Nov. 10, 1942. O. E. SEIFFERT 2,301,754

PAPER CONTAINER AND METHOD FOR MANUFACTURING SAME

Filed June 17, 1939 2 Sheets-Sheet 1

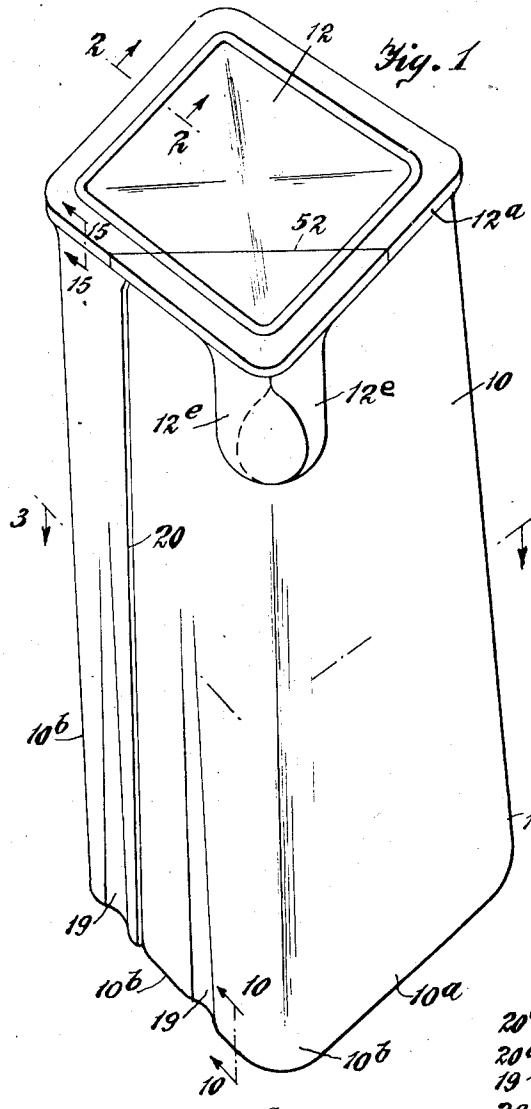



Fig. 1

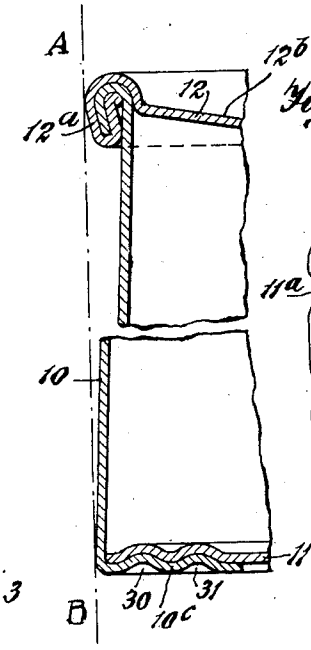



Fig. 2

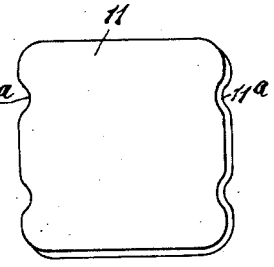



Fig. 5

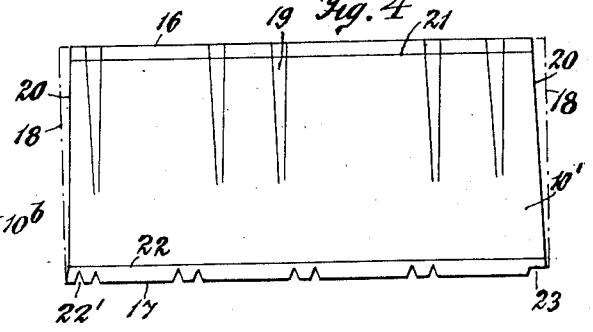



Fig. 4

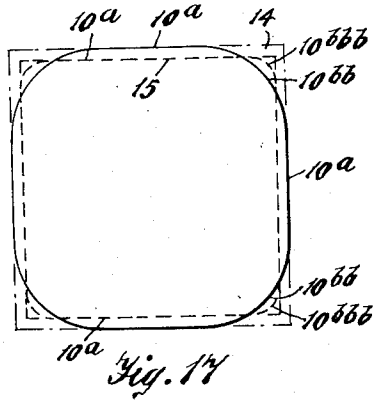



Fig. 17

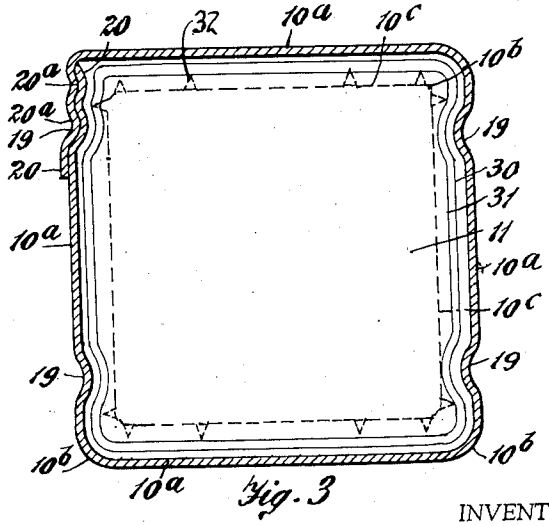



Fig. 3

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PAPER CONTAINER AND METHOD FOR MANUFACTURING SAME

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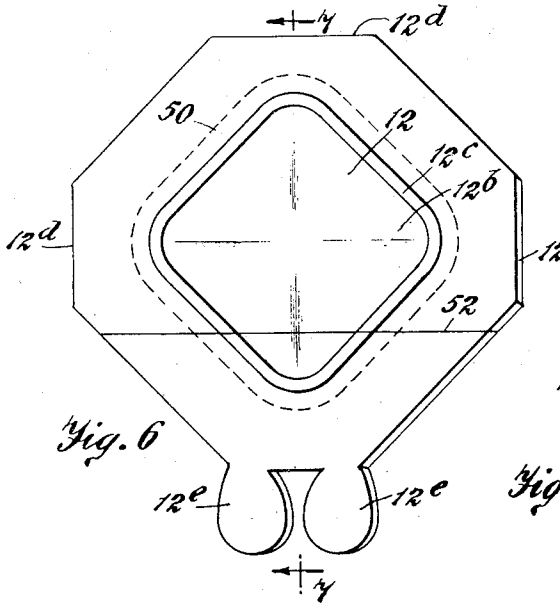



Fig. 6

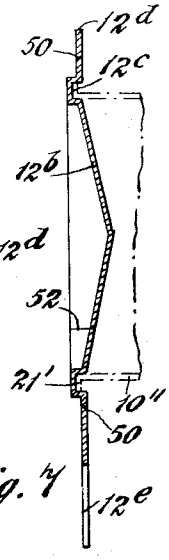



Fig. 7

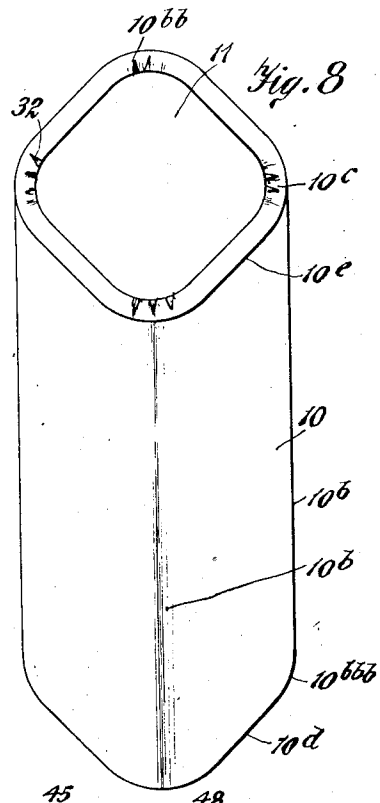



Fig. 8

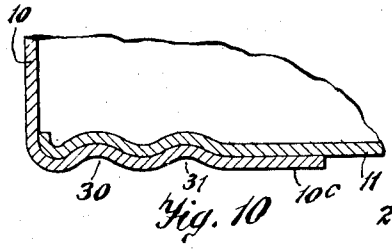



Fig. 10

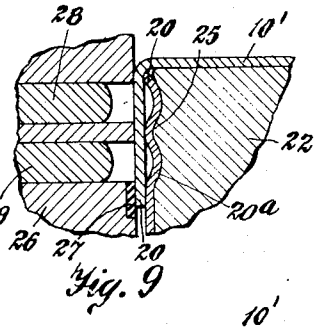



Fig. 9

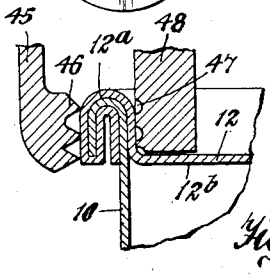



Fig. 15

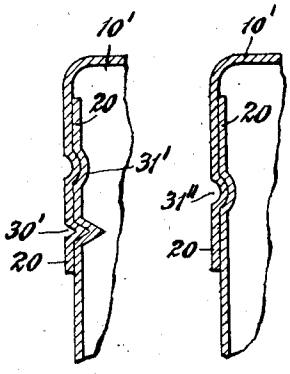



Fig. 11




Fig. 12

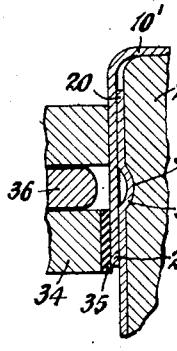



Fig. 13

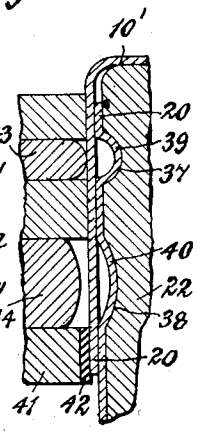



Fig. 14

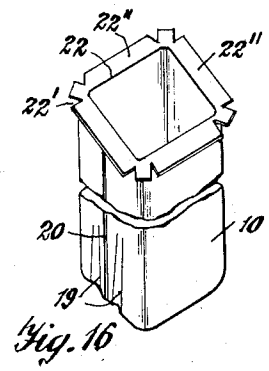



Fig. 16

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# UNITED STATES PATENT OFFICE

2,301,754

## PAPER CONTAINER AND METHOD FOR MANUFACTURING SAME

Otto E. Seiffert, Union, N. J.

Application June 17, 1939, Serial No. 279,635

8 Claims. (Cl. 229—4.5)

This invention relates to new and useful improvements in paper containers and drinking cups, and a method for the manufacture thereof.

This application relates to similar subject matter as that disclosed in my co-pending application Serial No. 221,671, filed on July 28, 1938.

This invention has for one of its objects, the construction of a paper container having straight sides with rounded corners, which are tapered longitudinally, and a novel arrangement whereby the paper container, during its manufacture, may be formed on a solid mould and easily removed from the mould. The invention particularly has reference to a certain arrangement of the rounded corners so that the end of the container which is the smallest dimension across the said sides of the container has the longer perimeter. The invention contemplates using rounded corners with large radii at the end desired to have the smaller perimeter and using rounded corners with small radii at the end desired to have the larger perimeter.

Still further, the invention proposes a novel construction and the method for forming the seams of the container. The invention particularly has reference to constructing the seams in a manner so that they may be securely pasted, cemented, or glued together in a way to form an exceptionally strong seam. When they are so constructed, a minimum quantity of wax or other water-proofing substance will be required to water-proof the container since this substance will not need to hold the seams and end cover of the container together.

Still further, the invention contemplates a novel construction of various parts used in making the container so that these parts may be efficiently, conveniently, and easily assembled.

Still further, the invention proposes a novel construction of the cover of the container so that it has a central area quite flexible, capable of buckling upwards or downwards, and adapting the container for liquids capable of liberating pressures, such as sodas and the like.

Still further, the invention proposes a novel construction of the cover of the container arranged so that it may easily be assembled in position on the body of the container.

Still further, the invention proposes various shapes of the parts of the container, and proposes a novel method for assembling the parts of the container in a way as to insure a water-proof container substantially for each container manufactured.

Still further, the invention proposes the construction of a paper container as mentioned which is simple, and durable and which may be manufactured and sold at a reasonable cost.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure:

Fig. 1 is a perspective view of a paper container constructed in accordance with this invention.

Fig. 2 is a fragmentary vertical sectional view taken on the line 2—2 of Fig. 1.

Fig. 3 is a horizontal sectional view taken on the line 3—3 of Fig. 1.

Fig. 4 is a developed view of the blank used in constructing the sides of the container.

Fig. 5 is a perspective view of the blank used in constructing the bottom of the container.

Fig. 6 is a perspective view of the blank used in constructing the cover of the container.

Fig. 7 is a sectional view taken on the line 7—7 of Fig. 6, a portion of the body of the container being schematically shown in dot and dash lines.

Fig. 8 is a perspective view of the body of the container, but turned upside down.

Fig. 9 is a fragmentary horizontal sectional view similar to the upper left end corner of Fig. 3 but illustrating the dies used in the manufacture of the seam at this area.

Fig. 10 is a fragmentary enlarged sectional view taken on the line 10—10 of Fig. 1.

Fig. 11 is a horizontal sectional view similar to Fig. 9 but illustrating a modified construction of the seam.

Fig. 12 is another horizontal sectional view similar to Fig. 9 but illustrating a still further modified construction of the seam.

Fig. 13 is another horizontal sectional view illustrating still another modified construction.

Fig. 14 is another horizontal sectional view illustrating still another modified construction of the seam.

Fig. 15 is a fragmentary sectional view taken on the line 15—15 of Fig. 1 but illustrating a forming tool applied to the seam so that the construction of the seam to be understood.

Fig. 16 is a perspective view of the container body as it appears before the cover is applied thereon.

Fig. 17 is a schematic plan view of Fig. 8.

The construction of the paper container in

accordance with this invention includes a tubular paper body 10 having straight sides 10a and rounded corners 10b. An end wall 11 closes one of the ends of the tubular body 10. The side walls of the tubular body 10 converge slightly from the end wall 11 to its other end, see Fig. 1. A cover 12 is provided upon the end of the tubular body remote from the end wall 11.

The end wall is formed from a relatively stiff piece of water-proofed paper. The tubular body 10 is joined to the end wall 11 having an edge portion 10c of the body 10 bent over the outside edge portions of the end wall 11. The cover 12 preferably is of soft or thinner paper material than the body of the container, and the bottom wall 11. It is secured upon the body 10 of the container by a double rolled seam 12a as illustrated in Figs. 2 and 15. Because of this double rolled seam, the outer edge of this seam would project past the bottom edge of the container body except for the fact that the walls of the container converge from the bottom to the top.

In Fig. 2, the dot and dash line AB represents the true vertical line from the bottom of the container to the top, and it should be noticed that this line includes the outer edge of the double rolled seam 12a. Since the container body has flat sides, it will be relatively easy to stack the containers one above the other, laid on their sides if this is required, or adjacent each other in side contact when in vertical positions.

The body 10 of the container is made from a blank 10', as illustrated in Fig. 4. The method used for forming the body essentially consists in winding the blank 10' around a forming mould which is shaped identical to the shape of the body desired. Since it is required that the tubular body of the container be initially manufactured so the container body 10 and the bottom end wall 11 are in one complete connected unit, and the cover 12 be separate, certain problems of removing the tubular body of the container from the form mould presents itself. The purpose for having the cover 12 separate from the tubular body resides in the fact that it is proposed to deliver the finished tubular bodies with separate covers to the milk dairies or to the sofa manufacturers, so that the containers may be sterilized through their open tops, may be filled with the liquids and then the covers 12 applied. It is proposed to supply each user of the containers with a capping machine capable of mounting the covers 12 in position after the containers have been filled.

In Fig. 8, a perspective view is shown of one of the container bodies without the cover. It is proposed that the container body be constructed by winding the blank 10' around a form mould, then dropping the bottom end wall 11 upon the top of the form mould, bending over the edge portion 10c, and seaming the parts together. It is then necessary that the body be removed upwards off of the mould since the bottom 11 (which is now at the top) prevents any other removal. Before it is possible to lift the container body as illustrated in Fig. 8 off of the mould, it is necessary that the perimeter of the bottom edge 10d be larger than the perimeter at the top edge 10e. This difference of perimeters must be accomplished in spite of the fact that the side walls of the container converge from the top (relative to Fig. 8) to the bottom in order to obtain the inclined side walls previously referred to. The difference in perimeters is accomplished by different radii of the rounded corners at the perimeters. More specifically, the corners 10bb at the end wall 11 are of greater radii than the corner 10bbb at the remote end of the container body. The corners 10b intermediate to the height of the container body gradually decrease from the corners 10bb to the corners 10bbb. In order to understand that this difference of radii accomplishes the results required it is best to see the schematic view illustrated in Fig. 17.

In Fig. 17, the outside square 14 represents a square which contains the side walls 10a of the container body at the end of the container body having the wall 11. The dotted square 15 is a square containing the side walls 10a at the end of the container indicated in Fig. 8 by reference numeral 10d. It can now be easily imagined that the straight side walls of the container body are converging from the top to the bottom. The corners of the large square 14 are cut off with large radii rounded corners 10bb, while the corners of the bottom square 15 are cut off by relatively small radii rounded corners 10bbb. Because of the large rounded corners 10bb, the perimeter of the container at the end 11, the top in Fig. 8, will be smaller than the perimeter at the bottom having the smaller radii corners 10bbb. The container body may therefore be easily pulled upwards off of the forming mould.

In order that the blank 10' illustrated in Fig. 4, used for constructing the container body, be capable of being easily formed, it is necessary that it be constructed with inclined sides so that it has a top edge 16 of a smaller length than the bottom edge 17. There are numerous ways of obtaining the inclined ends required, but I prefer to obtain these ends by cutting the blank 10' with ends 18 which are initially at right angles to the top and bottom sides. Then I form embossed grooves 19 extended downwards from the top edge 16 so that the ends 20 of the blank are dragged together at an inclination as illustrated by the full lines in Fig. 4. The dot and dash lines 18 illustrate the ends before the grooves 19 are formed. The grooves 19 also serve to reinforce and stiffen the body of the container, and furthermore one of the grooves may be utilized in constructing the seam at the side of the container body as hereinafter more fully described.

The blank 10' is also formed with a score line 21 across it, a short distance from the side 16. This crease is for the purpose of assisting in guiding the bending of the side of the blank, to form the inwardly directed flange 10c, illustrated in Fig. 8. The blank 10' is also formed with the crease or score line 22 to facilitate bending outwards the edge portion of the container body when the cover 12 is double seamed thereon. Furthermore, to assist in bending out this edge portion of the container body it is formed with niches 22' extended in from the edge 17 and located at the parts which will be the corners of the container body. Because of the niches 22', it is possible to flange out the top edge portion of the container body during the operation of double seaming the cover 12 thereon, particularly at the rounded corners, without causing the paper to be torn hapharzardly. The blank 10' is also formed with a cutout 23 along the edge 17 at one of the ends. This cutout is for the purpose of removing the double layer of material at the flange which is to be provided

The exterior die 41 is provided with an element 42 which during the operation of the die first grips the extreme edge portion of the outer overlapping end 20. This die 41 includes moving parts, a plunger 43 which is arranged to go into operation first as indicated in this figure to first form the groove which sets into the groove 39 then when this is completed, a plunger 44 goes into operation to form the groove in the outer overlapping end portion 20 to set into the groove 40. The forming of these grooves in succession will supply the required pressure and relative sliding of the parts.

In Fig. 15 a method has been disclosed for treating the double seam joint between the cover 12 and the container body 10. The cover 12 has its edge portion 12a turned into a double rolled seam as illustrated in Fig. 15 preferably with mechanism not shown and then the treatment of the seam is accomplished by a die member 45 formed with a plurality of projecting annular teeth portions 46 cooperative with grooves 47 formed in a die 48. The die 45 is engaged against the outside wall of the double rolled seam. The die 48 is placed adjacent the inside wall of the double rolled seam. For this reason, the cover 12 has its central area 12b depressed so that the die section 48 may be engaged in position. At the time that the double rolled seam is formed, suitable adhesive is applied on the cover and the material of the container body. Then the dies 45 and 48 are operated to form annular grooves around the circumference of the double rolled seam. These grooves when formed, serve to slide portions of the contacting parts relative to each other, so that the adhesive material holds the parts firmly.

In Figs. 6 and 7, a detail of the cover 12 has been illustrated. This cover is formed from a blank which is embossed to form a groove 12c formed in its bottom side. The central area 12b is also embossed so as to be concaved as shown in Fig. 7. Three of the corners of the blank are cut off to form flat sides 12d. The fourth corner is formed with adjacent projecting portions 12e, which are adapted to be superimposed on each other when the cover is engaged on the container body as illustrated in Fig. 1. This superimposing will be accomplished automatically when the cover 12 is bent and double seamed to the container body.

An area 50 is scored along the material of the blank of the cover 12 for breaking down the fibres at this area which is required to be bent during the double seaming. The scoring is for the purpose of making it easy to form the double seam. The cover 12 before being used is dipped into a liquid wax or other water-proofing material which is then blown off by a jet of air, so that the excess wax is blown off. However, excess wax will remain in the groove 12c. This small puddle of wax is later used to make certain that the double rolled seam is water-tight. When the cover 12 is finally engaged on the container body it is assembled in heat so that this puddle of wax becomes soft, and subsequently when it hardens, it assists in water-proofing the joint. The dot and dash line 10'' in Fig. 7 indicates the container body with the flanged area bent outwards therefrom, and disposed within the groove 12c. Preferably a score line 52 is engaged across the cover 12 illustrated in Fig. 6 to assist in bending up one corner of the cover as described in my prior patent application before referred to which is pending at the present time.

In Fig. 16 the container body has been illustrated complete except for the application of the cover. Particular attention is called to the flange 22'' produced by bending outwards the edge portion of the blank 10', shown in Fig. 4, especially the edge portion beneath the line 22. This flange 22'' is quite important in that it will hold the top portion of the container body in formation during the filling operation. The container body is shown in Fig. 16 ready to be filled with milk or other beverage. If not for the flange 22'' the top portion of the container body would be deformed and assume a somewhat circular shape when filled. This would make it difficult to engage the cover 12 thereon. With the flange construction, the liquid filled container body is merely engaged into a suitable cover engaging machine which double seams the cover 12 thereon.

It is also pointed out that the seaming and reinforcing of the container body may be applied to containers intended for other purposes besides milk and beverages, for example, the container body may be designed to simulate a drinking cup or other type of container.

While I have illustrated and described the preferred embodiments of my invention, it is to be understood that I do not limit myself to the precise constructions herein disclosed and the right is reserved to all changes and modifications coming within the scope of the invention as defined in the appended claims.

Having thus described my invention, what I claim as new and desire to secure by United States Letters Patent is:

1. In a paper container, a tubular paper body having flat sides and rounded corners, an end wall set into and closing one end of said tubular body, the side walls of said tubular body converging slightly from said first named end wall to its other end, the corners of said first named end wall being of a larger radii than the corners of said last named end and the perimeter of the first named end wall being smaller than the perimeter of the last named end, whereby the tubular paper body may be formed on a mould and slipped off of the mould from the first named end.

2. In a paper container, a tubular paper body having flat sides and rounded corners, an end wall set into and closing one end of said tubular body, the side walls of said tubular body converging slightly from said first named end wall to its other end, the corners of said first named end wall being of a larger radii than the corners of said last named end and the perimeter of the first named end wall being smaller than the perimeter of the last named end, whereby the tubular paper body may be formed on a mould and slipped off of the mould from the first named end, and a cover on the said last named end of the tubular body and having its edges seamed outwards to the adpacent edges of said tubular body so that the outer sides of the seam are in perfect alignment with the straight sides of the first named end wall of the tubular body, whereby the paper containers may be stacked horizontally in vertical piles.

3. In paper container, a tubular body having flat sides and round corners and at one of its ends having edge portions and a cover engaged over said end and having edge portions double

for the cover 12, at the seam of the container body.

The end wall 11 is formed with concave cutout portions 11a at areas corresponding with the longitudinal grooves 19. An examination of Fig. 1 will assist in visualizing the grooves 19 and the cutout areas 11a to accommodate these grooves.

The container body is constructed in the following way: The blank 10' is wound around a form for this purpose so that the end portions 20 overlap as illustrated for example in Fig. 3. In this condition it is pulled quite tightly on the form so that the corners 10b assume the identical shape as the corners of the form. The end wall 11 is then dropped into the top portion of the formed blank 10' and the edges bent inwards so as to form the flange 10c, with dies and by machine are pressed into shape. It is now required that the seam produced by the overlapping end portions 20 be securely sealed, and that the seam between the flange 10c and the adjacent material of the end wall 11 be also securely sealed. This invention contemplates a novel construction of these seams and also a novel method to produce this construction. The invention proposes utilizing a well-known law of pasting two portions together in a certain fashion. It is well-known that if adhesive material is placed upon two parts to be pasted together, and then these two parts are placed face against face and pressure is applied and simultaneously the parts are moved laterally relative to each other for a short distance, the cementing of these parts will be exceptionally strong. The pressure and the relative movement of the parts seem to efficiently work in cementing, gluing or pasting parts together. This invention furthermore, contemplates a novel construction of the seams, arranged so that there is a working in of the paste previously referred to.

At this point, the construction of the seam at the overlapping end portions 20 will now be given. It is proposed that just the bottom one of these overlapping end portions 20 be embossed under pressure with dies to form longitudinal extending grooves 20a. It is proposed that these grooves preferably be of different shapes and sizes to obtain the efficient rubbing together of the adhesive material. There are numerous methods by which the seaming may then be efficiently accomplished. In Fig. 9 a preferred way has been illustrated. In this figure the reference numeral 22 illustrates the form upon which the blank 10' has been wound. This form 22 has been shaped with longitudinal grooves 25 of the same shape as the said grooves 20a. The underneath one of the overlapping ends 20 previously embossed with grooves 20a, corresponding with the grooves 25, is placed so that these grooves interengage each other.

The outer of the overlapping ends 20 initially is straight. This is the condition in which the parts are illustrated in Fig. 9. An outer die is now used for accomplishing the seaming. Of course, prior to this time a coating of adhesive material is applied to the adjacent faces of the overlapping end portions 20. The outer die 26 is brought down upon the seam. This outer die has a gripping or friction element 27 which is caused to come down and grips the outer of the end portions 20. The die 26 also has moving portions 28 and 29. These portions may be simultaneously operated or selectively, first one then the other. The latter method is more efficient and will produce a better seam.

The portions 28 and 29 are brought down upon the outer of the overlapping ends 20, embossing grooves into this overlapping end. Since the friction material 27 is holding the edge of the outer layer 20, the material for the grooves of outer end 20 will be drawn from around the form 22, and will be forced into the grooves of the inner end 20a. This application of pressure and simultaneous drawing of the adjacent edge portions together will produce the pressure and sliding necessary for the adhesive to act most efficiently.

In Fig. 10 a detail of the finished seam 10c at the bottom of the container has been illustrated. This seam has been formed in a manner substantially identical to the seam shown on Fig. 9. The necessary forming dies are required. The operation briefly consists in applying the adhesive to the overlapping portions then suitably holding the outer overlapping portion, and then applying the required pressure to various parts, to obtain the necessary pressure and relative sliding of the portions, and to produce the grooves 30 and 31. A careful examination of Fig. 10 will indicate that these grooves are of different shapes and depths. The grcove 30 is of large oval shape while the groove 31 is of smaller oval shape.

It has been found that by using different shaped grooves a better and stronger seam will be obtained. This is so in that with the different shaped grooves, it will be possible to obtain better stretching, sliding, and rubbing together of the parts forming the seam. Since the edge portion 10c, see Figs. 3 and 8, is formed by bending over an edge portion of the blank 10', there will be several creases 32 formed in the flange 10c, particularly at the rounded corners. These creases will not interfere with obtaining a tight seam especially after the completion of the grooving operation as described relative to Figs. 9 and 10.

In Fig. 11, a sectional view similar to that shown in Fig. 9 has been illustrated to disclose a modified form of seam. In this figure the seam distinguishes from that shown in the prior figures merely in the form and size of the grooves produced. According to this form of the invention the seam includes the oval shaped grooves 31' and V-shaped grooves 30'. The seam is constructed substantially as previously described.

In Fig. 12 another modified form of seam has been disclosed in which the overlapping portions are seamed with just one oval shape groove 31''.

In Fig. 13, portions of the dies used in producing the single groove 31'' has been illustrated so that the method may thoroughly be understood. In this figure the form 22' is shown provided with one groove 31a. The interior overlapping end 20 is shown initially embossed with one groove which sets into the groove 31a formed in the forming member 22'. An external die 34 is used which has a friction element 35 adapted to grip the free edge of the outer overlapping portion 20. This exterior die 34 has a moving part 36 which is capable of coming down and embossing the outer overlapping edge 20 to produce the groove 31''.

In Fig. 14 another view has been shown to a more clearly disclosed the method of forming the seam. In this figure the forming die 22 has been shown provided with two grooves 37 and 38 of different sizes. The inner overlapping end portion 20 is initially embossed with grooves 39 and 40 adapted to set in to the grooves 37 and 38.

rolled upon said first named edge portions, said cover having a pair of spaced edge projecting lugs located at one of the corners of said body and folded into overlapping positions and extending down along the latter named corner of said tubular body.

4. A method for pasting overlapping portions in a paper container, consisting in embossing one of the portions with a groove, applying adhesive material upon the adjacent faces of said overlapping portions, and pressing the portions together, and embossing the material of the portion above said groove into said groove.

5. A method of pasting overlapping portions in a paper container, consisting in embossing one of the portions of said overlapping portions with grooves, applying adhesive material upon the adjacent faces of said overlapping portions and pressing the portions together, and embossing the material of the other portion with grooves forced into said grooves.

6. A method of pasting overlapping portions in a paper container, consisting in embossing one of the portions of said overlapping portions with grooves, applying adhesive material upon the adjacent faces of said overlapping portions and pressing the portions together, and embossing the material of the other portion with grooves forced into said grooves, and means for holding one of the edges and one of said overlapping portions during the embossing operation.

7. A method for pasting overlapping portions in a paper container, consisting in embossing one of the portions of said overlapping portions with grooves, applying adhesive material upon the adjacent faces of said overlapping portions and pressing the portions together, and embossing the material of the other portions with grooves forced into said grooves, said latter embossing step being carried out by embossing the grooves in succession.

8. A blank for a tubular body of a paper container comprising a strip of material having its top and bottom edges parallel and having grooves at right angles to said edges embossed inwards from one of the said edges so that its ends converge, score lines spaced slightly inwards from said top and bottom edges of said blank and extending the entire length thereof to assist in bending these portions inwards and outwards, and niches formed in one of said edges for assisting in the bending of said edge portions.

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