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FOLDED END-PANEL CARTON

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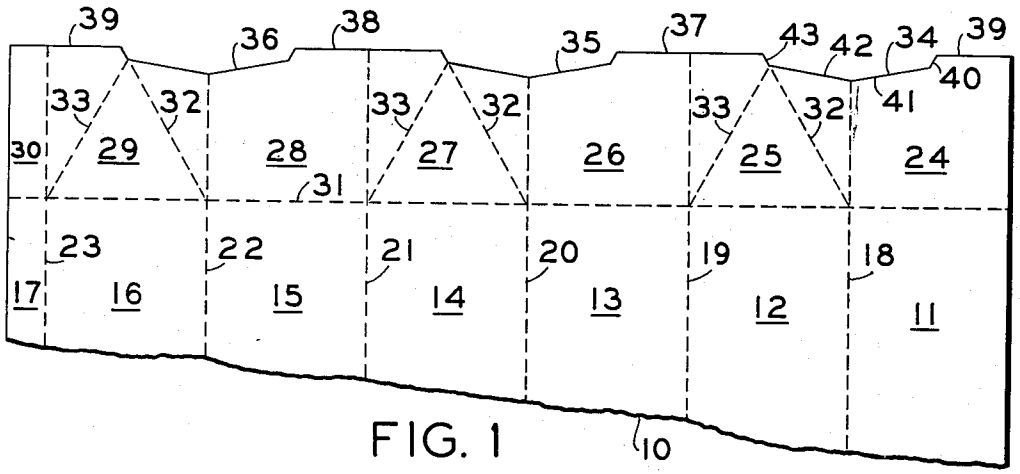


FIG. 1

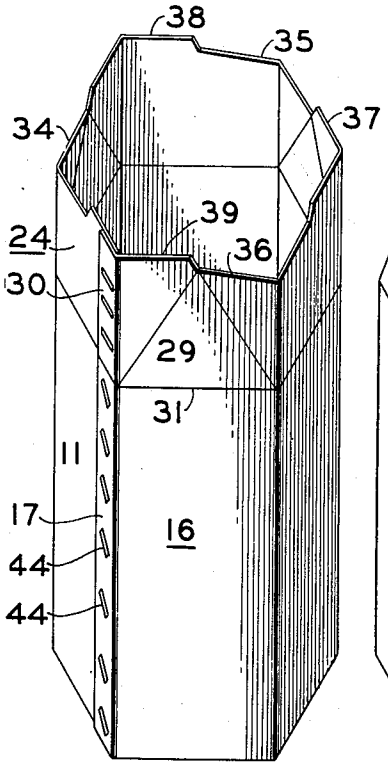


FIG. 2

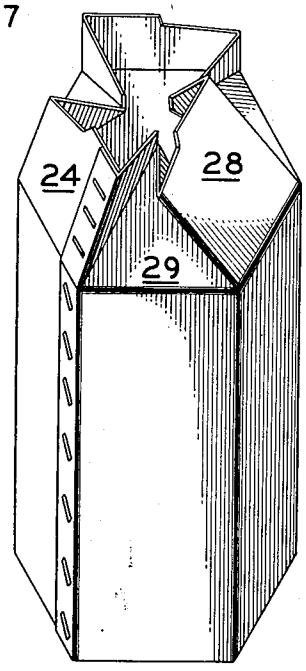
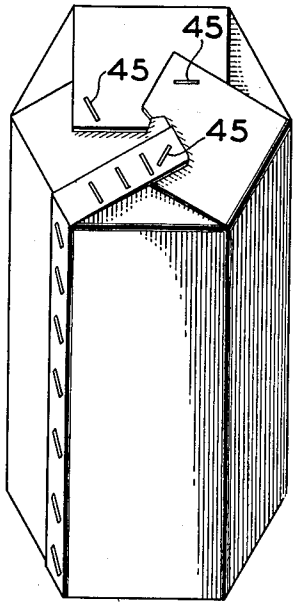


FIG. 3

FIG. 4



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FOLDED END-PANEL CARTON

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4 Claims. (Cl. 229—37)

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This invention relates to knock-down cartons or containers made preferably from heavy paperboard and the like, and more particularly is directed to an arrangement for folding a paperboard blank to form an hexagonal carton having end closures adapted to hold fluid materials, such as melted asphalt and the like, or to serve as a protective enclosure for granular materials packaged in bags or other wrappings.

As particularly described in Simmons Patent No. 2,285,174, it has been found that hexagonal cartons formed of heavy paperboard are especially desirable in the packaging and handling of asphalt. This is due to the fact that the hot and fluid asphalt filled into the carton may be more easily handled than other carton structures which have been proposed heretofore. While the arrangement of flaps and folds provided by the structure disclosed in the Simmons patent have proved to be quite satisfactory for the packaging of asphalt, it has been found that hot, fluid asphalt has a very high coefficient of expansion. Due to this high coefficient of expansion, such material either must be filled into the hexagonal cartons at an inefficiently low temperature, or provision must be made for over-filling a standard sized carton with the molten material in order to obtain the desired weight of material in the finished package when the cooled material has contracted to the expected volume. Accordingly, to provide for this increased volume when the asphalt is fluid, the carton may be constructed so that the side panels of the carton define a volume greater than that necessary when the material is cold or sufficient "free-board" may be provided above the side panels to permit overfilling. However, in the event that the length of the side panels is increased to provide the necessary volume, the asphalt will shrink sufficiently upon cooling so that the carton is not completely full and therefore an unfilled volume of the carton will be present when the end panels are closed. In this way one end of the carton is subjected to crushing when the filled cartons are stacked on top of each other. For these reasons, it has been common practice to fill the cartons with material at temperatures below the optimum for free flow. This of course results in an inefficient filling rate for the cartons. Additionally, since the asphalt is received from the refining stills at a temperature above that at which the paperboard cartons can be filled without scorching or burning, some cooling prior to the filling operation is required. However, the temperature at which the cartons may be filled safely is well above that dictated by the coefficient of expansion. Hence, considerably more time and cooling capacity is required to reduce the temperature down to that used heretofore in the filling operation.

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Previously proposed types of cartons having end closure panels formed by extensions of the side panels and set apart from such side panels by a transverse score line have been found to be unsatisfactory in that the cut intersection of the corners failed to provide sufficient freeboard to prevent spillage, restricted the filling temperature, or presented difficult problems in securing the flaps together with a minimum expenditure of labor and material.

Broadly, the present invention contemplates a carton which may be formed of a single blank of foldable material for forming an hexagonal carton which has a body portion having six side panels and a closure flap, such side panels and flap being defined by longitudinal fold, or score lines with the top or end closing panels being further formed by a transverse fold, or score line extending the width of the blank, and further score lines being provided in alternate top panels to define isosceles triangles therein, and with the outer edge of the blank being notched from the center of the unscored top panel to the center of the adjacent scored panel to form tongue portions which may be interlocked to complete the closure.

It is an object of the present invention to provide an hexagonal carton for packaging asphalt, and the like, which can be over-filled to the desired weight without leakage at an optimum temperature for such material and thereby permitting faster filling of the carton.

It is a further object of the invention to provide a carton with a tight end closure which can be easily and securely closed with a minimum cost of material and labor.

A still further object of the invention is to provide a blank for an hexagonal carton which may be easily assembled to provide a container for asphalt, and the like, which is sufficiently strong and sturdy to prevent bulging, and leaking of the fluid asphalt.

It is another object of this invention to provide an hexagonal carton having end closures integral with the carton side panels and being extensions thereof which are adapted to be folded inwardly to form a tight end closure for the carton which may be securely maintained by the exterior stapling of the overlapping flaps.

Still another object of the invention is to provide an hexagonal carton having superior re-

sistance to damage from the normal hazards of shipping for the enclosed contents.

Further objects and advantages of the present invention will become apparent from the following description and the accompanying drawing which forms an integral part of this specification and illustrates a preferred embodiment of this invention as applied to an hexagonal carton for the packaging of asphalt.

In the drawing, Fig. 1 is a fragmentary view of a paperboard blank showing the score lines forming the side panels and top panels and the notches in the top, or outer edge of the blank.

Fig. 2 is a perspective view of the blank shown in Fig. 1, formed into an hexagonal carton prior to the filling of the carton.

Fig. 3 is a perspective view similar to Fig. 2 in which the top or end closure flaps are partially closed.

Fig. 4 is a perspective view of the hexagonal carton with the top panels folded and stapled to complete the closure of the carton.

Referring now to the drawing, and particularly to Fig. 1, reference numeral 10 designates a blank which may be made of paperboard or other suitable sheet material which may be folded to form an hexagonal carton for packaging asphalt, and the like. Blank 10 is provided with six side panels designated 11, 12, 13, 14, 15 and 16 and a closure flap 17 which are defined from one another by six longitudinally extending score, or fold lines 18, 19, 20, 21, 22 and 23.

In order to define the top, or end forming panels 24, 25, 26, 27, 28, 29 and 30, a fold, or score line 31 is provided which is transverse to the previously mentioned score lines 18 to 23 and extends the full width of blank 10. Score line 31 is preferably positioned with respect to the outer edge of blank 10 so that the portions of lines 19, 21 and 23 which extend from the line 31 to the edge of the blank are longer than the width of each of the side panels 11 to 16. By so locating line 31, it is possible to form an isosceles, or equilateral triangle in end panels 25, 27 and 29 whose overall height is less than the length of the portion of lines 19, 21 and 23 which extend above line 31. Preferably, the height of the triangles is equal to the radius of a circle inscribed within the hexagon formed by the side panels of the carton. These triangles are formed in alternate panels 25, 27 and 29 by score lines 32 and 33. Score lines 32 and 33 are preferably equal to the radius of the circumscribed circle about the same hexagon. The purpose of the triangularly scored sections in panels 25, 27 and 29 will become apparent from a description of the manner of folding the end closures given in connection with Fig. 3 hereinafter.

In order to provide an arrangement which may be easily and rapidly interlocked, three notched portions designated generally as 34, 35 and 36 have been provided in the upper edge of blank 10 so that three tongue members 37, 38 and 39 are formed when closure flap 17 overlaps panel 11. These tongue members extend from the center of a scored top panel, such as 25, to the center of the next adjacent unscored panel, such as 26. Notches 34, 35 and 36 may be cut so that the inner end of side 43 of the tongue portion is coincident with the point where sides 32 and 33 of the scored triangle cross. Both sides 40 and 43 of the tongue members are preferably of equal length. One satisfactory method of forming notches 34, 35 and 36 is shown in Fig. 1 where, for example notch 34, is provided by lines 40, 41, 42 and 43 which are sequentially connected by obtuse angles. The angle between sides 41 and 42 should be less than 180° to provide clearance for side 33 of the triangle when the end panels are overlapped.

Reference is now made to Fig. 2 in which the bottom, or lower end closure has been formed in any suitable manner to provide an end closure for an hexagonal carton following the joining together of closure flap 17 with side panel 11 to form the hexagonal carton. As shown in Fig. 2, closure flap 17 may be joined to side panel 11 at intervals by staples 44. Likewise, the end closure panel 30 may be joined to top panel 24 in the same manner. With the carton formed as shown, hot asphalt or like thermoplastic material as well as granular solids of low, bulk-filling density, may be poured into the hexagonal carton formed thereby and due to the fact that the end closures are substantially extensions of the side panels, the finished weight of material may be placed in the carton since any increased volume due to temperature or compaction after filling may be accommodated by the freeboard provided by top panels 24 to 29 without the danger of leakage or overflow such as would occur with the top panels being cut to the base of transverse score line 31.

While normally asphalt is permitted to cool prior to closure of the carton, it is possible to complete the closure while the material is still semi-fluid. As shown in Fig. 3, the previously defined top panels 25, 27 and 29 may be pushed inwardly so that the triangular portions, formed by score lines 32 and 33, are depressed. By continued pushing inwardly on these triangular portions, the three unscored panels 24, 26 and 28 are moved inwardly preparatory to closing. The final closure is then completed as shown in Fig. 4 so that the three tongue portions 37, 38 and 39 overlap notches 34, 35 and 36. The inwardly folded, triangularly scored top panels 25, 27 and 29 are depressed to such an extent that tongues 37, 38 and 39 overlap the next adjacent unscored panel without interference by the scored panels. The advantage of this arrangement of tongue members 37, 38 and 39 overlying the next adjacent unscored panels is twofold in effect. First, the inner ends of the tongue member inter-engage to produce a locking effect so that a smooth tight closure of the carton is obtained. Second, the sealing of the end closure is greatly facilitated since the excess paper stock is disposed exteriorly of the carton in three overlapping rectangular flaps which may be closed by only three staples 45 located generally in the positions shown in Fig. 4. Ease in stapling the end closure results from the fact that in the stapling operation it is possible to insert a thin, horizontally disposed anvil against which the stapling machine must operate under the adjacent fold which overlies the triangular portion of the scored top panel.

From the foregoing description of the hexagonal carton constructed in accordance with the present invention, it will be apparent that a novel arrangement has been provided for forming and closing such a carton. By virtue of this arrangement, a carton, or container for asphalt and the like has been provided which may be filled to the desired weight, irrespective of final volume, without leakage since the end closure panels 24 to 29 are substantially continuations, respectively, of side panels 11 to 16 and provide a container of greater initial volume than that finally required. It will also be apparent that by virtue of the pres-

ent invention a carton has been provided which may be more easily closed than any similar prior device of which we are aware with a minimum of material and labor. Furthermore, by the present arrangement a container for asphalt has been provided which is sufficiently strong and sturdy in construction to withstand bulging, or leaking of fluid asphalt when the carton is being filled. By virtue of this invention an hexagonal carton is provided which is particularly resistant to the subsequent hazards of shipping and affording superior protection to the contents of the carton.

While modifications and changes in the present arrangement will be apparent to those skilled in the art, all such modifications and changes as fall within the scope of the appended claims are intended to be included thereby.

We claim:

1. A single blank of foldable material for forming an hexagonal carton comprising a body portion having six side panels and a side closure flap for forming the six sides of said carton, said side panels and flap being defined from one another by score lines, top forming panels extending outwardly from each of said side panels and said flap and defined therefrom by a score line extending the width of said blank, score lines forming an isosceles triangle in alternate top panels with the base of said triangle defined by the side panel scores lines and the top panel score line, the other of said alternate top panels being unscored, and each of said top panels having an outwardly extending tongue portion and an inwardly extending notch portion from the center of said panel to the score lines defining the opposite edges of said top panel, and notch portions and tongue portions of each of said scored top panels being respectively adjacent the notch portions and tongue portions of the adjacent unscored top panels.

2. A blank for forming an hexagonal container comprising a sheet of foldable material having parallel fold lines extending the length of said sheet to form six panels and a side closure flap, the outer edge of said sheet having a notch extending inwardly from the center of each of said panels to the center of the next adjacent panel to form three spaced tongue portions when said container is assembled, a fold line transverse to said parallel fold lines to divide said panels into side and top panels, and fold lines forming an equilateral triangle in alternate top panels and having the apex of said triangle coincident with the base of one side of said tongue portions.

3. A blank for forming an hexagonal carton from an integral sheet of foldable material having parallel fold lines extending the length of said sheet to form six panels and a side closure flap, a transverse fold line to divide said panels into rectangular side panels and end panels, alternate end panels having fold lines defining equilateral triangles with the apex of said triangles at a distance less than the greatest length of said end panel, the other of said alternate end panels being unscored, the outer edge of each of said scored end panels being notched to form tongue means extending outwardly from said apex of said triangle and laterally from the center of said end panel to the edge of said panel, and said alternate unscored end panels being similarly notched, the notched edge of said unscored end panels being adjacent the notched edge of said scored end panels to form three spaced tongue means when said sheet is assembled as a carton.

4. A blank for forming an hexagonal carton from an integral sheet of foldable material having parallel fold lines extending the length of said sheet to form six panels and a transverse fold line to divide said panels into rectangular side panels and shorter end panels, three alternate end panels having fold lines each equal in length to the width of said panels beginning at the intersection of said parallel fold lines and said transverse fold line and intersecting at a point spaced inwardly from the ends of said panels, and the edge of each of said end panels being notched inwardly at the center thereof to the depth of said last named points and laterally to the parallel fold line dividing said end panel from the adjacent end panel, the notched portions and the tongue portions of each of said three end panels having fold lines therein being disposed adjacent respectively the notched portions and tongue portions of the other three end panels.

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