United States Patent

[11] 3,554,433

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[54] CONTAINER FOR TISSUE SPECIMENS
8 Claims, 11 Drawing Figs.

[52] U.S. Cl. 229/51
[51] Int. Cl. B65d 17/16
[50] Field of Search 229/51
Div., 33, 32; 220/54; 128/(Inquired)

[56] References Cited

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ABSTRACT: A single unit container having easily separable upper and lower portions utilized during the preparation of a histologic specimen. The lower portion is perforated to allow circulation of infiltrating liquid while the upper portion is folded to form a container closure. After infiltration, the container is placed in a pan during which time an embedding liquid is introduced into the container. After solidification, the container is removed from the pan and a zip strip separating the upper and lower portions is torn to allow removal of the lower portion thereby exposing the embedded tissue.

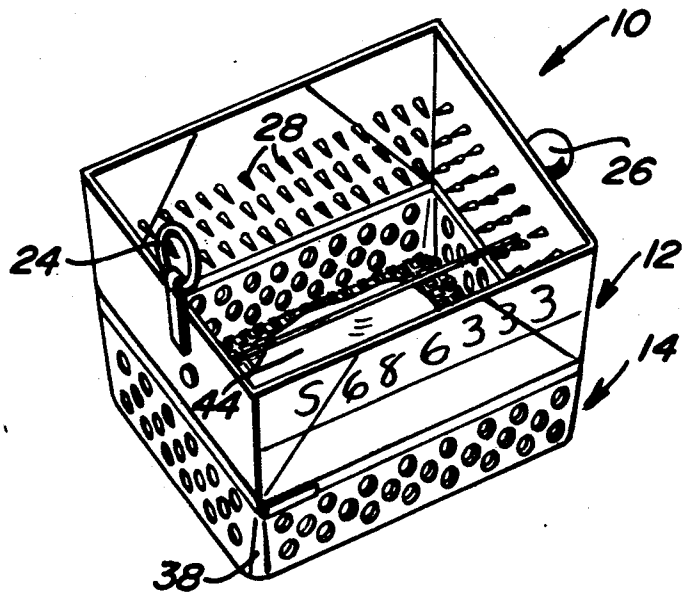

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Fig. 1

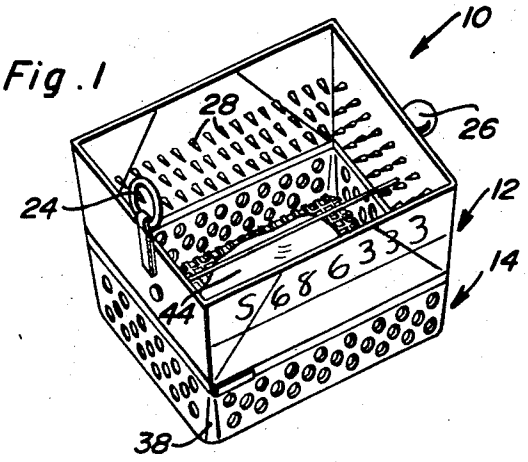

Fig. 2

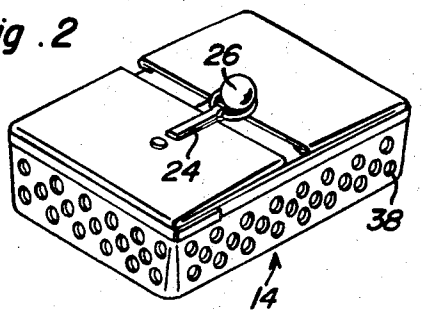

Fig. 3

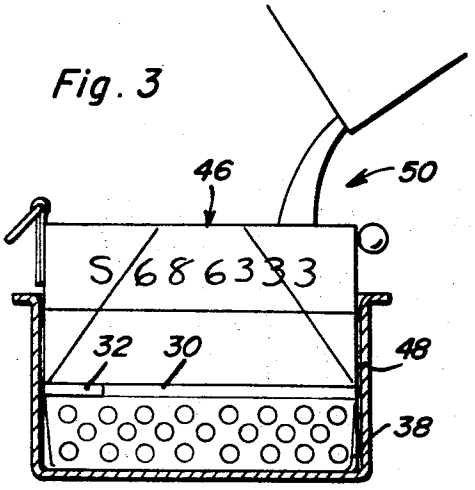

Fig. 4

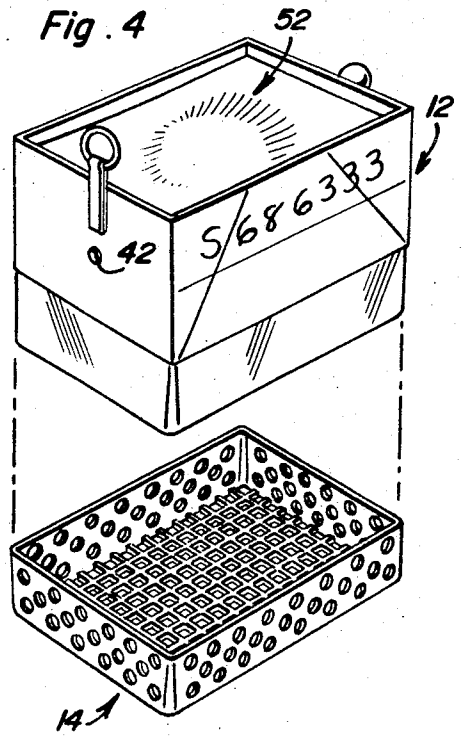

Fig. 5

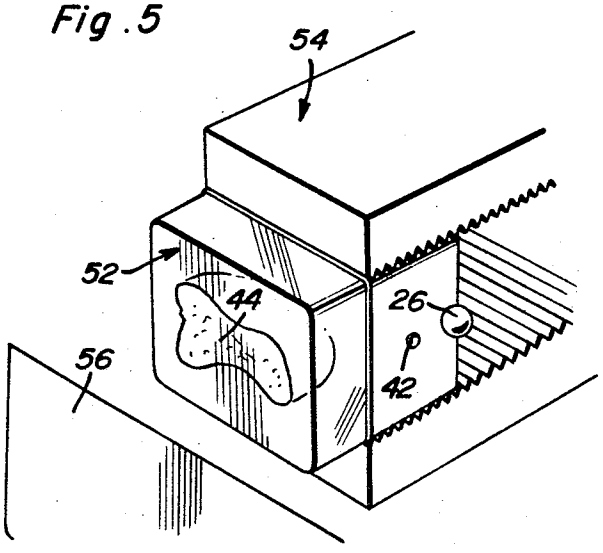

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Fig. 6

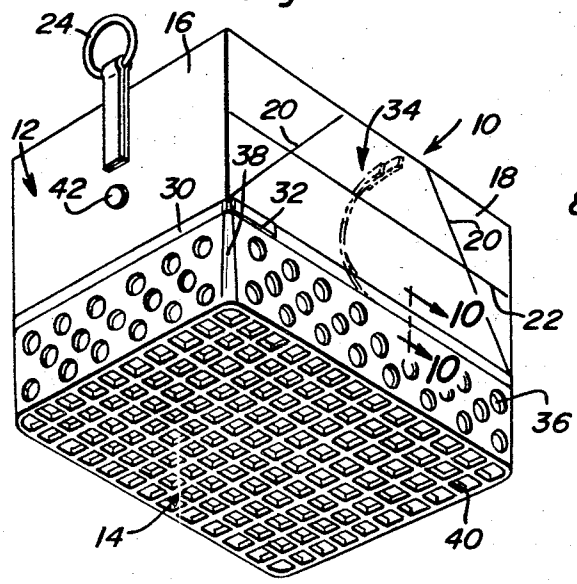


Fig. 7

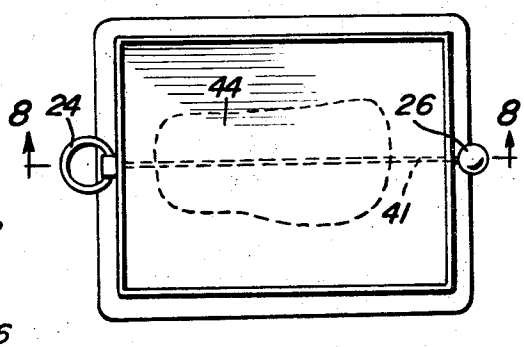


Fig. 8

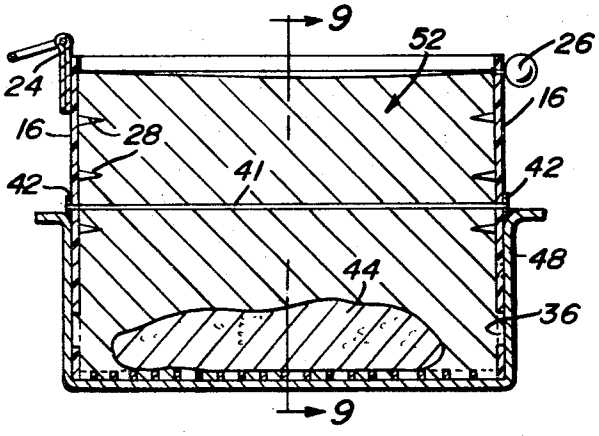


Fig. 9

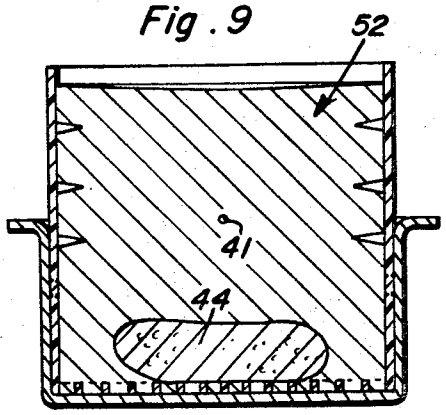


Fig. 10

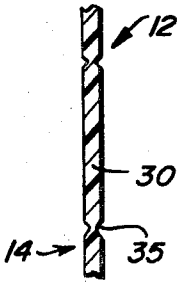
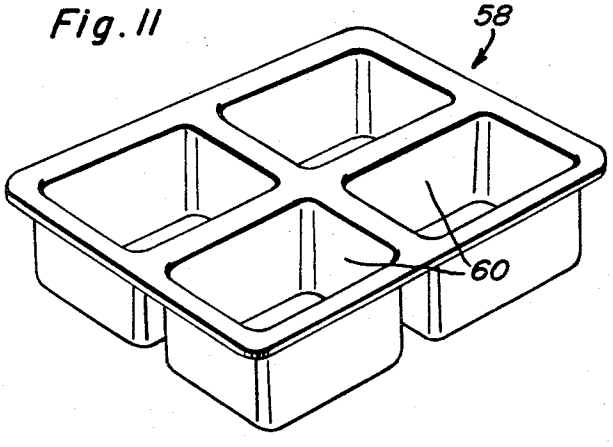


Fig. 11



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CONTAINER FOR TISSUE SPECIMENS

The present invention relates to a loading, blocking and cutting vehicle for surgical and autopsy tissues processed in histology laboratories.

The processing of biological specimens or tissues involves such steps as the selection of a proper tissue, dehydration of this tissue with one or several dehydrants, clearing of this tissue with a soluble oil or other acceptable clearing agent, infiltration of this tissue with a paraffin wax or a combination of wax and resinous material, embedding of this impregnated tissue in a block of paraffin wax allowed to harden, and mounting of this paraffin block with its embedded tissue into a chuck of a cutting instrument, commonly known as a microtome for the purpose of slicing thin sheets from the block whereby the paraffin supporting the impregnated tissue serves to support the slice of tissue so that it may be used on a slide for microscopic study.

In past years a number of containers have been designed for allowing laboratory preparation of tissues as outlined above. However, generally these containers are separate and individual so that the tissue must be moved from one to another and manipulated in proper position in each container. Although this approach may be acceptable for research or educational purposes, it is impractical for mass production techniques of histology laboratories. Further, a disadvantage of present containers resides in the fact that a formed paraffin block is difficult to remove from the container because as the molten embedding material is caused to harden, planes of cracking are formed. Also, cracking may be caused by rigid material of the container being disposed around the softer paraffin block.

The present invention is designed to permit the labeling of a single unit container throughout the aforementioned histological preparation process. Thus, by virtue of the present invention only one container is necessary for treating the tissue. Further, the present container is in the form of a disposable plastic package so that after its use, it may be discarded without experiencing the time-consuming disadvantages of cleaning reusable containers.

The instant invention provides excellent circulation of solutions through and around tissues because all sides of the container portion in which the tissue lies are foraminous. The circulation is required during infiltration of the tissue.

The present container includes an upper portion which is folded down to form a closure for the container during the infiltration process. Afterwards, the upper portion is opened and the container is placed in a pan during which time molten paraffin or other embedding medium is poured into the container to embed the specimen. The container is then removed from the pan and the lower portion of the container which is perforated and which served its use during the infiltration process is removed by merely pulling a zip tab separating the upper and lower portions thereby permitting removal of the lower container portion and exposure of the embedded specimen for slicing. Use of a single unit container obviates the necessity for repositioning the specimen tissue in separate containers during the multiple tissue preparation treatments.

Paraffin block cracking during cooling and cutting is prevented by including a reinforcing member in the upper container portion.

The upper portion of the container includes conical projections extending inwardly from the interior surface of the upper portion. Initially, these projections are utilized to keep the tissue specimen in place during the infiltration process however, when the upper portion is opened and the embedding liquid is introduced, the hardened paraffin becomes structurally reinforced by the projections thereby reducing the possibility of block cracking in the upper portion of the paraffin block, where it most frequently occurs.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying

drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIG. 1 is a perspective view illustrating the present specimen mounting container.

FIG. 2 is a view of the container with the upper portion thereof closed to serve as a specimen container during an infiltration process.

FIG. 3 is a sectional view showing the disposition of the container i n a pan as an embedding fluid is introduced.

FIG. 4 depicts removal of the upper portion from the lower portion after a zip strip, separating the upper and lower portions, has been removed.

FIG. 5 is a perspective view illustrating the disposition of the paraffin block in a microtome.

FIG. 6 is a perspective view illustrating the bottom exterior appearance of the container.

FIG. 7 is a top plan view of the embedded specimen after the embedding process, shown in FIG. 3, is completed.

FIG. 8 is a cross-sectional view taken along a plane passing through section line 8–8 of FIG. 7.

FIG. 9 is a transverse sectional view taken along a plane passing through section line 9–9 of FIG. 8.

FIG. 10 is a partial sectional view taken along a plane passing through section line 10–10 of FIG. 6 depicting the disposition of a zip strip between the upper and lower container portions prior to being torn from the container to permit the removal of the upper and lower portions.

FIG. 11 is a perspective view illustrating the four compartment pan which allows receipt of four containers therein during the pouring of embedding liquid so as to permit the preparation of four specimens simultaneously.

Referring to the drawings and more particularly FIGS. 1 and 6 thereof, reference numeral 10 generally denotes the present single unit container which includes an upper portion 12 and a lower portion 14. The upper portion includes transverse sides 16 and longitudinal sides 18, the latter sides having grooves 20 formed therein to permit rapid and easy folding of the upper container portion as finally seen in FIG. 2. More particularly, the grooves 20 form a truncated frustoconical shape and an additional groove 22 formed in each lateral side extends horizontally across each of the lateral sides to effectuate the folding of the upper portion.

An elastic strap and ring assembly 24 is attached to a first transverse end of the upper container portion while a knob member 26 is attached to the opposite transverse side thereby permitting the fastening of the folded upper portion sides to form a closure as depicted in FIG. 2. The package shown in FIG. 2 includes the tissue therein and is ready for a conventional infiltration treatment. In order to retain the tissue against the base of the container and also to allow fluid circulation along the upper surface of the tissue, conical projections 28 are formed in the interior surfaces of the upper container portion and when this upper portion is folded, the projections extend downwardly to contact the tissue. After the upper portion has been folded down, and the projections contact the tissue, spaces between the projections are present to permit infiltration fluid circulation therethrough.

A zip strip 30 as seen in FIGS. 6 and 10 separates the upper portion 12 from the lower portion of the container 14. Perforations 35 define the strip and a pull tab 32 is formed at one end thereof. As will be seen in FIG. 6, when tab 32 is grasped and peripherally torn from the container as indicated by 34, the upper and lower portions of the container may be separated for purposes to be described hereinafter.

Referring to FIG. 6, the lower portion of the container will be seen to include a foraminous or apertured peripheral wall through which infiltration liquid passes. The edges of the lower portion are indicated by 38 and are tapered downwardly to permit effortless insertion and removal of the container into a pan during introduction of embedding fluid as hereinafter explained. As will be noted from FIG. 6, the base of the container is in the form of a grid 40 which enhances the capacity for permitting free circulation of infiltrating liquid into the container for contact by the specimen.

In operation of the device, after introduction of a specimen into the container, the upper portion of the container is folded down and fastened as seen in FIG. 2. The package so illustrated is subjected to infiltration in the usual manner. Next, the upper portion of the container is opened as seen in FIG. 3 and the container is lowered into a snugly fitting pan. As will be noted in FIG. 3, at least one area of the upper container portion should be opaque to permit the labeling by means of grease pencil or the like of the specimen as indicated by **46**. The specimen in the container is now ready for embedding by introduction of paraffin or other embedding liquid into the container as indicated by **50**. A cord **41** is disposed between the transverse ends **16** as will be shown in FIG. **8**. The specimen **44** is positioned below the cord and rests upon the base of the container. The cord is held in place by head elements **42** abutting the outward surfaces of the transverse side **16**. Molten paraffin is poured into the container until it approaches the top of the container. The paraffin will harden around the reinforcing cord **41** and the projections **28** which aid to reinforce the paraffin block against cracking or breaking. FIG. **8** illustrates the relationship between the block reinforcing members and the embedded specimen **44**.

After hardening, the container is lifted and twisted from the pan until free therefrom. Next, the zip strip **30** is peripherally torn from the container as indicated by **34** in FIG. **6**. This permits the removal of the lower container portion **14** from paraffin filled upper portion as will be seen in FIG. **4**. The resultant block covered by the upper container portion is indicated by **52** and as will be seen in FIG. **5**, is positioned in between the jaws of a microtome **54** with the embedded specimen projecting outwardly to permit the cutting of slices therefrom by a blade **56**.

Although the present invention has been described in terms of a single container to be used with a single pan **48**, it is within the purview of the present invention to provide a multiple compartment pan **58** as seen in FIG. **11** having a number of individual compartments **60** which allow the insertion of a similar number of containers **10** therein. Use of a multiple assembly results in more efficient utilization of a laboratory assistant's time in the preparation of the specimens.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

I claim:

1. A single unit boxlike container for maintaining biological specimens during preparation treatment comprising an upper portion adapted for folding to form a closure, a lower foraminous portion having apertures around the periphery and the base thereof, the base to support a specimen, the upper portion being closed over the lower portion during preparatory treatment of the specimen.

2. The device set forth in claim **1** wherein the upper portion has grooves formed therein to permit rapid folding thereof.

3. The device set forth in claim **1** wherein the upper portion has fastener means attached thereto to allow secure closure of the upper portion when the latter is folded.

4. The device set forth in claim **1** wherein the upper portion has attached elements projecting inwardly therefrom for contacting the specimen when the upper portion if folded thereby retaining the specimen in place against the base during preparatory treatment.

5. A single unit boxlike container for embedding histologic specimens comprising an upper portion and a lower portion for supporting the specimen. An integrally formed perforated zip strip disposed between the upper and lower portions. A pan for receiving the container during the pouring of an embedding medium in the container, after solidification of the medium, the container being removed from the pan to permit the strip to be torn from the container thereby allowing separation of the lower portion from the upper portion to expose the embedded specimen for further processing.

6. A unitary boxlike container for maintaining a histologic specimen during preparatory treatment comprising an upper portion adapted for folding to form a closure, a lower foraminous portion having apertures around the periphery and base thereof, the base to support a specimen, the upper portion being closed over the lower portion during preparatory treatment of the specimen, the upper portion of the container having grooves formed therein to permit rapid folding thereof, fastener means being attached to the upper portion to allow secure closure of the upper portion, the upper portion having interiorly disposed attached elements projecting inwardly thereof for contacting the specimen when the upper portion is folded thereby retaining the specimen in place against the base during preparatory treatment, an integrally formed perforated zip strip disposed between the upper and lower portions, a pan for receiving the container during the pouring of an embedding medium in the container, after solidification of the medium, the container being removed from the pan to permit the strip to be torn from the container thereby allowing separation of the lower portion from the upper portion for exposing the embedded specimen for further processing.

7. The device set forth in claim **6** wherein one area of the upper container surface is opaque to permit the labeling thereof by a writing implement, the upper portion further having reinforcing means therein to inhibit cracking of the specimen embedding block.

8. The device set forth in claim **7** wherein the lower container portion includes apertures peripherally formed therein and wherein the lower portion further has a gridlike base to effectuate circulation of fluid therethrough during a preparatory treatment, the lower portion further having inwardly tapering edges to permit effortless insertion and removal of the container from the pan after the embedding medium has hardened.