

[54] PACKING CONTAINERS

[75] Inventor: Akio Saito, Kakegawa-shi, Shizuoka,
Japan

[73] Assignee: Shinwa Kagaku Kogyo Kabushiki
Kaisha, Tokyo, Japan

[22] Filed: Sept. 13, 1971

[21] Appl. No.: 179,934

3,331,513 7/1967 Cappelli..... 150/1 X
3,374,929 3/1968 Silfverskiold 222/181 X
3,425,472 2/1969 Marino 150/11 X

Primary Examiner—Donald F. Norton

Attorney, Agent, or Firm—Fitzpatrick, Cella, Harper
& Scinto

[30] Foreign Application Priority Data

Sept. 11, 1970 Japan.....45/89922 [U]
Sept. 12, 1970 Japan.....45/90333 [U]
Nov. 11, 1970 Japan 45/111319 [U]
Nov. 30, 1970 Japan 45/118256 [U]
Dec. 26, 1970 Japan 45/118581 [U]
Feb. 1, 1971 Japan.....46/3898 [U]
Mar. 19, 1971 Japan.....46/18446 [U]

[52] U.S. Cl..... 150/11, 150/1, 222/105,
222/181

[51] Int. Cl..... B65d 29/02

[58] Field of Search 222/105, 181; 150/1, 11

[56] References Cited

UNITED STATES PATENTS

2,691,998 10/1954 Stucker..... 150/11 X

[57] ABSTRACT

In a container, a double walled cylindrical body is formed by turning inside out a pliable cylindrical member at about the center of the length thereof, first and second binding cords are threaded about the lower ends of the inner and outer layers of the cylindrical body and are tied to substantially close the bottom of the cylindrical body, a third binding cord is threaded about the upper end of the cylindrical body to close the upper end thereof and a plurality of circumferentially spaced apart closed loop shaped hanging cords are provided to encircle the third binding cord.

19 Claims, 28 Drawing Figures

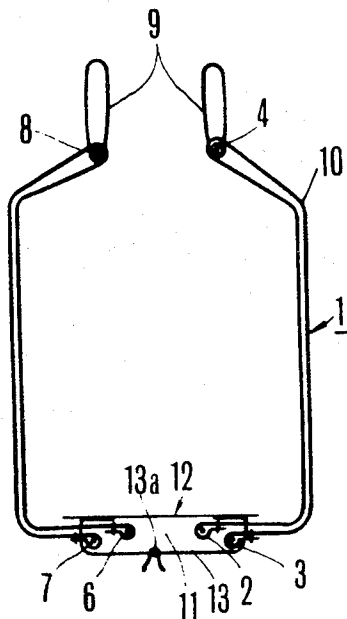


FIG. 1

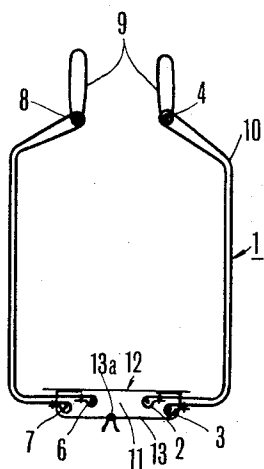


FIG. 2

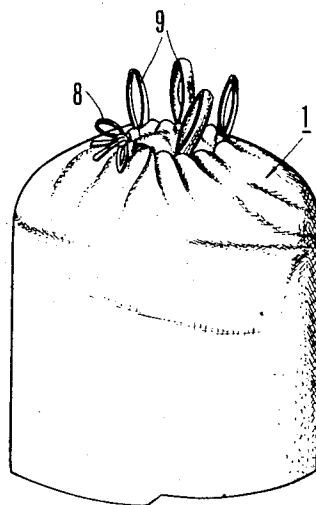


FIG. 3

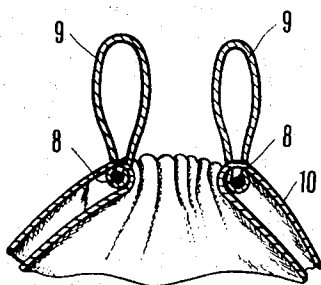


FIG. 4

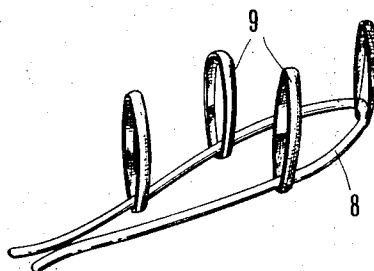


FIG. 7

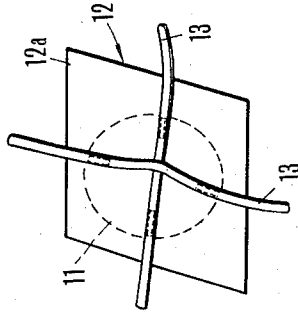


FIG. 8

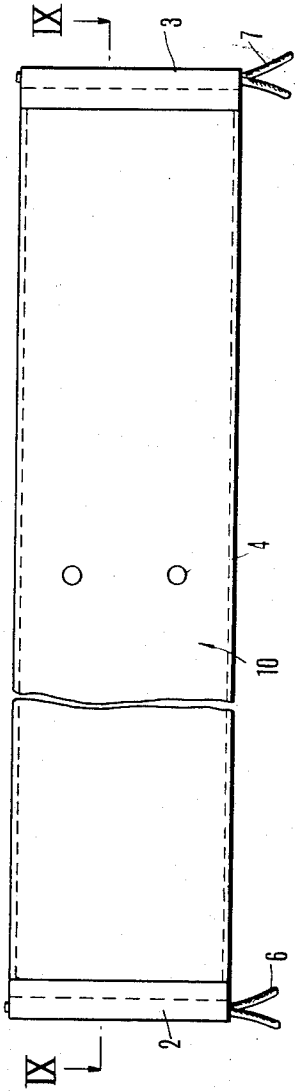


FIG. 9

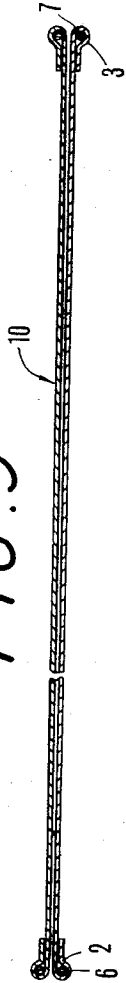


FIG. 5

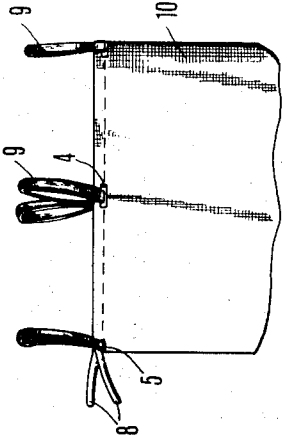


FIG. 6

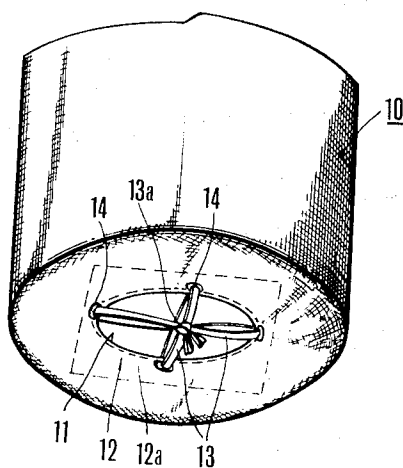


FIG. 10

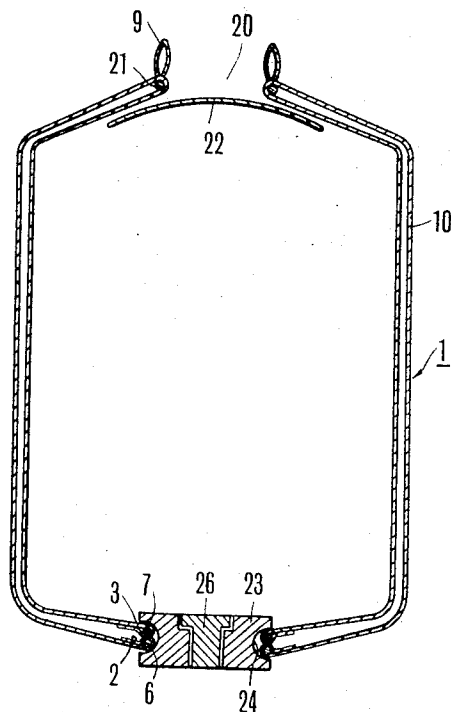


FIG. 11

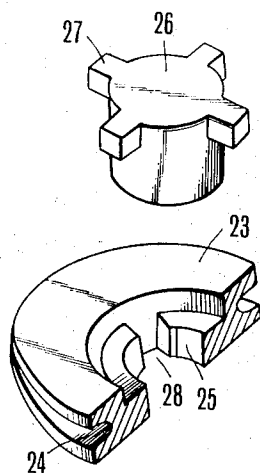
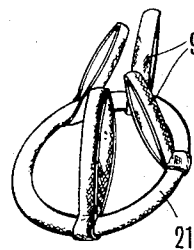


FIG. 12



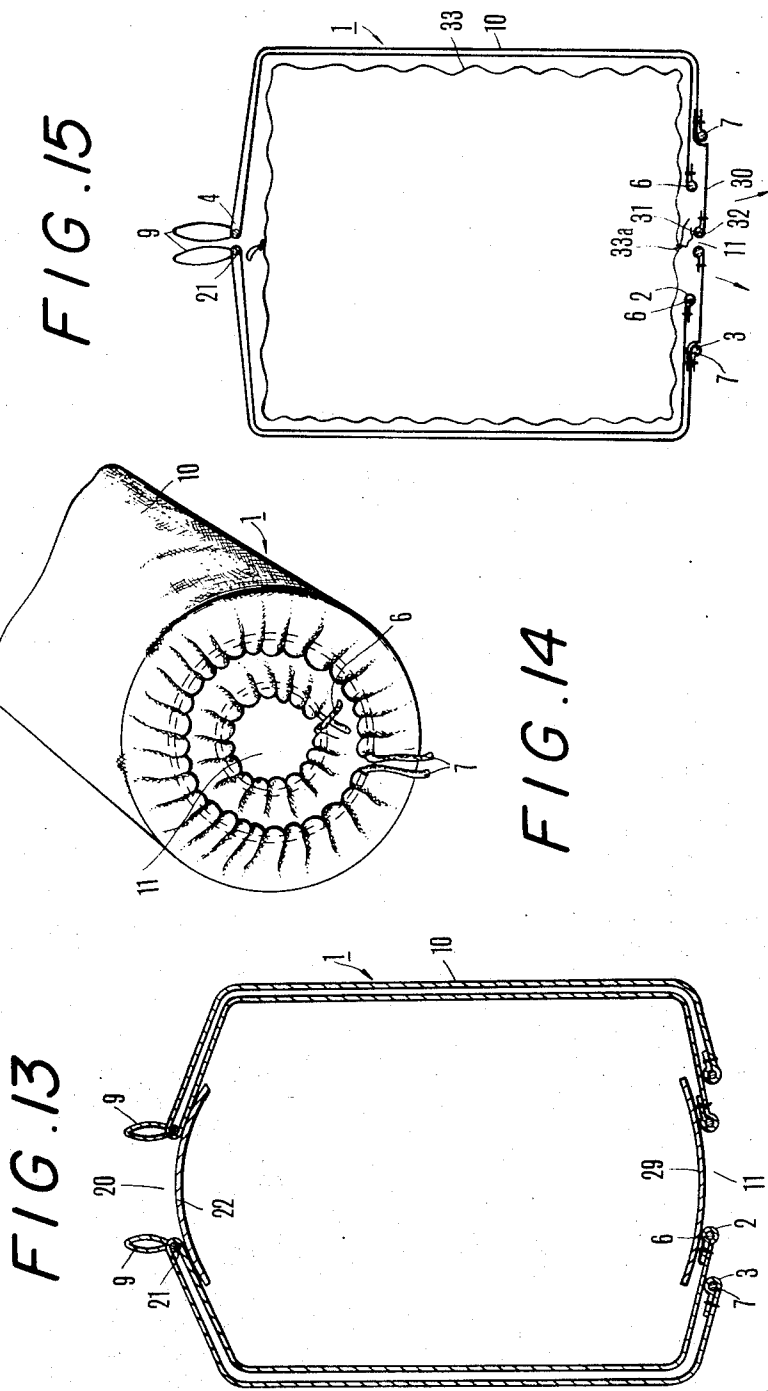


FIG. 16

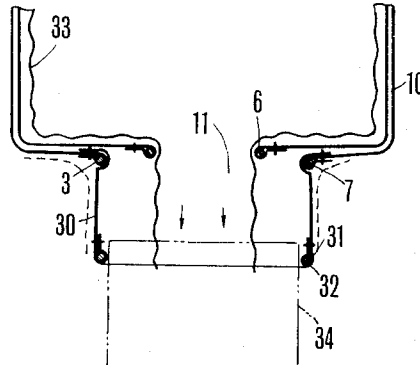


FIG. 17

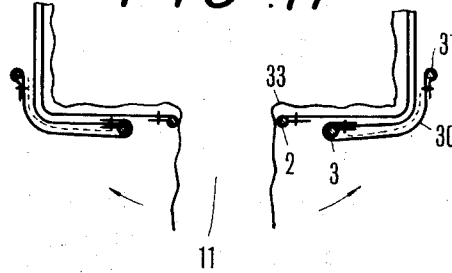


FIG. 18

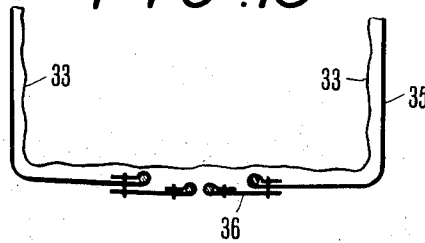


FIG. 19

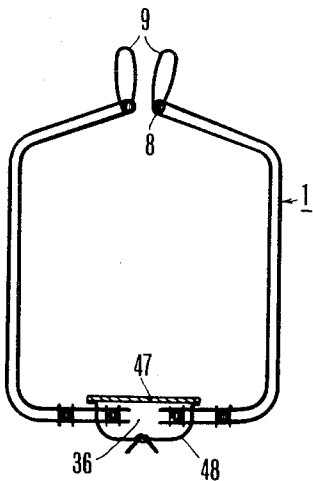


FIG. 20

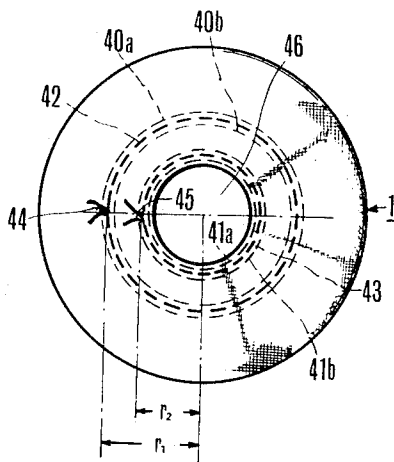


FIG. 22

FIG. 21

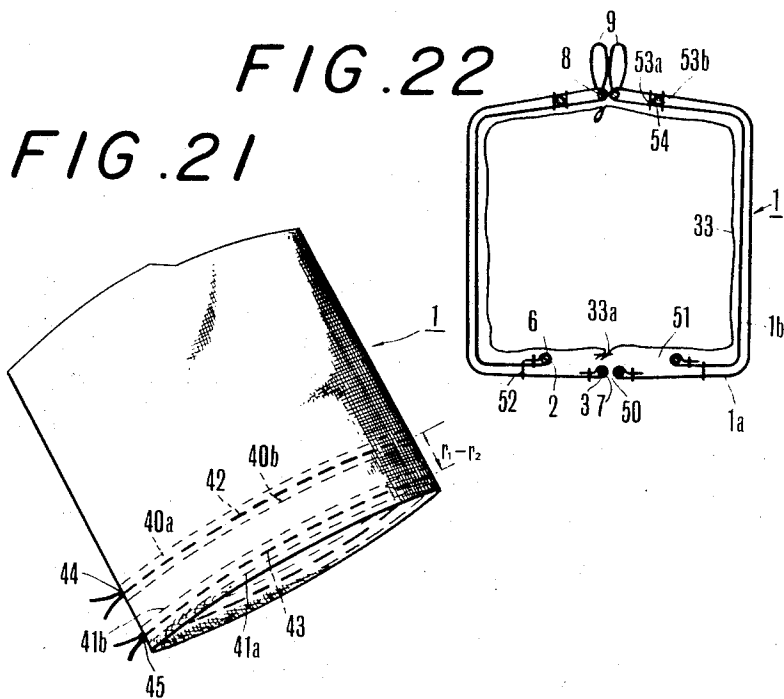


FIG. 23

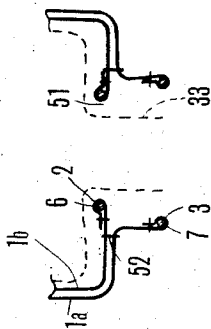


FIG. 24

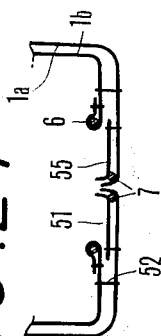


FIG. 25

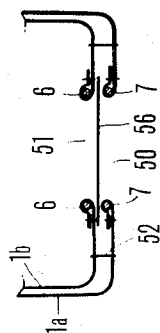


FIG. 26

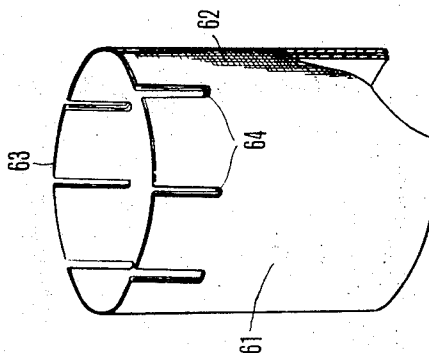


FIG. 27

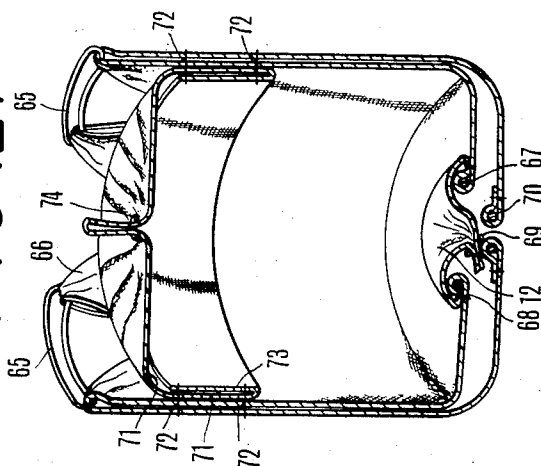
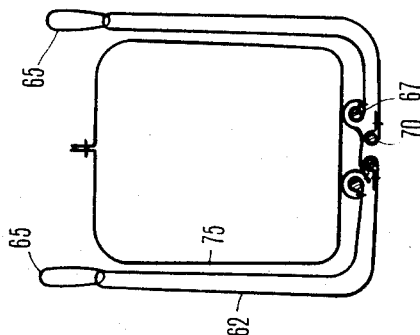


FIG. 28



PACKING CONTAINERS

BACKGROUND OF THE INVENTION

This invention relates to a transportable container for containing powdery or granular material.

The container used to contain a large quantity, for example from 600 to 1,000 Kg. of such material is required to be constructed such that it permits easy loading and discharge of the content, and such that it can be stored easily before use, transported easily after loading, piled up one upon the other, and is light weight and not expensive.

Cartons or cardboards are not suitable because they are relatively stiff and bulky. Cylindrical bags made of paper or woven fabric are more advantageous than cartons, but it is difficult to discharge the content while the bag is being hung vertically unless the bottom is broken, thus discarding the bag. Moreover, when the bottom of the container is opened to discharge the content, the content is often contaminated by the dirt deposited on the bottom of the container.

SUMMARY OF THE INVENTION

It is therefore the principal object of the invention to provide a new and improved container by which it is possible to load the content through the upper opening and to discharge the content through the bottom opening.

Another object of the invention is to provide an improved double walled container made of pliable material of light weight.

Yet another object of this invention is to provide an improved container having upper and lower openings which can be readily opened and closed by binding cords.

A further object of the invention is to provide a novel container having a bottom of improved construction permitting discharge of the content without the fear of its being contaminated by the dirt deposited on the bottom.

A still further object of the invention is to provide an improved double walled container by which it is possible to stably hang the container while it is transported or while discharging the content from the bottom thereof.

Another object of the invention is to provide an improved double walled container made of pliable material yet having a flat bottom which can be readily opened and closed.

According to this invention there is provided a packing container comprising a double walled cylindrical body, the body including a pliable cylindrical member which is turned inside out at about the center of the length thereof to form the double walled cylindrical body, a first binding cord threaded about the periphery of the lower end of the inner layer of the cylindrical body, a second binding cord threaded about the periphery of the lower end of the outer layer of the cylindrical body, the first and second binding cords being tied independently to substantially close the bottom of the cylindrical body, a third binding cord threading the periphery of the upper end of the cylindrical body and a plurality of circumferentially spaced closed loop shaped hanging cords encircling the third binding cord and projecting above the upper end of the cylindrical body, the third binding cord being used to substantially close the upper end of the cylindrical body.

Where the bottom of the container is not completely closed by the first and or the second binding cord a suitable bottom lid may be used to close the bottom opening of the container. Where the second binding cord is used to form a bottom opening smaller than that formed by the first binding cord the outer layer may be connected to the inner layer of the cylindrical body at portions, near the first binding cord. When the second binding cord is untied the lower portion of the outer layer depends from the first binding cord to form a discharge chute thus preventing the discharging content from being contaminated by the dirt deposited on the bottom of the container. If desired, an inner bag having an openable or breakable bottom may be disposed in the container to receive the content. The upper end of the container can be closed by tying the third binding cord or placing a top cover in the container.

The cylindrical member may be formed of a knitted or woven fabric, and a film of synthetic resin may be applied to one or both sides of the cylinder member to render it air and moisture tight.

A cylindrical auxiliary bottom member may be attached to the outer layer near the second binding cord to substantially close the bottom of the container and to provide a clean discharge chute.

BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying drawings;

FIG. 1 shows a diagrammatic longitudinal section of a packing container embodying the invention;

FIG. 2 shows a perspective view of the upper portion of the container after the upper opening thereof has been closed;

FIG. 3 shows an enlarged longitudinal section of the upper portion of the container shown in FIG. 2 ;

FIG. 4 shows a perspective view of the hanging cords and the upper binding cord utilized in the container shown in FIG. 1,

FIG. 5 shows a side view of the upper portion of the container before use;

FIG. 6 shows a perspective view of the bottom portion of the container;

FIG. 7 shows a perspective view of the bottom lid;

FIG. 8 shows an exploded view of the cylindrical member used to form the cylindrical body of the container;

FIG. 9 shows a section of the cylindrical member shown in

FIG. 8 taken along a line IX—IX

FIG. 10 shows an longitudinal section of a modified container;

FIG. 11 is an exploded view of the bottom lid utilized in the container shown in FIG. 10;

FIG. 12 shows a perspective view of the annular ring and hanging cords used in the container shown in FIG. 10 ;

FIG. 13 shows a longitudinal sectional view of another modification of the invention ;

FIG. 14 shows a perspective view of the bottom portion of the container shown in FIG 13 ;

FIG. 15 shows a diagrammatic longitudinal section of yet another embodiment of the invention;

FIG. 16 and 17 are diagrammatic view of the bottom portion of the container shown in FIG. 15 when the bottom is opened in different manners ;

FIG. 18 is a diagram to show a modified bottom portion of the container ;

FIG. 19 is a diagrammatic longitudinal sectional view of a container having a bottom of a different construction ;

FIG. 20 is a bottom view of the container shown in FIG. 19 ;

FIG. 21 shows a perspective view of the bottom portion of the container shown in FIG. 19 before use.

FIG. 22 shows a diagrammatic longitudinal sectional view of further modification of this invention having a bottom of different construction and utilizing an inner bag ;

FIG. 23 shows a diagram of the bottom of the container shown in FIG. 22 when it is opened ;

FIG. 24 and 25 shows diagrammatically modified bottom portion of the container ;

FIG. 26 is a perspective view of the cylindrical body illustrating one step of manufacturing the container shown in FIG. 27 ;

FIG. 27 shows a longitudinal section, partly in perspective of a modified container and

FIG. 28 is a diagrammatic representation of a modification utilizing an internal bag.

Throughout the drawings, like or corresponding portions are designated by the same reference numerals.

DESCRIPTION OF THE PREFERRED EMBODIMENT

A preferred embodiment of the packing container embodying the invention and diagrammatically shown in FIGS. 1 to 9 comprises a double walled cylindrical body 1. At first a cylindrical member 10 is prepared by knitting cords of synthetic fibers or by uniting, as by sewing, longitudinal side edges of a woven or non-woven cloth of synthetic of natural fibers, as shown in FIG. 8 and 9. One half of the length of the cylindrical member 10 is turned inside out or folded back on the other half to form the double walled cylindrical body 1 as shown in FIG. 1. A film of synthetic resin is bonded to at least one side of the cylindrical member to render it impervious to moisture and air. Alternatively, a solution containing a suitable flexible film forming material may be applied to the cylindrical member. Circumferential grooves 2 and 3 are formed around the periphery of the lower ends of the inner and outer layers of the cylindrical body to receive first and second binding cords 6 and 7 respectively. These grooves are formed by folding back a short length of the free ends of the cylindrical member and then securing the folded back ends to the underlying layers as by sewing. Opposite ends of cords 6 and 7 are projected to the outside of the cylindrical member through perforations, not shown, formed through the inner and outer layers. At the upper end of the cylindrical body, there are formed a plurality of perforations 4 for receiving a plurality of endless loop shaped hanging cords 9. An upper binding cord 8 is inserted in the folded back end of the cylindrical body with its opposite ends extending to the outside of the cylindrical body or container. Each of the hanging cords 9 encircles the binding cord 8 at its lower end as best shown in FIG. 4. Bottom binding cords 6 and 7 are tied to form the bottom of the container having a discharge opening 11 of small diameter, as shown in FIG. 1. A bottom lid 12 is disposed in the bottom of the container to close the discharge opening 11. As shown in FIG. 7, the bottom lid 12 comprises a square or circular sheet 12a of woven fabric, for example, and a plurality of mounting tapes 13 extending in the radial di-

rection of the discharge opening 11 are suitably secured to sheet 12a as by sewing. After placing the bottom lid 12 on the inner bottom of the cylindrical body with mounting tapes 13 facing downward, the tapes are passed through perforations 14 through the bottom on the outside of binding cords 6 and 7 and the free ends of tapes 13 are tied together as at 13a at about the center of discharge opening 11, as shown in FIGS. 1 and 6, thus closing the discharge opening. In this manner, as tapes 13 encircle binding cords 6 and 7, bottom lid 12 is securely maintained in position.

As shown in FIGS. 1 and 4 before tying the binding cord 8 the content is charged into the container through its upper opening. Then the cord 8 is tied to close the upper opening as shown in FIGS. 2 and 3. To discharge the content, the container is hung by means of hanging cords 9 and the knots 13a of tapes 13 are untied to remove bottom lid 12 from the container. Thus, the bottom of the cylindrical body 1 is opened to discharge the content.

In the modified embodiment shown in FIGS. 10 to 12, instead of using the upper binding cord, an annular ring 21 of metal or plastic is used to define upper opening 20 having a diameter smaller than that of cylindrical body 1. In this case, after charging the content into the container, an upper circular lid 22 of cardboard or taupaulin paper is used to close the opening 20.

The bottom opening of the container is closed by a bottom lid 23. As best shown in FIG. 11, the lid takes the form of a flat annular ring having a peripheral groove 24 to accommodate binding cords 6 and 7 when they are tied and a central opening 25 for receiving a rotatable plug 26. Plug 26 is provided with radial wings 27 and the central opening 25 is formed with corresponding longitudinal slots 28. For this reason, by slightly rotating the plug 26 so as to align wings 27 with slots 28, the plug 26 can be readily removed from the bottom lid to discharge the content. Instead of providing the wings and slots, the plug may be fastened to the opening 25 by screw threads.

The container shown in FIGS. 13 and 14 is different from that shown in FIGS. 1 and 10 in that, the construction of the bottom of the container is simplified. Thus, the bottom opening 11 is closed by a bottom lid 29 similar to upper lid 22 shown in FIG. 10. In this modification, however, the cylindrical member 10 is not folded back at the middle along the length thereof as in the foregoing embodiments, but is folded back or turned inside out such that when tied independently, binding cord 6 defines the opening 11 somewhat smaller than that defined by cord 7, as best shown in FIGS. 13 and 14. With this construction the content of the container can be readily discharged by untieing cord 6 or both cords 6 and 7. Where the content of the container is a substance which should be kept clean during discharge, such as sugar, flour or the like, the content is liable to be contaminated by dirt deposited on the bottom of the container. However, the modified embodiments shown in FIGS. 15 to 18 can solve this problem. The construction of the body portion of the container of these modified embodiments is the same as that shown in FIGS. 1 to 3 and the construction of the bottom of the container is similar to that shown in FIGS. 13 and 14, while a cylindrical auxiliary bottom 30, preferably of the same material as the cylindrical body 1, is used. The outer or upper end of this bottom 30 is secured to the lower end of the outer layer of the

double walled cylindrical body 1 near binding cord 7 as by sewing whereas a binding cord 31 is secured to the inner end of the bottom by folding back this end as at 32. By tying the protruding ends of cord 31, the bottom of the container is nearly closed as shown in FIG. 15, thus protecting against contamination of opening 11. Furthermore, an inner bag 33, preferably of synthetic resin, is disposed in the container. The bottom of the bag 33 is tied by a binding cord as at 33a. After charging the inner bag with the content, its upper opening is closed and then binding cord 21 is tied to close the upper end of the container. To discharge the content the container is hung through hanging cords 9 and the cord 31 is untied permitting the auxiliary bottom 30 to depend from binding cord 7 as shown in FIG. 16. Then, the knot 33a is untied to permit the bottom of the inner bag 33 to depend downwardly into a receptacle or chute 34 through bottom opening 11 and depending auxiliary bottom 30. Thus, it is possible to discharge the content without contacting the contaminated bottom wall of the container. Alternatively, after untying the binding cord 31, the auxiliary bottom 30 may be folded back around the bottom corner of the container as shown in FIG. 17 to completely isolate the contaminated bottom surface. In this case, it is not necessary to use a receptacle or chute which fits into the lower end of the depending auxiliary bottom, as shown at 34 in FIG. 16.

In the case shown in FIG. 18, the container 35 is of the single walled construction, and the same auxiliary bottom 36 as that shown in FIG. 15 is secured to the lower end of the container.

Containers containing powdery or granular material are often piled up one upon the other. For such an application, the container is required to have substantially flat bottom so that a number of containers can be piled up stably and that the load of the content is applied uniformly upon the entire area of the bottom. The modified embodiment shown in FIGS. 19, 20 and 21 is suitable for such application. More particularly, as shown in FIG. 21, four parallel seams 40a, 40b and 41a, 41b are formed around the periphery of the double walled cylindrical body 1 which is formed in the same manner as the embodiment shown in FIG. 1. A binding cord 42 is threaded through a circumferential groove defined between seams 40a and 40b. The opposite ends of cord 42 are brought to the outside of the container through an opening 44. In the same manner, a binding cord 43 is threaded through a circumferential groove between seams 41a and 41b with its opposite ends projected outwardly through an opening 45. Then, binding cords 42 and 43 are tied independently to form a flat circular bottom having an opening 46 at its center as shown in FIG. 20. The tied cords 42 and 43 define circles having radii r_1 and r_2 , respectively. As in the case of FIG. 1, a bottom lid 47 is used to close the opening 46 and is held in position by tapes 48. If desired, an inner bag (not shown) similar to bag 33 shown in FIG. 15 may be used. The content may be discharged by untying tapes 48 to remove the inner lid 47.

By locating the binding cord 43 a short distance from the lower edge of the cylindrical body, and by strongly tying the cord 43, it is possible to substantially eliminate the central opening 46 at the bottom. Where the area of the bottom is large it is possible to use more than two radially spaced (as viewed like FIG. 20) binding cords may be in order to reinforce the bottom.

FIGS. 22 to 25 show modifications of this invention wherein the bottom opening defined by the outer layer has a diameter which is equal or a little smaller than that defined by the inner layer of the double walled cylindrical body.

More particularly, in the embodiment shown in FIG. 22, the double walled cylindrical body 1 is constructed in the same manner as in FIG. 1 except the bottom opening 50 defined by binding cord 7 of the outer layer 1a is much smaller than the bottom opening 51 defined by binding cord 6 of the inner layer 1b. The inner and outer layers are sewed together as at 52 at a position close to cord 6. Furthermore, annular parallel seams 53a and 53b are formed near upper binding cord 8 to receive a binding cord 54. An inner bag 33 with its bottom end tied as at 33a is disposed in the container.

To charge a powdery or granular material into the container, without binding the cord 8, cord 54 is first tied to form a pouring mouth of a predetermined diameter as shown in FIG. 22. The upper ends of the container and of the inner bag are caused to project upwardly from the pouring mouth, and then the material is charged into the inner bag. Thereafter, the upper end of the inner bag is suitably closed as shown in FIG. 22 and the cord 8 is tied to close the upper end of the container. The filled container can be handled or transported by means of the hanging cords.

To discharge the content, the cord 7 is untied and then the knot 33a of the inner bag, as shown in FIG. 23. The lower end of the inner bag 33 hangs downwardly through opening 51 defined by binding cord 6 and through a short cylindrical passage or chute formed by the lower end of the outer layer 1a, which depends from seam 52.

In the embodiment shown in FIG. 24, an auxiliary annular sheet of pliable material 55 is secured on the inner surface of the outer layer 1a to extend inwardly beyond a circle defined by binding cord 7 so as to nearly perfectly close the bottom of the container. In this case, the inner bag may be omitted. Where the bottom opening 50 defined by binding cord 7 is nearly equal or a little smaller than that of the bottom opening 51 defined by binding cord 6 as shown in FIG. 25, a bottom lid 56 is interposed between binding cords 6 and 7 to close the bottom openings. Then, the content can be discharged by untying the cord 7 and then removing the bottom lid 56.

In the container of the character described above, where the container is large to accommodate 600 to 1,000 Kg of a powdery or granular material, the height of the container is limited by the height of the building where the content is discharged. Moreover, during discharge it is desirable to hang the container along its vertical side wall in order to hang it stably. FIG. 27 shows a modified embodiment of this invention suitable for this purpose.

As shown in FIG. 26, a cylindrical member 61 of the same material as in the previous embodiments is folded back at its longitudinal center into a double walled cylindrical body 62, and a plurality of longitudinal slits 64 are formed at the upper end 3 of the cylindrical body. In the example shown, 6 circumferentially equally spaced apart slits are formed. Flexible hanging cords 65 are inserted between the inner and outer layers of the cylindrical body through slits 64 to hang two adjacent portions 66 by each hanging cord. In this example, three closed loop shaped hanging cords are used.

An intermediate portion of the inner layer is tied by a binding cord 67 to form a circle having a diameter about one half of that of the cylindrical body.

In this example, the cord 67 is threaded through a circumferential groove formed by folding back the lower portion of the inner layer and sewing the folded back portion as at 68. After sewing, the lower portion is again folded in the opposite direction in the form of letter S. The lower end of the inner layer is tied by a binding cord 69 to close the bottom of the container. The lower end of the outer layer is nearly closed by a binding cord 70. A cylindrical cover 71 having substantially the same outer diameter as the inside diameter of the container and a folded back lower end 73 is secured to the upper portion of the container by sewing as at 72. After charging the content, the upper end of the cover 71 is closed by a cord 74.

The container may be handled by hanging the hanging cords 65 on the arms of a fork lift truck, not shown. In this condition, since the container is hung by the hanging cords positioned on the extension of the vertical side wall of the container, it is held stably and there is no feat of deformation. Instead of using cover 71, a discardable inner bag 75 may be used as shown in FIG. 28. In this case, the content is discharged by partially breaking the bottom portion of the inner bag after the binding cords 67 and 69 have been untied.

What is claimed is:

1. A packing container comprising a double walled cylindrical body, said body including a pliable cylindrical member which is turned inside out and folded back at about the center of the length of said cylindrical member to form said double walled cylindrical body, a first binding cord threaded about the periphery of the lower end of the inner layer of said cylindrical body, a second binding cord threaded about the periphery of the lower end of the outer layer of said cylindrical body, said first and second binding cords being tied independently to substantially close the bottom of said cylindrical body, an annular member inserted in the folded back upper end of said cylindrical body and a plurality of circumferentially spaced apart closed loop shaped hanging cords encircling said annular member and projecting above the upper end of said cylindrical body, said annular member being used to substantially close the upper end of said cylindrical body.

2. The container according to claim 1 wherein said cylindrical member comprises a cloth of synthetic fibers coated with a film of synthetic resin.

3. The container according to claim 1 wherein said lower ends of said inner and outer layers are folded back to form circumferential loops and said first and second binding cords are threaded through said circumferential loops, the opposite ends of said first and second binding cords extending outwardly through openings formed through said inner and outer layers.

4. The container according to claim 1 wherein said annular member comprises a third binding cord contained in the folded back upper end of said cylindrical body, the opposite ends of said third binding cord extending outwardly through said cylindrical member, and wherein said cylindrical body is provided with a plurality of circumferentially spaced apart openings for accommodating said hanging cords.

5. The container according to claim 1 wherein a bottom lid is disposed in the bottom of said container, for closing the bottom opening thereof, and said bottom lid

is secured in position by means of tapes passing about said first and second binding cords.

6. The container according to claim 1 wherein the diameter of the bottom opening formed by tying said first binding cord is smaller than that of the bottom opening formed by tying said second binding cord.

7. The container according to claim 6 wherein a cylindrical auxiliary bottom member is connected at its one end to the lower end of said outer layer near said second binding cord, and a third binding cord is threaded about the periphery of the opposite end of said auxiliary bottom member, said third binding cord substantially closing the bottom opening of said container when said third binding cord is tied, said auxiliary bottom member depending downwardly from said second binding cord when said third binding cord is untied, thus defining a contamination free discharge chute for the content contained in said container.

8. The container according to claim 7 wherein said auxiliary bottom member is turned upwardly around the bottom corner of said container to expose the bottom openings formed by said first and second binding cords.

9. The container according to claim 1 wherein the upper opening of said container which is formed by said annular member is closed by a top lid.

10. The container according to claim 1 wherein the bottom openings of said container which are formed by tying said first and second binding cords independently have substantially the same diameter and wherein a short cylindrical bottom lid is provided, said bottom lid having a peripheral groove adapted to accommodate said first and second bonding cords and a central opening closed by a removable plug.

11. The container according to claim 1 wherein said annular member takes the form of a rigid annular ring.

12. The container according to claim 1 wherein a cylindrical inner bag is disposed in said container.

13. The container according to claim 12 wherein the bottom end of said inner bag is closed by means of a binding cord which is untied when discharging the content of said container.

14. The container according to claim 1 wherein a third binding cord is threaded through the upper portion of said cylindrical body, said third binding cord being adapted to form an opening larger than that formed by said annular member.

15. The container according to claim 1 wherein the bottom opening formed by said second binding cord is smaller than that formed by said first binding cord and wherein said outer layer is connected to said inner layer at points close to said first binding cord so that when said second binding cord is untied the lower end of said outer layer depends downwardly to form a discharge chute.

16. The container according to claim 15 wherein an inner bag is disposed in said container, said inner bag having an openable bottom.

17. The container according to claim 15 wherein an annular sheet of pliable material is secured onto the inner surface of said outer layer at the lower end thereof, the lower side of said annular sheet extending beyond said second binding cord so as to substantially close the bottom of said container when said second bonding cord is tied.

18. The container according to claim 1 wherein the bottom opening formed by said second bonding cord is

9

substantially equal to or a little smaller than that formed by said first binding cord and a bottom lid is interposed between said first and second binding cords to close said bottom openings.

19. The container according to claim 1 wherein said 5

10

inner and outer layers of said cylindrical body are connected together at points axially spaced apart from said first and second binding cords.

* * * * *

10

15

20

25

30

35

40

45

50

55

60

65