which can be easily and conveniently returned to a source of supply for reuse. It may also be washed out and may be used to ship another product than the product it initially contained instead of being returned directly to its point of origin.

In FIG. 7 of the drawing there is shown a modified bag 52 of the present invention which is essentially similar to the bag 10. For convenience of description those parts of the bag 52 which are identical or substantially identical to corresponding parts of the bag 10 are not separately described herein and are designated both in this description and in the drawing by the primes of the numerals previously employed to designate such parts.

The bag 52 differs from the bag 10 in that the material in the ends 24' and 26' of the closure 14' and the sack 16' extend around continuous rope or cable loops 54 having substantially the external diameter of the ring 28'. These loops 54 are located immediately above the ring 28' so as not to be held against the ring 12'. These loops 54 act as enlargements upon the closure 14' and sack 16' which are of such a size that they cannot slip through the space between the ring 28' and the ring 12'. Thus, with this construction indicated in FIG. 7 there is no danger of the closure 14' and the sack 16' "pulling out" of place during use, regardless of the stresses and strains placed upon these members.

Those skilled in the art to which this invention pertains will realize that bulk bags as herein described are very efficient and desirable for the purpose of handling comparatively large quantities of materials. They will further realize that bulk bags as herein described may be speedily and easily used without danger of the material within them being damaged by environmental influences and without danger of such material being lost through spillage. They will further realize that bulk bags as herein described may be constructed at a comparatively nominal cost and that these bags will wear for a prolonged period in use. Because of the nature of this invention it is to be considered as being limited only by the appended claims forming a part of this disclosure.

I claim:

1. A bag for use in transporting material which comprises: a continuous ring, said ring having a continuous channel extending around the exterior thereof; a tubular closure, one end of said closure extending through said ring, around one end of said ring, and being located within said channel; a tubular sack, one end of said sack being located within said channel, said sack extending from the side of said ring remote from said closure and having a bottom opening located remote from said ring; a clamping ring located within said channel, said clamping ring bearing against said ends of said closure and

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said sack located within said channel so as to hold said closure and said sack with respect to said continuous ring; and means for supporting said continuous ring attached to said continuous ring so as to extend away from said sack.

2. A bag as defined in claim 1 wherein said channel has V-shaped cross-sectional configuration and wherein said clamping ring has a corresponding cross-sectional configuration, and wherein said clamping ring exerts uniform pressure on said ends of said closure and said sack so as to securely hold said closure and said sack within said channel.

3. A bag as defined in claim 1 wherein said closure and said sack are both formed of a flexible, waterproof material.

4. A bag as defined in claim 1 wherein said sack is provided with a tapered section terminating in said bottom, said tapered section being capable of being used as a discharge chute.

5. A bag for use in transporting material which comprises: a continuous ring, said ring having a continuous channel extending around the exterior thereof; a tubular closure, one end of said closure extending through said ring, around one end of said ring, and being located within said channel; a tubular sack, one end of said

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sack being located within said channel, said sack extending from the side of said ring remote from said closure and having a bottom opening located remote from said ring; a clamping member located within said channel, said clamping member bearing against said ends of said closure and said sack located within said channel so as to hold said closure and said sack with respect to said continuous ring; and means for supporting said continuous ring attached to said continuous ring so as to extend away from said sack.

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