June 28, 1927. R. A. BENNETT ET AL 1,633,884

PAPER CAN

Filed June 21, 1922

Fig. 2.

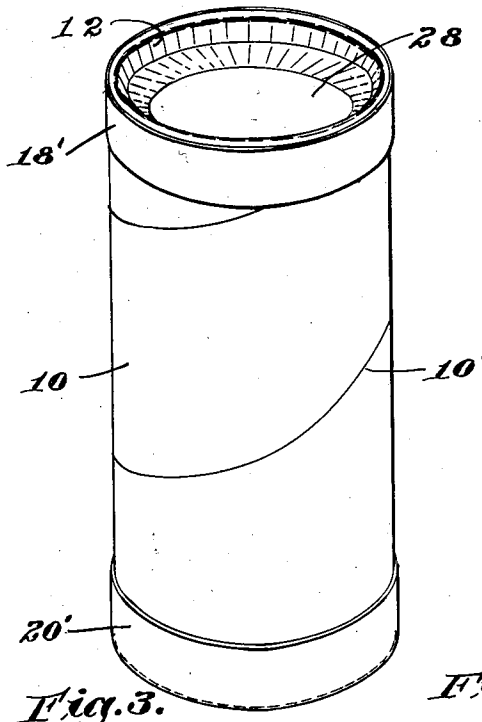


Fig. 1.

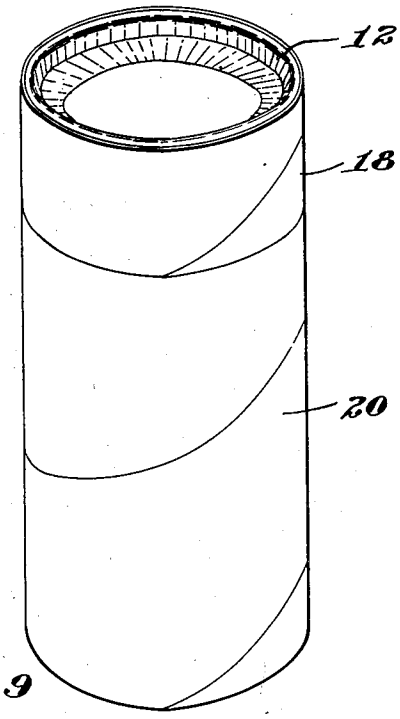


Fig. 3.

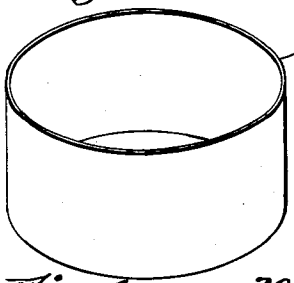


Fig. 9

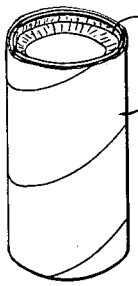


Fig. 7.

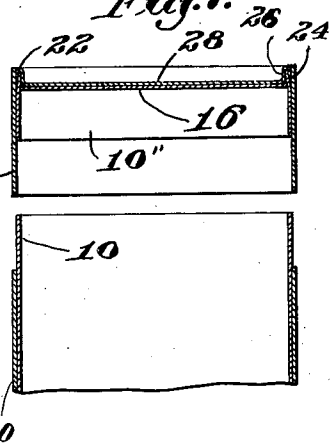


Fig. 4

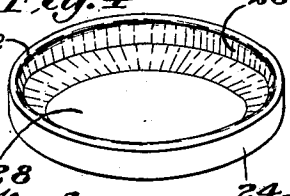


Fig. 8.

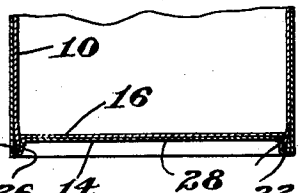


Fig. 5.

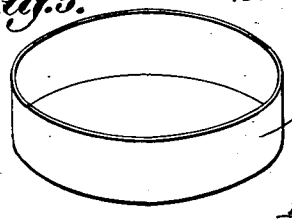


Fig. 6.



Inventors

Raymond A. Bennett,

Albion M. Boothby

by Mitchell, Chadwick & Kent

Attorneys

Patented June 28, 1927. 1,633,884

UNITED STATES PATENT OFFICE.

RAYMOND A. BENNETT, OF ROXBURY, AND ALBION M. BOOTHBY, OF WATERTOWN, MASSACHUSETTS, ASSIGNORS TO BOOTHBY FIBRE CAN COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

PAPER CAN.

Application filed June 21, 1922. Serial No. 569,909.

This invention relates to improvements in paper cans, and methods of making the same. More particularly it relates to a can of this sort which, irrespective of whether it contains powdered or liquid matter, is proof against loss of contents by leakage. The advance of the art has made available paper material which is impervious to moisture; but it remains a problem to form this material into a container from which moisture can not escape between the several parts thereof. Greatest difficulty is encountered in the type of can which is too long to permit the bottom and walls to be pressed or drawn from the same unit sheet, and in which it is necessary to attach a separate bottom to the body. Although many types of joints have been tried no one of them has been able to withstand the seepage of liquids for more than a few hours, so far as we are aware, even when the parts of the cans have been glued together.

Glue itself takes up moisture and offers no barrier to its percolation, so that the opening of a seam follows rapidly, resulting both in waste of contents and other damage, as, for example, when oyster juice leaks out upon the dress of a woman carrying the can.

It is among the objects of the present invention to provide a can whose seams can not be opened or passed by contents. Other objects are the provision economically of a smooth exterior for the can, with cover flange flush with the body. A further object is to provide a way of building a can with multiple layers of material throughout the various parts of the can, thereby enhancing strength and safety and accomplishing this without material increase of weight or cost.

These objects are accomplished by providing a cylindrical shell of light thin-rolled paper material, such as manila board, constituting the body of the can, whereon is placed, at each end, a cover having a groove into which the end of the shell nicely fits. This groove is formed between two parallel and substantially cylindrical walls made by a cylindrical fold in the cover. By this fold a dished inner or central portion of the cover is made and is set a little distance within the end of the can body. The reentrant wall of this dished portion forms one side of the groove, and an external flange which encircles the shell outside, around its edge, forms the other wall of the groove. Within the can, with its edges tightly pressing against the wall thereof, is a round disk which lies flat against that face of the dished surface of the cover, which is toward the interior of the can. Outside, a sleeve slipped over the end of the can holds the flange of the cover snug against the shell, and in so doing holds the shell against both the re-entrant wall of the cover and the edge of the flat disk. The result is a can having double walls between which the flange of the outer end piece is tucked. The flat disk inside keeps the inner wall from moving inward, and enables the inner wall to resist any collapsing pressure exerted by the sleeve and flange, thereby making tight the seams between cover and shell. By extending the outer sleeves from each end along the length of the can until they meet, the surface of the can is made smooth, thus improving its appearance and enabling cans to be stacked evenly on their sides; and this smooth exterior eliminates the danger of the cover being knocked off. If desired a single sleeve may envelop the entire length of the can, in place of the two.

The simple forms of can illustrated herewith, are typical of various embodiments within the scope of the invention. It is intended that the patent shall cover, by suitable expression in the appended claims, whatever features of patentable novelty exist in the invention disclosed.

In the accompanying drawings:

Figure 1 is a perspective view of a can constructed in accordance with the present invention, showing two flush sleeves making a smooth exterior;

Figure 2 is a view like Figure 1, but with the sleeves around only the end portions of the can;

Figures 3, 4, 5 and 6 are perspectives of details;

Figure 7 is a medial section showing an assembly of the details in one form of body and cover;

Figure 8 is a similar view of the bottom portion of the same, and

Figure 9 is a perspective of a can with a single sleeve.

Referring to the drawings, the can comprises a body shell 10, a cover 12, a bottom 14, internal end disks 16 and external binding sleeves 18 and 20. The shell 10 is pref-

erably made of ordinary spiral lapped tubing in two layers each a thin strip arranged helically around the axis of the shell with its abutting edges 10′ midway between the corresponding edges of the other. The cover and bottom are substantially alike and stamped and pressed from sheet paper stock, whereby is formed a channel, groove or cylindrical fold 22 into which the end of the shell is inserted. The walls of this groove are the flange 24 and the re-entrant wall 26 which is a continuation of the flange in reverse direction, and the groove surrounds a dished central portion 28 that is the exterior of the end wall of the finished can and which stands within the hollow of the shell. Preferably this dished portion is bowed inward somewhat from the re-entrant wall, so that when pressure is brought against it from within, and it tends to flatten, it spreads the circular re-entrant wall, forcing it closer against the shell 10 and making the shell tighter against the flange. The internal end disks 16 are stamped from suitable stiff material, being very accurately made to fit nicely within the shell. The sleeves 18 and 20 may be made like the shell, from ordinary spiral lapped tubing or may be a plain endless band. As shown in Figure 2 these sleeves 18′, 20′ may be only long enough to cover the ends, or as in Fig. 1, and as preferred, they may be long enough so that together they form an outside shell around the entire can, or even, for some uses, (Fig. 9) a single sleeve 18‴ may extend the entire length of the can.

In assembling the various parts, the flat disk 16 is first placed within the shell 10 conveniently near its end. The end of the shell is then inserted within the cylindrical fold 22 of the bottom and pressed home. The disk 16 is then pushed flat against the dished portion 28 of the cover. This serves both to set the disk in position perpendicular to the axis of the shell and to flatten the bowed portion of cover, slightly thereby pushing the re-entrant wall outward and thus narrowing the groove and clamping its walls against the cylindrical shell end. The assembly of the bottom end of the can is then completed by slipping the sleeve 18 over the flange 24. The sleeve makes a reasonably tight fit with the shell, so that when slipped over the flange, which is outside of and slightly larger than the shell, the sleeve compresses the flange firmly against the shell. This, of course, causes a pressure of the shell against the edge of the interior stiff disk so that the latter is held tightly in place. When the can is filled, the weight of its contents on the disk is transmitted thereby to the inwardly bowed portion of the bottom, in a direction tending to flatten it, so that the latter acts like a circular toggle and forces the re-entrant walls 26 still closer to the inner face of that portion of the shell which is within the groove. Thus, a pressure is exerted on the inside of the shell in opposition to the pressure executed by the sleeve outside, so that the shell is closely pressed by both walls of the groove.

Any leakage of liquid or other material at the bottom must first pass the tightly pressed edge of the flat disk, then work its way along the shell between it and the inturned wall 26 of the bottom, then around the edge of the latter in the depth of the groove, thence upward between the flange and shell, and finally in the form of Fig. 1, downward between the flange and sleeve. With these several surfaces all pressed against each other firmly, practical tests have indicated that loss by seepage is impossible.

The flange of the bottom may be tapered toward its edge, and the groove may be made of slightly smaller diameter than the shell, so that as the shell is forced into the groove, the end of the shell becomes somewhat constricted in following the taper of the flange. This leaves the outside cylindrical surface of the flange 24 substantially in alignment with the body 10 of the shell, so that when the sleeve 20 is applied it fits evenly and closely both the flange and the shell.

If desired, the bottom may be made of two kinds of material, one absorbent to water, and the other, forming the inner surface, of liquid proof stock. The bottom being first moistened, and thereby expanded, and being applied to the shell while expanded, it will shrink upon drying and will exert additional pressure on the shell for this reason. If desired, glue may also be employed without detracting from the tightness, but it has been observed that this is not necessary on either the inside or outside of the flange 24 as the nicety of fit provides sufficient frictional holding power to maintain the assembled parts together under severe service and exceptional stresses.

The cover shown in Figure 7 is particularly adapted for use with a can which is intended to be carried with its top normally up. It is assembled in the same manner as hereinbefore described for the bottom. Its sleeve 18″, however, extends somewhat past the short portion 10″ of the shell, which in this modification is a part of the cover corresponding to the body shell 10, so that when the cover is applied to the can body whose upper end is arranged as shown in the lower part of the Figure 7, with the shell 10 projecting past the sleeve 20, the sleeve 18″ of the cover passes down outside the shell 10 of the body into edge contact with the sleeve 20 around the latter. Similarly the shell of the body 10 contacts with the short shell portion 10″ in the cover, so that the double tube effect is maintained. When cans are to be used for shipment of liquids, however,

or are otherwise liable to be inverted while filled, it is preferable to assemble the top or cover with the body in the same manner as the bottom is assembled, after the contents are within the can, and then either to slip separate sleeves over the flange of each end as in Figure 2, or else to employ a single long sleeve 18 whose ends reach to the extreme top and bottom of the can, as in Figure 9.

The use of the single long sleeve, or of two contacting sleeves as in Fig. 1, provides, as it were, a double tube. The sleeve and the shell may if desired be made of very thin stock, with combined thickness less than that of the ordinary single thickness container; and in this case the double tube is superior to the single tube for the cross-spiralling of the several layers of the two tubes acts in the well known manner of cross graining in multi-ply wood or veneer constructions, with resulting increased strength.

Although a container of the sort described can be used repeatedly, the make up is so simple, requiring no skilled labor, and the stock used is so inexpensive, that it is possible to produce cans of this type at a cost which warrants their use and wastage on the "single service" principle. If intended solely for single service the can may be made of material not entirely water proof, as for example when liquid is normally to be in the container but a relatively short time. In such cases the percolation through the pores of the paper is slow enough to delay leakage until the contents are removed; and there will be no leakage through the seams, for the swelling of the flat interior disk due to liquid absorption will be faster than the swelling of the tubes, so that the joint between the disk and tube will always be tight, which tightness retards the swelling of the tube by delaying seepage of liquid into the groove. However, the cost of waterproofing is so small, that it is negligible in comparison to its beneficial results, for this prevents leakage by porcolation through the material; and since this is the only possible way in which a can constructed in accordance with the invention can leak, the result is a light, permanently tight container.

Although glue may be used in some cases, it is in general not necessary; and is no protection against water. Constriction and friction of the sleeve on the flange and can body may be relied upon to hold the sleeve in place and to prevent any curling outward of the lip of the outside cap. Such prevention of curling is a key to the control. It prevents that release of the above described internal construction which is necessary before the seal can break down. Under these circumstances any small quantity of liquid which may work through the sizing of the paper stock or even through the seam evaporates before it can effect dissolution, and all stays tight.

We claim:

1. A paper container comprising the combination, with a shell, of a cover closing the end of the shell and having a central body portion within the hollow of the shell and terminating in a flange extending in the outward direction of the axis from said central portion and fitting closely the inside of the shell; the said body portion of the cover being dished inward and adapted under pressure from within to press said flange more tightly against the shell.

2. A paper container comprising the combination, with a shell, of a cover closing the end of the shell and having a central portion dished inward within the hollow of the shell and terminating in a flange fitting closely the inside of the shell; said flange extending outward from said central portion and being turned back upon itself to form a portion which engages the shell further, whereby upon movement of the central portion of the cover outward, under pressure from within the container, the said flange is pressed more tightly against the shell and the shell is pressed more tightly against the said turned back portion of the flange.

Signed at Boston, Massachusetts, this twenty-sixth day of May, 1922.

RAYMOND A. BENNETT.
ALBION M. BOOTHBY.