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SEALED CARTON AND METHOD

2,543,757

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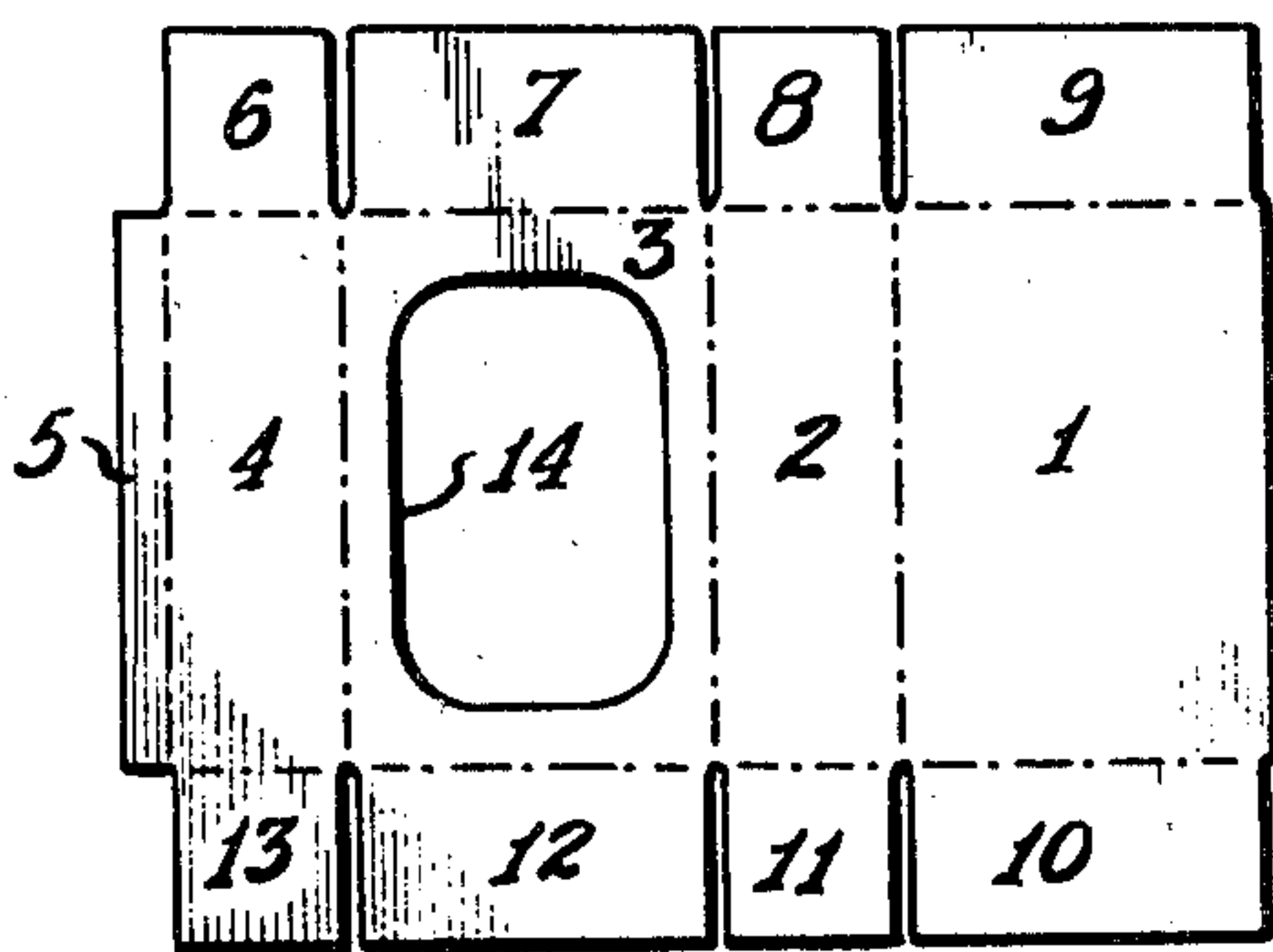


FIG. 1.

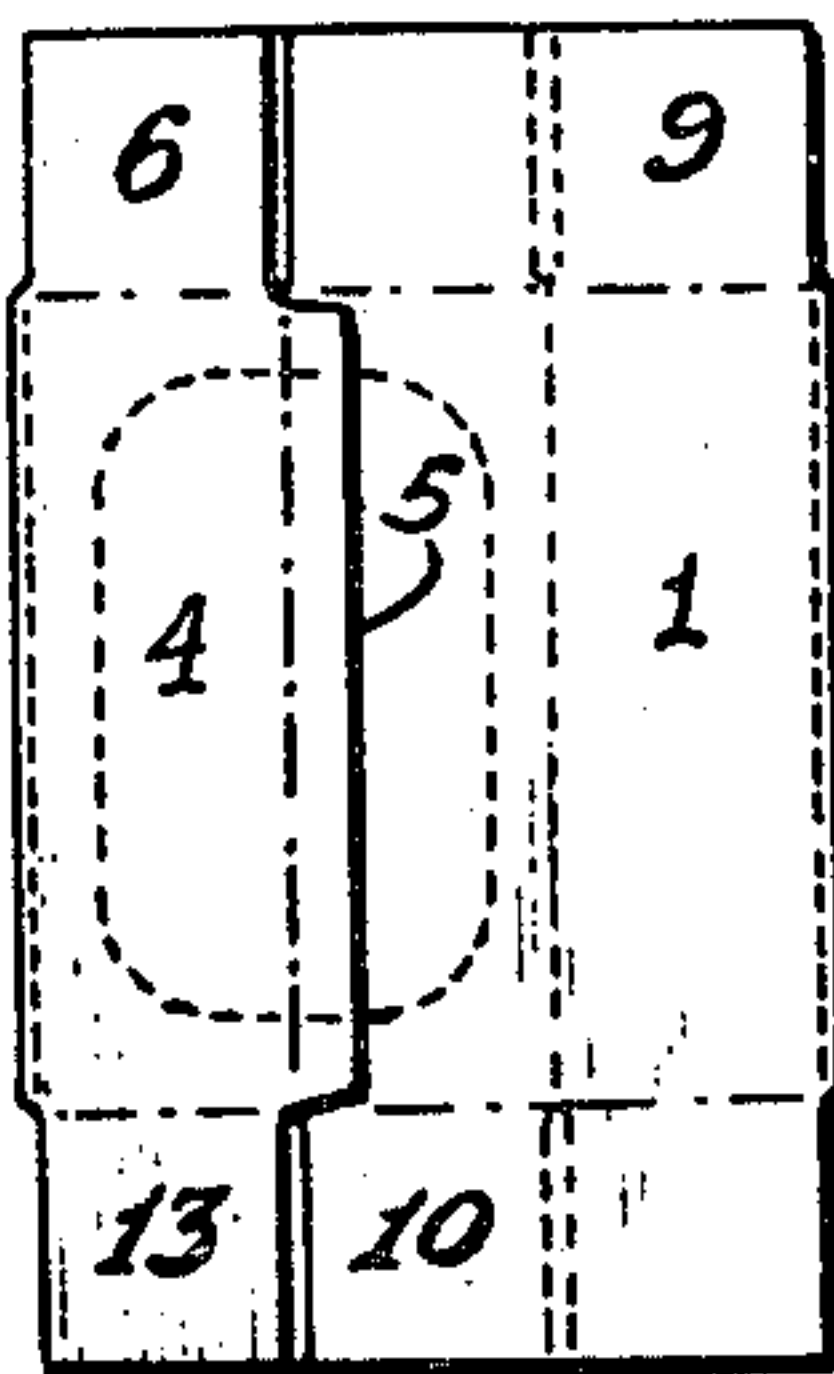


FIG. 2.

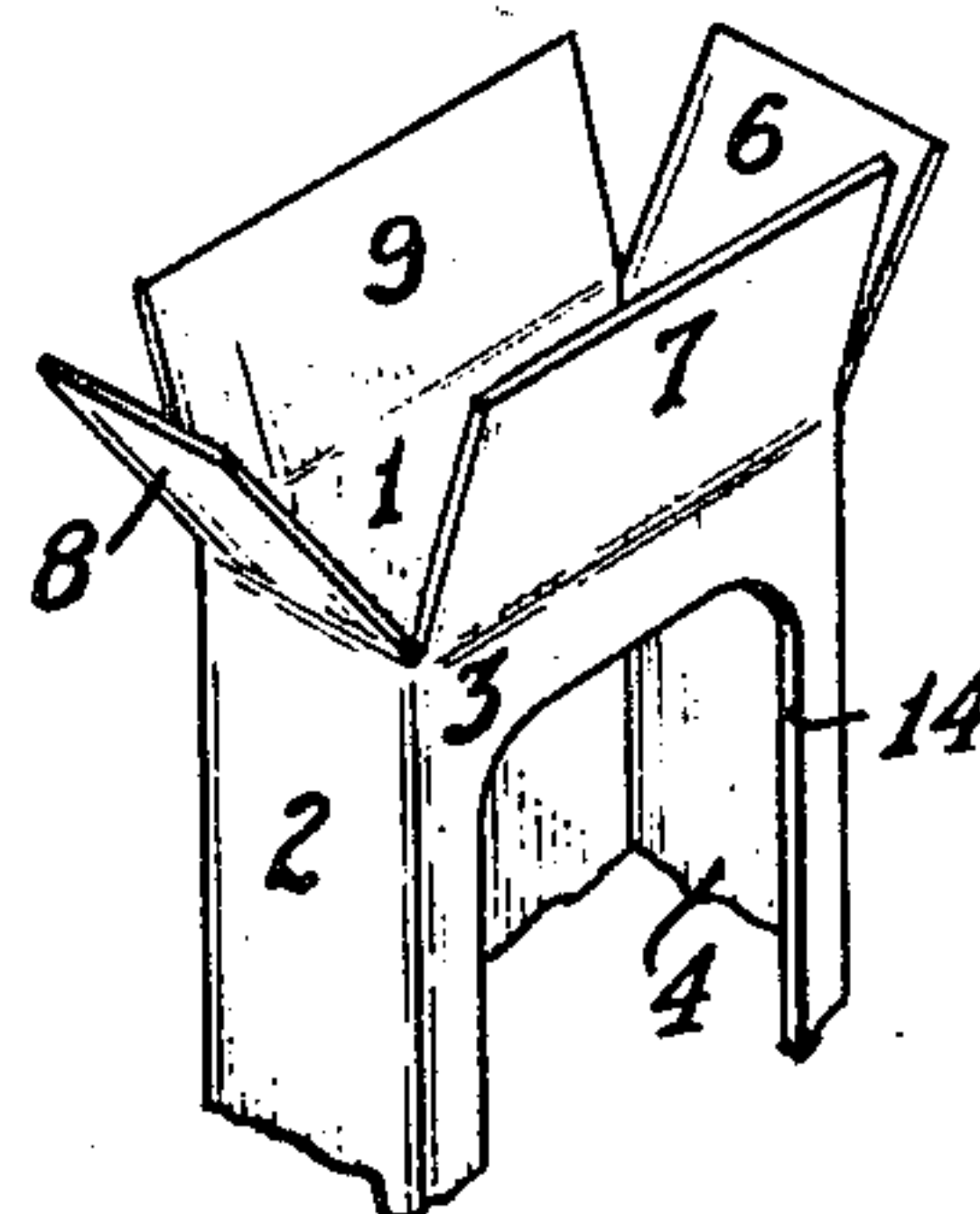


FIG. 3.

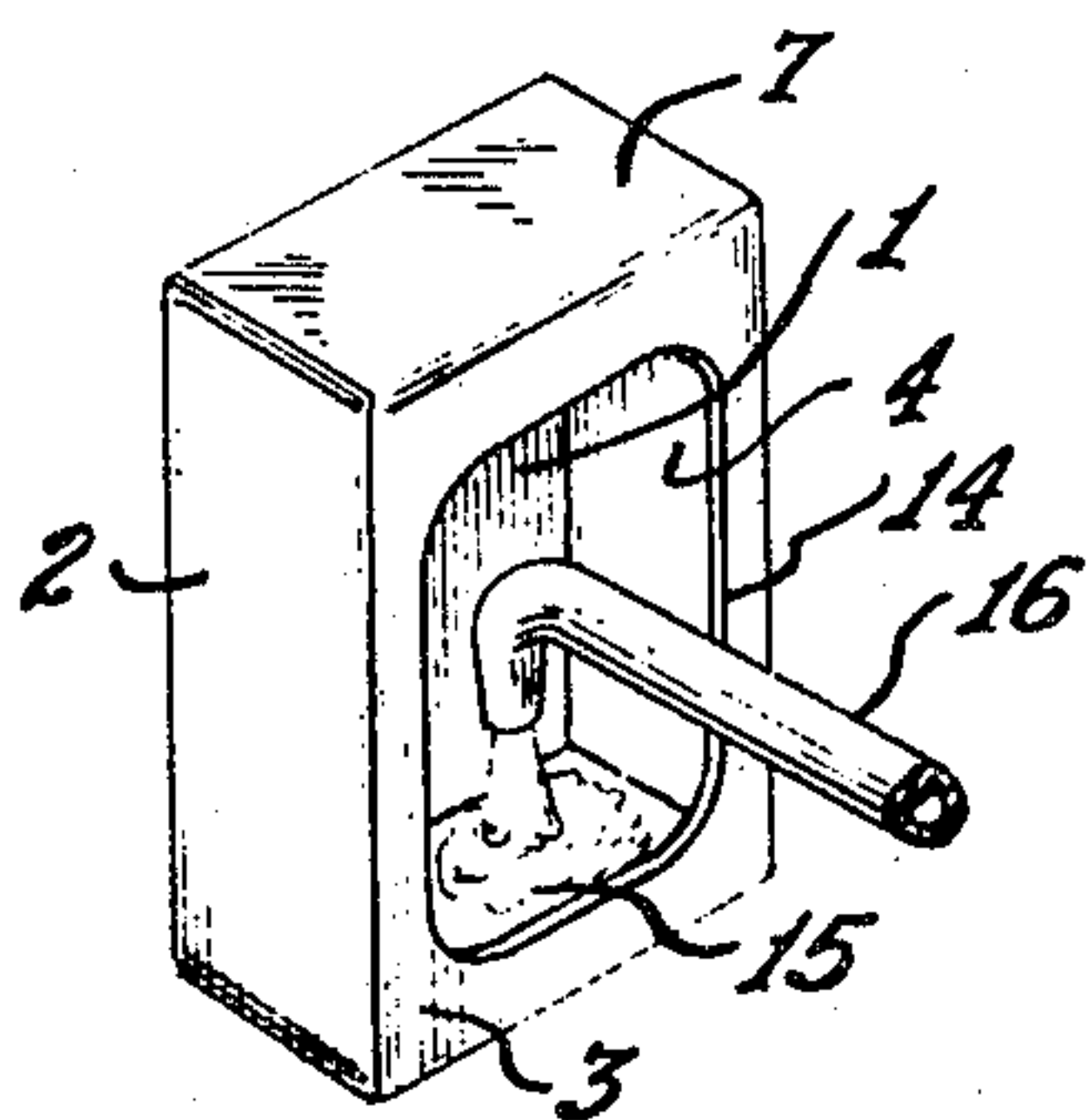


FIG. 4.

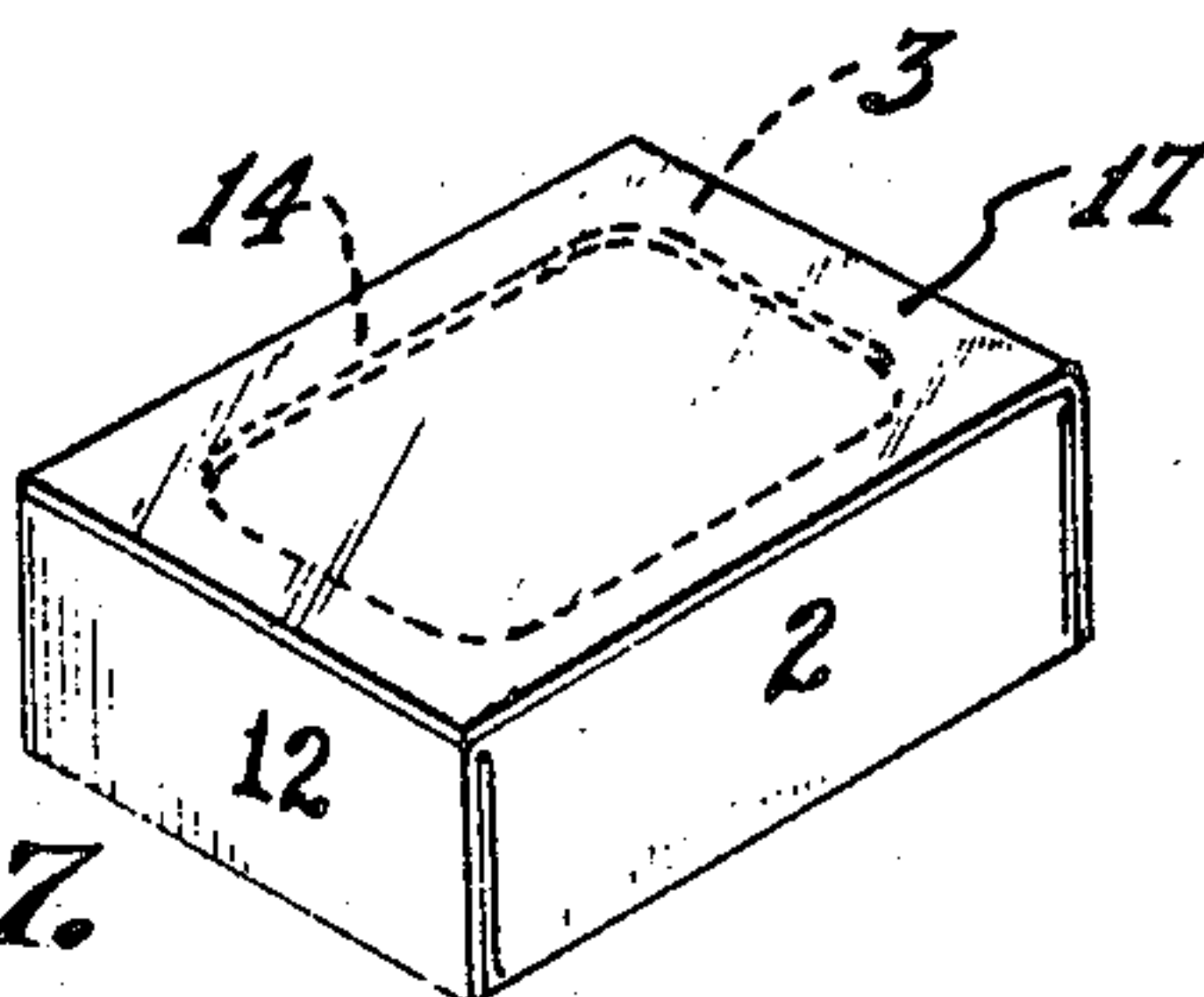


FIG. 7.

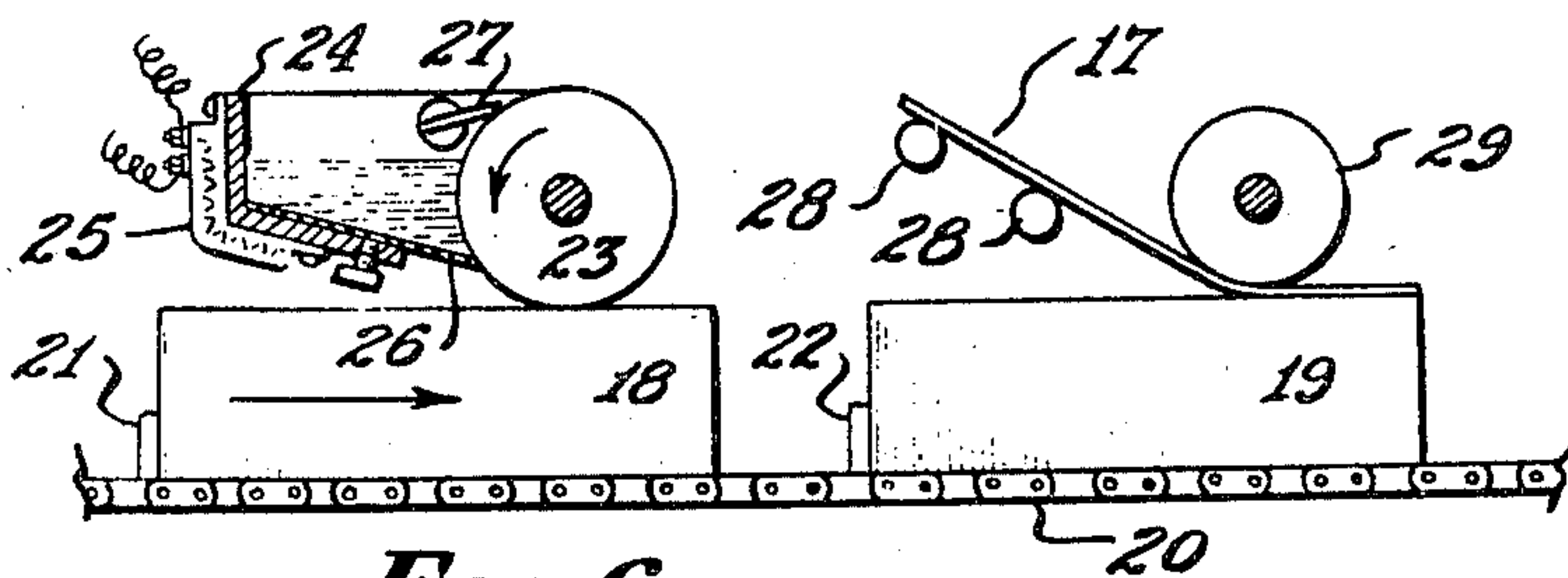


FIG. 6.

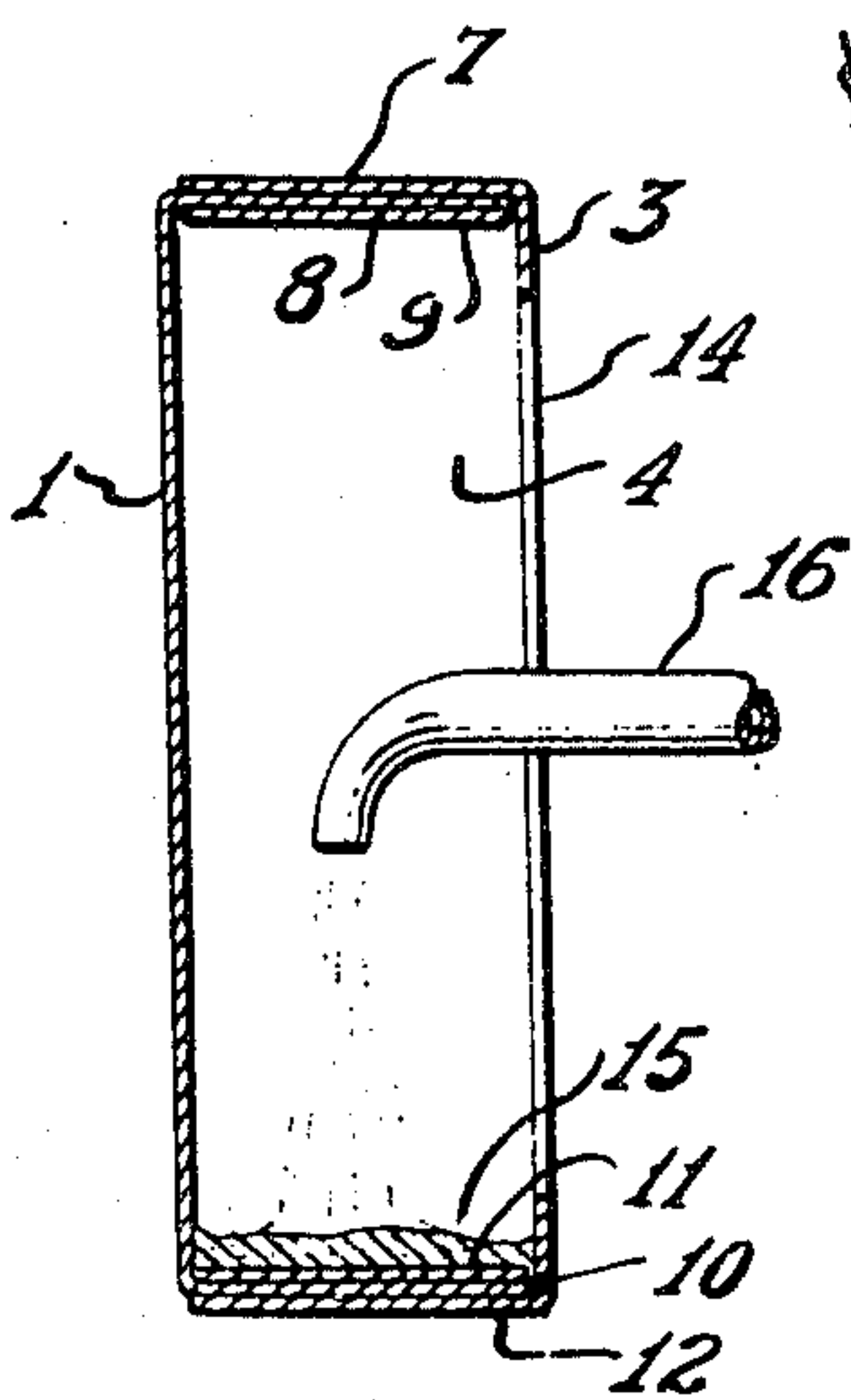


FIG. 5.

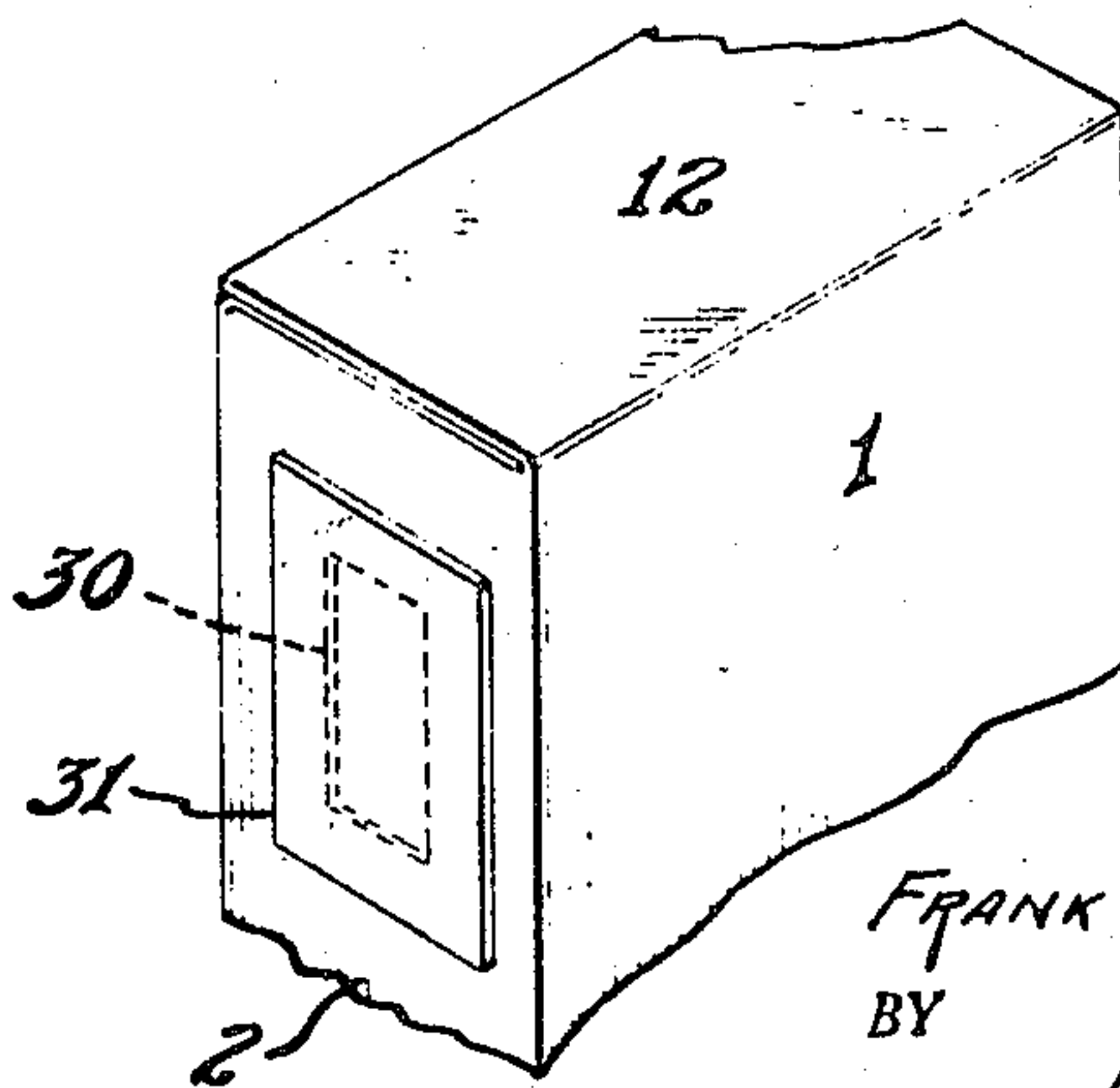


FIG. 8.

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SEALED CARTON AND METHOD

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9 Claims. (Cl. 229-5.5)

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Cartons to which this invention relates find their principal usefulness as containers for food-stuffs, frozen foods, and other materials requiring a sealed condition of the container.

It is an object of the invention to provide cheaply a carton which can readily be sealed and a method for that purpose.

It is an object of the invention to provide cartons which may be sealed by the user either entirely by hand operations or with the simplest devices and mechanism, so that the finishing of his product in a sealed carton does not entail any large capital outlay for equipment.

It is an object of my invention to provide cartons which while sealed, nevertheless permit a view of the contents thereof.

It is further my object to attain all of these features in knocked down paperboard cartons manufactured in the usual way on standard equipment and of no greater cost than conventional cartons not possessing the features set forth above.

These and other objects of the invention which will be set forth hereinafter or will be apparent to one skilled in the art upon reading these specifications, I accomplish in those constructions and arrangements of parts and by those methods of which I shall now describe certain exemplary embodiments. Reference is made to the drawings which form a part hereof and in which:

Figure 1 is a plan view of a blank for one form of my carton.

Figure 2 is a plan view of the tubed, knocked-down structure.

Figure 3 is a partial perspective view of the erected carton.

Figure 4 is a perspective view of the closed carton in process of being sealed at its ends.

Figure 5 is a vertical sectional view through the carton at this stage.

Figure 6 is a diagrammatic elevational view of the final treatment of the carton after it has been filled.

Figure 7 is a perspective view of the final package.

Figure 8 is a partial perspective view of another form of carton embodying my invention.

In a copending application Serial No. 740,313, filed April 9, 1947, and entitled Tight Cartons, I have described a method of sealing cartons by flooding interior end portions with a liquid solidifiable, sealing substance, preferably thermoplastic. By end portions, I mean those portions of a knock-down structure at which closure flaps are provided. The size and shape of the cartons

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themselves form no limitation on this invention and, excepting as otherwise expressed in the claims hereof, the nature and disposition of the closure flaps are likewise not a limitation.

In the formation of cartons, proofness to various environments can be obtained either by treatments of the paperboard itself, or by affixing to the paperboard layers or webs of material having the desired proofness. The treatments may vary depending upon the kind of proofness desired, whether resistance to moisture, moisture vapor, water, organic liquids, or vegetable oils and greases, or resistance to the passage of gases. These treatments form no limitation upon the present invention, and since satisfactory ones are known in the art, they will not here be described. It will be understood, however, that my cartons will be made of boxboard or paperboard possessing inherently or, by reason of suitable treatments, or suitable coverings of the body walls, the desired kind and quality of proofness.

For sealing the ends of the cartons I may use any suitable substance, my preference being for thermoplastic materials of waxy or resinous character, or compositions of wax and resin.

Referring now to Fig. 1, I have shown an exemplary carton blank for a box which may be thought of as one designed for the preservation and shipment of frozen foods. The blank provides in articulation a series of enclosing body walls 1, 2, 3 and 4 and a glue flap 5. At the ends of the body walls I have shown closure flaps 6 to 13 inclusive, which are of conventional seal-end form. I have also indicated a cut-out 14 in one of the body walls. The size of this cut-out may be varied in accordance with the contents for which the box is intended.

If the box is to hold frozen vegetables, it may be desired to make it as large as possible, since the contents of the box will be introduced through this opening. It is possible in my invention to make the opening almost as large as the wall in which it is made, leaving, however, a continuous marginal portion of that wall for adhesive union with a covering member as will be hereinafter described.

The blank of Figure 1 may be made in the usual way, printed or not as desired, and cut and scored in the usual cutting and scoring press. It will also be tubed as usual, which may be done on conventional carton folding and gluing machinery, it being understood that a suitable adhesive and method will be employed to bring about good adhesion and proofness in the longitudinal seam where the board is of proofed or treated

character. I have shown in Figure 2 a carton after it has been tubed in such a way as to bring the glue flap 5 outside the body wall 1, this being a construction which I prefer for liquid tightness. It does not, however, constitute a limitation upon my invention. The tubed, knocked-down carton may be shipped to the carton user in the condition shown in Figure 2.

The user will erect the carton as shown in Figure 3 but, departing from conventional practice, he will proceed to close both ends of the carton prior to filling it. The closure of the end flaps may be carried on in the usual way and, if not by hand, by the usual devices current in the art for that purpose. It is well known that the ordinary seal-end carton is not tight at its ends, even to the point of the prevention of sifting with powdered contents. The treatment hereinafter described, however, cures this defect and completely seals the carton at its ends.

The closing of the flaps may be done with any suitable adhesive. In my copending application to which reference has been made, I have taught how my end sealing treatments may be employed to adhere the flaps as well as to seal the ends, and this procedure may be adopted here. If it is, it will be necessary only to fold the flaps and place the carton in a cage or holder which will maintain its folded condition.

In Figures 4 and 5 I have illustrated the mode of effecting the end seals. The carton in closed condition is placed with one end downward and a sealing substance 15, preferably in a highly liquid condition, is flowed into the downward end through a spout 16 inserted into the carton through the opening formed by the cut-out 14. When this material is introduced, the carton is preferably tilted repeatedly in a plurality of directions to insure that the liquid material covers the entire interior bottom thereof and bonds with the lower edges of the body walls. I have found that it is also advantageous to warm the end portions of the carton. In this fashion I form a continuous but relatively thin layer of sealing substance over the entire inner bottom. When the carton has been sealed on one end as described, it is then inverted and the opposite end is sealed by a similar procedure involving the introduction of the flood-sealing substance and, the tilting of a carton as may be required, and the maintenance of the inverted condition until the sealing substance has solidified. The result is an erected carton sealed at both ends and closed excepting for the filling opening 14.

There are a very large number of sealing substances which I may employ, and I do not regard the specific character of the substance as a limitation on the invention otherwise than as claimed. The sealing substance should be one which bonds readily with the carton walls. It is preferably one which can be rendered highly fluid by solvent or heat. It should, in itself, possess the desired qualities of proofness as will be evident. Preferably also it should be non-brittle when set. For this reason a brittle wax like paraffin is not used by me excepting in instances where the structure of the box can be relied upon to protect the seal from crushing or bending. Non-brittle waxes like the micro-crystalline waxes are satisfactory alone or in admixture with paraffin; and excellent results may be attained by adding resinous substance such, for example, as polybutenes, chlorinated terphenyls, and others to impart toughness and resilience. I am not restricted to this class of sealing substance, but may, by way of

further example, employ solvent solutions of cellulosic substances and the like.

The contents may now be introduced into the carton through the filling opening in any convenient way. When the carton has been filled, it is finally closed by affixing to the same, over the filling opening and over the contents, a sheet or panel of material of satisfactory proofness. A wide variety of materials may be used, depending upon their strength and other desired qualities. For many purposes, however, it is desirable to use a transparent material to permit inspection of the contents and to provide a package having a high degree of sales appeal. For this purpose, I may employ any of the transparent materials of commerce including the thin, non-felted films, such as cellophane, Pliofilm, a rubber hydrochloride transparent film manufactured by the Goodrich Tire and Rubber Company, and the like; but my preference is for a heavier material of the nature of a transparent sheeting. Cellulose acetate sheeting .001 inch or more in thickness is an exemplary, but non-limiting, material. A polystyrene transparent or translucent film, called by the trade-name Polyflex, manufactured by the Plax Corporation of Hartford, Connecticut, in thickness of from .005 to .0075 inch, is highly satisfactory for many purposes in my invention. It is highly inert and is unaffected by foods. It is non-toxic, non-yellowing and unusually rigid. When treated with certain solvents such as methyl ethyl ketone or methyl isobutyl ketone, the surface of the film or sheeting softens instantly and becomes highly tacky and adhesive. When this tacky surface is pressed against the surface of a material such as paperboard, an excellent liquid-tight joint is obtained with a very short setting time.

A sheeting of sufficient stiffness may be employed to impart marked rigidity and strength to the box, especially where the cut-out 14 is large.

In affixing the sheeting or other substance it may be coated with a transparent adhesive, laid on the wall 3 of the box and pressed into position. If precoated with a thermoplastic adhesive and cooled, the covering sheet 17 in Figure 7 may be laid in position on the box and the adhesive reactivated by means of a hot iron or heated pressing member. I prefer, however, to apply the adhesive to the box rather than the covering sheet, since this leaves the window portion of the structure free of adhesive.

In the case of the polystyrene film mentioned above, instead of using an adhesive, I may apply a solvent to the paperboard or to marginal portions of the covering sheet and immediately bring these parts together.

In Figure 6, I have shown filled boxes 18 and 19 carried in the direction of the arrow by conveyor means comprising a chain 20 and pins 21 and 22. At 23 I have shown a coating roller for applying to the surface of the wall 3 a coating of thermoplastic adhesive from a fountain 24. The fountain is electrically heated as by means 25 and is juxtaposed to the coating roller 23. At its lower end it has an adjustable blade 26 which acts to meter onto the coating roller a thin and controlled film of the thermoplastic adhesive. A scraper 27 serves to remove from the surface of the roll any portions of the thermoplastic which are not transferred to the wall 3.

In the second carton position indicated at 19, the covering sheet 17, supported by rolls 28 is laid onto the wall 3 and pressed into position by a roll

29. The sheet 17 may be understood to be one of a number of sheets successively fed from a hopper, mechanism for this purpose being known.

I have found that I can seal a sheet of covering material against a wall of a carton in such a way as to produce a tight closure. Where the covering material is transparent, as I prefer, a window is also provided, without sacrifice of the sealed condition of the final package. It will be seen that the article of Figure 7 not only is a sealed package giving complete protection to its contents, even if they are or may become liquid in whole or in part, but that it is also an attractive display package for the merchandise.

Where the carton is to contain liquid, powdery, granular or other freely flowable substances, the filling opening may be made smaller. In Figure 8 I have shown a carton in which like parts have been given like index numerals. A small filling opening 30 is shown in an end wall 2. The ends of the carton may be sealed through this opening in the ways described above. After filling and sealing the opening 30 may be closed by a covering 31 of acetate sheeting or similar substance. Where the carton is one designed to take a liquid filling, the location of the opening 30 and cover sheet 31 may be such as to provide a view of a portion of the liquid within the carton, either to determine its level, or to permit observation of a cream line as in a carton of milk.

The principles of this invention may be applied to a wide variety of boxes as will be apparent. Modifications may be made in my invention without departing from the spirit of it. Having thus described my invention in connection with certain exemplary embodiments, what I claim as new and desire to secure by Letters Patent is:

1. A process of producing sealed cartons which comprises providing a collapsible carton having a tubular body and closure flaps at the ends of the body walls, erecting said carton and effecting closure thereof at both ends, providing a filling opening in a body wall of said carton, and sealing end portions of said carton by introducing through said opening relatively small quantities of liquid sealing substance capable of hardening in situ, a predetermined quantity of said substance being so introduced for sealing each end of said carton while said end is down and being sufficient to cover the folded flaps at the carton ends, and permitting the said substance so introduced to solidify therein whereby to form castings of said coating substance entirely covering said folded flaps, confined substantially to the areas of said flaps and located within said carton, and after said sealing operation filling said carton through said opening, and affixing over said opening in adhesive union to the body wall of the carton in which said opening is formed, a sheet of substance larger in area than the area of the filling opening itself.

2. The process claimed in claim 1, in which an adhesive sealing substance is applied to the carton wall in which said filling opening is formed, and in which said closure sheet is thereupon applied to said adhesive substance.

3. The process claimed in claim 1, in which said closure sheet is a polystyrene substance, and in

which said sheet is applied to the carton wall in which said filling opening is formed, with the interposition of a solvent for said polystyrene therebetween.

4. The process claimed in claim 1, wherein said closure sheet is first coated with adhesive and then applied to the wall of the carton in which said filling opening is formed.

5. In a sealed package, a collapsible paperboard container, having a tubular body and end closure means, said container being in erected condition with said end closure flaps closed, interior seals for the ends of said carton comprising hardened castings of predetermined amounts of sealing substance entirely covering the folded flaps at each end, said castings being confined substantially to the area of said flaps and located within said carton, one of the body walls of said carton having a filling opening formed therein of less area than the area of said body wall, and a closure for said filling opening comprising a sheet of substance affixed exteriorly to said body wall and extending across said filling opening.

6. The structure claimed in claim 5 in which said sheet is a sheet of transparent substance providing a view of the interior contents of said package.

7. The structure claimed in claim 5 in which said sheet is a sheet of transparent substance providing a view of the interior contents of said package, and is a sheet of non-scorable plastic substance stiffer than the boxboard of which said carton is made.

8. The structure claimed in claim 6 in which said filling opening occupies the major portion of the area of the body wall in which it is formed, leaving relatively narrow marginal portions of said body wall thereabout, and in which said sheet of transparent substance is substantially of the full area of said body wall.

9. A carton formed of proofed paperboard and having a tubular body of enclosing body walls, with end closure elements, said carton having an opening in one of its said body walls, said carton being in erected condition, closed at both ends and with interior end seals consisting of castings of hardened sealing substance fully covering interiorly the end closure elements of said carton, substantially confined thereto and bonded with end portions of the body walls thereof, and a piece of transparent plastic substance affixed in sealed relationship to the body wall of said carton having said opening therein, and in such position as to cover said opening.

FRANK DAVID BERGSTEIN.

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