

Aug. 10, 1943.

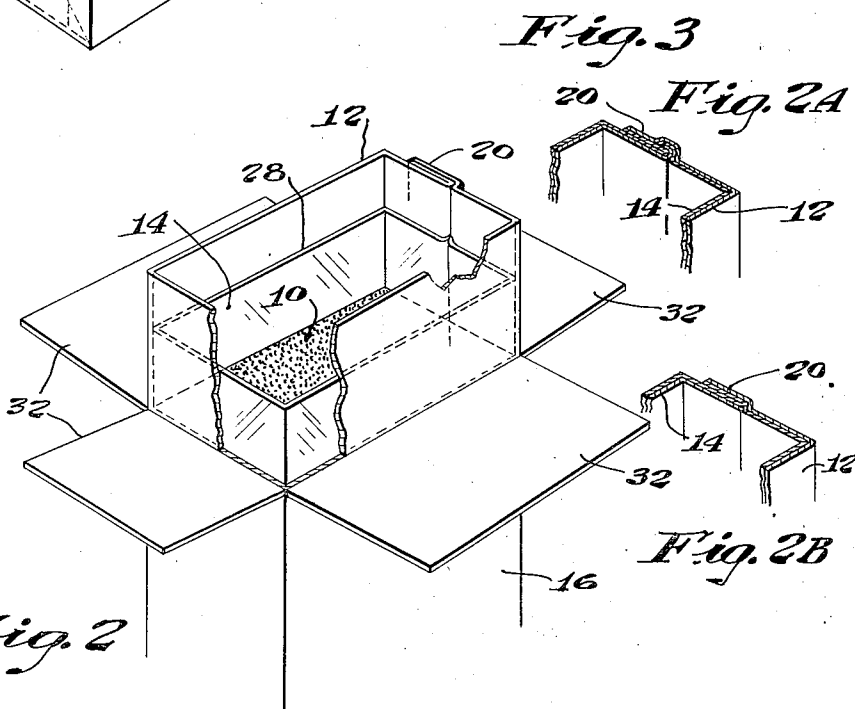
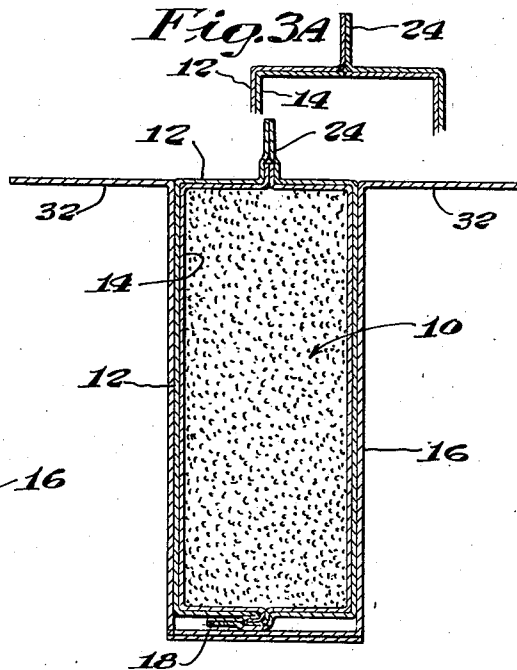
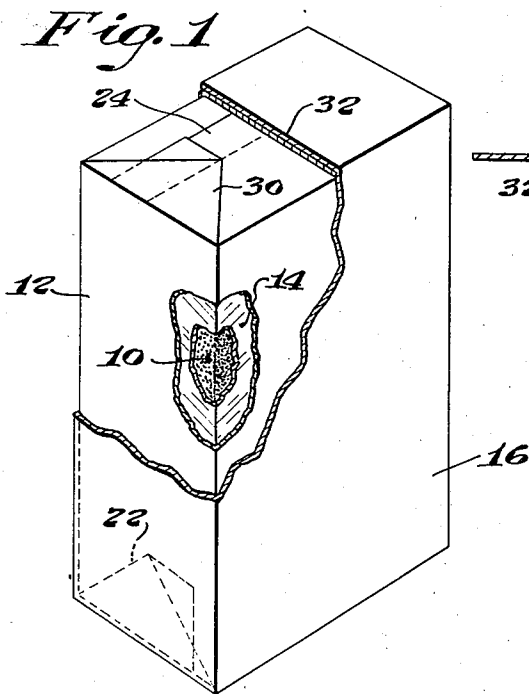
S. R. HOWARD

2,326,649

VACUUM PACKAGE

Filed Nov. 25, 1939

4 Sheets-Sheet 1



BY

INVENTOR.
Stanley R. Howard
J. Stanley Churchill
ATTORNEY.

Aug. 10, 1943.

S. R. HOWARD

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4 Sheets-Sheet 2

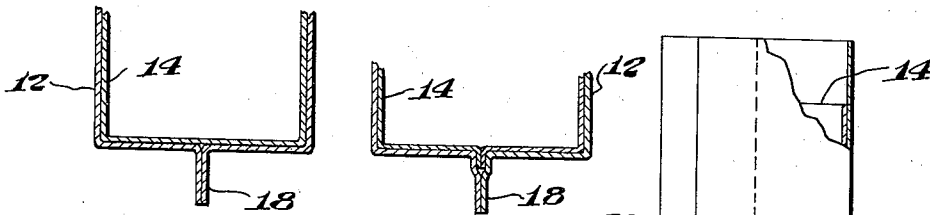


Fig. 4A Fig. 4

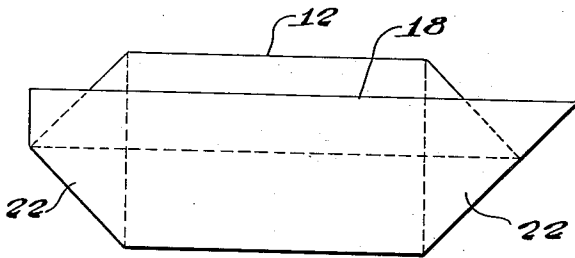


Fig. 5

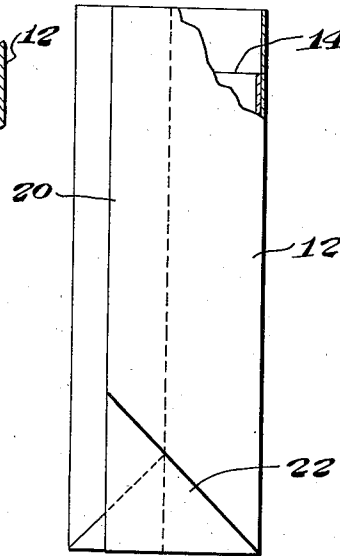


Fig. 6

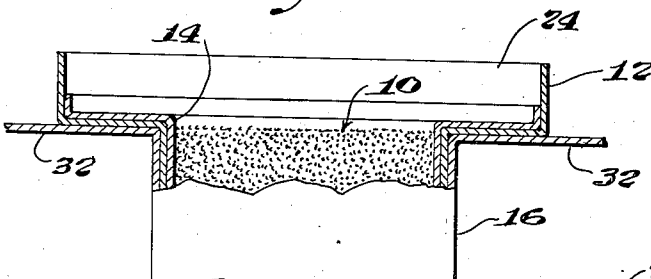


Fig. 7

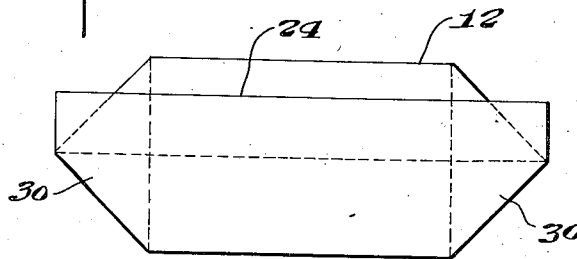


Fig. 9

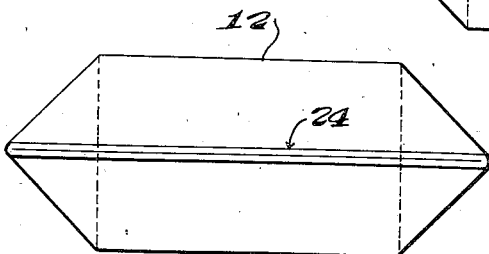


Fig. 8

BY

INVENTOR.
Stanley R. Howard
J. Stanley Churchill
ATTORNEY.

Aug. 10, 1943.

S. R. HOWARD

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Fig. 10

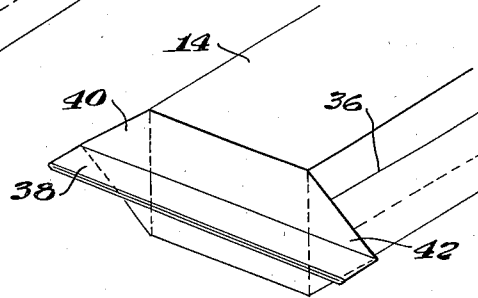
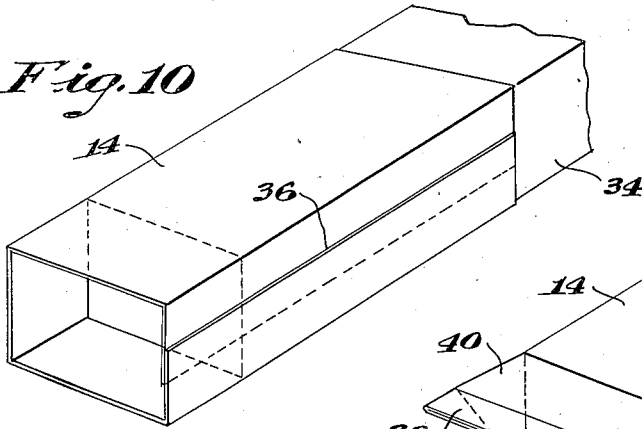


Fig. 11

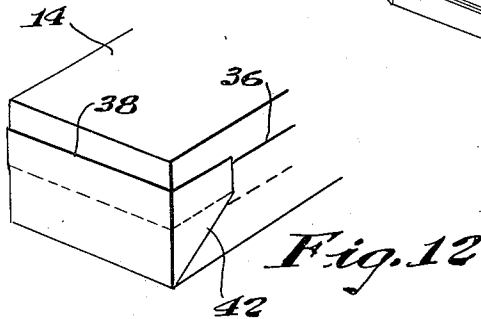


Fig. 12

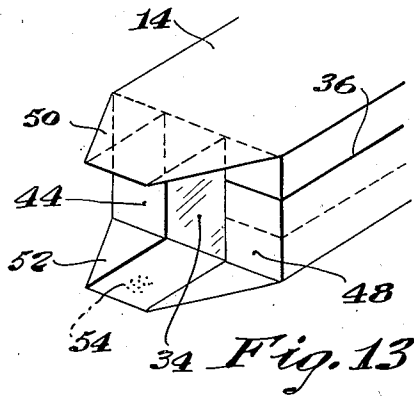


Fig. 13

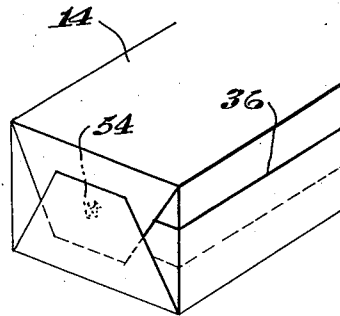


Fig. 14

BY

INVENTOR.
Stanley R. Howard
J. Stanley Churchill,
ATTORNEY.

Aug. 10, 1943.

S. R. HOWARD

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4 Sheets-Sheet 4

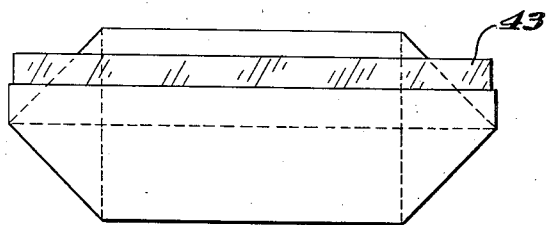
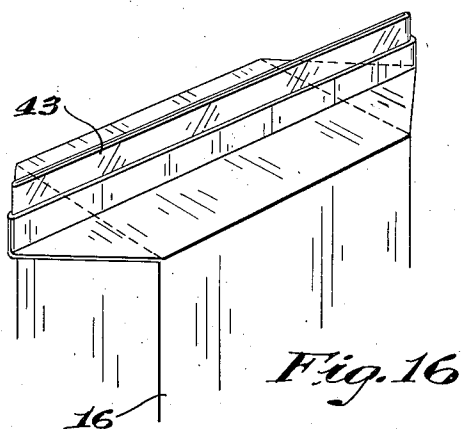
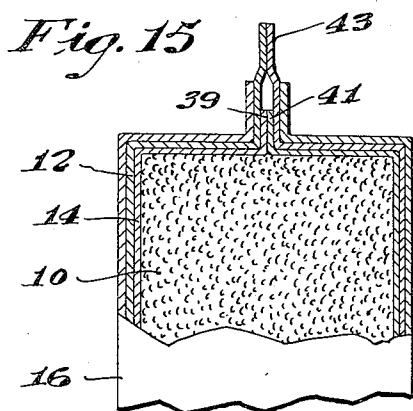


Fig. 17

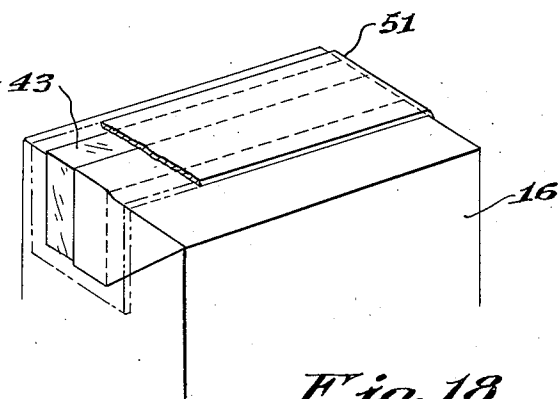


Fig. 18

BY

INVENTOR.

Stanley R. Howard
J. Stanley Churchill
ATTORNEY.

UNITED STATES PATENT OFFICE

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VACUUM PACKAGE

Stanley R. Howard, Milton, Mass., assignor to
Pneumatic Scale Corporation, Limited, Quincy,
Mass., a corporation of Massachusetts

Application November 25, 1939, Serial No. 306,108

5 Claims. (Cl. 206—46)

This invention relates to an air evacuated package containing a granular material such as ground coffee.

In general, the object of the invention is to provide a novel and improved air evacuated package which may be manufactured economically, which lends itself to manufacture upon packaging machinery and which is adapted to protect a commodity such as ground coffee from deterioration for relatively long periods of time.

A further and more specific object of the invention is to provide an air evacuated package containing granular material such as ground coffee in which the material is packaged within a fibrous container such as a carton or paper container, thereby imparting all of the desirable features of the vacuum package embodying metal containers now upon the market.

With these general objects in view and such others as may hereinafter appear, the invention consists in the novel air evacuated package and in the various structures, arrangements and combinations of parts hereinafter described and particularly defined in the claims at the end of the specification.

In the drawings illustrating the preferred embodiments of the invention, Fig. 1 is a perspective view of a package embodying the present invention with portions broken away; Fig. 2 is a perspective view of the package before the top closure is formed; Fig. 2A is a detail view in perspective of the side seam for the package shown in Fig. 2; Fig. 2B is a similar view showing a modified form of seam; Fig. 3 is a longitudinal cross-section of the package illustrating the preferred form of top closure; Fig. 3A is a detail in cross-section of a modified form of the top closure; Fig. 4 is a detail view in cross-section showing the construction of the bottom seal for the liner; Fig. 4A is a similar view showing a modified form of bottom seam; Figs. 5 and 6 are plan and side elevation views respectively of the liner; Fig. 7 is a detail view in cross-section illustrating one step in the formation of the top closure; Fig. 8 is a plan view of Fig. 7; Fig. 9 is a plan view showing another step in the formation of the top closure; Fig. 10 is a perspective view of a modified construction of the inner liner; Figs. 11 and 12 are perspective views illustrating one form of bottom closure for the inner liner; Figs. 13 and 14 are similar views illustrating another form of bottom closure for the inner liner; Fig. 15 is a cross-sectional view of a modified form of top closure; Fig. 16 is a perspective view of the top closure shown in Fig. 15; Fig. 17 is a plan

view of the same showing the top folded down and Fig. 18 is a perspective view of the completed top fold showing the sealing strip.

At the present time, various commodities are marketed in vacuum packages comprising metal containers in order that the commodity may be protected from deterioration. Ground coffee is typical of such a commodity and in the packaging of ground coffee in such metal containers, special machinery is required, and the cost of the metal container itself comprises a substantial part of the cost of the complete vacuum package placed upon the market.

The present invention seeks to provide a practical construction of protective air evacuated package for granular commodities such as ground coffee, whose construction is such as to enable the commodity to be packaged in a practical and economical manner and at a cost of production substantially below that of the metal vacuum packages now upon the market. Accordingly, the invention contemplates a novel package in which the granular material such as ground coffee is contained within a hermetically sealed and air evacuated bag of heat sealable thermo-plastic material, preferably a rubber derivative comprising rubber hydrochloride such as the product commercially obtainable in sheet form under the trade name "Pliofilm." The thermo-plastic bag is itself provided with an inner liner which is closed and sealed and of a material capable of protecting the thermo-plastic bag from abrasion and from being ruptured by engagement with the irregular or sharp surfaces of the granular commodity as atmospheric pressure forces the bag against the commodity during the evacuation of the air from the bag. The hermetically sealed and air evacuated bag of thermo-plastic material containing the granular commodity may and preferably will be contained within an outer fibrous container such as a carton or wrapper and the entire structure is such as to lend itself to production in an economical manner upon existing packaging machinery with minimum alterations thereof and in a manner comparable to the production of filled cartons and bags of various packages now upon the market.

Referring now to the drawings, the granular commodity such as ground coffee is illustrated at 10 and is received within a bag or container 12 of thermo-plastic material, such as "pliofilm." The bag or container 12 is provided with a protective liner, preferably of a material possessing greater strength than the "pliofilm" and in practice, various grades of paper may be used in the

production of the inner liner 14. In producing the present package, the air within the lined and filled thermo-plastic bag is evacuated and the inner liner 14 is closed, either independently of but preferably simultaneously with the thermo-plastic bag 12, and sealed, and the thermo-plastic bag sealed preferably by heat in such a manner as to produce a hermetically sealed thermo-plastic bag. Either before or after filling and sealing, the thermo-plastic bag is further protected by an outer fibrous container 16 such as a carton or a wrapper and the outer container is closed in forming the complete package.

In practice, in producing the present hermetically sealed bag 12 of thermo-plastic material such as "pliofilm", I may first form the "pliofilm" bag from a sheet of such material by wrapping the same about a forming block or mandrel (not shown) in accordance with present usual practice now employed in the manufacture of bags with the exception that I prefer to form an outwardly projecting seam 18, at one end of the bag which may, for convenience of description, be referred to as the bottom, and a similar seam 20 upon one side thereof to thereby produce a bag open at its top. The protective liner 14 of paper or other material may be introduced down into the "pliofilm" bag thus formed, or the liner 14 may be formed simultaneously with the formation of the "pliofilm" bag. In some instances, it may be desirable that the "pliofilm" bag be formed over the previously formed liner 14 and these steps in the manufacture of the present lined bag may follow existing practice, and be performed upon more or less standard machines now employed in the art for performing these or comparable operations.

In accordance with the preferred method of producing the present package, after the lined thermo-plastic bag has been thus produced, an outer fibrous container is provided for the structure and this may either be formed around a lined "pliofilm" bag while the latter is supported upon a forming block or mandrel, or if desired, the lined "pliofilm" bag may be removed from the mandrel and introduced into a preformed carton or other fibrous container of the desired shape and size. In some instances, it may prove advantageous to insert or enclose the lined "pliofilm" bag into or within the outer container after the bag has been filled and sealed.

During the formation of the lined "pliofilm" bag the bottom and side seam or seams are heat sealed and when the bottom seam 18 comprises a projecting seam as illustrated in Fig. 4, it is then preferably folded down upon the rectangular bottom of the bag into the position shown in Fig. 5, and the projecting and generally triangular shaped end tabs 22 may then be folded upwardly against the sides of the bag, or if desired, may be folded upon the bottom of the bag. During the folding of the bottom seam, the projecting side seam 20 is folded onto the side of the bag, as illustrated in Fig. 6.

After the carton or other fibrous outer container has been provided with the "pliofilm" bag, itself containing the liner of paper or similar material, the granular commodity such as ground coffee is then introduced in any usual or preferred manner, preferably by any of the commercial forms of filling machines now upon the market. The filled package is now in condition for the closing and sealing of the top of the liner and bag and of the evacuation of air from within the bag. Any usual or preferred method may be

employed in evacuating the air from the "pliofilm" bag, as for example, the bag may be closed and sealed while the carton containing the same is positioned within a vacuum chamber, or any other suitable method may be employed.

The top closure preferably employed for closing and sealing the top of the "pliofilm" bag is illustrated in Figs. 1, 3, 7 and 8 and this preferably contemplates the production of an elongated top fold where the two half sections of the top of the "pliofilm" bag are brought together and sealed by heat to produce a projecting seam 24, such as is illustrated in Fig. 3, and in order that an efficient hermetical seal may be made, it is desirable that the upper end 28 of the inner paper liner terminate a substantial distance below the top of the "pliofilm" bag, as illustrated in Fig. 2, so that when the elongated seam 24 is produced, as above described, a "pliofilm" to "pliofilm" contact is insured. The inner liner, however, should preferably be of sufficient length so that the adjacent edges therefor, when folded, are brought into a position in which they project a short distance into the seam 24, as illustrated in Fig. 3, and preferably provided with adhesive prior to being thus folded whereby to seal the top of such inner liner and to thereby insure the complete protection of all portions of the "pliofilm" bag against the rupturing action of the irregular or sharp particles of granular material and which might otherwise take place under the influence of atmospheric pressure after the bag has been evacuated. The completely sealed inner liner prevents leakage of the granular material in some instances and for certain purposes it may be found sufficient that the adjacent edges of the inner liner be of such length that, when folded, they are in a substantially abutting position as illustrated in Fig. 3A, but it is preferred that the inner liner be as above set forth closed and sealed. After the top closure in the form illustrated in Fig. 3 has been produced, then the projecting "pliofilm" seam 24 is folded down onto the top of the "pliofilm" bag and the triangular shaped end tabs 30 are folded inwardly upon the same in the manner illustrated in Fig. 1. Subsequently the top flaps 32 of the outer carton or container, if the latter be provided with top flaps, are closed and sealed in any usual or preferred manner.

In practice, when the inner protective liner 14 and the "pliofilm" liner 12 are formed simultaneously upon a forming block, the adjacent edges of the inner liner are preferably of sufficient length to project into the bottom seam 18 and side seam 20 as shown in Figs. 4 and 2A to assure complete protection for the "pliofilm" liner 12. However, in some instances, as described in connection with the top closure, the adjacent edges may be disposed in substantially abutting position, as illustrated in Figs. 4A and 2B.

Referring now to Figs. 10 to 14, when the inner liner 14 is produced separately upon a forming block 34, the adjacent edges of the liner may overlap and may be adhesively sealed to form a side seam 36. One form of bottom closure for the inner liner thus formed may comprise, as illustrated in Figs. 11 and 12, an elongated and adhesively sealed fold to produce a sealed projecting flap 38 and outwardly extended triangular flaps 40, 42. The projecting flap 38 may then be folded down against the bottom of the liner and the triangular flaps 40, 42 are thereafter folded up against the sides thereof as shown in Fig. 12. The above described construction is particularly useful when it is desired to insert the sepa-

ately formed inner liner 14 into the "pliofilm" liner 12 since the upwardly folded flaps 40, 42 are retained in their folded condition during the inserting operation by the sides of the "pliofilm" liner.

A modified form of bottom closure for a separately formed inner liner 14 is illustrated in Figs. 13 and 14, which is produced by folding in the opposed extending ends 44, 48 upon the bottom of the block 34 and thereafter folding the remaining extended ends 50, 52 to produce the closure shown in Fig. 14. In practice, a spot of adhesive 54 may be provided upon one of the extended ends to retain the closure in its folded condition. This form of bottom closure for the inner liner 14 is particularly useful when the "pliofilm" liner is to be formed by wrapping the same about the block and over the previously formed inner liner and such operations may be performed upon existing machines and in accordance with more or less standard practice.

In Figs. 15, 16, 17 and 18, I have illustrated a still further modification of the invention which is characterized by a novel top closure structure. Both the top of the inner liner 14 and the top of the thermo-plastic bag 12, after evacuation of the filled bag as above described, may and preferably will be simultaneously closed and formed into an elongated and upwardly projecting fold, as illustrated in Figs. 15 and 16. In order to prevent leakage of the granular material, the contacting portions 39, 41 of the inner liner will have been rendered adhesive in any suitable manner so that upon formation of the elongated projecting fold, the inner liner will be closed and sealed between the surfaces 39, 41 thus forming a sealed top closure for the top of the inner liner. The portion 43 of the elongated fold of the thermo-plastic bag projecting above the inner liner may and preferably will be heat sealed to form a hermetically sealed top closure. In most instances in practice, it will be found convenient to simultaneously fold the upper portion of the carton 16 at the time that the top closure is made for the thermo-plastic bag 12 and its inner liner 14, and such a structure is illustrated in Figs. 15 and 16 wherein the length of the upstanding portion of the elongated top fold of the thermo-plastic bag is such as to cause it to project a substantial distance above the elongated folded portion of the carton. The folding of the inner liner 14, the thermo-plastic bag 12 and the top of the carton, producing the closure shown in Figs. 15 and 16, may be effected simultaneously. These operations may be performed within a vacuum chamber so that after heat sealing the elongated "pliofilm" seam, a structure such as is illustrated in Fig. 16 may be produced in which the granular material is hermetically sealed in a substantially air free atmosphere within the container. In producing the completed package, it is preferred to fold down the projecting portions of the carton of the thermo-plastic bag and of the inner liner first into the position shown in Fig. 17 and then into the position shown in Fig. 18, in which the projecting ends of the top closure are folded down onto the carton and a suitable sealing strip 51 adhesively affixed to the thus folded down portions and to the sides of the carton.

In those instances when the coffee or other commodity is exposed to the pressure of carbon dioxide or other gas, the sealed inner liner protects the seams of the "pliofilm" bag when the latter are softened by heat from the abrasion and

rupturing action of the granular coffee or other commodity.

It is generally recognized that the deterioration of freshly roasted coffee is primarily due to the presence of air. In the present air evacuated package, this cause of deterioration is removed, or at least reduced to a minimum. In practice, the air evacuated package in its commercial form may contain an atmosphere of carbon dioxide gas which is produced within the sealed "pliofilm" bag by evolution from the freshly roasted coffee. In other instances, it may be desirable to effect the removal of the air from the "pliofilm" bag by the use of an inert gas such as carbon dioxide gas and in other instances it may be found desirable to introduce into the package an inert gas such as carbon dioxide gas under pressure.

By constructing the inner liner 14 of cardboard it may in some instances be found sufficient to close the same without adhesively sealing the end or ends thereof. Although for most purposes it is preferred to provide the inner liner with adhesively sealed end closures, the rigidity of the cardboard assists in preserving the predetermined shape of the package during the air evacuation process.

It has also been found that the normal air leakage which naturally occurs at the incompletely sealed corners of an inner liner of this character enables the commodity to be enclosed within the same and the end closures adhesively sealed prior to the air evacuation operation.

While the term "pliofilm" has been used throughout the body of the specification and claims for convenience of description, it will be understood that other suitable heat sealable thermoplastic materials may be used if found advantageous.

Having thus described the invention, what is claimed is:

1. An air evacuated package containing a granular commodity comprising an outer fibrous container, a liner therefor and a body of the commodity within the liner, said liner comprising a hermetically sealed thermoplastic bag having an adhesively sealed inner liner enclosing the commodity therein, the top closures of the thermo-plastic bag and its inner liner being of similar construction with the thermo-plastic top closure heat sealed and projecting above the inner liner and with the inner liner top closure adhesively sealed.

2. An air evacuated package containing a granular commodity comprising an outer fibrous container, a liner therefor and a body of the commodity within the liner, said liner comprising a hermetically sealed thermoplastic bag having an adhesively sealed inner liner enclosing the commodity therein, the top closures of the outer fibrous container, the thermo-plastic bag and its inner liner being of similar construction with the thermo-plastic top closure heat sealed and projecting above both the inner liner and the outer fibrous container and with the inner liner adhesively sealed.

3. An air evacuated package containing a granular commodity comprising an outer fibrous container, a liner therefor and a body of the commodity within the liner, said liner comprising a hermetically sealed thermo-plastic bag having an adhesively sealed inner liner, the top closure of the outer container, the thermo-plastic bag, and its inner liner comprising elongated folds, all being simultaneously folded down

onto the outer container and an adhesive sealing strip for the thus folded portions thereof.

4. An air evacuated package containing a granular commodity, said package comprising a composite flexible bag collapsed against said commodity by atmospheric pressure and supported by said commodity, said composite bag comprising a hermetically sealed flexible thermo-plastic outer bag member and an adhesively sealed inner liner surrounding said commodity and preventing contact between said commodity and said outer bag member to prevent rupture of said outer bag member by said granular commodity, said composite bag being positioned in an outer fibrous container to protect said thermo-plastic bag member.

5. An air evacuated package containing a granular commodity, said package comprising a composite flexible bag collapsed against said commodity by atmospheric pressure and supported by said commodity, said composite bag comprising a hermetically sealed flexible thermo-plastic outer bag member and a closed inner liner surrounding said commodity and preventing contact between said commodity and said outer bag member to prevent rupture of said outer bag member by said granular commodity, said composite bag being positioned in an outer fibrous container to protect said thermo-plastic bag member.

STANLEY R. HOWARD.