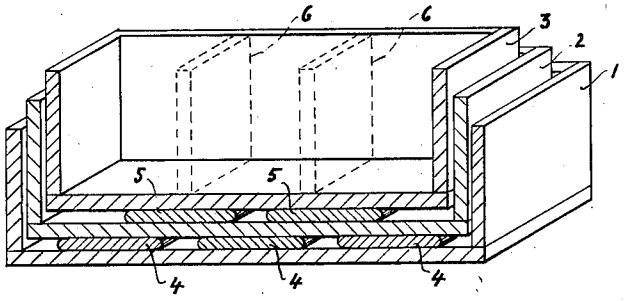
June 4, 1940. E. S. TIPTON 2,203,240

NESTED BOX

Filed March 9, 1939

Fig. 1.



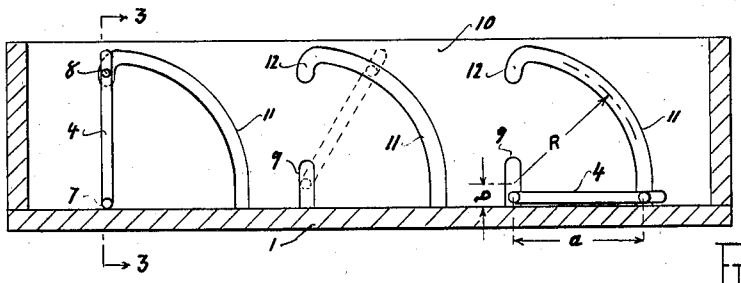


Fig. 2.

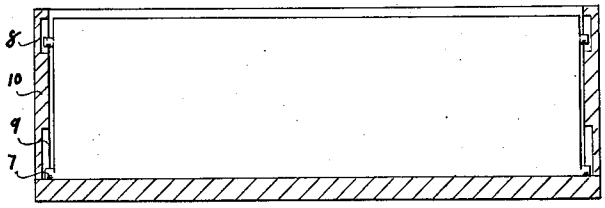
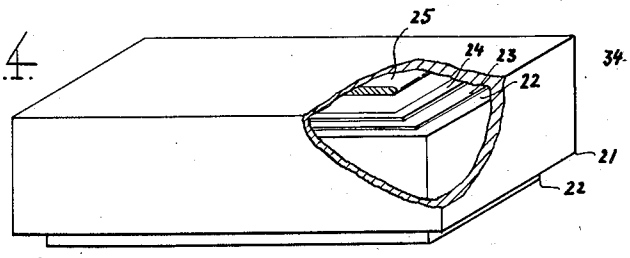


Fig. 3.

Fig. 4.



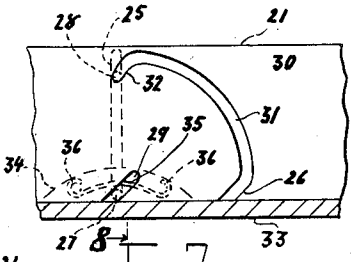


Fig. 7.

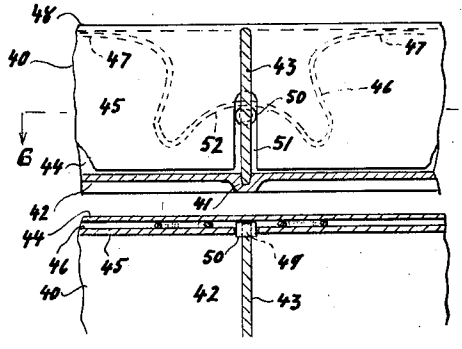


Fig. 5.

Fig. 6.

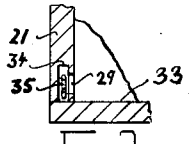


Fig. 8.

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Patented June 4, 1940 2,203,240

UNITED STATES PATENT OFFICE

2,203,240

NESTED BOX

Edna Sibley Tipton, New York, N. Y.

Application March 9, 1939, Serial No. 260,806

10 Claims. (Cl. 217—7)

This invention concerns tray-like nested boxes, some or all of which have partitions. The partitions of boxes, in which other boxes are nested, are collapsible or "nestable" in order to facilitate nesting of the smaller boxes therein. Part of the instant subject matter has been taken over from applicant's abandoned application, Serial No. 622,901, filed July 16, 1932, for "Articles of manufacture."

The object of this invention is to provide a set of coordinated receptacles, which may be nested and thus will occupy very little space, when they are stored or packed away for transportation. When these boxes are unnested for use, so to speak, they present a number of individual trays, some or all of which are subdivided by the collapsible or nestable partitions into a plurality of compartments. Each compartment may accommodate a different kind or type of article in a segregated, orderly fashion.

Nested boxes of this invention may represent an independent article of manufacture, and the largest of boxes may serve as a cover for the others, whereas the smallest of the boxes may be provided with solid, permanently arranged partitions, which do not have to be collapsible for the nesting operation.

But such a unit of nested boxes may also form part of a larger unit or article of manufacture and fits, for instance, a pigeon hole or bin of a rack, cabinet or desk, or may be nested into the drawers of any piece of furniture.

Nestable boxes of this invention may be put to use in a store in order to afford the keeping and display of merchandise in a well appointed fashion. When, at another time, larger merchandise is to be kept on display, and there is no ware to occupy the nestable boxes, these boxes may be nested in a compact manner and stored away without any appreciable waste of space.

In a manufacturing establishment, where in a certain assembling operation a plurality of ingredients or parts are to be neatly separated but all within convenient reach of the craftsman, nestable boxes of this invention serve excellently for such operation, but may be removed and unobtrusively stored by nesting, when they have been emptied and have served their purpose for the time being.

The nestable boxes offer good use in office and studio, for instance for pens, pencils, brushes, instruments, etc. when the user is at work, and likes to have all instruments and tools conveniently at his disposal. When in use the boxes may be stacked, when not in use they are nested.

A set of boxes of this invention are particularly suited for transient or permanent occupants of hotels and apartment houses, cabins on board ship, in bathing or health resorts, on trains or in trailers.

It is an object of this invention to supply a set of receptacles for household use, e. g., designed especially for the reception of table silver, such as knives, forks, spoons and other like articles.

The dining room or kitchenette may usually be supplied with furniture such as a sideboard or cupboard, but such furniture is not usually equipped with drawers or other compartments for holding tableware of the type mentioned.

The nested boxes of this invention render possible the appointment of necessaries in new surroundings in a manner to which one has become accustomed in prior quarters.

In like manner nestable boxes of this invention render necessaries available in rooms and boudoirs, by separately accommodating haberdashery, garments, toilet articles, cosmetics, utensils, etc.

A construction whereby said objects may be attained is exemplarily shown in the accompanying drawing, in which:

Fig. 1 is a set of nested boxes, shown in transverse vertical section.

Fig. 2 is a vertical section of one of said boxes looking in the direction of one of the sides which is supplied with mounting grooves for partitions.

Fig. 3 is a section of Fig. 2 taken at, and looking in the direction indicated at line 3—3 in Fig. 2.

Fig. 4 is the perspective view of another embodiment of this invention in which part of the outside container has been sectioned away in order to permit a view of the novel interior arrangement.

Fig. 5 is a cross-sectioned side view of another container of this invention, in which some of the partitions are tension-controlled, like in all the remaining figures.

Fig. 6 is a corresponding horizontal cross-section taken at a level and in the direction indicated in Fig. 5 by line 6—6.

Fig. 7 is a detailed view executed similar to that of Fig. 2, but concerns another modification of this invention.

Fig. 8 is a corresponding cross-section taken

at a line and in a direction denoted by the digit 8 in Fig. 7.

Similar numerals refer to similar parts throughout the various views.

In detail, the construction illustrated in said drawing is as follows:

In Fig. 1 the individual boxes from the largest to the smallest are indicated by the reference figures 1, 2 and 3 respectively.

The partitions are shown in boxes 1 and 2 in the folded position, those in box 1 being indicated at 4, 4, 4; those in box 2 are indicated at 5, 5; the partitions in the smallest box 3 may be either rigidly attached or foldable, are shown in dotted lines and are indicated by the reference numerals 6, 6.

One particular novel feature of this invention is found in the foldability of the partitions and more especially in the construction whereby the two characteristics of foldability and non-removability are combined.

For the attainment of these characteristics the following construction is suggested:

In an embodiment of Figs. 1, 2 and 3 each partition is provided upon each end with two short pegs or dowel-like projections as 7 and 8; the lower one, 7, is termed the hinge-pin and the upper one, 8, is termed the locking pin.

For the reception of hingepin 7, a vertically disposed groove or slot 9 is formed in the inner opposing faces of two opposite vertical walls 10, 10; also for the reception and movement of said locking pin 8, a groove or slot 11, having a substantially arcuate form is formed in the inner opposing faces of said two opposite vertical walls.

In the formation of said groove 11, a radius R is employed the length of which is equal to the distance from center to center of said pins 7 and 8 as indicated at *a* in Fig. 2; the center from which said radius is struck is located at a short distance above the bottom of the box, as indicated at *b*; the upper extremity of said groove 11 extends downwardly, as shown at 12; said downwardly disposed extremity forms the locking feature whereby the foldable partitions are retained in their upright positions.

For the purpose of explaining how this locking feature operates, reference is made to Fig. 2 of the drawing, in which three partitions are indicated as follows: The one at the left hand end of said view indicates a partition in the upright, service position; in the center of said view, a partition, indicated in dotted lines, is shown in a position which is intermediate to the service position and the folded position; at the right hand end of said Fig. 2 a partition is indicated in the downward (out-of-service, nestable) position; in order to place the upright partition in the folded position it is raised sufficiently to permit the locking pin 8 to enter the arcuate portion of slot 11, substantially as indicated in dotted lines in said Fig. 2; in this position, the partition will readily fall by gravity into the folded position shown at the right hand end of said figure. To erect a partition into its service position, it is manually actuated by grasping its upper edge and raising the same until the locking pin 8 drops into the vertically disposed upper end 12 of the groove 11.

The partitions of any unit of the nestable series may extend transversely to those in any other unit.

The material from which the box units of the series are made may be wood, metal or any other suitable composition such as plastics commercialized under the trade names of "Bakelite," "Viscoloid," etc.

Or course it may also be desirable to arrange the height of nestable boxes such as 22, 23 and 24 in Fig. 4, so that their tops are substantially level when they are nested, as shown. These nestable boxes 22, 23 and 24, may be coordinated with a largest nestable box 21 according to the arrangement of Fig. 1. Or, as illustrated in Fig. 4, these boxes may be nested so that the contents of the smallest box 24 are upwardly protected, all the nested boxes 22, 23 and 24, being gathered underneath the largest box 21, which is turned upside-down for this purpose and serves as a lid or cover.

However, after the largest nestable box 21 has been collapsed and then turned into an upside-down position the partitions 25, which correspond to the partitions 4 of the device of Figs. 1, 2 and 3, will gravitationally drop back into their pitched, substantially vertical positions, and will thus interfere with the depositing of box 21 in an upside-down position on the nested other boxes 22, 23 and 24.

For this and other reasons of positively allocating the partitions in either the pitched or the nestable position, an arrangement may be preferred which does not depend upon mere gravity for the positioning of the partitions but which temporarily secures them, preferably by tension, in the said extreme positions. This is illustrated in the remaining figures.

In Fig. 7, which concerns a construction applicable to all the nestable boxes and especially to a largest nestable box 21, hinge pins 27, locking pins 28, the straight hinge groove 29 at the bottom for hinge pins 27, the one of opposite vertical side walls 30, the arcuate groove 31, and the hook portion 32 of said groove correspond to the parts 7, 8, 9, 10, 11 and 12 of the embodiment of Figs. 1, 2 and 3. But here the arcuate groove 31 has a reclined spur portion 26 at its lower end. The straight groove 29 is correspondingly inclined, and a similar tilt may be given to the hook 32 at the upper end of the arcuate groove 31. This arrangement, by itself, has the advantage that the unnested box may stand upright on the side of the box from which the spur, hook and hinge groove are tilted away, in which position of the box the partitions are gravitationally stable when pitched or when collapsed.

From the bottom at which side walls 30 are assembled with the bottom panel 33 of box 21, a narrow groove 34 is countersunk into such wall 30, for instance by the cut of a thin milling cutter of a diameter corresponding to the top extent of the slot or groove 34.

The slot or groove 34 is just wide enough to allow a vertical play of tension means therein, which may for instance be a round spring wire 35. Wire 35 comprises a straight central portion and the coiled ends 36. These coiled ends of the spring react upon the top extent of the narrow groove 34, the central portion of said wire 35 being deformed and curved upwardly by the pin 27 extending thereunder through groove 29 into groove 34, as shown in Fig. 7. This arrangement works as follows:

A partition 25 is not retained in the vertical position shown in Fig. 7 by reasons of gravity only. Spring 35 depresses the partition into its lowest position shown so that the upper pin 38 is also firmly locked in the end of the hook portion 32 of arcuate groove 31. But against the pres-

sure of spring 35 the partition 25 may be manipulated, lifted and moved parallel to itself to the right, until the upper pin 28 slides into the arcuate groove 31 around the hinge pin 27, which is now lodged in the upper end of the hinge groove 29. When the partition 25 has been swung into a horizontal position, pin 28 enters upon the spur 26 at the end of groove 31, and the partition 25 will move parallel to itself in a substantially horizontal position at an incline to the left, pins 27 and 28 following the hinge groove 29 and spur 26, respectively. At the end of this motion the pin 28 is locked at the bottom of the spur 26, because pin 27 has been pushed down and to the left by the spring 35, so that the partition 25 is now retained under tension in a nestable position, which corresponds to the position indicated for a partition 4 at the extreme right of Fig. 2.

Since the partitions are now retained in the nestable position, under spring pressure, they will not flop around and flap into any possible position when the box 21 is turned upside-down in order to be deposited as a lid upon the nested boxes 22, 23 and 24. After the nestable box 21 has been removed and restored to an upside-up position, the partitions, which are now collapsed in a nestable position, may be pitched again by reversing the procedure described in the second preceding paragraph: Against the tension of spring 35, the partition 25 is pulled up to the right; then pin 28 engages again in the arcuate groove 31 and slides therealong—finally locking pin 28 snaps into the hook end 32, and the tension of springs 35 depressing hinge pins 27 again retains the partition in the pitched position shown in Fig. 7.

If the hinge pins are arranged at a slightly elevated position on the opposite sides of a partition—intermediate to the top and bottom edges of the partitions—the arcuate guide groove and the locking pins such as 11 and 31, and 8 and 28, respectively, may be dispensed with, other means being provided for engaging the partition releasably in an upright, pitched position. Such an embodiment is indicated in Figs. 5 and 6.

In order to indicate versatility of the arrangement of this invention, the nestable box 40 of the modification of Figs. 5 and 6 is shown to be formed and struck up in sheet metal. Transverse grooves 41 are formed in the bottom portion 42 of the nestable box 40, and serve to receive and to engage the lower edge of a partition 43, when it is in an upright, pitched position. From the bottom portion 42 of nestable box 40 are bent up opposite outer sides 44. These opposite outer sides 44 are folded in, back upon themselves again by way of flaps 45 forming inner opposite walls, the respective outer walls 44 and inner walls 45 being suitably spaced apart, for instance by insertion of flaps extending from the end walls which are not shown. Thus free play is allowed between said side 44 and wall 45 for a spring 46. Spring 46 is curved so that portions 47 thereof, which are located adjacent to or between partitions 43 of the nestable box 40, are seated in the bottom of the fold 48 formed between the outer and inner walls 44 and 45. At the partition 43, the spring 46 is slung back in reaction upon the hinge pin which is shown here as a pivot 49 extending laterally from the partition 43 and the roller 50 journalled upon pivot 49. Vertical slots 51 in the inner opposite walls 45 substantially register with the bottom groove 41 and accommodate and guide the rollers 50. These rollers 50 are also engaged underneath the concave portion 52 of spring 46 in the space between the inner and outer walls 44 and 45.

The tension of spring 46 normally retains the partition 43 in the upright, pitched position shown in Fig. 5 in which the bottom edge of the partition is engaged in groove 41. But when the partition 43 is lifted out of the groove 41 against the reaction of spring 46, and is then tilted and released, it will flop and snap into a position in which it rests horizontally flat upon the bottom portion 42, the spring portion 42 now assuming a substantially straight or convex position, by way of contrast with the concave position in which it is shown in Fig. 5.

While the partition 45 is collapsed into a nestable position, the roller 50 is of course depressed into its lowest position, and the spring portion 52 reacting thereupon will now retain the partition 43 in the horizontal nestable position, until the partition 43 is returned by a tilting manipulation against the reaction of spring portion 52 into a vertical position, in which the lower end of partition 43 again snaps into the groove 41 in the bottom portion 42 of the nestable box.

It is clearly shown in the drawing, and attention is hereby furthermore called to the fact, that the foldability of said partitions, also the method of their self-retainability in the upright position are inherent in structural, co-operative features formed in, upon or carried by said partitions at each end thereof and the box walls adjacent said ends whereby not only the necessity of any accessory fixtures is dispensed with, but a high degree of strength, economy, efficiency and convenience in use are also attained.

The examples herein shown and described are to be interpreted as illustrative and not in limitation of the invention.

What I claim is:

1. An article of manufacture comprising a series of nestable boxes each having vertically disposed partitions which are adapted to be folded into contact with the bottom of the respective box, two oppositely-positioned walls of said box being provided in their inner opposing faces with grooves adapted to form receiving, retaining, guiding and locking means for co-operative, co-acting features carried upon the ends of said partitions, and partitions for said box having upon each end thereof a feature such as a pin or dowel having co-operative action with said grooves so as to occupy, be retained, guided and locked thereby in their service position.

2. A box comprising a bottom having vertically-extending side walls rigidly secured thereto so as to form a rectangular structure, one or more partitions for such box, each of said partitions having a longitudinally-extending dowel adjacent each edge of each end thereof, there being a pair of transversely aligned grooves in the inner opposing faces of said walls for the reception of the dowels upon the respective ends of said partitions, whereby said partitions are arrangable into either a vertical service position or in flatwise contact with said bottom for the respective purposes set forth.

3. An article of manufacture consisting of a series of nestable boxes, a unit thereof comprising a bottom having vertically-extending side walls rigidly secured thereto so as to form a rectangular structure, one or more partitions for such box each of which partitions is provided with a longitudinally-extending dowel adjacent each edge of each end thereof, there being for

each partition employed, a pair of transversely-aligned grooves, one in each inner, opposing face of said side walls for the reception of the dowel upon the respective ends of said partitions whereby said partitions are arrangable into either a vertical service position or in flatwise contact with said bottom, for the respective purposes set forth.

4. An article of manufacture consisting of, a box of rectangular form having a permanently attached bottom and partitions for said box having at each end thereof dowels or like members, the oppositely-positioned walls of said box being provided with grooves for the reception and free movement of said dowels therein, said grooves being of such configuration as to permit said partitions to be disposed in flatwise contact with the bottom of said box and/or to be erected into and retained at a vertical position with their lower edges in contact with said bottom.

5. As an article of manufacture, tray-like, solid, relatively nestable boxes having back walls and partitions arising from said walls and rendered nestable by an arrangement under which the partitions can be swung back onto said walls, comprising hinge pins upon opposite ends of said partitions, opposite side walls upon each box having guide grooves for said pins, and tension means arranged in said side walls, engaged upon said hinge pins, and tensioning said partitions into the positions in which said partitions either arise from or are swung back onto said back walls.

6. As an article of manufacture, tray-like, solid, relatively nestable boxes having back walls and partitions arising from said walls and rendered nestable by an arrangement under which the partitions can be swung back onto said walls, comprising hinge pins and lock pins upon opposite ends of said partitions, opposite side walls forming part of each of said boxes and having guide grooves for said pins, the grooves for the lock pins being arcuately disposed and having offset spur portions at opposite ends for accommodating said lock pins when said partitions arise from or are swung onto said back walls, respectively.

7. As an article of manufacture, tray-like, solid, relatively nestable boxes having back walls and partitions arising from said walls and rendered nestable by an arrangement under which the partitions can be swung back onto said walls, comprising hinge pins and lock pins upon opposite ends of said partitions, opposite side walls forming part of each of said boxes and having guide grooves for said pins, the grooves for the lock pins being arcuately disposed and having offset spur portions at opposite ends inclinedly extending substantially in the same direction as the grooves accommodating said hinge pins and accommodating said lock pins when said partitions arise from or are swung onto said back walls, respectively.

8. As an article of manufacture, tray-like, solid, relatively nestable boxes having back walls and partitions arising from said walls and rendered nestable by an arrangement under which the partitions can be swung back onto said walls, comprising hinge pins upon opposite ends of said partitions, said hinge pins being predeterminedly spaced from the upper and lower edges of said partitions, opposite side walls forming part of said boxes, and having guide grooves arising from said back wall and accommodating said hinge pins, and tension means pressing said hinge pins down in said guide grooves.

9. As an article of manufacture, tray-like, solid, relatively nestable boxes having back walls and partitions arising from said walls and rendered nestable by an arrangement under which the partitions can be swung back onto said walls, comprising hinge pins upon opposite ends of said partitions, said hinge pins being predeterminedly spaced from the upper and lower edges of said partitions, opposite side walls forming part of said boxes and having guide grooves arising from said back wall and accommodating said hinge pins, tension means pressing said hinge pins down in said guide grooves, and locking means receiving said partitions under the pressure of said tension, means and releasably retaining said partitions in pitched positions in which the partitions arise from said back walls.

10. An article of manufacture comprising a series of nestable boxes each having vertically disposed partitions which are adapted to be folded into contact with the bottom of the respective box, two oppositely-positioned walls of said box being provided in their inner opposing faces with grooves adapted to form receiving, retaining, guiding and locking means for co-operative, co-acting features carried upon the ends of said partitions, partitions for said box having upon each end thereof a feature such as a pin or dowel having co-operative action with said grooves so as to occupy, be retained, guided and locked thereby in their service position, and tension means reacting upon said box, engaged upon portion of said partitions, and supplementing the gravitational tendency of the partitions to assume a lowest position in the normally disposed box by depressing said portion down towards the bottom of the box.

EDNA SIBLEY TIPTON.