

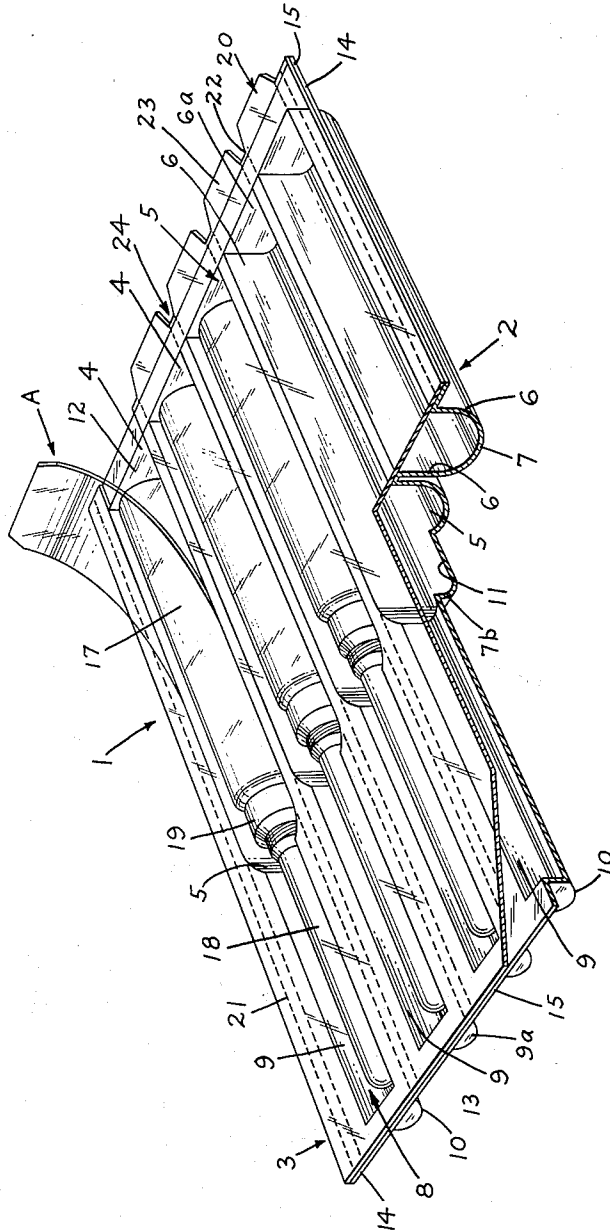
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TAMPER-PROOF CONTAINER FOR HYPODERMIC SYRINGES

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TAMPER-PROOF CONTAINER FOR
HYPODERMIC SYRINGES

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This invention relates generally to sealed containers for materials, and more particularly, to a tamper-proof sterile package for a plurality of disposable hypodermic syringes.

Disposable hypodermic syringes for injecting medicaments of various kinds have found such widespread use in the medical and related professions that it has been found useful to the ultimate user and economical to the supplier to package a plurality of such units in a single container. However, the existing packages for the most part have been found to have several disadvantages in that they are comparatively costly and nonetheless lend themselves to pilferage of the disposable syringes, breakage thereof, contamination and/or adulteration of the medicaments contained therein, and also raise problems in connection with storing of the containers, such as when it may be advantageous to stack a plurality of containers in a limited space.

With the foregoing disadvantages of the containers presently available in mind, it is a primary object of the present invention to provide a container for a plurality of disposable hypodermic syringes which container may be opened easily for removal of a single syringe as desired without disturbing the sterile packaging of the remaining syringes.

It is another object to provide a container which, when opened to remove a syringe therefrom, may no longer be closed, thereby to indicate to the user whether the container has previously been tampered with.

It is another object of this invention to provide a container of the kind referred to which is economical to manufacture since it requires a minimum amount of material due to its generally asymmetric configuration.

It is yet another object of this invention to provide an asymmetrical container of the type described which nevertheless permits storage of the containers without undue breakage of the hypodermic syringes contained therein.

It is another object of the invention to provide a container as described which permits stacking of a plurality of containers.

The foregoing and other objects and advantages of the present invention will become apparent as a result of a better understanding thereof upon reference to the description that follows.

Generally, the tamper-proof container for sterile disposable hypodermic syringes in accordance with the present invention comprises a bottom shell, said shell comprising a plurality of first pairs of first generally upstanding walls, each of said first walls being substantially parallel to the other of said first walls; a plurality of first connecting bottom walls, each of said first pairs of first walls being connected at the lower portions thereof by a respective one of said first bottom walls to define therewith a first elongate pocket at one end of said shell to provide thereby a plurality of said first elongate pockets extending in the same general direction in side-by-side parallel relationship; said first upstanding walls and said first bottom walls having predetermined dimensions whereby each of said first pockets is adapted to contain completely the cartridge portion of a sterile hypodermic syringe; a plurality of second pairs of second generally upstanding walls, each of said second walls being sub-

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stantially parallel to the other of said second walls; a plurality of second connecting bottom walls, each of said second pairs of second walls being connected at the bottom portions thereof by a respective one of said second bottom walls to define therewith a second elongate pocket at the other end of said shell to provide thereby a plurality of second elongate pockets extending in the same general direction in side-by-side parallel relationship and with each of said second pockets extending axially of and in communication with a respective one of said first pockets; said second upstanding walls and said second bottom walls having predetermined dimensions whereby each of said second elongate pockets is adapted to contain completely the needle and cannula cover of the cartridge of the hypodermic syringe contained in the first pocket from which the second pocket extends axially and with which it is in communication; a plurality of webs, each of said webs joining the upper portions of adjacent ones of said first and second upstanding walls of adjacent pockets, said webs having at least the highest portions thereof in coplanar relationship; a top peripheral coplanar edge merging into those of said first and second upstanding walls of said pockets which are located immediately adjacent the periphery of said bottom shell, said coplanar web portions and said coplanar top peripheral edge being in the same plane; and a flat cover, said cover comprising a flexible sheet having at least a major portion thereof removably adhered to and substantially co-extensive with said top peripheral edge, said sheet also being removably adhered to said coplanar web portions; and means for removing one portion of said flat flexible cover at a time for rendering accessible only one of said first pockets without affecting the sealing closure of any of the other of said pockets.

Preferably, both the shell and cover are of plastic materials which, in the case of the shell, is of a substantially rigid variety and in the case of the cover, is of a flexible variety as already referred to herein. It is also preferred that either the shell or the cover be transparent in order to permit a visual check of the contents of the container. It is further preferred that the cover of flexible plastic material be adhered to the shell by sonic welding. In such case, it has been found that the sonic welds themselves tend to weaken the plastic cover adjacent the points of attachment and thus give tear edges to permit facile removal of a single strip from the cover, as described hereinafter. However, the cover may alternatively be cemented to the base shell, and in such case should preferably be provided with lines of perforations adjacent the lines of attachment to facilitate removal of strips of the flexible plastic cover. Obviously, even in those cases where the cover is sonic-welded to the base shell, perforations may also be provided to further facilitate removal of the strips.

A preferred embodiment of the device, in accordance with the present invention and as an illustration thereof, is now described below with reference to the drawing wherein:

The figure is a perspective view of a filled and sealed container having parts broken away and two hypodermic syringes removed from their respective recesses in order to illustrate better the construction of the container. The container is also shown with one strip partially lifted to indicate the manner of removal thereof to permit access to a single hypodermic syringe at a time.

Referring to the drawing, the tamper-proof container for hypodermic syringes comprises essentially a formed substantially rigid plastic bottom or base shell 2 provided with a transparent flexible plastic cover or top 3. Base shell 2 is provided with a plurality of recesses 4. Each of the recesses 4 has an elongate comparatively deep and wide well portion 5 formed by a pair of opposed upstanding

side walls 6, an end wall 6a, and a curvilinear bottom wall 7, and a second elongate but comparatively shallower and narrower well portion 8 each formed by a pair of opposed, upstanding side walls 9, an end wall 9a, and a curvilinear bottom wall 10. Elongate well 8 is in communication with elongate well 5 and extends substantially axially therefrom via a shorter well portion 11 which is intermediate said wells 5 and 8 with respect to depth and width as well as position, for a purpose that will appear presently.

The top edges of pairs of adjacent walls 6 of adjacent pairs of wells or pockets 5 merge into and are connected by webs 12 also formed of the body of shell 2. Similarly, the top edges of adjacent pairs of walls 9 of adjacent pairs of wells or pockets 8 merge into and are connected by webs 13. Webs 13 are wider than webs 12, but in each case, a respective web 13 is in effect unitary with a respective web 12 and lies in the same horizontal plane therewith and with each of the other webs 12 and 13, for a purpose that will also appear presently. The outside side walls 6 and 9 of the respective wells 5 and 8 of the two outermost pockets 4 in base shell 2, merge at their upper ends into respective horizontally disposed peripheral side edges 14. Similarly, the upstanding end walls 6a and 9a of wells 5 and 8 respectively merge into horizontally disposed peripheral end edges 15. As shown, horizontally disposed peripheral side and end edges 14 and 15 and horizontally disposed webs 12 and 13, all lie in the same horizontal plane.

The depth and width of wells 5 are designed so that the cartridge portions 16 of the hypodermic syringes 17 contained in shell 2 do not protrude above the upper surface of coplanar edges 14, 15 and webs 12, 13. The cartridge portions 16 are retained against lateral movement by abutment with the upstanding walls 6, and against longitudinal movement in the direction to the right as viewed in the figure by abutment with a respective wall 6a. The depth and width of walls 8 are similarly designed to support and retain the needle and cannula cover 18 of a respective hypodermic syringe 17 against lateral displacement. Additionally, relative longitudinal movement in recesses 4 of syringes 17, toward the left as viewed in the figure, is restricted by shoulders 7b of the smaller wells 11 each of which is abutted by the ferrule 19 of the syringe 17 in a respective recess 4, whereby the needle covered by the cannula sheath 18 is further protected.

Substantially co-extensive with the flat top of bottom shell 2 presented by said coplanar edges 14 and 15 and said webs 12 and 13, is a flat transparent flexible plastic cover sheet 3, which, at its end adjacent edge 15 connected to walls 6a (and hence adjacent the ends of the cartridges 16 of the hypodermic syringes 17 in container 1) extends laterally beyond said edge 15 in a series of tabs 20. Transparent cover 3 is adhered to said coplanar webs 12 and 13 by double lines of sonic welds 21. As appears in the figure, the ends 22 of each of tabs 20 extend into a line of a sonic weld 21.

In the manufacture of the container 1, after shell 2 has been separately molded into the form shown, and the recesses 4 have been filled with properly oriented sterile filled hypodermic syringes 17; cover 3 is welded to base 2, with the former still in the shape of a rectangle and having one edge 23 thereof extending beyond edge 15. After sonic welding at 21, cover 3 is then die cut at 24, thus forming tabs 20.

Container 1, when not in use, may be stored with its bottom shell 2 on a flat surface. In such case, due to the fact that the combined liquid-filled cartridge 16 and ferrule 19 portions of the hypodermic syringes 17 are appreciably heavier than the cannula sheathed needle portions 18 thereof, the container 1 maintains a normal attitude on the flat surface wherein curved bottom walls 7 of deeper wells 5 bear completely on said surface while curved bottom walls 10 of shallower wells 8 are positioned above

said surface in substantially parallel relationship thereto. As a matter of fact, due to the disproportionate total weights of the two ends of the container 1, when the latter may be inadvertently tilted, even to the extent whereby the distal ends of curved bottom walls 10 contact the surface; upon release of the force causing such tilting, container 1 will pivot back to said normal attitude wherein only curved bottom walls 7 bear on said surface. Alternatively, of course, container 1 may be inverted to rest on the entire surface of flat cover 3, if desired, until a syringe 17 is to be removed from the container 1 in the manner described below.

When it is desired to remove a single sterile disposable hypodermic syringe 17 from the tamper-proof container, it is only necessary to maintain container 1 with the bottom shell 2 thereof on a surface, with one hand, and to grasp, with the other hand, a tab 20 for applying a lifting and tearing force along the sonic welds 21 adjacent the ends 22 of said tab 20, whereby a hypodermic syringe 17 is exposed for removal without disturbing the adjacent seal of any of the other hypodermic syringes, as indicated in the figure at A.

It will, of course, be understood that, although a specific and preferred embodiment of the invention has been described above in detail, many changes and modifications may be made and said invention embodied in widely differing forms without departing from the spirit and scope thereof in its broader aspects coming within the language or scope of any one or more of the appended claims. Merely by way of example, the base shell member may be made of various materials other than plastic, such as metal, glass, stiff paper; the cover may also be of material other than plastic, such as treated paper or other fabric; tabs may be provided at the other end of the container to permit removal of strips starting from said end; supporting legs may be provided at the end of the container in which the shallower wells are located; etc.

It will also be apparent that because of the effectively horizontal supporting surfaces provided by flat cover 3 and the lowermost surface-contacting edges of curvilinear bottom walls 7, in conjunction with the greater weight of the ends of the containers 1 in which deeper pockets 4 are located, as referred to hereinbefore; said containers are adapted for stacking with either their covers 3 or their base shells 2 uppermost, as desired.

I claim:

1. A tamper-proof container for sterile disposable hypodermic syringes, said container comprising:

(A) a substantially rigid plastic unitary bottom shell, said unitary shell comprising:

- (1) a plurality of first pairs of first generally upstanding walls, each of said first walls being substantially parallel to the other of said first walls,
- (2) a plurality of first connecting bottom walls of curvilinear configuration, each of said first pairs of first walls being connected at the lower portions thereof by a respective one of said first bottom walls to define therewith a first elongate pocket at one end of said shell to provide thereby a plurality of said first elongate pockets extending in the same general direction in side-by-side parallel relationship,
- (3) said first upstanding walls and said first bottom walls having predetermined dimensions whereby each of said first pockets conforms substantially completely to the shape of and is adapted to contain completely the cartridge portion of a sterile hypodermic syringe,
- (4) a plurality of second pairs of second generally upstanding walls, each of said second walls being substantially parallel to the other of said second walls,
- (5) a plurality of second connecting bottom walls of curvilinear configuration, each of said sec-

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and pairs of second walls being connected at the bottom portions thereof by a respective one of said second bottom walls to define therewith a second elongate pocket at the other end of said shell to provide thereby a plurality of second elongate pockets extending in the same general direction in side-by-side parallel relationship and with each of said second pockets extending axially of and in communication with a respective one of said first pockets,

- (6) said second upstanding walls and said second bottom walls having predetermined dimensions whereby each of said second elongate pockets conforms substantially completely to the shape of and is adapted to contain completely the needle and cannula cover of the cartridge of the hypodermic syringe contained in the first pocket from which the second pocket extends axially and with which it is in communication,
 - (7) a plurality of webs, each of said webs joining the upper portions of adjacent ones of said first and said second upstanding walls of adjacent pockets, said webs having at least the highest portions thereof in coplanar relationship,
 - (8) a top peripheral coplanar edge merging into those of said first and second upstanding walls of said pockets which are located immediately adjacent the periphery of said bottom shell, said coplanar web portions and said coplanar top peripheral edge being in the same plane,
 - (9) said pockets formed in said bottom shell being devoid of any other connection to each other than by said plurality of webs and said top peripheral coplanar edge,
 - (10) said second pockets being of less depth and narrower than said first pockets,
- (B) a plurality of hypodermic syringes each syringe comprising:

- (1) a liquid-filled cartridge, and
 - (2) a cannula-sheathed needle attached thereto, with
 - (3) each of said syringes being positioned within a respective recess with said cartridge retained completely within said first elongate pocket, and said cannula-sheathed needle in said second elongate pocket, whereby each of said syringes is retained against both lateral and tilting movement in said shell; and
- (C) a flat cover, said cover comprising:
- (1) a flexible sheet having the peripheral edges thereof adhered to and substantially co-extensive with said top peripheral edge, means adhering said sheet to said coplanar web portions, whereby said syringes are retained within said bottom shell,
 - (2) means for removing one portion of said flat flexible cover at a time along predetermined tear lines for rendering accessible, for lateral removal from its respective first and second elongate pockets, only one of said syringes without affecting the sealing closure of any of the other of said syringes, and
 - (3) said means adhering said sheet to said coplanar web portions, and said means for removing one portion of said flat flexible cover at a time along pre-determined tear lines being comprised of a pair of straight sonic weld lines which extend co-extensively of the entire lengths of each of an adjacent pair of said plurality of webs along said highest portions thereof.

2. A tamper-proof container for sterile disposable hypodermic syringes, said container comprising:

- (A) a substantially rigid plastic bottom shell, said shell being a unitary structure which comprises:

- (1) a plurality of first pairs of first generally up-

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standing walls, each of said first walls being substantially parallel to the other of said first walls,

- (2) a plurality of first connecting bottom walls of curvilinear configuration, each of said first pairs of first walls being connected at the lower portions thereof by a respective one of said first bottom walls to define therewith a first elongate pocket at one end of said shell to provide thereby a plurality of said first elongate pockets extending in the same general direction in side-by-side parallel relationship,
- (3) said first upstanding walls and said first bottom curvilinear walls having predetermined dimensions whereby each of said first pockets conforms substantially completely to the shape of and is adapted to contain completely the cartridge portion of a sterile hypodermic syringe,
- (4) a plurality of second pairs of second generally upstanding walls, each of said second walls being substantially parallel to the other of said second walls,
- (5) a plurality of second connecting bottom walls of curvilinear configuration each of said second pairs of second walls being connected at the bottom portions thereof by a respective one of said second bottom walls to define therewith a second elongate pocket at the other end of said shell to provide thereby a plurality of second elongate pockets extending in the same general direction in side-by-side parallel relationship, and with each of said second pockets extending axially of and in communication with a respective one of said first pockets,
- (6) said second upstanding walls and said second bottom walls having predetermined dimensions whereby each of said second elongate pockets conforms substantially completely to the shape of and is adapted to contain completely the needle and cannula cover of the cartridge of the hypodermic syringe contained in the first pocket from which the second pocket extends axially and with which it is in communication,
- (7) a plurality of third pairs of third generally upstanding walls, each of said third walls being substantially parallel to the other of said third walls,
- (8) a plurality of third connecting bottom walls of curvilinear configuration, each of said third pairs of third walls being connected at the bottom portions thereof by a respective one of said third bottom walls to define therewith a short pocket intermediate said ends of said shell to provide thereby a plurality of short pockets extending in the same general direction in side-by-side parallel relationship and with each of said short pockets functioning as the means of communication between said first and said second pockets,
- (9) said third upstanding walls and said third bottom walls having predetermined dimensions whereby each of said plurality of short pockets conforms substantially completely to the shape of and is adapted to contain completely the ferrule of the hypodermic syringe contained in said first and second pockets with which said short pocket is in communication, and the portion of said third bottom wall which merges with said second bottom wall of the second elongate pocket in communication therewith forms a shoulder whereby longitudinal movement of the cartridge in a first elongate pocket in the direction toward said second elongate pocket is restricted,

- (10) a plurality of webs, each of said webs joining the upper portions of adjacent ones of said first, said second and said third upstanding walls of adjacent pockets, said webs having at least the highest portions thereof in coplanar relationship, 5
- (11) a top peripheral coplanar edge merging into those of said first, second and third upstanding walls of said pockets which are located immediately adjacent the periphery of said bottom shell, said coplanar web portions and said coplanar top peripheral edge being in the same plane, 10
- (12) said pockets formed in said bottom shell being devoid of any other connection to each other than by said plurality of webs and said top peripheral coplanar edge, 15
- (13) said second pockets being of less depth and narrower than said first pockets, and said third pockets being of less depth and narrower than both said first and said second pockets. 20
- (B) a plurality of hypodermic syringes, each syringe comprising:
- (1) a liquid-filled cartridge,
 - (2) a cannula-sheathed needle, and
 - (3) a ferrule mounting said needle on said cartridge, with 25
 - (4) each of said syringes being positioned within a respective recess with said cartridge retained completely with said first elongate pocket, said cannula-sheathed needle in said second elongate pocket, and said ferrule in said short pocket, whereby each of said syringes is retained against both lateral and tilting movement in said shell; and 30
- (C) a flat transparent flexible plastic cover, said cover comprising: 35
- (1) a flexible sheet having a peripheral edges

thereof adhered to said top peripheral edge by means of longitudinal sonic welds, said sheet being substantially co-extensive with said top peripheral edge, said sheet also being adhered to said coplanar web portions by means of longitudinal sonic welds, and

- (2) said sheet extending beyond that portion of said top peripheral edge which lies adjacent the distal ends of said first elongate pockets in the form of a plurality of tabs, each of said tabs being connected with a single elongate portion of said sheet defined between a pair of sonic welds of which each weld is located at opposite sides of a single system of said first, second and third pockets whereby said tabs present means for removing one portion of said flat flexible cover at a time at a pair of adjacent sonic welds for rendering accessible only one of said single systems of said first, second and third pockets without affecting the sealing closure of any of the other of said pockets.

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