

March 8, 1949.

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2,464,154

PARTITION FOR CONTAINERS

Filed Sept. 19, 1947

3 Sheets-Sheet 1

FIG. 1

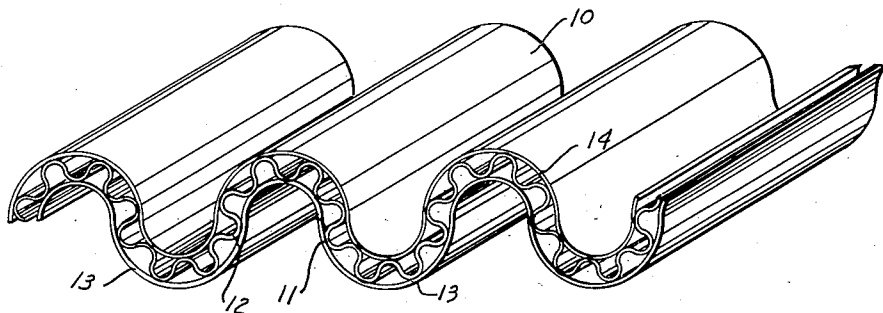


FIG. 2

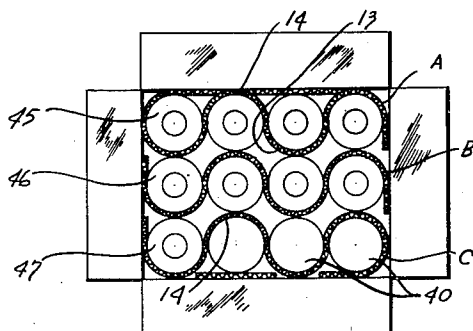
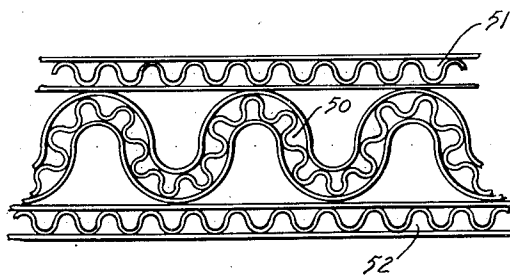


FIG. 3



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FIG. 4

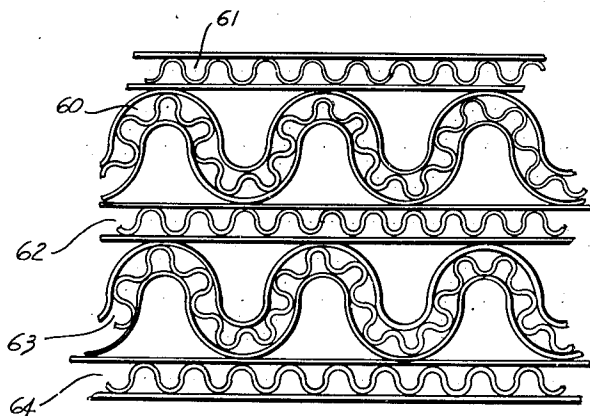
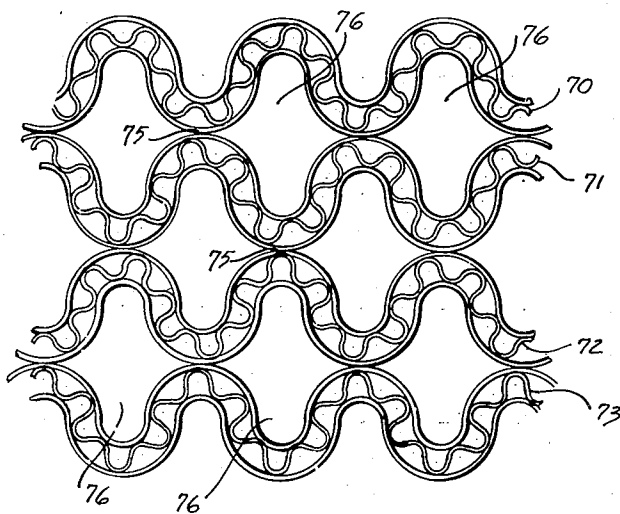


FIG. 5



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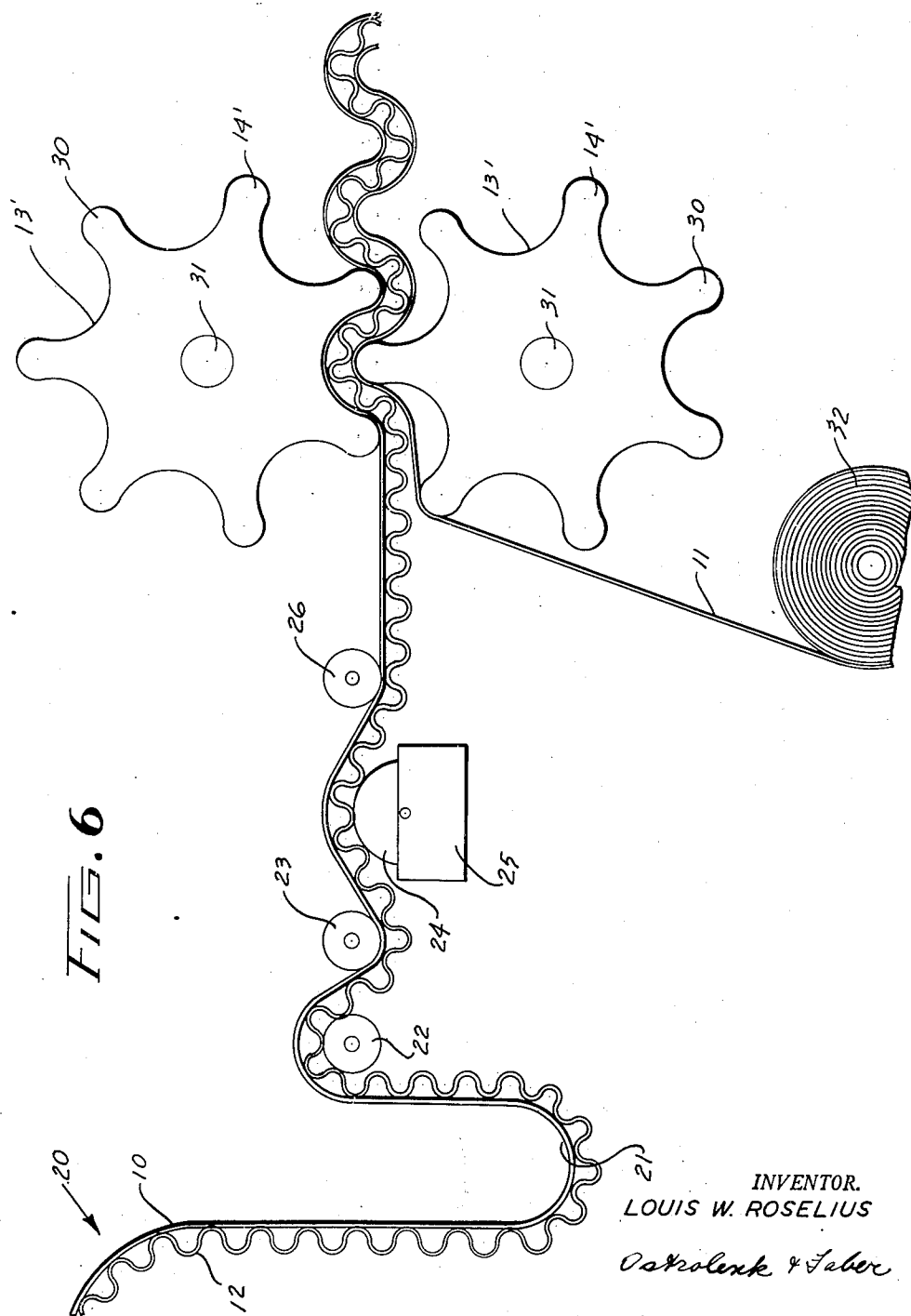
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3 Sheets-Sheet 3



UNITED STATES PATENT OFFICE

2,464,154

PARTITION FOR CONTAINERS

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Application September 19, 1947, Serial No. 774,963

2 Claims. (Cl. 229—15)

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My present invention relates to partitions adapted to divide a box or other container into a plurality of cushioned receptacles for retaining a number of relatively fragile elements in appropriate position in the box or container, and more specifically relates to the utilization of waved double face corrugated board for the formation of the partitions.

Double face corrugated board comprises a pair of outer liners which are substantially plane on opposite sides of a corrugated central liner. This type of structure is a stiff inflexible unit which can not be bent, although it may be scored and folded.

Attempts have previously been made to produce a waved double face corrugated board wherein the complete three liner board, consisting of the two outer liners and a corrugated central liner, was itself formed with a waved cross-section. Although this kind of formation has been suggested in the prior art, no method has previously been suggested for forming this board so that the double face corrugated board is itself waved; and where suggestions have been made as to a waved double face corrugated board, no specific conformation of the waves in the board was suggested, and no utilization of the board for partitioning purposes was possible. At best, the waved board suggested in the prior art was previously capable of being made to be used as a rather hard stiff cushioning member for a side wall.

My invention is directed to the utilization of waved double face corrugated board for use as partitions dividing a box or container into a plurality of separate cushioned receptacles in which the contents of each receptacle is separated from the contents of all the other receptacles in the box or container.

For this purpose, I prefer to utilize a substantially semi-circular wave and to use two or more rows of waved double face corrugated board to create the partitions, although even a single double face corrugated board will be sufficient in a narrow container to create a single row of receptacles.

Thus, the primary object of my invention is the provision of a novel and simple substitute for old style partitions for boxes or containers wherein the partitions consisted of a plurality of flat notched sheets, the notches of which engaged each other to produce a particular cellular structure, as in the well-known egg box.

The difficulty which arose with partitions of this type, especially when heavy notched parti-

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tions were used or heavy materials such as grenades, bottles and the like, was that a separate assembling operation was required for the partitions, which were then shipped in collapsed form for erection and insertion into the box or container.

My novel waved double face corrugated board need merely be laid in sheet by sheet as the box is packed to create the necessary partitions and does not require any assembling operation.

Also, in prior partition structures, it was not possible by simple assembling of flat board to create a multiplicity of cells extending in a single row through a narrow box.

My novel waved double face corrugated board makes it possible to create such a single row of cells extending through a narrow box or container.

Another object of my invention is the arrangement of waved double face corrugated board to produce strong and effective cushioning members.

A further object of my invention is the utilization of waved double face corrugated board for the production of structural members.

A further object of my invention is the provision of a novel method for making waved double face corrugated board.

The foregoing and many other objects of my invention will become apparent in the following description and drawings in which:

Figure 1 is a view in perspective of a waved double face corrugated sheet in accordance with my invention.

Figure 2 is a top plan view of a box with a plurality of the waved double face corrugated sheets of Figure 1 assembled therein to form a partition, the view showing a number of objects in the various cells of the partitions thus formed.

Figure 3 is a cross-sectional view showing a modified construction of my novel waved double face corrugated board to provide an efficient cushioning member which may also be a structural member.

Figure 4 is a cross-sectional view showing another modified construction of my novel waved double face corrugated board to provide an efficient cushioning member which may also be a structural member.

Figure 5 is a cross-sectional view showing another modified construction of my novel waved double face corrugated board to provide an efficient cushioning member which may also be a structural member.

Figure 6 is a schematic view illustrating one

method for constructing my novel double face waved corrugated board.

Referring first to Figures 1 and 6, my novel waved double face corrugated board comprises a pair of outer liners 10 and 11 and an inner corrugated liner 12, the entire board having a plurality of undulations or waves 13, 14.

Heretofore, as is well known, it has been impossible to bend double face corrugated board along any curve. The only way in which a bend might be obtained was by creasing, scoring, or otherwise deforming a portion of the board in order to obtain a sharp bend line or a plurality of such bend lines.

In Figure 6 I have shown one way in which my novel waved double face corrugated board of Figure 1 may be obtained.

A single face corrugated sheet 20 which has already been manufactured by conventional corrugated methods and which comprises the liner 10 and the inner corrugated liner 12 is fed either from a supply roll or from the machine which has made the single face corrugated sheet 20 at a speed sufficient to form the slack loop 21.

The single face sheet 20 is then drawn over the idler 22 and under idler 23 over the silicate applying roll 24 rotating in the glue box 25 under the idler 26 and into the meshing waved applicator rolls 30, 30.

Rolls 30, 30 are essentially cylindrical rolls rotating on their respective shafts 31, 31 but are provided with surface indentations or waves 13', 13' which mesh with each other.

Thus, as the corrugated sheet 20 is fed into the rolls 30, 30, it assumes a waved formation in accordance with the indentations or undulations 13', 14', the outer liner 11 taken from the supply roll 32 is simultaneously fed between rolls 30, 30 against the crowns of the corrugated sheet 12, which crowns have already had glue applied to them by the glue applicator roll 24. The outer liner 11 is thus pressed down on to the crowns of the corrugated liner 12 by the rolls 30, 30, and the sheet which then emerges is the waved double face corrugated board of my invention.

The rolls 30, 30 are spaced from each other by a distance which is very slightly less than the ultimate thickness of the board in order to apply sufficient pressure to the outer liner 11 to cause it to adhere to the glue on the crowns of the flutes of the corrugated liner 12, the spacing being, however, not so close as to cause collapse of the flutes of the corrugated liner 12.

The waved double face corrugated board which issues from the machine may then be cut off into appropriate lengths by well-known cutting mechanisms and the sheets stacked in nested form until they are to be used.

In Figure 2, I have shown one way in which my novel waved double face corrugated board construction of Figure 1 may be used to form a plurality of partitions or receptacles 40, 40 in a box or container 42.

Preferably, the waved double face corrugated board sheet is provided with undulations 13 and 14 which are substantially semi-circular, although other cross-sectional arrangements of the undulations may be used depending on the dimensions and cross-sectional arrangement of the objects to be packed.

The sheets are laid into the box in such manner that the undulations 14 in each sheet are in alignment with the similar undulations 14 of the other sheets, and the undulations 13 of each

sheet are similarly in alignment with undulations 13 of the other sheets.

Preferably, in the operation of packing the box the first sheet A is laid into the box and the objects 45 which are to be packed are inserted between the waves or undulations. In this case, a line of four such objects 45 is inserted. The second sheet B is then laid into the box and a second line of objects 45 is inserted. Then the third sheet C is laid into the box and a third line of objects 47 is inserted.

By this means, therefore, a plurality of compartment cells or partitioned elements 40 are created in the box without the necessity for manufacturing and assembling partitions prior to insertion thereof in a box. The box packer need merely lay in one sheet, put in four bottles 45, lay in the second sheet, put in four more bottles 46 and lay in the third sheet and put in four more bottles 47 in the case of a box which is to be packed 3 x 4 to produce a twelve-partitioned box.

The partitions may be made available to the packer in stacked form. They need not be erected from collapsed position as a preliminary operation and the assembling of the partitions and the units to be protected, separated and cushioned thereby is a simple continuous operation.

By the means herein shown, a single element, such as the element A of Figure 2 may be used to create a single line of partitions in a narrow box. A pair of such elements will form two lines of partitions; three such elements will form three lines of partitions and so forth.

The curve of the waved double face corrugated board since it resists deformation by reason of its double face construction acts as an effective cushioning element. This is far more effective than the simple flat partition wall heretofore used.

As previously pointed out, the waves or undulations in the double face corrugated board may be varied in their arrangement by variations in the outer conformation of the rolls 30, 30 to produce waves with different cross-section in accordance with the specific packing requirements.

In addition, cushioning side walls may be formed by the utilization of my novel waved double face corrugated board, and the said cushioning side walls may be provided with flat surfaces also of double face corrugated board as shown in Figure 3 wherein the waved double face corrugated sheet 50 made in accordance with the construction of Figure 1 has laminated thereto on either side thereof a double face flat corrugated sheet 51, 52.

In appropriate cases, only one flat corrugated surface 51 may be used or, where desired, two such flat corrugated surfaces 51 and 52 may be used. Such a sheet not only has vertical structural strength in a direction longitudinal of the flutes or waves in the waved double face sheet 50 but has strengthening cushioning characteristics for heavy duty purposes owing to the tendency of the waved double face sheet 50 to resist deformation in any direction. This tendency to resist deformation in any direction is further assisted by the lamination to the waved double face sheet 50 of the flat double face corrugated board 51, 52.

In Figure 4, I have shown a modified construction which may be used either for cushioning purposes in the case of very heavy material or for great structural strength. In this case, the waved double face corrugated sheet 50 is sandwiched between a pair of flat double face corru-

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gated sheets 61 and 62. The flat double face corrugated sheet 62 has laminated thereto the crowns of the waves of the additional curved double face corrugated sheet 63, and this additional waved sheet has laminated to the crowns thereof the flat double face sheets 64.

In this case again, great resistance to compression of the sheet is encountered by reason of the resistance offered by the waved double face sheets reinforced by the lamination with the flat double face sheets to deformation. This resistance is, however, a resilient one and thus provides a cushioning effect.

In addition, as previously pointed out, great structural strength particularly in a direction longitudinal of the waves in the waved double face sheets is obtained.

In Figure 5, I have shown a modified construction adapted either for cushioning purposes, structural strength or for manufactured set-up partition purposes wherein a plurality of waved double face corrugated sheets 70, 71, 72, 73 are successively laminated together by gluing together of the meeting crowns of the waves as at 75, 75 to produce a multiplicity of partitions 76, 76 and also to produce a structure which offers great vertical structural strength in a direction longitudinal of the crowns of the waves and great resistance to transverse compression owing to the fact that double face corrugated board when manufactured can not be deformed without an actual score cut, break or crease of the material.

All of the structures of Figures 3, 4, and 5 in addition to being used for structural or cushioning purposes may be used for partitioning purposes where the cross-sectional dimension of the objects to be protected by and retained in the partitions is such as to permit the use of partitions having the conformation shown in Figures 3, 4 and/or 5.

Thus, while the general idea of the production of waved double face corrugated board has previously been suggested, no suggestion of the method of manufacture of this board has previously been made, and no suggestion has been made of the utilization of a specific waved conformation in the board for partitioning purposes

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as shown in Figure 2, nor has any suggestion been made of the structural conformations possible as shown in Figures 3, 4 and 5.

In the foregoing, I have described my invention solely in connection with specific illustrative embodiments thereof. Since many variations and modifications of my invention will now be obvious to those skilled in the art, I prefer to be bound not by the specific disclosures herein contained but only by the appended claims.

I claim:

1. A cellular structure comprising a plurality of waved double face corrugated boards each having a succession of waves producing oppositely directed successive troughs and a plurality of flat double face corrugated boards, the flat boards and the waved boards alternating in the structure, the flat boards being connected to the crests of the waves of the waved boards.

2. A cellular structure comprising a plurality of waved double face corrugated boards each having a succession of waves producing oppositely directed successive troughs and a plurality of flat boards, the flat boards and the waved boards alternating in the structure, the flat boards being connected to the crests of the waves of the waved boards.

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