Jan. 4, 1955 E. A. NEUMAN 2,698,709

COLLAPSIBLE CONTAINER

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Fig. 1.

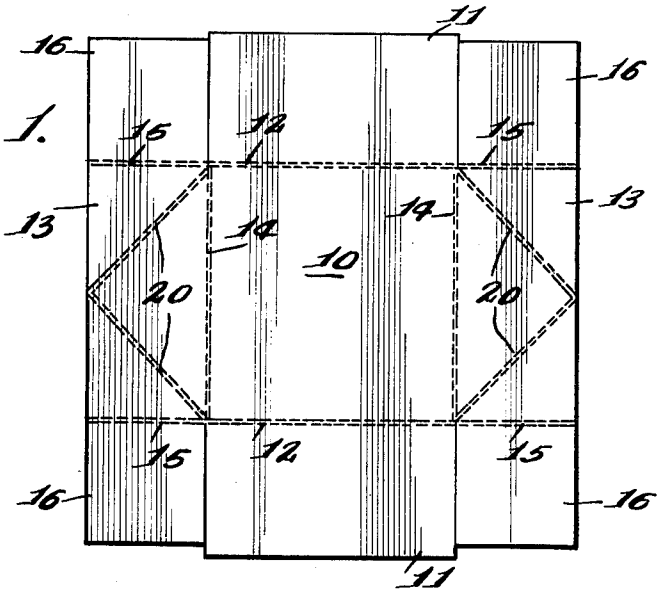


Fig. 2.

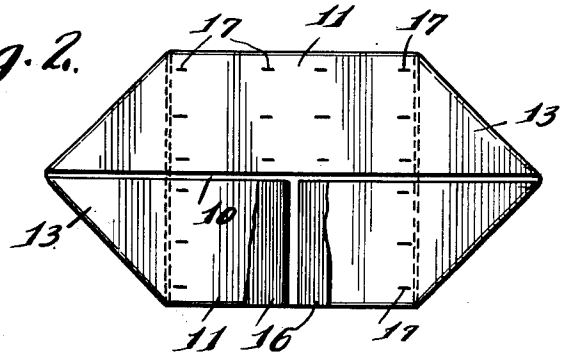
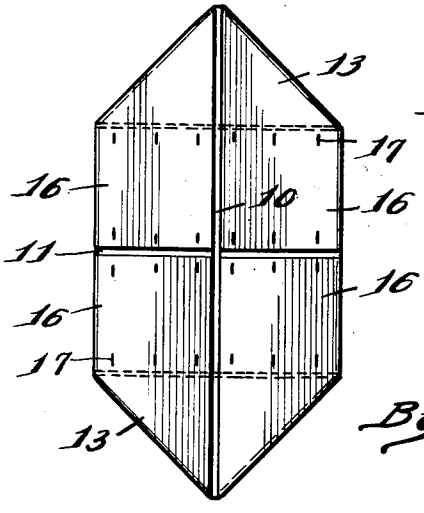


Fig. 3.



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Fig. 4.

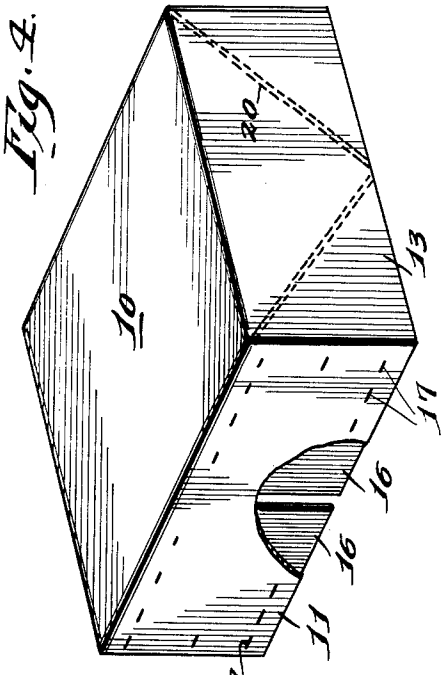


Fig. 5.

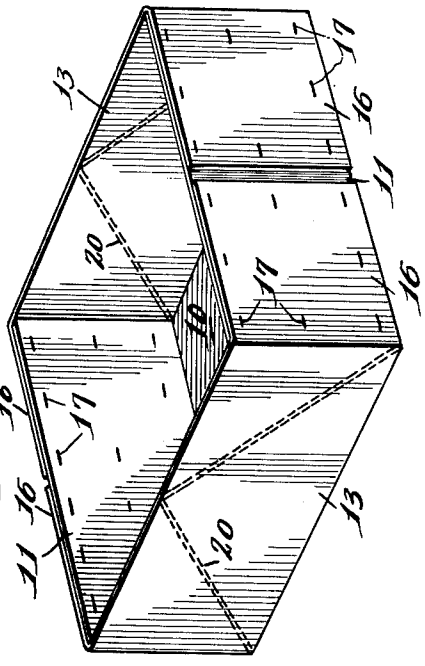


Fig. 6.

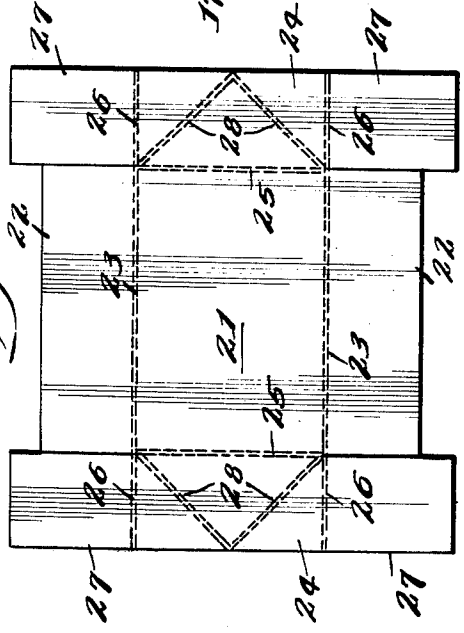
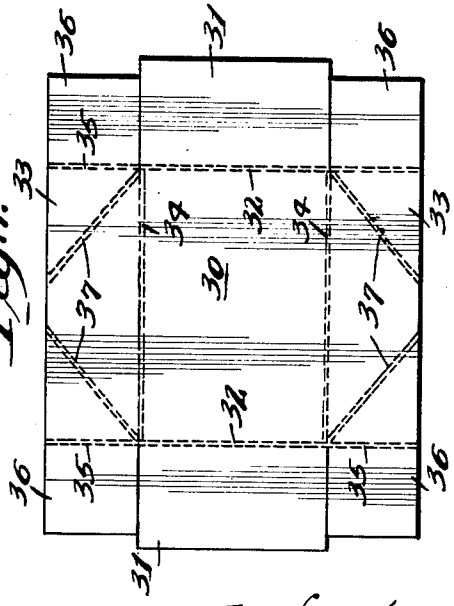


Fig. 7.



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COLLAPSIBLE CONTAINER

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4 Claims. (Cl. 229—32)

This invention relates to a new and improved container, and more particularly to a two component, that is, separate top and bottom, collapsible container formed of fiberboard or other suitable material.

It is an object of the present invention to provide a strong, rigid container which may be used for shipping purposes and which is adaptable for reuse.

It is a further object of the present invention to provide a container or box composed of a separate top and bottom section, each of which may be collapsed flat so as to occupy a minimum of space when stored or shipped in empty condition, and wherein the two components mutually reinforce and support each other when they are set-up and telescopically engaged.

It is a further object of the present invention to provide a collapsible box constructed and arranged in a manner whereby the side walls of the composite top and bottom are each composed of three thicknesses of substantially equal area, and do not require any separate reinforcing or stiffening pieces to maintain the box in erected position.

It is a further object of the present invention to provide a box constructed and arranged in a manner whereby the composite side walls of its top and bottom are each provided with a slot extending transversely of the said walls and intermediate the outer and inner surfaces of said side walls to provide air relief ducts to facilitate telescopic engagement and separation of the top and bottom.

Other objects, advantages and economies of my invention, together with its details of construction and arrangement of parts will be apparent from a consideration of the following specification and drawings, wherein:

Fig. 1 is a plan view showing a blank cut and scored for forming either the top or bottom sections of a collapsible container in accordance with one form of my invention.

Fig. 2 is a plan view of the top section of a container in accordance with my invention, with parts broken away, and in collapsed condition.

Fig. 3 is a plan view of the bottom of the container in collapsed condition.

Figs. 4 and 5 are perspective views of set-up top and bottom sections, respectively, of a collapsible container in accordance with my invention illustrating their relative positions for telescopic engagement.

Figs. 6 and 7 are plan views of blanks cut and scored for forming the top and bottom sections of a collapsible container in accordance with another form of my invention.

Referring to the drawings, Fig. 1 illustrates a blank cut and scored for forming a container having a square top and bottom, and thus substantially identical blanks may be used for both sections with the exception that the blank for the bottom section will be of slightly smaller dimension so that it may be telescoped within the top section, and therefore only one blank is shown and described. Thus, the blank of Fig. 1 which may be formed of fiberboard of a thickness suitable for intended use, is composed of a square central panel **10**, a pair of opposed rigid side wall forming panels **11—11** in hinged engagement with the central panel at the score lines **12—12**, and a second pair of opposed collapsible side wall forming panels **13—13** in hinged engagement with the central panel on the score lines **14—14**.

The width of panel **11**, that is from its hinge line **12** to its outer parallel edge, is not more than one-half the width of the central panel so that the two panels **11** may be folded over in a common plane above and parallel to the central panel after the blank is assembled and collapsed.

Extending from the opposed side edges of each of the panels **13**, and in hinged engagement thereat on the score lines **15**, are the flaps **16**. These flaps **16** are each of a length substantially equal to, but less than one-half the length of a panel **11**, so that when they are all secured to the panels **11**, as shown in Figs. 2 and 3 by means of the staples **17**, or otherwise such as for example by adhesive means, the adjacent ends of the flaps **16** will be slightly spaced forming a narrow slot extending transversely of the rigid wall forming panels **11**, such as a pair of slots in Fig. 2 (only one being shown) or the slots shown in Fig. 3.

In assembling the blank of Fig. 1, wherein all score lines are formed on the same face illustrated, which will be the interior of the section, the walls **11—11**, and **13—13** are folded upwardly to extend normal to the central panel **10**, and a pair of flaps **16** secured to each of the walls **11—11**. In forming the top section of the two-piece container, the flaps **16** are disposed inwardly of the rigid side walls **11** as shown in Fig. 2, and in forming the bottom section the flaps **16** are disposed outwardly of the rigid side walls **11**.

Each of the panels **13** is formed with a pair of obliquely extending score lines **20—20** having their inception at the lower corners of the panels and extending to substantially the center of the outer edge of these panels. This permits each of the two assembled sections to be individually collapsed by urging the side walls **11** toward each other and down against the central panel **10** and causing the collapsible walls **13** to double over on their score lines **20**, as shown in Figs. 2 and 3, and permits the shipment or storage of the carton sections in a minimum of space.

Assembly of the two complementary container sections for use is accomplished by expanding them to the forms shown in Figs. 4 and 5, and placing the top section shown in Fig. 4 in the relative relationship to the bottom section shown in Fig. 5, as shown by the illustration of these two figures considered as a whole, and telescoping them together in a manner whereby the collapsible walls of one section are juxtaposed with the rigid side walls of another to result in mutual reinforcement. Firm engagement is brought about as a result of outward bowing tendency of the collapsible side walls **13** of one section against the rigid side walls **11** of the other section, which effect is enhanced after repeated reuse, that is repeated collapsing and erecting. The telescoping of one section with the other further results in a composite wherein each of the side walls is composed of three thicknesses of substantially equal area, with the intermediate thickness of this composite divided by a slot at each of the four composite walls between the adjacent ends of a pair of flaps **16**.

Provision of the indicated slots in each of the walls of the composite is an important advantage in engaging and disengagaing the two components of the container. Thus, when the bottom section of the container is filled and the top section telescoped thereover, the side wall slots permit ready escape of entrapped compressed air and prompt and easy seating of the top over the bottom which might otherwise be delayed if it were required to gradually expel the entrapped air. Such temporary compression of air in an effort to telescope the top over the bottom might also disturb the contents of the filled container. The same holds true in separation of the top from the bottom section. That is to say, by reason of the provision of the slots in the side walls of the composite container, when it is desired to lift the top from the bottom or to separate the two components, manually or mechanically, air readily enters the container which in the absence of these slots might result in a temporary vacuum and hinder or require special effort in separating the two sections.

The disposing of the flaps **16** outwardly of the rigid side walls **11** in the bottom section of the container further provides a smooth interior for the bottom section so

that the material packaged therein, such as for example, pulverulent material in a flexible bag, will not be disrupted or the bag torn in shipment. To the same end, when staples **17** are employed, they should be engaged in a manner whereby their end prongs are closed against the outer surface of the flaps **16**. Similarly the disposing of the flaps **16** inwardly of the rigid side walls **11** on the top section of the container provides a smooth outer surface so as to minimize projecting end pieces which might be disrupted under conditions of handling and shipment. After the goods which are to be shipped are placed within the bottom section of the container and the top section telescoped thereover, the two may be secured together in any suitable manner, such as by tying or banding.

Figs. 6 and 7 show two blanks suitably scored and cut, one of which may be employed as a bottom section and the other as a top section of a container such as that described with respect to the previous figures, and likewise the one forming the bottom section will have a central panel of slightly smaller dimension than the other which is to form the top section. The only difference between the blanks of Figs. 6 and 7 and that of Fig. 1 is that the blanks of Figs. 6 and 7 are for the formation of a container which has a rectangular top and bottom other than the square shape of Fig. 1.

Assuming the blank of Fig. 6 is to form the top section of a composite container of the class herein contemplated, it will be composed of a central panel **21**, a pair of opposed rigid side wall forming panels **22—22** in hinged engagement with the central panel at the score lines **23—23**, and a second pair of opposed collapsible side wall forming panels **24—24** in hinged engagement with the central panel on the score lines **25—25**. The width of a panel **22**, that is from its hinge line to its outer parallel edge is not more than one-half of the width of the central panel **21** between the score lines **23—23** so that two panels **22** may be folded over in a common plane above and parallel to the central panel after the blank is assembled and collapsed. Extending from the opposed side edges of each of the panels **24** and in hinged engagement thereat on the score lines **26** are the flaps **27**. These flaps **27** are each of a length substantially equal to, but less than one-half of the length of a panel **22** so that when they are all secured to the panels **11** in the manner described with respect to the previous figures, the adjacent ends of the flaps **27** will be slightly spaced forming a narrow slot extending transversely of the rigid wall forming panels **22**. In assembling the blank of Fig. 6 the walls **22—22** and **24—24** are folded upwardly to extend normal to the central panel **21** and a pair of flaps **27** are secured to each of the walls **22**, and since the blank **6** is to form the top section, the flaps **27** will be disposed inwardly of the walls **22**, as for example in the manner shown in Fig. 4.

Each of the panels **24** is formed with a pair of obliquely extending score lines **28** so that the erected section can be collapsed by urging the side walls **22** toward each other and down against the central panel **21** and causing the collapsible walls **24** to double over on their score lines **28**.

The blank of Fig. 7 which may be employed to form the bottom section of the container is cut and scored to form a central rectangular panel **30** of slightly smaller dimension than the panel **21** and has a pair of opposed rigid side wall forming panels **31—31** in hinged engagement with the central panel at the score lines **32—32**, and a second pair of opposed collapsible side wall forming panels **33—33** in hinged engagement with the central panel on the score lines **34—34**. The width of a panel **31**, that is from its hinge line **32** to its outer parallel edge is not more than one-half of the width of the central panel between the score lines **32** so that the two panels **31** may be folded over in a common plane above and parallel to the second panel after the blank is assembled and collapsed. Extending from the opposed side edges of each of the panels **33** and in hinged engagement thereat on the score lines **35** are the flaps **36**. These flaps **36** are each of a length substantially equal to but less than one-half of the length of a panel **31** so that when they are secured to the panels **31**, as shown for example in Fig. 5, by means of staples or otherwise, the adjacent ends of the flaps **36** will be slightly spaced forming a narrow slot extending transversely of the rigid wall forming panels **31**, as illustrated in Fig. 5.

When a two-section container is formed wherein the top and bottom panels are of a rectangular shape rather than square, one section will have its short side wall panel scored for folding and the other will have its long side wall panel scored for folding. Thus, in Fig. 7 the panels **33** are formed with a pair of obliquely extending score lines **37—37** to permit the assembled section to be collapsed by urging the side walls **31** toward each other and down against the central panel **30** and causing the collapsible walls **33** to double over on their score lines **37**, in the manner shown in Fig. 3. In forming the bottom section from the blank shown in Fig. 7, the flaps **36** are disposed and secured outwardly of the panels **31**.

In telescoping the erected container sections formed from the blanks of Figs. 6 and 7, of necessity the collapsible side walls of one section will be brought into juxtaposition with the rigid side walls of the other section to result in mutual reinforcement. Further, as previously described the composite of the two sections results in side walls of three thicknesses, the intermediate one of each wall being divided by an air relief slot.

It has been found that collapsible fiberboard boxes formed in accordance with the foregoing have great strength and are suitable for shipping material such as TNT and other high explosives, smokeless powder, components of ammunition, and many other uses where a strong tight box which may be reused repeatedly is required, and it will be understood that the box may be made in different sizes and of different strength materials according to the use desired. The tightness of the closure which is obtainable by means of my construction and the strength of the side walls thereof make these boxes or containers eminently suitable for stacking in filled condition.

I claim as my invention:

1. A two-piece container composed of a top section and a bottom section each separately collapsible and having telescopic engagement and being in mutual reinforcement in set-up position, each of said sections being formed of a blank cut and scored to define a central rectangular panel, an opposed pair of rigid rectangular side walls and an opposed pair of foldably scored rectangular collapsible side walls in hinged engagement with said central panel, all of said walls being of substantially the same transverse width, and rectangular flaps extending from and in hinged engagement with the opposed ends of each of said collapsible walls and fixedly secured against and in reinforcing relationship to said rigid walls, each of said flaps having a length slightly less than one-half the length of said rigid walls to provide a narrow slot between their adjacent ends extending transversely of said rigid walls, the flaps of said bottom section being secured to the respective outer faces of the rigid walls of said bottom section and the flaps of said top section being secured to the respective inner faces of the rigid walls of said top section, said bottom section in operative position being telescoped within said top section with the collapsible walls of one section lying in juxtaposition with the reinforced rigid side walls of the other section and forming composite side walls each of three-layer thickness of substantially equal area throughout the area thereof, the intermediate layer of each of said composite walls being divided by a transversely extending slot.

2. A two-piece container composed of a top section and a bottom section each separately collapsible and having telescopic engagement and being in mutual reinforcement in set-up position, each of said sections being formed of a blank cut and scored to define a square central panel, an opposed pair of rigid rectangular side walls and an opposed pair of foldably scored rectangular side walls in hinged engagement with said central panel, all of said walls being of substantially the same transverse width, the width of said rigid walls being not greater than one-half the width of said central panel whereby said walls may be folded over and parallel to said central panel, and rectangular flaps extending from and in hinged engagement with the opposed ends of each of said collapsible walls and fixedly secured against and in reinforcing relationship to said rigid walls, each of said flaps having a length slightly less than one-half the length of said rigid walls to provide a narrow slot between their adjacent ends extending transversely of said rigid walls, the flaps of said bottom section being secured to the respective outer faces of the rigid walls of said bottom section and the flaps of said top section being secured to the respective inner faces of the rigid walls of said top section, said bottom section in operative position being telescoped with-

in said top section with the collapsible walls of one section lying in juxtaposition with the reinforced rigid side walls of the other section and forming composite side walls each of three-layer thickness of substantially equal area throughout the area thereof, the intermediate layer of each of said composite walls being divided by a transversely extending slot.

3. A two-piece container composed of a top section and a bottom section each separately collapsible and having telescopic engagement and being in mutual reinforcement in set-up position, each of said sections being formed of a blank cut and scored to define a central rectangular panel, an opposed pair of rigid rectangular side walls and an opposed pair of foldably scored rectangular collapsible side walls in hinged engagement with said central panel, all of said walls being of substantially the same transverse width, and rectangular flaps extending from and in hinged engagement with the opposed ends of each of said collapsible walls and fixedly secured against and in reinforcing relationship to said rigid walls, each of said flaps having a length slightly less than one-half the length of said rigid walls, the flaps of said bottom section being secured to the respective outer faces of the rigid walls of said bottom section and the flaps of said top section being secured to the respective inner faces of the rigid walls of said top section, said bottom section in operative position being telescoped within said top section with the collapsible walls of one section lying in juxtaposition with the rigid walls of the other section and forming composite side walls each of three-layer thickness of substantially equal area throughout the area thereof, the intermediate layer of each of said composite walls being divided by a transversely extending slot.

4. A two-piece container composed of a top section and a bottom section having telescopic engagement, each of said sections being formed of a blank cut and scored to

define a central rectangular panel, rectangular side walls in hinged engagement with said central panel, all of said walls being of substantially the same transverse width, and rectangular flaps extending from and in hinged engagement with the ends of one opposed pair of said side walls and fixedly secured against the other opposed pair of said side walls, each of said flaps having a length slightly less than one-half the length of the walls to which they are secured to provide a narrow slot between their adjacent ends extending transversely of the side walls, the flaps of said bottom section being secured to the respective outer faces of the walls to which they are secured and the flaps of said top section being secured to the respective inner faces of the walls to which they are secured, said bottom section in operative position being telescoped within said top section with the walls of one section lying in juxtaposition with the walls of the other section and forming composite side walls each of three-layer thickness of substantially equal area throughout the area thereof, the intermediate layer of each of said composite walls being divided by a transversely extending slot.

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