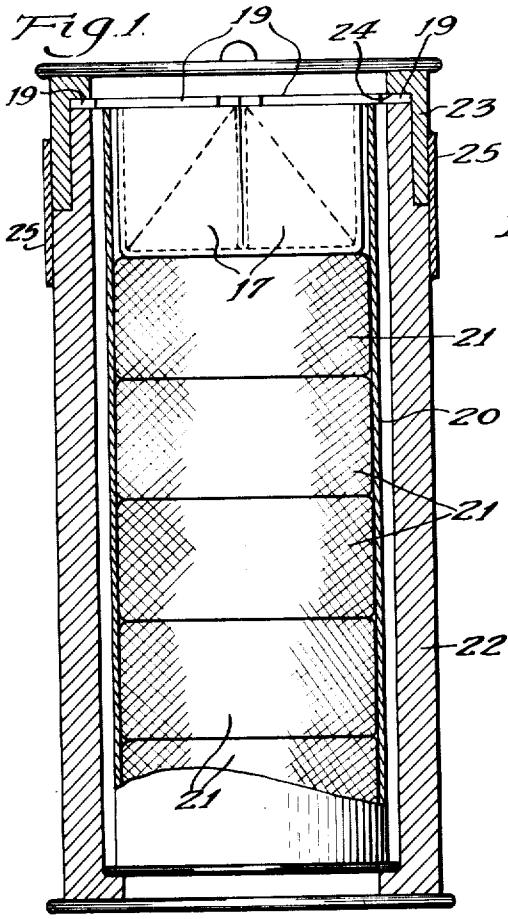
Dec. 16, 1947. A. P. D. BELANGER 2,432,501

FOLDABLE BLANK CELLULAR SPACER PLUG FOR RECEPTACLES

Filed Feb. 5, 1944 4 Sheets-Sheet 1

Fig. 1.



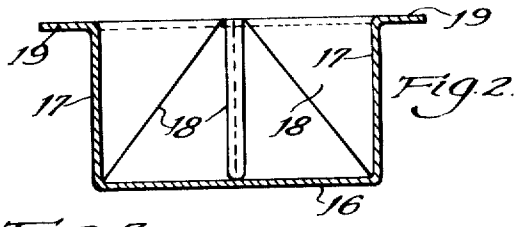
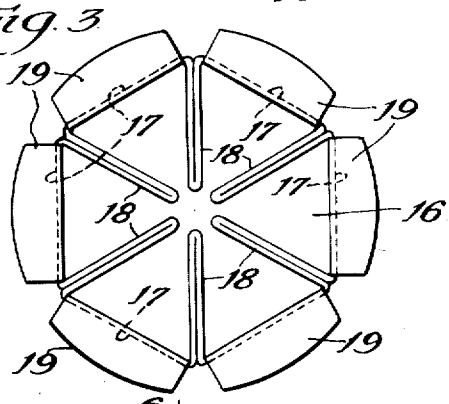


Fig. 2.

Fig. 3.



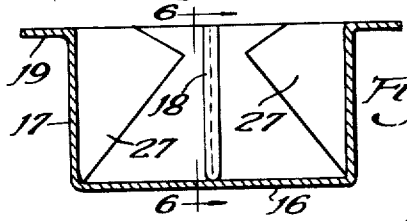


Fig. 5.

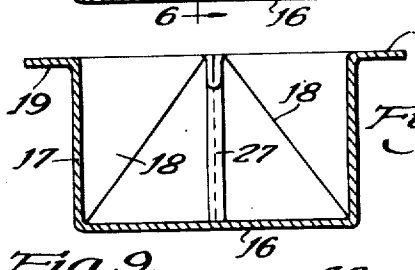


Fig. 6.

Fig. 8.

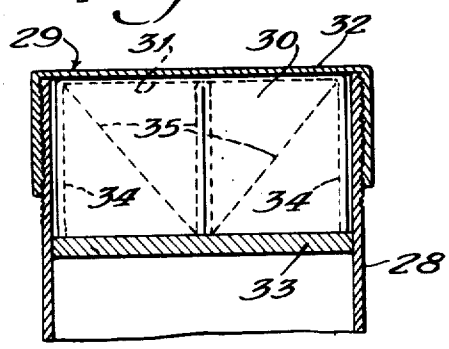
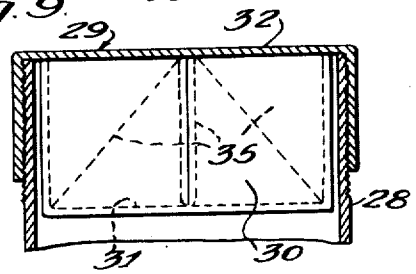


Fig. 9.



Inventor:
Albert P.D. Belanger
By: Zahl, Carlson, Bitzbaugh & Wells
Attorneys

Dec. 16, 1947. A. P. D. BELANGER 2,432,501

FOLDABLE BLANK CELLULAR SPACER PLUG FOR RECEPTACLES

Filed Feb. 5, 1944 4 Sheets-Sheet 2

Fig. 4.

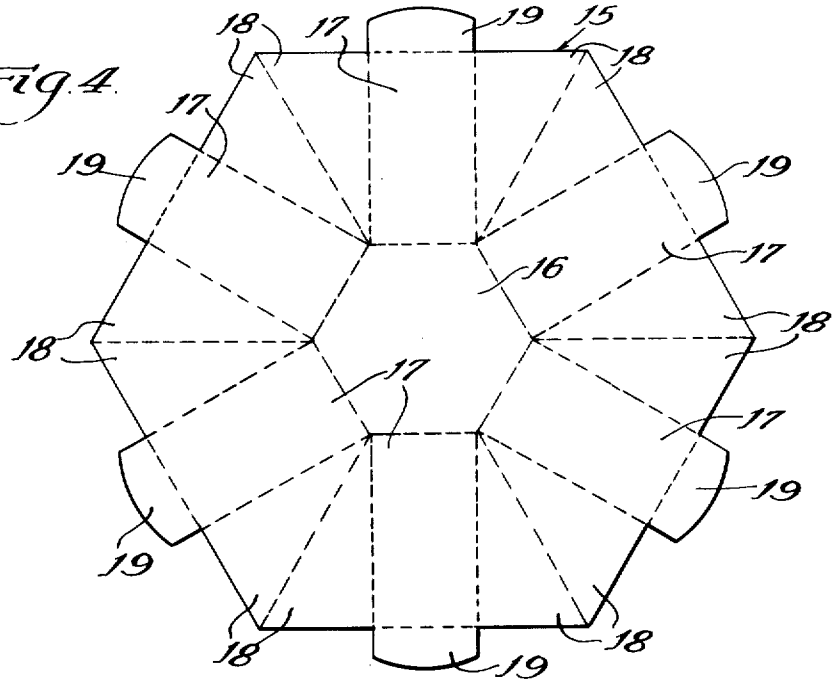
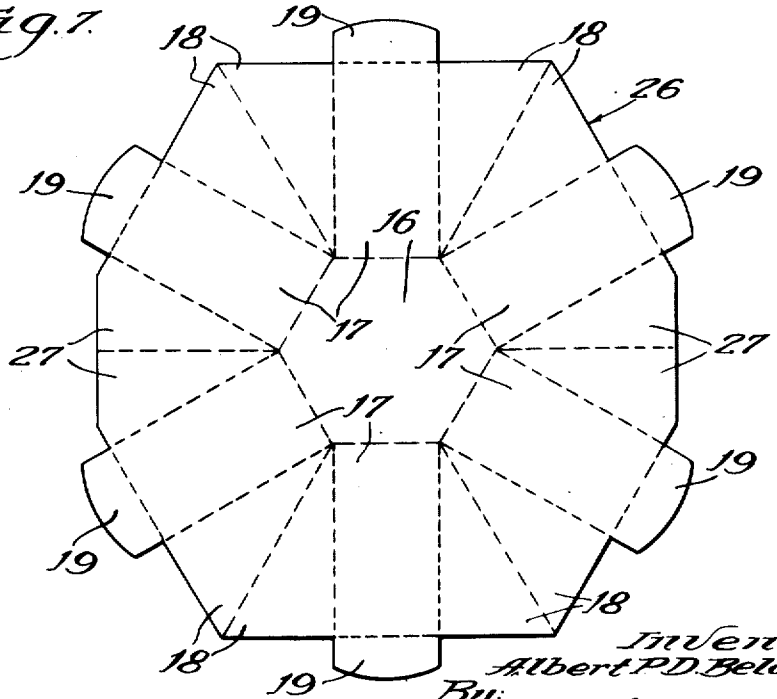


Fig. 7.



Inventor:
Albert P.D. Belanger
By:
Zahl, Carlson, Fitzhugh & Wells
Attorneys

Dec. 16, 1947. A. P. D. BELANGER 2,432,501

FOLDABLE BLANK CELLULAR SPACER PLUG FOR RECEPTACLES

Filed Feb. 5, 1944 4 Sheets-Sheet 3

Fig. 10.

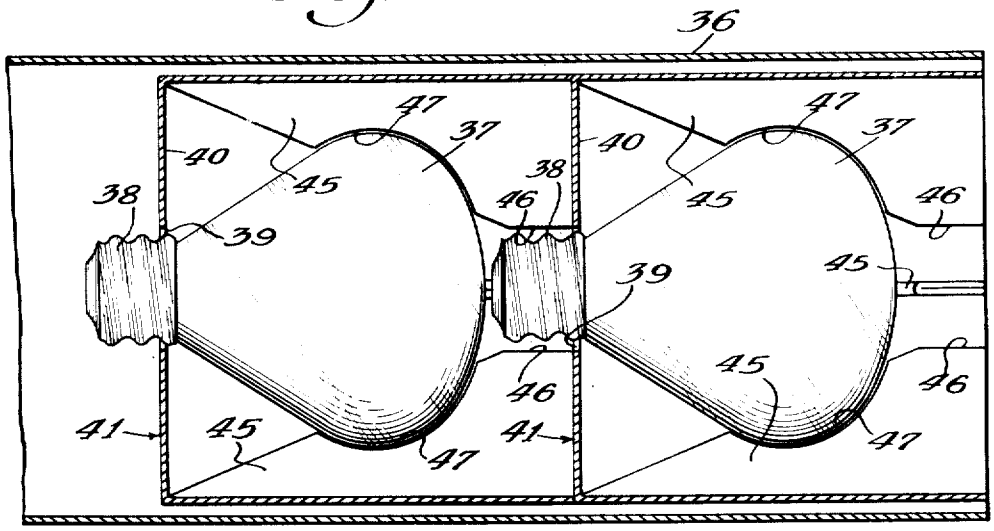
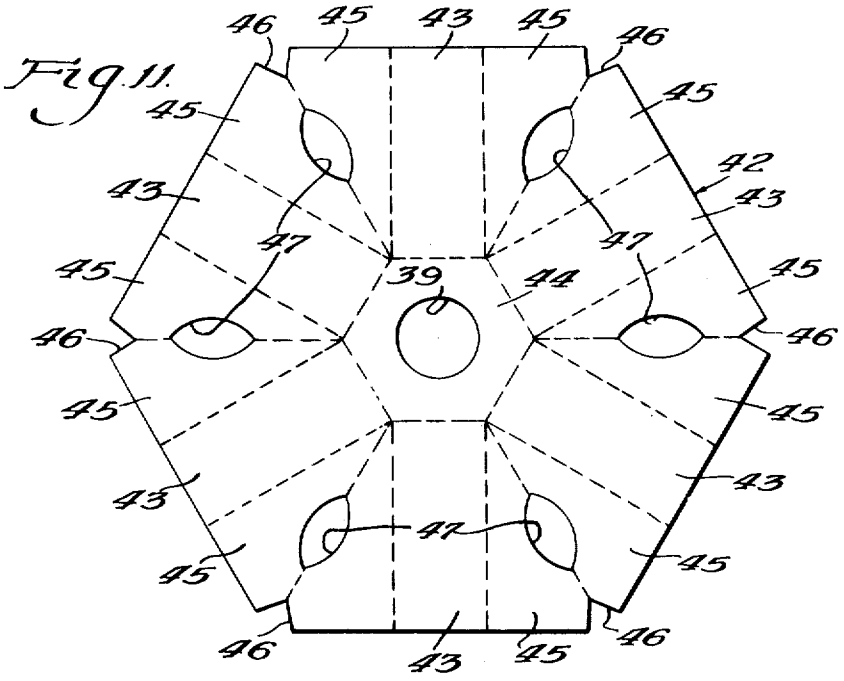


Fig. 11.



Inventor:
Albert P. D. Belanger
By: Zabel, Carlson, Fitzhugh & Wells
Attorneys

Dec. 16, 1947. A. P. D. BELANGER 2,432,501

FOLDABLE BLANK CELLULAR SPACER PLUG FOR RECEPTACLES

Filed Feb. 5, 1944 4 Sheets-Sheet 4

Fig. 12.

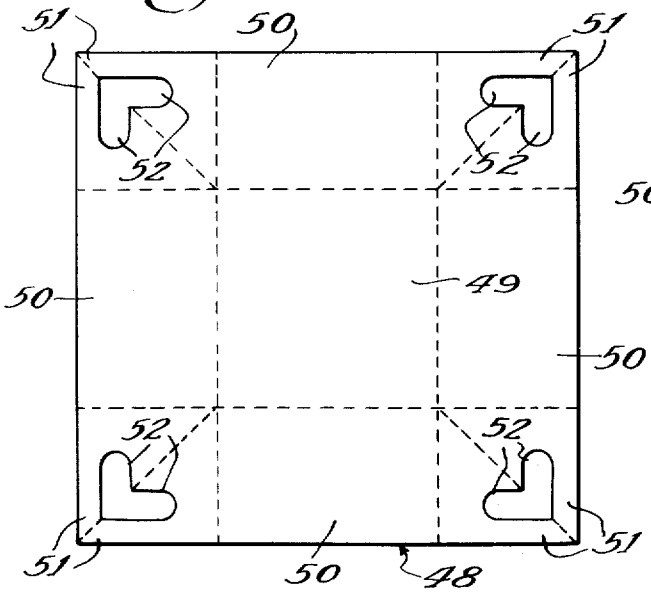


Fig. 13.

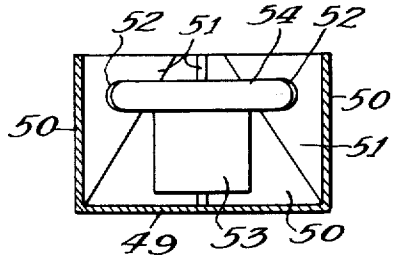


Fig. 15.

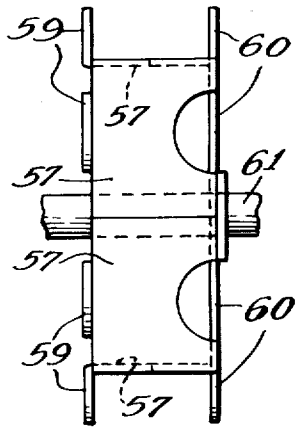
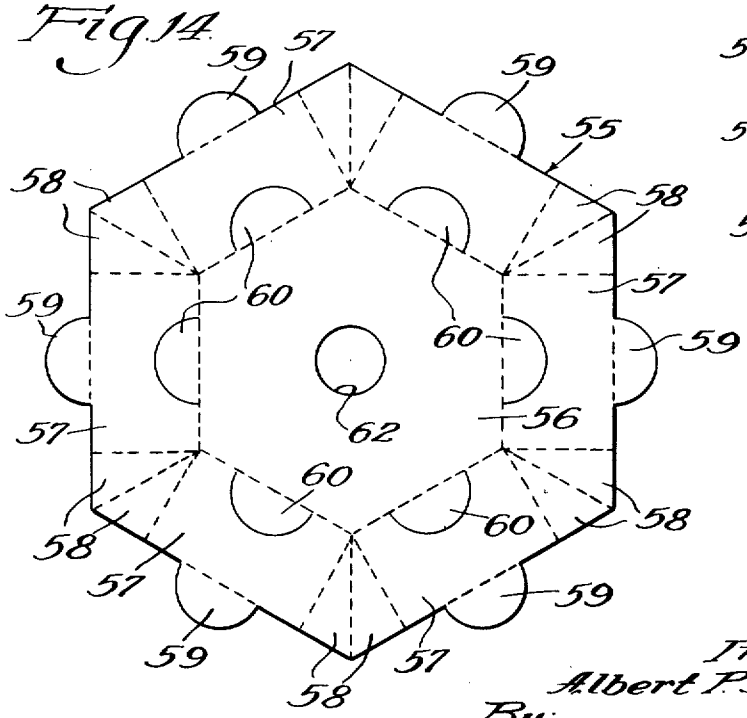


Fig. 14.



Inventor:
Albert P. D. Belanger
By:
Fidel, Carlson, Fitzhugh & Wells
Attorneys

Patented Dec. 16, 1947 2,432,501

UNITED STATES PATENT OFFICE

2,432,501

FOLDABLE BLANK CELLULAR SPACER PLUG FOR RECEPTACLES

Albert P. D. Belanger, Alton, Ill.

Application February 5, 1944, Serial No. 521,224

9 Claims. (Cl. 229—31)

1

This invention relates to ammunition retaining cups and the like and it has for its object particularly the provision of an improved structure for closing the end of a shell casing of the 105 mm. type. In the manufacture and shipment of this type of ammunition, it is the practice to place a full load of powder in bags in the casing, after which a retaining plug is inserted in the casing for holding the powder bags securely in position, the casing being then placed in a suitable container of paper or the like in which it is handled up to the time when it is to be used at the piece in the field. The projectile portion of the shell is packed in a separate container so as to provide the utmost of protection for the rotating band or ring, the projectile and the casing being assembled for the first time at the gun.

It is one of the objects of my invention to provide an improved retaining plug preferably made of paper folded in cup shape so as to give the requisite strength while at the same time being formed of minimum weight. It is another object of the invention to provide improved means for holding the plug in the desired position with respect to the casing and the container.

It is another object of the invention to provide an improved arrangement of plug of this type which shall have maximum strength in proportion to its weight. To this end, I have provided an arrangement in which there is a truss reinforcement whereby great strength shall be provided for resisting endwise pressure. In my improved plug structure, the required strength is attained by the use of a plurality of triangular brace members formed by folding inwardly the surplus sheet material at the corners, the arrangement being such that the folded together end portions of the triangular brace members will lie in the same transverse plane so as to derive support from a transversely positioned plate.

It is still another object of the invention to provide an improved package arrangement whereby such articles as electric light bulbs, radio tubes, and the like, can be packed readily for safe handling, such result being attained preferably by the use of the same type of cup device as is employed for the accomplishment of my other objects, the corner tabs being preferably notched for engaging and gripping the articles to be packed.

It is one of the objects of my invention to provide a reel or spool for the reception of cord, yarn, wire or other products, such reel or spool

2

being made preferably from sheet material folded into cup form and furnished with tabs for holding the cord in its wound position on the spool.

It is another object of the invention to improve devices of this type in sundry details hereinafter pointed out. The preferred means by which I have accomplished my several objects are illustrated in the accompanying drawings, in which—

Fig. 1 is a central vertical sectional view through a shell casing filled with powder held in position by means of my improved plug, together with the container in which said loaded shell casing is mounted for handling;

Fig. 2 is a central vertical sectional view through the preferred form of my improved retaining cup;

Fig. 3 is a top face view of my improved retaining cup;

Fig. 4 is a face view of the blank from which the cup of Figs. 2 and 3 is formed;

Fig. 5 is a central vertical sectional view through a slightly modified form of retaining cup;

Fig. 6 is a vertical sectional view taken substantially at the line 6—6 of Fig. 5;

Fig. 7 is a face view of the blank from which the cup of Figs. 5 and 6 is formed;

Fig. 8 is a central vertical sectional view through a length of tubing having one of my improved plug devices in its end for holding a crossplate in position, such plug device being modified slightly from the forms shown by Figs. 2 and 5;

Fig. 9 is a central vertical sectional view similar to Fig. 8 but showing a different arrangement of the plug device in a piece of tubing;

Fig. 10 is a central sectional view through a tubular package member with a plurality of light bulbs packed therein by the use of a plurality of cup members;

Fig. 11 is a face view of the blank from which the holding cups of the type employed in Fig. 10 are made;

Fig. 12 is a face view of a blank made of sheet material for the production of a modified form of holding cup to be used for packaging purposes;

Fig. 13 is a central vertical sectional view through a cup made from the blank of Fig. 12, with an article packed in the cup;

Fig. 14 is a face view of a sheet material blank of the type for forming a winding reel or spool; and

Fig. 15 is a side face view of a winding spool

formed from the blank of Fig. 14 and mounted on a rotary shaft.

Referring now to Figs. 1 to 4 of the drawings, in which corresponding parts are indicated by the same reference characters, 15 indicates a blank formed preferably of a comparatively stiff heavy paper comprising a base panel portion 16 of a hexagonal form, side wall portions 17 formed integrally with the panel portion 16, and triangular tab portions 18 formed integrally with the side wall portions 17. Upon the outer edge of each of the side wall portions 17, I have provided an extension tab portion 19.

For forming the blank 15 into its desired cup formation, the side wall portions 17 are bent upwardly with the triangular tab portions 18 folded together so as to extend inwardly toward the center of the cup, as is clearly shown in Fig. 3. The folding of the blank into cup form may be carried out by the use of suitable die or jig means, with the lines of fold between the several portions or panels pre-formed by suitable weakening operations if desired.

As is clearly shown in Fig. 1, 20 indicates a shell casing of any approved type adapted to receive a plurality of powder bags 21 therein which substantially fill the casing. 22 indicates a container formed preferably of paper within which the casing 20 is inserted, the arrangement being such that the casing 20 and the container 22 terminate in the same plane. With a plurality of bags of powder in position within the casing as shown in Fig. 1, and with the casing in position in the container 22, one of my improved spacer plugs is inserted in the end of the casing above the powder bags and is pressed downwardly so as to bring the outwardly extending tab portions 19 into engagement with the end faces of the casing 20 and the container 22. The arrangement is such that the plug in this position engages the top bag of powder so as to prevent shifting of the powder bags longitudinally of the casing when handled. The upper end of the container 22 is then closed by means of a cover member 23, formed preferably of paper, the container 22 and the cover member 23 being cut out so as to have a notched joint with respect to each other, involving a shoulder 24 on the cover member which engages the top faces of the tabs 19 for holding them pressed firmly into frictional engagement with the end faces of the casing member 20 and the container 22. After the cover member 23 is placed in position, a friction tape 25 or other suitable fastening means is applied for holding the cover in position and for effectively sealing the container.

By the use of my improved construction, I have provided a spacer plug of very light weight which is of sufficient strength for opposing any undesired movement of the powder bags within the casing. The tabs 19 serve effectively for holding the plug in its operative position. By the use of my light weight plug held positively in its adjusted position with respect to the casing 20, I have reduced very substantially the amount of paper necessary for producing the desired results as compared with the amount of paper required for the structures heretofore in use.

In the arrangement shown in Figs. 5, 6 and 7, a slight modification is involved whereby there is a substantial saving in the amount of paper or other sheet material required for the production of my improved plug. In this arrangement, a blank 26 is used similar in all respects to the blank 15 except that two oppositely disposed corner

portions of the blank are cut away at opposite sides, the cutaway corner portions being parts of the triangular tab portions forming the brace members of the structure. In Fig. 7, all of the parts are indicated by the same reference characters as are used in Fig. 4, except that the cutaway tabs are indicated by the numeral 27.

By the use of the slightly modified form of blank, a very substantial saving in paper is effected, since the number of blanks capable of being cut from a given amount of paper stock is very substantially increased. While this change modifies slightly the shape of the tab portions, as is best shown in Fig. 5, it will be noted that even in connection with these tab portions there are substantially portions of the end faces of the doubled together tabs which lie in the same transverse plane as that in which the end faces of the unmodified tabs lie.

In the arrangement shown in Fig. 8, one of my improved plug devices is employed in the end of a piece of tubing 28 which has its upper end closed by a screw-threaded cap 29. A spacer cup 30 is inserted in inverted position in the tube with its transverse panel portion 31 in contact with the transverse wall 32 of the cap. Against the opposite end of the spacer plug, a transverse plate 33 is positioned engaging the ends of the side wall portions 34 and also engaging the ends of the doubled together tabs 35. By reason of the use of the triangular tab portions 35 formed by folding inwardly the paper intervening between the side wall portions of the cup, a truss arrangement is provided, the pressure upwardly against plate 33 being applied against the side walls of the tube or cylinder 28. The arrangement is such that a very strong structure is provided for opposing movement of the plate 33 upwardly in Fig. 8.

In Fig. 9, a spacer cup 30 of the same type is employed, with its transverse wall portion 31 spaced away from the transverse wall portion 32 of the cap 29. In this arrangement, the aligned end faces of the triangular tab portions 35 bear directly against the transverse wall portion 32 of the cap 29 so as to complete the truss arrangement by which movement of the transverse portion 31 of the cup upwardly is opposed. It will be appreciated also in connection with Fig. 9 that the triangular tab portions 35, being in square engagement with the plate 32 of the cap completely across the cap oppose any inward swinging movement of the triangular tab portions away from their normal position as shown in Fig. 9. The transverse plate portion 31 of the cup is thus braced against any tendency to collapse upwardly. The triangular tab portions also support the transverse panel 32 of the cap completely across the cap against pressure downwardly thereon.

In Fig. 10, I have shown a modified form of cup device adapted for use for packing light bulbs, or the like. In this arrangement, a cylindrical tube 36 preferably formed of paper has a plurality of light bulbs 37 packed therein, with the shank portions 38 of the bulbs extending through openings 39 in the end walls 40 of cups 41 fitting snugly in the tube. Each of the cups 41 is doubled into shape from a blank 42 formed of sheet material, the side wall portions 43 of the cup being doubled upwardly into position at right angles to the bottom wall panel 44, the surplus sheet material at each of the corners of the blank being folded inwardly into the form of tabs, the tab portions being indicated by reference characters 45. As is clearly shown in the drawings,

the tab portions 46 are cut out at 46 and 47 along their folded edges. The cut-out at 47 is shaped to correspond to the form of the bulb 37 to be held in position, and the cut-out at 46 is arranged so as to receive the shank portion 38 of the adjacent bulb which extends through the opening 39 in the end wall of the cup in which such adjacent bulb is packed.

By the use of the construction as shown in Figs. 10 and 11, the bulbs 37 are held very strongly in position. The arrangement is such that it is not necessary that the member 36 be a heavy tube, since the tube is very strongly reinforced by the cups 41 against collapsing inwardly. It will be understood that the cut-outs at 46 and 47 can be shaped to meet the requirements for the particular type of bulb to be packed. For packing some types of bulbs or other articles, the cut-outs at 46 and 47 may be omitted, and for many articles the openings 39 are not required.

In Figs. 12 and 13, I have shown a modified form of packaging device adapted for use for packing articles individually. A blank 48 of comparatively stiff paper or other sheet material is shown, comprising a base panel 49, side wall portions 50, and corner tab panel portions 51 having notches 52 cut therein. The arrangement is such that the cup is adapted to be folded about an article such as the device 53 having a flange portion 54 adapted to have snug engagement with the notches 52 so as to hold the device strongly in position so long as the cup is maintained in its dished form.

In Figs. 14 and 15, I have shown an arrangement of cup device of the types above described adapted for use as a reel or spool for the reception of wire or the like to be wound thereon. A blank 55 of heavy paper or the like comprises a base panel portion 56, side wall portions or panels 57, and corner tab portions 58, adapted to be folded together so as to extend inwardly when the side wall portions 57 are folded upwardly and inwardly to form a cup. Rounded ears or tabs 59 are formed as extensions on the upper edges of the side wall portions 57 and similar rounded ears or tabs 60 are cut from the side wall portions 57, the ears or tabs 59 and 60 being adapted to extend outwardly as shown in Fig. 15 for holding the wound material in position on the spool. In Fig. 15, the device is shown in its dished form mounted on a rotatable shaft 61 extending through a central opening 62 in the base panel portion 56. As will be readily understood, the material wound on the spool will prevent the side wall portions from swinging outwardly so as to maintain the device in its dished formation.

While the form of invention as shown and described is preferred, it will be understood that the invention is not to be limited thereto except so far as the claims may be so limited, it being understood that changes might well be made in the form and arrangement of the parts without departing from the spirit of the invention.

I claim:

1. A spacer plug device of hexagonal shape made from a single piece of strong stiff sheet material folded into the shape of a cup, comprising a transverse panel, and a plurality of triangular brace members spaced about said transverse panel and extending into close proximity to each other and serving by connection with the panel to brace said panel strongly and effectively substantially completely across the panel against collapse axially.

2. A spacer plug device of hexagonal shape made from a single piece of strong stiff sheet material folded into the shape of a cup, comprising a transverse panel, a plurality of side wall panels, and a plurality of triangular brace members formed by folding inwardly the sheet material intervening between the side wall panels, with their folded inner edges obliquely positioned and with their doubled together end edges all positioned in the same transverse plane and extending into close proximity to each other so as to support the panel completely thereacross.

3. A device of the type described, comprising in combination a spacer plug device of hexagonal shape made from a single piece of strong stiff sheet material folded into the shape of a cup having a transverse panel and a plurality of triangular brace members spaced about said transverse penal and connected thereto, and a transverse plate serving by engagement with said triangular brace members to strengthen the cup substantially completely across the transverse panel of the cup against collapsing under heavy pressure.

4. A device of the type described, comprising in combination a spacer plug device of hexagonal shape made from a single piece of strong stiff sheet material folded into the shape of a cup so as to have a transverse panel, a plurality of side wall panels, and a plurality of triangular brace members formed by folding inwardly the sheet material intervening between the side wall panels, with their doubled together end edges all positioned in the same transverse plane, and a transverse plate engaging the doubled together end edges of said triangular brace members serving to support the cup completely across the transverse panel of the cup from collapsing under heavy pressure.

5. A device of the type described, comprising in combination a cylinder, a spacer plug of hexagonal shape made from a single piece of strong stiff sheet material folded into the shape of a cup adapted to fit snugly in said cylinder and having a transverse panel, a plurality of side wall panels, and a plurality of triangular brace members formed by folding inwardly the sheet material intervening between the side wall panels, with their doubled together end edges all positioned in the same transverse plane, and a plate extending across said cylinder engaging the doubled together end edges of said triangular brace members serving to support the cup substantially completely across the transverse panel of the cup from collapsing under heavy pressure thereon longitudinally of the cylinder.

6. A device of the type described, comprising in combination a cylinder, a cap comprising a transverse wall secured on the end of said cylinder, and a spacer plug device of hexagonal shape made from a single piece of strong stiff sheet material folded into the shape of a cup fitted snugly into the cylinder and having a transverse panel, a plurality of side wall panels, and a plurality of triangular brace members formed by folding inwardly the sheet material intervening between the side wall panels, with the folded together end edges of said triangular brace members having square engagement with the transverse wall of said cap whereby said triangular brace members have a truss effect for supporting the cup substantially completely across the transverse panel of the cup from collapsing under heavy pressure in the cylinder.

7. A spacer plug device of hexagonal shape made from a single piece of strong stiff sheet

material folded into the shape of a cup, comprising a transverse panel, a plurality of side wall panels, and a plurality of triangular brace members extending inwardly into close proximity to each other and formed by folding inwardly the sheet material intervening between the side wall panels, serving when their end faces are brought into alignment with each other by pressure axially thereon to hold the side wall portions of the cup spread to normal position and thus to hold the transverse panel from collapse axially.

8. A device in the form of a cup folded into shape from a piece of comparatively stiff sheet material, comprising in combination a base panel, side wall portions formed integrally with the base panel on all sides of the panel and standing at right angles thereto, and inwardly extending corner tabs formed integrally with the side wall portions and normally holding said side wall portions in end to end relationship to each other when folded into position and holding said side wall portions normally at their normal angular relationship to each other, the parts being so proportioned that the corner tab portions extend into close proximity to each other at the middle of the device and engage the base panel of the cup completely across the cup for supporting the panel.

9. A device in the form of a cup of hexagonal shape folded into shape from a single piece of comparatively stiff sheet material, comprising in combination a base panel, side wall portions

formed integrally with the base panel on all sides of the panel and standing at right angles thereto, inwardly extending corner tabs formed integrally with the side wall portions, the parts being of such size and shape that the upper edges of the corner tabs and the upper edges of the side wall portions lie in a common transverse plane, and a plate extending across the cup transversely thereof in engagement with the end faces of the side wall portions and with the end faces of said corner tabs substantially completely across the cup whereby said corner tabs assist substantially in supporting said base panel portion against pressure upwardly or downwardly thereon.

ALBERT P. D. BELANGER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
992,683	Myers	May 16, 1911
1,935,669	Rogers	Nov. 21, 1933
2,163,060	Ray	June 20, 1939
1,059,359	Hahn	Apr. 22, 1913
1,020,878	Bendelari	Mar. 19, 1912

FOREIGN PATENTS

Number	Country	Date
5,292	Great Britain	Mar. 2, 1911
113,829	Australia	Sept. 6, 1939

Certificate of Correction

Patent No. 2,432,501. December 16, 1947.

ALBERT P. D. BELANGER

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Column 6, line 18, claim 3, for the word "penal" read *panel*; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 10th day of February, A. D. 1948.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.

material folded into the shape of a cup, comprising a transverse panel, a plurality of side wall panels, and a plurality of triangular brace members extending inwardly into close proximity to each other and formed by folding inwardly the sheet material intervening between the side wall panels, serving when their end faces are brought into alignment with each other by pressure axially thereon to hold the side wall portions of the cup spread to normal position and thus to hold the transverse panel from collapse axially.

8. A device in the form of a cup folded into shape from a piece of comparatively stiff sheet material, comprising in combination a base panel, side wall portions formed integrally with the base panel on all sides of the panel and standing at right angles thereto, and inwardly extending corner tabs formed integrally with the side wall portions and normally holding said side wall portions in end to end relationship to each other when folded into position and holding said side wall portions normally at their normal angular relationship to each other, the parts being so proportioned that the corner tab portions extend into close proximity to each other at the middle of the device and engage the base panel of the cup completely across the cup for supporting the panel.

9. A device in the form of a cup of hexagonal shape folded into shape from a single piece of comparatively stiff sheet material, comprising in combination a base panel, side wall portions

formed integrally with the base panel on all sides of the panel and standing at right angles thereto, inwardly extending corner tabs formed integrally with the side wall portions, the parts being of such size and shape that the upper edges of the corner tabs and the upper edges of the side wall portions lie in a common transverse plane, and a plate extending across the cup transversely thereof in engagement with the end faces of the side wall portions and with the end faces of said corner tabs substantially completely across the cup whereby said corner tabs assist substantially in supporting said base panel portion against pressure upwardly or downwardly thereon.

ALBERT P. D. BELANGER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
992,683	Myers	May 16, 1911
1,935,669	Rogers	Nov. 21, 1933
2,163,060	Ray	June 20, 1939
1,059,359	Hahn	Apr. 22, 1913
1,020,878	Bendelari	Mar. 19, 1912

FOREIGN PATENTS

Number	Country	Date
5,292	Great Britain	Mar. 2, 1911
113,829	Australia	Sept. 6, 1939

Certificate of Correction

Patent No. 2,432,501. December 16, 1947.

ALBERT P. D. BELANGER

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Column 6, line 18, claim 3, for the word "penal" read *panel*; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 10th day of February, A. D. 1948.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.