

Nov. 5, 1946.

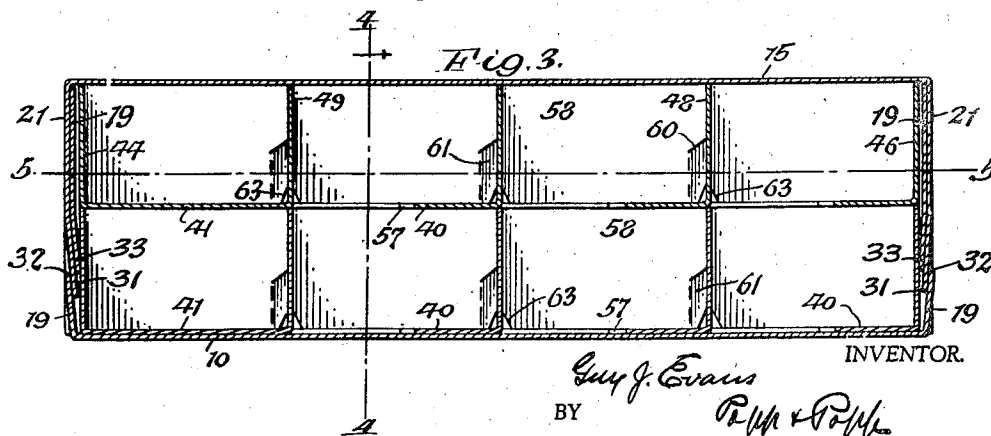
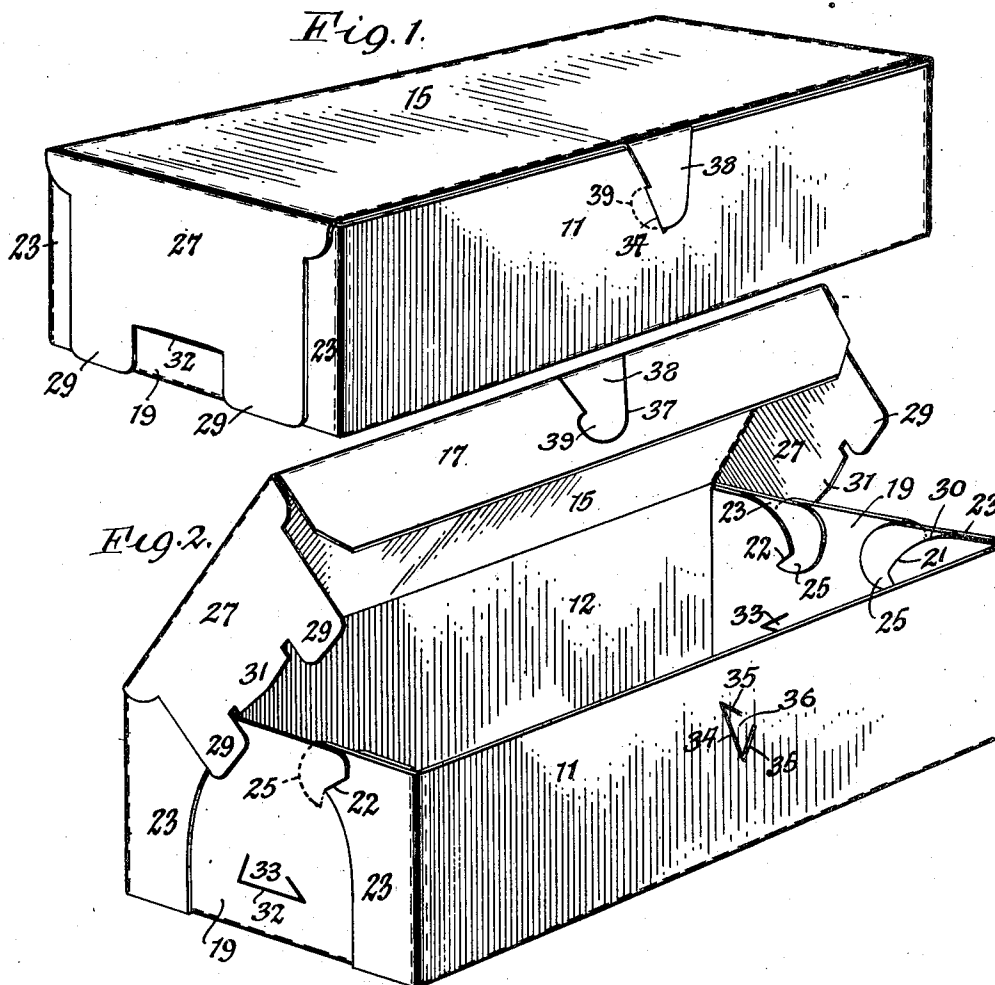
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2,410,486

FOLDABLE BOX

Filed May 29, 1943

4 Sheets-Sheet 1



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2,410,486

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Fig. 4.

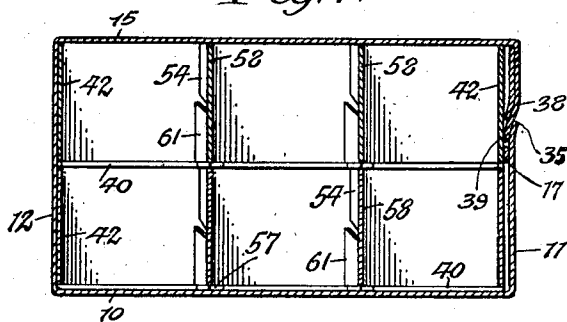


Fig. 5.

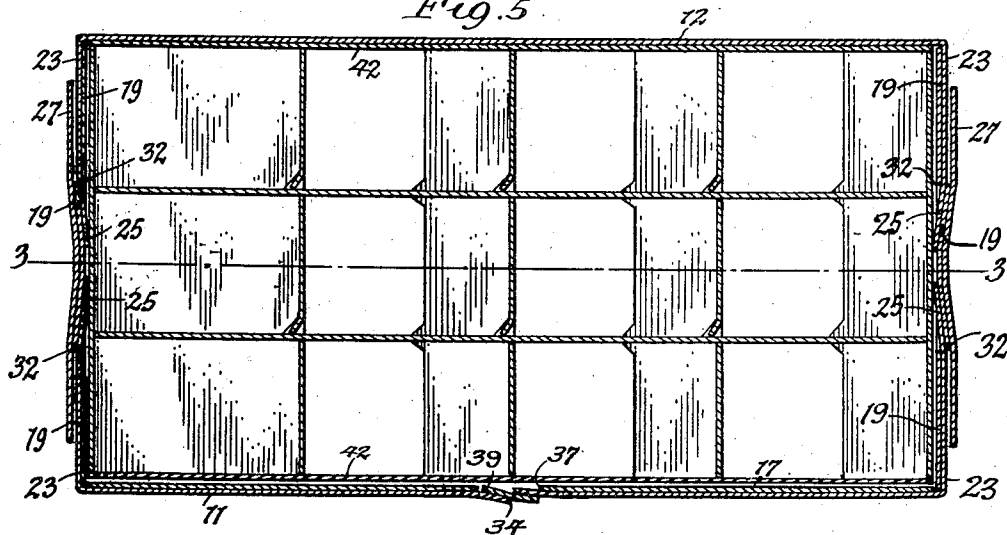
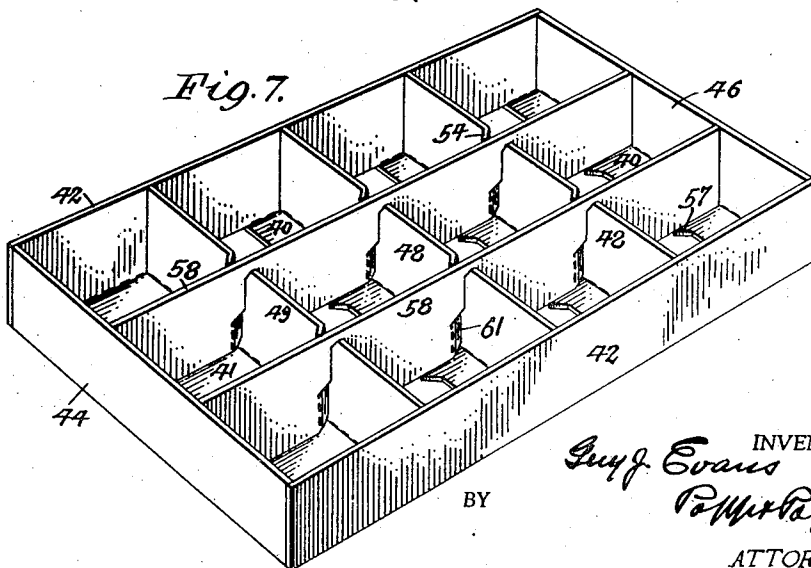


Fig. 7.



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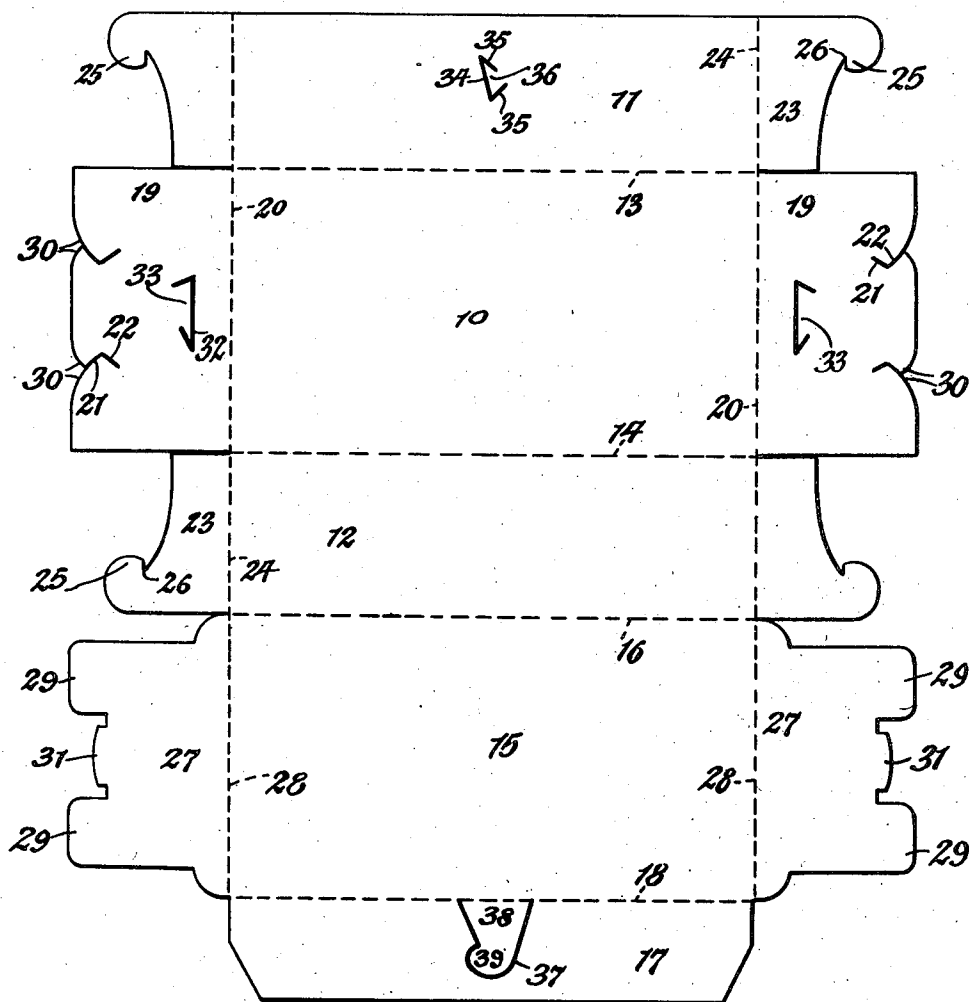
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Fig. 6.



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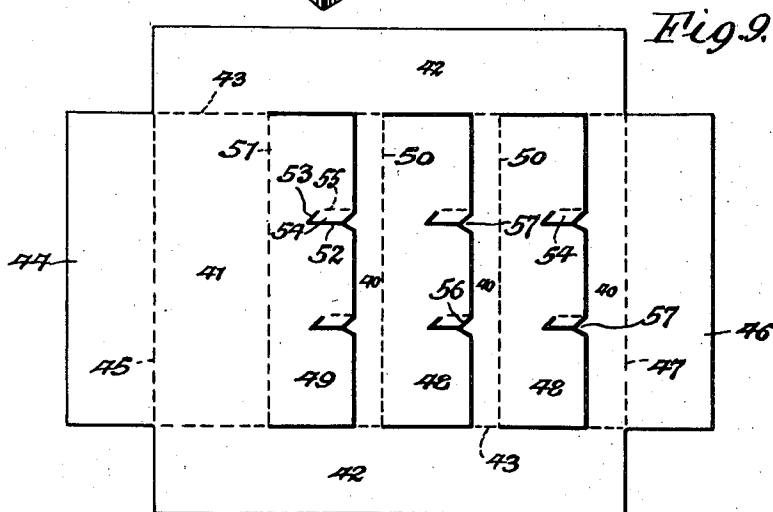
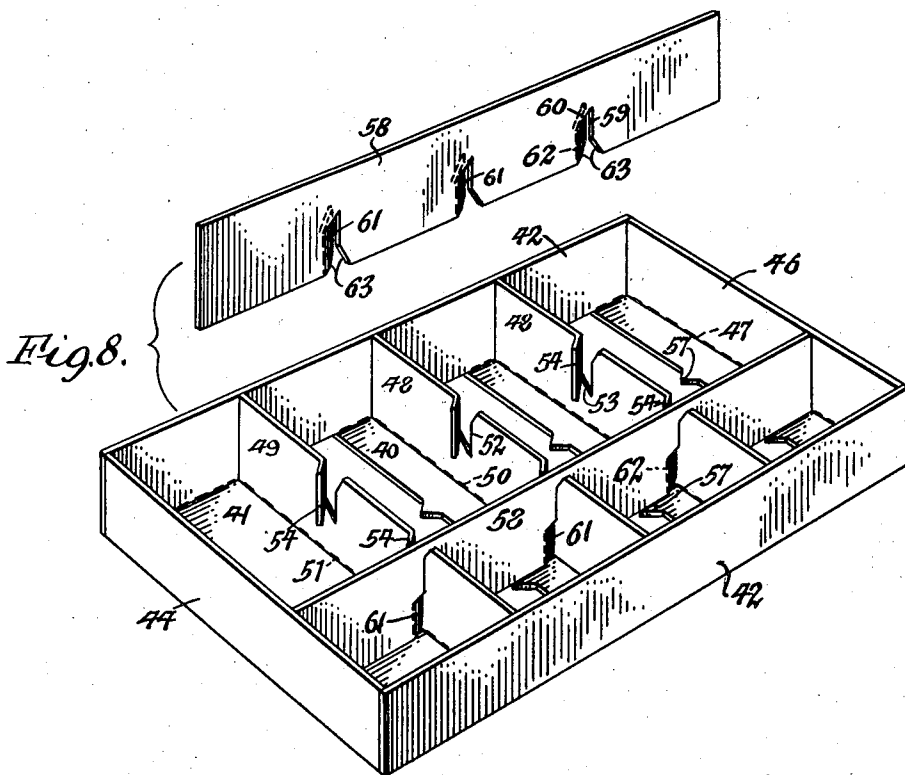
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4 Sheets-Sheet 4



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2,410,486

FOLDABLE BOX

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Application May 29, 1943, Serial No. 488,981

2 Claims. (Cl. 229-42)

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This invention relates to that type of folding box in which the container and cover are made of one sheet of paper or similar material and also to a folding box in which the space within the container is divided into a plurality of cells or compartments by partition means which are constructed or foldable sheet material, such as paper.

Paper boxes of the rigid type are usually favored on account of the corners of the container being full and continuous from one wall to the other of a corner instead of showing vertical slits at the corners.

One of the objects of this invention is to provide a folding paper box in which the corners of the container are full and avoid the use of any slits at these places.

Another object of this invention is to so construct the end walls of the complete box that the same are stronger and more durable and the parts thereof are firmly interlocked and not liable to be detached.

A further object of this invention is to provide the interior of the box with a partition for dividing the same into a plurality of cells or compartments which can be manufactured without the use of expensive dies and also without wasting an undue amount of material.

In the accompanying drawings:

Fig. 1 is a perspective view of a closed box embodying this invention.

Fig. 2 is a similar view showing the box partly open.

Fig. 3 is a vertical longitudinal section of the box and the partition therein taken on line 3-3 Fig. 5.

Fig. 4 is a vertical cross section taken on line 4-4, Fig. 3.

Fig. 5 is a horizontal section taken on line 5-5, Fig. 3.

Fig. 6 is a plan view of the blank from which the container and cover of the box are constructed.

Fig. 7 is a perspective of the completed partition embodying this invention.

Fig. 8 is a perspective view of the partition partly assembled.

Fig. 9 is a plan view of the blank from which a part of the partition is constructed.

The blank from which the container and cover of the box are made consist preferably of a single sheet of paper or similar material which, as shown in Fig. 6, is constructed as follows:

The numeral 10 represents the bottom of the container, 11, 12 the front and rear longitudinal

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side walls thereof which are arranged on opposite sides of the bottom and adapted to be folded relative thereto along folding lines 13, 14 between the same.

Lengthwise along the upper edge of the rear wall 12 is arranged the top 15 of the cover which is foldable relative to the rear wall 12 along the longitudinal line 16 and 17 is a longitudinal sealing flange arranged lengthwise along the front edge of the cover top and foldable relatively thereto along a longitudinal line 18 between the same.

At the opposite transverse edges of the container bottom are arranged the transverse end walls 19 of the container, each of which is foldable relative to the bottom 10 along a transverse line 20 between the same.

Preparatory to interlocking the several members of the container and cover for producing a closed box the front and rear side walls 11, 12 are bent upwardly along the longitudinal lines 13, 14 into a vertical position relative to the horizontal bottom 10 and the end walls 19 are also bent upwardly along the transverse lines 20 into a vertical position relative to the bottom, the cover 15 is bent inwardly along the longitudinal line 16 into a horizontal position and the sealing flange 17 is bent downwardly along the line 18 into vertical position relative to the cover and along the inner side of the front wall 11.

Locking means are provided whereby the opposite ends of each end wall and the adjacent ends of the front and rear side walls of the container are connected after these walls are turned upwardly into a vertical position relative to the bottom of the container. Each of these wall locking means is preferably constructed as follows:

On opposite sides of its central part each of the end walls 19 is provided with a reentrant slit comprising an outer part 21 which inclines inwardly toward the center of this wall and an inner part 22 which inclines outwardly from the inner end of the outer part 21. The outer end of the outer part 21 of this reentrant slit preferably flares outwardly, as shown at 30 in Fig. 6.

Each of the ends of the front and rear side walls is provided with a corner flap 23 which is adapted to be turned inwardly at right angles to the respective side wall on a transverse line 24. At its outer corner this flap is provided with a locking hook the beak 25 of which projects inwardly and downwardly and is separated from the adjacent part of the respective corner flap 23 by an undercut slit 26.

After the side walls 11, 12 and end walls 19 have

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been turned upwardly into a position in which they are perpendicular to the bottom 10, then each corner flap 23 is turned inwardly against the outer side of the adjacent side edge portion of the respective end wall 19 and the beak 25 of the locking hook of this flap is moved downwardly into the companion reentrant slit of this end wall until the inner end of the undercut slit 26 engages with the inner end of the inner part 22 of the reentrant slit in this end wall, as shown in Fig. 2, thereby securely connecting the respective parts of these walls. By making the outer end of the reentrant slit of flaring form, as shown at 26 in Fig. 6, the beak 25 of the locking hook on the adjacent corner flap can be easily guided into this reentrant slit and the connection of the respective side and end wall effected very quickly and readily.

This manner of forming the vertical corners between the side and end walls of the container renders the same full and without a break or slit thereon, thus not only improving the appearance of this part of the box but also rendering these corners stronger and approximating the appearance and strength of boxes in which the side and end walls are permanently connected by glue or otherwise.

Means are provided for sealing the joints between the transverse edges of the cover top 15 and the upper edges of the end walls 19 and the corner flaps 23 which means are preferably constructed as follows:

The numeral 27 represents sealing flaps arranged at opposite ends of the cover top 15 and adapted to be bent downwardly at right angles thereto on a transverse line 28 between the same. Each of these sealing flaps is somewhat narrower than the cover top, as shown in Fig. 6, and provided at its corners with comparatively long end concealing tabs 29, 29 and centrally between the corner tabs with a single intermediate locking tab 31. On the lower central part of each end wall 19 it is provided with a slit 32 which is of substantially keystone shape and forms a correspondingly shaped lip 33, the upper end of which is connected with the respective end wall while the lower end of the same is free to be deflected inwardly.

Before lowering the cover top over the container the sealing flaps are bent downwardly at right angles to the cover top and while lowering the top the sealing flaps are also lowered into engagement with the outer side of the container end walls and the corner flaps. During the last part of this downward movement of the cover and sealing flaps the central locking tab 31 is pressed inwardly against the locking lip 33 so as to deflect the latter inwardly and thereafter this tab is engaged with the inner side of the respective container end wall, as shown in Figs. 1 and 3, whereby this end of the cover is interlocked with the corresponding end of the container and the horizontal transverse joint between the respective edges of the cover top and the container end wall and corner flaps are closed or sealed. While in this lowered position of the cover the concealing tabs 29 of the sealing flaps also completely conceal the joints between the end walls 19 and the flaps 23, thereby rendering the appearance of the ends of the box comparatively plain and causing the same to more nearly resemble in appearance that of a rigid non-foldable box which is favored by the trade without incurring the greater cost of the latter.

Means are provided for locking the cover in

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the closed position on the container which means are preferably constructed as follows:

On the central part of the front wall 11 it is provided with a locking slit which is of keystone shape and comprises an inclined central part 34 and two end parts 35 which converge from opposite ends of the central part and form between them a locking lip 36 which is of keystone shape.

The numeral 37 represents an R-shaped slit formed in the central part of the front sealing flange 17 of the cover and forming a locking hook which has a downwardly tapering shank 38 and a rounded beak 39 projecting laterally from the lower end of the shank, as shown in Figs. 2 and 6.

When lowering the cover into its closed position the sealing flange is tucked into the container on the inner side of its front wall 11 but its locking hook is carried downwardly on the outer side of this wall and when the cover is fully lowered its locking hook is sprung laterally and its beak 39 is pressed inwardly against the locking lip 36 sufficiently to permit of passing the beak through the locking slit 37 in the front wall 11 and into engagement with the inner side of the front wall 11, as shown in Figs. 1 and 4, and thereby securing the cover in its closed position.

The space within the container is divided into a plurality of cells or compartments by partitioning means which embody this invention and which are constructed as follows:

Referring to Fig. 9, the blank of flat sheet material, such as paper, from which the main part of the partitioning means are constructed comprises a plurality of transverse bottom sections or bars 40, 41 of which each of the sections 40 is comparatively narrow and forms the partial bottom of a plurality of cells which are arranged in a transverse row and the section 41 is comparatively wide and forms the complete bottom of a transverse row of cells at one end of the entire group of cells.

Along transversely opposite sides of the ends of the bottom sections are arranged two longitudinal side walls 42 which are adapted to be bent upwardly into a vertical position on longitudinal lines 43 between these walls and the respective ends of the bottom sections and form the outer longitudinal walls of those cells which are arranged along the opposite longitudinal sides of the entire group.

At the transverse outer edge of the wide bottom section 41 is arranged a transverse end wall 44 which is adapted to be turned upwardly into a position perpendicular to the wide bottom section 41 along a transverse line 45 between the same and form the outer transverse wall of the transverse row of cells at the respective end of the entire group. On the outer side of the narrow bottom section 41 at the opposite end of the group of cells is arranged another transverse end wall 46 which is adapted to be turned upwardly into a vertical position along a transverse line 47 between this wall and the endmost bottom section 40 and thereby form a transverse wall for the several cells of the transverse row at this end of the group.

In the spaces intermediate of the bottom sections are respectively arranged a plurality of transverse dividing walls 48, 49, each of the walls 48 adapted to be bent upwardly into a vertical position along a transverse line 50 between the same and an adjacent narrow bottom section 40 and the dividing wall 49 adapted to be bent

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upwardly into an upright position along a transverse line 51 between the same and the wide bottom section 41.

Each of the transverse dividing walls is provided in its upper edge with a plurality of retaining slits each of which has a vertical upper part 52 and a laterally extending lower part 53 thereby forming a locking wing 54 on this wall which is adapted to be deflected horizontally to a moderate extent on a vertical line 55 between this wing and the respective dividing wall. The upper end 56 of the upper vertical part 52 of each retaining slit is preferably made of downwardly tapering V-form and the material which is left in producing the V-form 56 produces a V-shaped tongue 57 on the opposing transverse edge of the respective narrow bottom section.

The numeral 58 represents a plurality of longitudinal dividing walls each of which is adapted to intersect the transverse dividing walls and have its ends arranged close to or engage the transverse outer walls 44, 46 and form part of the side closure of a plurality of cells or compartments.

Each of these longitudinal dividing walls is provided in its lower edge with a plurality of retaining slits each of which has a vertical lower part 59 and a laterally extending upper part 60, thereby forming a locking wing 61 on this wall which is adapted to be deflected horizontally to a moderate extent on a vertical line 62 between this wing and the respective dividing wall. The lower end 63 of the vertical part 59 of this retaining slit is preferably of downwardly flaring or V-form.

Upon assembling the several longitudinal dividing walls with the transverse dividing walls each longitudinal dividing wall is moved downwardly while its several retaining slits register with the corresponding slits in the several transverse dividing walls until the longitudinal dividing wall engages its lower edge with the several bottom sections 40, 41 and during this movement the vertical parts of the retaining slits of the transverse dividing walls are engaged by the adjacent upper parts of the longitudinal dividing walls and the lower vertical parts of the retaining slits in the longitudinal dividing walls receive the adjacent lower parts of the transverse dividing walls, as best shown in Figs. 7 and 8. The inter-engagement of the slitted parts of these dividing walls is facilitated by the V-formation of the entrance to these slots which permits of readily locating these dividing walls relatively to one another and starting the interlocking of the same.

During the operation of interlocking the transverse and longitudinal dividing walls the locking wings of these members are deflected by the wedge action of the cooperating inclined surfaces formed on these wings by the V-formation of the inlets of the retaining slits. In their operative positions the wings of one dividing wall incline toward the flat surface of an adjacent dividing wall and engage each other with a clutching or gripping action whereby the same are securely held in assembled position and thus form substantial compartments or cells for maintaining the goods placed therein in proper order.

In the drawings the partitioning means are so constructed as to form two superposed tiers of cells and each tier comprises three longitudinal rows of cells, but it is to be understood that the number of tiers and the cells in each tier may be varied to suit requirements.

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It will be noted that in the construction of the transverse walls that part of each of these walls below the lower end of each vertical slit 52 forms a neck or web on this wall and that a similar neck or web is formed on each of the longitudinal walls at the inner end of each of its vertical slots 59 and that when the transverse and longitudinal walls are assembled the rest of the longitudinal walls are received by the vertical slits 52 of the transverse walls and the rest of the transverse walls are received by the respective slits of the longitudinal walls.

It is also to be noted that in the formation of the V-shaped guide recesses on the transverse walls in the upper ends of the slits 52 the V-shaped tongue 57 which is left on the adjacent bottom portions 40 serve as additional supports for the longitudinal walls by engagement with the lower edges of the same, as shown in Figs. 4 and 7 and thereby utilize to the fullest extent the sheet material from which the transverse walls and bottom sections are made for obtaining a cellular division for use in boxes which is of maximum strength.

The several members of the box can be manufactured without any appreciable waste of material and by the use of cutters of simple construction, thereby enabling this product to be marketed economically.

Moreover the box can be easily and quickly erected from flat blanks and when assembled is strong and durable and presents the appearance of a rigid non-foldable box.

I claim as my invention:

1. Partitioning means for dividing the space in a container into a plurality of cells comprising a sheet of material which is cut to form a plurality of horizontal transverse bottom sections and a plurality of vertical transverse walls each of which is bent upwardly from a transverse edge of one of said horizontal bottom sections, and a plurality of vertical longitudinal walls intersecting said transverse walls, and means for interlocking said transverse and longitudinal walls including a plurality of upwardly opening vertical slits formed at intervals in the upper part of each of said transverse walls and leaving the lower part of the transverse wall below said vertical slit in the form of a connecting neck, the upper end of the sides of each of said vertical slits diverging upwardly to form a V-shaped guide recess on the upper edge of the respective transverse wall, the material forming said recess being left as a V-shaped tongue on the transverse edge of the adjacent bottom section, and the material of the transverse wall on one side of each of its vertical slits forming a locking wing which is bent on this wall along a vertical line thereon and which is separated at its lower end from this wall by a slit extending laterally in said transverse wall from the lower end of the respective upwardly opening vertical slit, and each of said longitudinal walls having its upper part provided with a plurality of downwardly opening vertical slits leaving the lower part of this wall in line with each of these slits in the form of a connecting neck, and each longitudinal wall having its slits receiving the necks of the respective transverse walls, and the slits of said longitudinal walls receiving the necks of the respective transverse walls.

2. Partitioning means for dividing the space in a container into a plurality of cells comprising a sheet of material which is cut to form a plurality of horizontal transverse bottom sections

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and a plurality of vertical transverse walls each of which is bent upwardly from a transverse edge of one of said horizontal bottom sections, and a plurality of vertical longitudinal walls intersecting said transverse walls, and means for interlocking said transverse and longitudinal walls including a plurality of upwardly opening vertical slits formed at intervals in the upper part of each of said transverse walls and leaving the lower part of the transverse wall below said vertical slit in the form of a connecting neck, the upper end of the sides of each of said vertical slits diverging upwardly to form a V-shaped guide recess on the upper edge of the respective transverse wall, the material forming said recess being left as a V-shaped tongue on the transverse edge of the adjacent bottom section, and the material of the transverse wall on one side of each of its vertical slits forming a locking wing which is bent on this wall along a vertical line thereon and which is separated at its lower end from this wall by a slit extending laterally in said

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transverse wall from the lower end of the respective upwardly opening vertical slit, and each of said longitudinal walls having its upper part provided with a plurality of downwardly opening vertical slits leaving the lower part of this wall in line with each of these slits in the form of a connecting neck, and each longitudinal wall having its slits receiving the necks of the respective transverse walls, and the slits of said longitudinal walls receiving the necks of the respective transverse walls, and the sides of each of the slits in the longitudinal wall having their lower ends diverging downwardly to form a V-shaped guide recess and the material of each longitudinal wall on one side of each of its slits forming a locking wing which is bent on this wall along a vertical line and which is separated at its upper end from this wall by a slit extending laterally in said transverse wall from the upper end of the respective downwardly opening slit.

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