June 19, 1934. J. W. CLARK 1,963,118

COMPOSITE PAPER WRAPPER

Filed Nov. 7, 1928 2 Sheets-Sheet 1

Fig. 1.

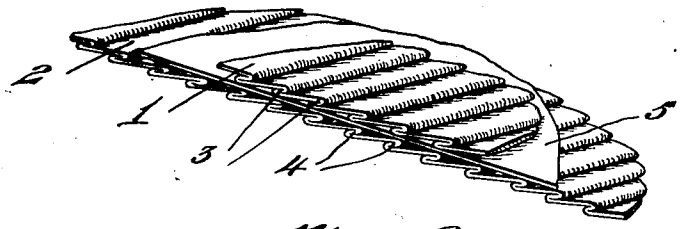



Fig. 2.

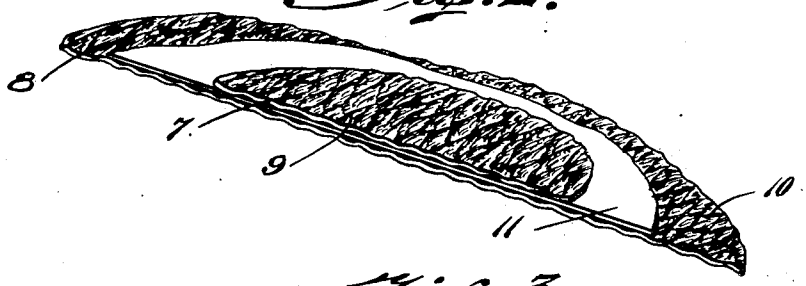



Fig. 3.

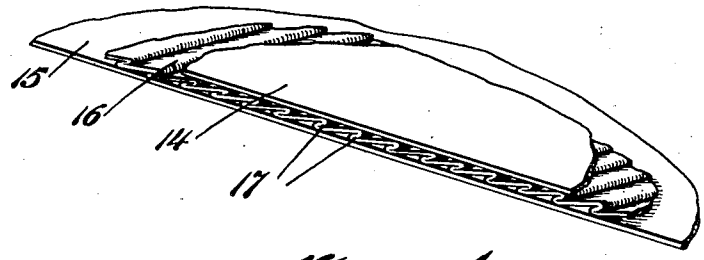
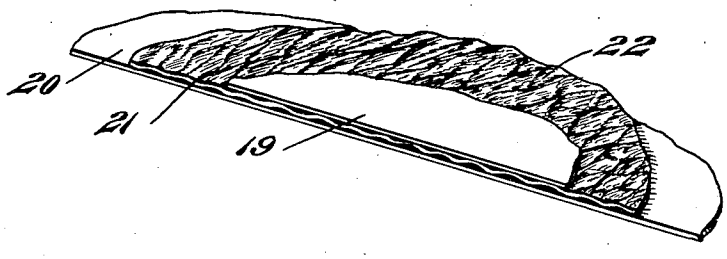



Fig. 4.




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COMPOSITE PAPER WRAPPER

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Fig. 5.

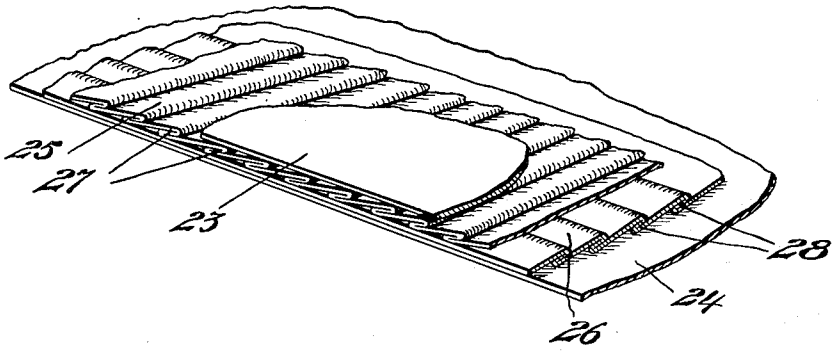



Fig. 6.

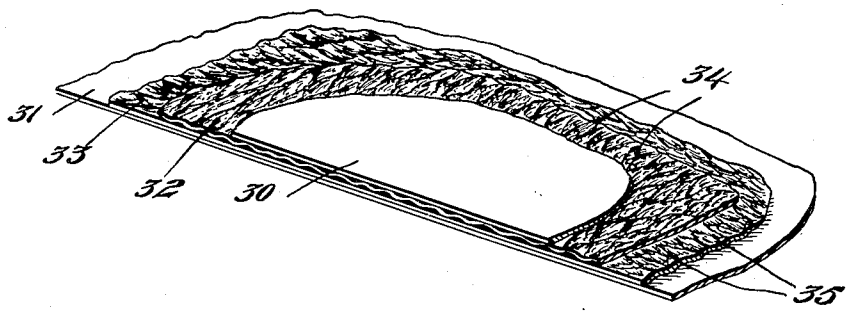
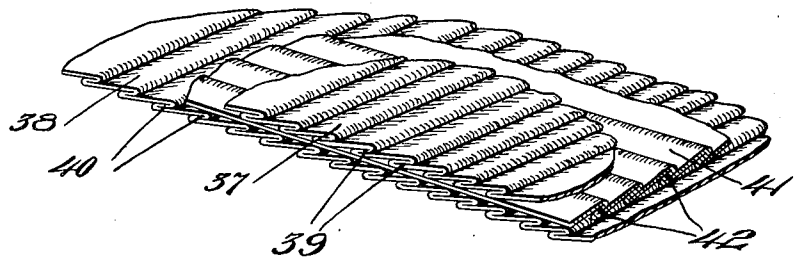



Fig. 7.




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# UNITED STATES PATENT OFFICE

1,963,118

## COMPOSITE PAPER WRAPPER

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Application November 7, 1928, Serial No. 317,787

13 Claims. (Cl. 154—46)

This invention relates to an improved composite paper wrapper adapted for use with expansible material, as cotton, wool, or the like, or in packaging heavy material such as cement, sugar, fertilizer, and other materials of similar character requiring the use of strong wrappers to prevent rupture of the container material in handling.

One object of the invention is the provision of a strong tough paper wrapper made up of sheets or layers some of which are pleated or creped in order to permit a limited degree of expansion or to permit rupture of one sheet or layer without such damage to the remaining sheets or layers as will result in loss of or damage to the packaged material.

Another object of the invention is the provision of a composite wrapper having expansible portions capable of expanding along one or more lines to permit limited enlargement of the packaged material at certain points on the area of the wrapper without destruction of the wrapper or loss or injury of the material.

Referring to the drawings:—

Fig. 1 is a detail perspective view of a portion of a wrapper formed with two outer layers or sheets of pleated paper and an intermediate sheet of plain paper,

Fig. 2 is a detail perspective view of a portion of a modified form of wrapper having two outer sheets of crepe paper and an intermediate sheet of plain paper,

Fig. 3 is a detail perspective view of another modified form of wrapper formed with two outer sheets of plain paper and an intermediate sheet of pleated paper,

Fig. 4 is a detail perspective view of a further modified form of wrapper made with two outer sheets of plain paper and an intermediate sheet of crepe paper,

Fig. 5 is a modified form of wrapper having two outer sheets of plain paper and two intermediate sheets of pleated paper with the pleats arranged at substantially right angles to each other,

Fig. 6 is a modified form of wrapper formed from two outer sheets of plain paper and two intermediate sheets of crepe paper with the creases of the crepe sheets arranged at substantially right angles to each other, and,

Fig. 7 is another modified form of wrapper having two outer sheets of pleated paper with the pleats therein arranged substantially parallel and an inner pleated paper sheet in which the pleats extend at substantially right angles to the pleats in the two outer sheets.

In the form of wrapper illustrated in Fig. 1 of the drawings, 1 and 2 designate the outer paper sheets which are provided with pleats 3 and 4 respectively, the pleats 3 being arranged in substantial parallelism with each other and with the pleats 4 formed in the sheet 2. The intermediate sheet 5 of plain paper is located between the outer sheets 1 and 2, and the several sheets 1, 2 and 5 may be secured together at intervals as by stitches or staples (not shown) or any other suitable means where it is desired to secure the several sheets against separation in handling.

In the composite wrapper shown in Fig. 2 of the drawings, 7 and 8 designate the outer crepe sheets provided with creases or folds 9 and 10 respectively as is characteristic of crepe paper, the creases or folds 9 and 10 extending generally in a direction parallel with each other. The intermediate paper sheets located between the crepe sheets 7 and 8, is designated by the numeral 11, and the several sheets 7, 8 and 11 may be secured together at intervals, in any suitable manner, if desired, in order to render the composite sheet more readily handled without separation of the individual sheets, or without their becoming disarranged.

In the form of wrapper shown in Fig. 3, 14 and 15 designate the outer plain paper sheets, while a pleated paper sheet 16 is located between the paper sheets 14 and 15 and is provided with a plurality of parallel pleats 17, and the several sheets may be secured together at intervals in any suitable manner, if desired.

In the wrapper shown in Fig. 4 of the drawings, two outer plain paper sheets 19 and 20 enclose therebetween a crepe paper sheet 21, having creases or folds 22 therein as is characteristic of crepe paper, the creases or folds 22 being arranged generally in a direction substantially parallel with each other. As in the forms shown in the previous figures, the several sheets 19, 20 and 21 may be secured together at intervals, if desired.

While the several forms of composite wrappers shown herein are capable of use as wrappers for expansible material, such as bales or packages of cotton, wool, and other materials of similar character, as well as, in the construction of bags, liners for bags, etc., for powdered or pulverized material, such for example as, cement, sugar, fertilizer, and the like, as well as for heavy duty wrapping purposes generally where a strong wrapper highly resistant to rupture is desired. I regard the forms of wrappers shown in Figs. 1, 2, 3 and 4 of the drawings as especially adapt-

ed for use as wrappers for bales or packages of expansible material, such as cotton, wool, or the like. In the use of the forms of wrappers shown in Figs. 1, 2, 3 and 4 of the drawings as wrappers for expansible material I preferably arrange the wrappers so that the parallel pleats, creases or folds of the pleated or crepe paper will lie substantially parallel with the bale ties or cords which are placed thereover, whereby upon expansion of the expansible material the pleats, folds or creases, being arranged substantially parallel with the bale ties, will permit a certain amount of expansion of the material between the bale ties without rupturing the pleated or crepe paper sheets.

In the packaging of raw cotton, for example, the cotton is first given an initial compression, the wrappers being previously placed in the press with the pleats, folds or creases so positioned as to extend substantially parallel with the direction of the bale ties when applied. After compression, the bale ties are applied to the bale, and the bale thus formed is what is commonly known as a gin bale. In practice these gin bales may be and frequently are still further compressed, without removal of the original wrappers, to form what are commonly known as standard or high density bales. The degree of pressure exerted upon the wrappers is considerably greater after the bales have been subjected to the second compression than after the first or initial compression. The bale ties placed upon the bales after the second compression are arranged in the same general direction as those first applied and consequently generally parallel with the pleats, folds or creases of the pleated or crepe paper sheets of the composite wrapper.

In the forms of composite wrappers shown in Figs. 1 to 4 of the drawings, it is not expected that the plain sheets will remain entirely untorn after the pressure engendered by the second compression is exerted thereagainst, but the plain paper sheet or sheets of the composite wrapper will resist the expansion of the material sufficiently to enable the pleated or crepe sheet or sheets to expand and accommodate the expansible material without rupture of the expansible sheet or sheets. In other words, one purpose to be served by using one or more plain paper sheets in the composite wrappers for highly expansible material is that such plain sheets will offer sufficient resistance to the expansion of the expansible sheet or sheets before becoming ruptured to slow up the expansion of the pleated or creped sheet or sheets and thus permit the necessary expansion of such sheet or sheets without rupture.

In the form of wrapper shown in Fig. 5 of the drawings, 23 and 24 designate the two outer plain paper sheets, while 25 and 26 designate the two inner paper sheets which are provded with pleats 27 and 28 respectively. The pleats 27 of the sheet 25 are arranged at an angle to the pleats of the sheet 26, which in the present instance are shown as at substantially right angles, although the pleats 27 may be arranged, if desired, to cross the pleats 28 at angles other than right angles, as the materials to be packaged may require or conditions render expedient. As in the forms previously described, the several sheets may be united at intervals throughout their extent, if desired, in order to facilitate handling of the composite wrapper.

In the form of invention shown in Fig. 6 of the drawings, 30 and 31 designate the two outer plain paper sheets, and 32 and 33 the inner crepe paper sheets which are provided with folds or creases 34 and 35 respectively. The folds or creases 34 and 35 are arranged to extend generally at substantially right angles to each other, although such variation of this angular relationship may be had as may be best adapted for the purposes for which the wrapper may be employed. In this form of the invention also, the several sheets may be united together at intervals throughout their extent, if desired.

In the form of wrapper shown in Fig. 7 of the drawings, 37 and 38 designate the outer paper sheets which are provided with pleats 39 and 40 respectively, the pleats 39 and 40 extending substantially parallel to each other. The inner pleated sheet 41 is provided with a plurality of pleats 42 which extend in a direction at substantially right angles to the pleats 39 and 40. As in the forms previously described, the pleats 42 of the inner sheet 41 may be arranged at such an angle relative to the pleats in the outer sheets as may be found best adapted for the particular use for which the material is employed, and, the several sheets may be connected at intervals throughout their extent, if desired.

It is to be understood that any of the various forms and types of ordinary or especially prepared paper may be employed in the construction of the various forms of wrappers shown and described, each wrapper varying in weight, strength, toughness and other characteristics dependent upon the material with which they are to be employed and the specific purpose for which they are to be used, and that the various sheets of the composite wrapper may be formed from different grades and types of paper varying from each other in weight, strength, toughness, etc.

While certain of the modified forms of wrappers shown and described are regarded as particularly applicable to certain specific purposes, the various forms shown are generally applicable for use both as wrappers for expansible material and in packaging heavy material where high resistance to strain is required or desirable. It is to be understood also that the various forms or wrappers shown and described are adapted for use in sheet form or may be employed as material for use in the manufacture of bags, liners for bags, or the like.

In this connection, I regard the forms of my invention shown in Figs. 6 and 7 as particularly well adapted for use in the manufacture of bags for heavy materials, such for example as, sugar, cement, fertilizer, and the like, the arrangement of two sheets of pleated or crepe paper with the respective pleats or folds extending at an angle to each other offering exceptional resistance to the undue expansion of the packaged material while permitting limited expansion at certain points without rupture of the containing wrapper.

When the form of the invention illustrated in Fig. 7 of the drawings is used as a wrapper for cotton or other expansible material in the form of bales, I regard it as preferable that the wrappers be so applied that the pleats 39 and 40, formed in the outer sheet 37 and 38, be arranged substantially parallel with the bale ties applied thereover, in order that the pleats 39 and 40 may open somewhat under the influence of pressure to permit expansion of the material between the bale ties without rupture of the sheets 37 and 38 of the wrapper.

It is to be understood that the several forms of wrappers shown herein may be employed in the form of composite sheets as wrappers to be ap-

plied to expansible or heavy material, or may be used in the formation of composite bags, liners and the like, for packaging expansible or heavy material. The term "folds" as used in the appended claims is employed in its generic sense as including the closely folded pleats shown in the drawings, as well as the creases which are characteristic of crepe paper and such other forms of gathers and the like as may be applied to a paper sheet and permit limited expansion of the same upon the application of pressure thereto.

In each form of the invention as shown herein, a folded or pleated sheet or sheets may be so located as to be interposed between two unfolded sheets or between one or more unfolded sheets and the packaged material. In which case the outwardly directed pressure exerted by the packaged material or its resistance to pressure from without serves to bind or press the folds of the folded or pleated sheet or sheets against the unfolded sheet or sheets, thereby tending to compress the folds or hold them against separation and thus retard the expansion of the folded sheet or sheets. The result of this arrangement of the parts is to provide a wrapper having one or more expansible elements so arranged that the expansion thereof may be retarded by means of the pressure or weight of the expansible material, while expansion of such sheet or sheets is permitted, especially in localized areas, whenever the pressure thereagainst at any point becomes sufficiently great, thus providing a certain amount of expansion of the folded sheet or sheets without rupturing the wrapper. The expansion of the folded sheet or sheets may take place in more or less localized areas or may be more or less general dependent upon the conditions, and such expansion results in partially or entirely pressing out certain of the folds or gathers to accommodate the packaged material without rupturing the folded or gathered sheets. This function of the wrapper material will of course be present regardless of whether or not the sheets are connected together at intervals, since in any event the sheets will be capable of a certain degree of movement relative to each other throughout portions of their areas.

While I have shown and described various forms which my invention may assume in practice, and referred to various uses for which the same may be employed, it is to be understood that the various forms of composite wrappers shown and described and the several uses enumerated are to be regarded as illustrative and not as limiting the invention, since I am aware that the forms shown as well as other modified forms may be employed without departing from the spirit and scope of my invention, and that my invention is adapted for use for many purposes and uses other than those mentioned herein. Moreover, I do not intend that my invention shall be limited to the various illustrated embodiments thereof nor by failure to show and describe other forms which I am aware that it may assume in practice, but that the appended claims be broadly construed in the light of my disclosure.

What I claim is:—

1. A composite expansible wrapper comprising a plurality of superposed sheets each of which is capable of movement independently of the others throughout a portion of its extent, certain of said sheets being each expansible in one direction within the plane of the sheet, the direction of expansion of said expansible sheets being angularly arranged relative to each other.

2. A composite expansible wrapper comprising a plurality of superposed paper sheets capable of movement relative to each other within the plane of the wrapper, certain of said sheets being each provided with a plurality of expansible folds arranged substantially parallel with each other, the folds in one of said sheets being located at an angle to the folds formed in another of said sheets, and certain of said sheets being relatively non-expansible in all directions throughout their extent.

3. A composite expansible wrapper comprising a plurality of superposed paper sheets each of which is capable of movement independently of the others throughout a portion of its extent, certain of said sheets being each expansible in one direction within the plane of the sheet the direction of expansion of said expansible sheets being angularly positioned relative to each other, and certain of said sheets being relatively non-expansible in all directions throughout their areas.

4. A composite expansible wrapper material comprising a plurality of superposed paper sheets each disconnected from the others throughout a material portion of its extent to permit free sliding movement of portions of each sheet relative to the contiguous portions of the sheets next adjacent thereto and provided with a plurality of folds, the folds formed in each sheet being arranged substantially parallel with each other, and the folds formed in each sheet being located at an angle to the folds formed in the sheet next adjacent thereto.

5. A composite expansible wrapper material comprising a plurality of superposed paper sheets certain of said sheets being each provided with a plurality of folds, the folds formed in each sheet being arranged substantially parallel with each other, and the folds formed in each sheet being located at an angle to the folds formed in the sheet next adjacent thereto, and certain of said sheets being free from folds throughout their extent, contiguous portions of adjacent sheets being free to move relative to each other whereby each sheet may accommodate itself to pressure exerted thereagainst without rupture of the sheet material.

6. A composite expansible wrapper material comprising a plurality of superposed paper sheets, two or more of the intermediate sheets being each expansible in one direction, the direction of expansion of said expansible sheets being located at an angle relative to each other, and outer paper sheets located upon opposite sides of said intermediate sheets said outer paper sheets being relatively non-expansible throughout their extent, contiguous portions of adjacent sheets being free to move relative to each other whereby each sheet may accommodate itself to pressure exerted thereagainst without rupture of the sheet material.

7. A composite wrapper for packaged material comprising a plurality of paper sheets capable of movement relative to each other throughout portions of their areas, certain of said sheets being capable of expansion to accommodate themselves to the shape assumed by the packaged material, and one or more of said sheets being relatively non-expansible and being arranged outwardly of said expansible sheets to serve as a support therefor.

8. A composite wrapper comprising a plurality of paper sheets, one or more of said sheets being provided with expansible folds, and relatively non-expansible sheets located upon opposite sides

of said expansible sheet or sheets to so confine the expansible folds as to retard their expansion while permitting limited expansion thereof upon continued pressure.

9. A composite wrapper for packaged material comprising a plurality of paper sheets, one or more of said sheets being expansible and one or more of said sheets being relatively non-expansible, at least one of said non-expansible sheets being located upon that side of the expansible sheet or sheets which is outwardly of the packaged material.

10. A composite wrapper for packaged material comprising a plurality of paper sheets, one or more of said sheets being expansible and one or more of said sheets being relatively non-expansible, said expansible sheet or sheets being located between the packaged material and one of said non-expansible sheets whereby the expansibility of said expansible sheet or sheets is retarded by the pressure exerted by the non-expansible sheet or sheets.

11. As an article of manufacture, a composite expansible wrapper comprising a plurality of superposed paper sheets each capable of independent movement relative to the sheet next adjacent thereto throughout a portion of its extent, certain of said sheets being provided with a plurality of expansible folds arranged substantially parallel with each other, the folds in one of said sheets being located at an angle to the folds formed in the other sheet or sheets.

12. A composite expansible wrapper material comprising two or more paper sheets, each of said sheets being expansible in one direction and relatively non-expansible in a direction at right angles to the direction of its expansion, the sheets being so positioned that the lines of maximum expansion of adjacent sheets are located at an angle to each other, and portions of each sheet being capable of sliding movement relative to the remaining sheet or sheets to permit limited expansion of each sheet without rupture of the adjacent sheet.

13. A composite wrapper for packaged material comprising a plurality of superposed paper sheets, two or more of said sheets being each expansible in one direction within the plane of the sheet and one or more of said sheets being relatively non-expansible, said expansible sheets being so arranged that the lines of maximum expansion of adjacent sheets are located at an angle to each other, and said expansible sheets being located between the packaged material and one of said non-expansible sheets whereby the expansibility of said expansible sheets is retarded by the pressure exerted by the non-expansible sheet or sheets.

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