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CARTRIDGE WITH ANTIPILFERING PISTON

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FIG. 1

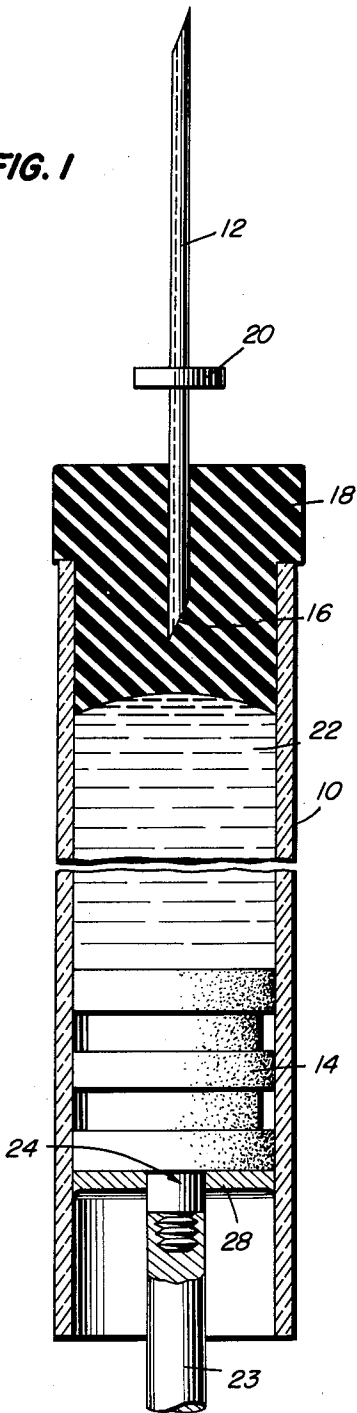


FIG. 2

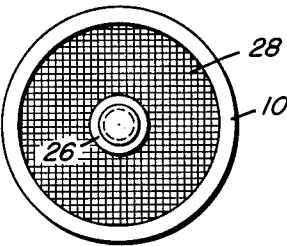


FIG. 3

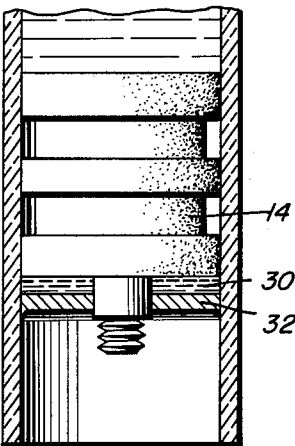
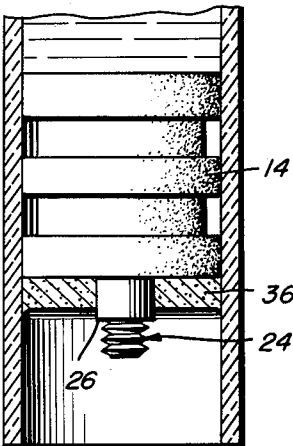


FIG. 4



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CARTRIDGE WITH ANTIPIRFERING PISTON
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This invention relates to a cartridge for use with hypodermic cartridge holders and particularly to the type of cartridge wherein a tube having a hollow needle at one end is filled with medication and at the other end is provided with a piston to evacuate the tube contents through the needle.

It is known that, surreptitious removal of the fluid in conventional cartridges can be effected, as by inserting a very thin needle tubing either through the piston or between the piston and the inner wall of the cartridge, or by the removal and replacement of the piston. Such surreptitious removal presents a grave problem where cartridges are loaded with a fluid containing a narcotic. Unauthorized persons, such as addicts, have been known to remove all or some of the contents of such a cartridge, refill the same with another fluid, such as water or saline solution, leaving the cartridge without visible indication that the same had been tampered with. Particularly where some of the original contents of the cartridge remains and the diluted drug in the cartridge has some effect on a patient, it is difficult to determine that abstraction of contents of the cartridge had been effected.

It is an object of this invention to provide an improved cartridge constructed to make readily visible any removal and replacement of the piston or penetration thereof, or of the sliding of a very fine needle down along the piston between it and the glass wall of the cartridge to effect removal of the cartridge contents.

The manner in which the object of the invention is attained will be made clear by a consideration of the following specification and claims when taken in conjunction with the accompanying drawing in which:

FIG. 1 illustrates a cartridge of the one-use-throw-away type embodying a piston sealed with a wax;

FIG. 2 is a bottom end view of the cartridge of FIG. 1;

FIG. 3 is a view similar to FIG. 1 in which the piston is sealed with a wax and an intermediate fluid, and

FIG. 4 shows a still further embodiment of the invention wherein the piston is sealed into the tube utilizing a dye impregnated wax.

In FIG. 1 there is illustrated a tube 10 of glass or the like provided at one end with a hollow needle 12, of any type known in the art, and provided at the other end with a piston 14. Diagrammatically, the needle is illustrated as having a perforating end 16 which may be thrust through a flanged rubber stopper 18 with the aid of a disc 20 rigidly secured to the needle. The tube is filled with a fluid medication 22.

The piston 14 is provided with some form of coupling means for coupling the same with a plunger 23 (see FIG. 1) of a hypodermic cartridge holder and, as illustrated, the coupling means is in the form of a threaded stud 24 having a shoulder 26 to limit the threaded movement of the plunger onto the stud, in order to prevent the plunger engaging with sealing compositions to be described.

In order to make any tampering with the piston 14 evident, the coupling face of the piston is covered with a thin film 28 of sealing wax or other like material which extends to and onto the inner wall of the tube 10. Any movement of the piston relative to the tube will result in crumbling or fracturing of the sealing wax and make evident prior movement of the piston. Moreover, the exposed end face of the wax may have impressed therein an intricate pattern design, as shown in FIG. 2, whereby puncturing of the stopper will become readily apparent.

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The sealing wax is of a character which is brittle at normal temperatures though viscous at higher temperatures. Such waxes and the methods for impressing a design therein are well known and need not be given here.

In a modified form of the invention shown in FIG. 3, the coupling end of the piston 14 is flooded with a dye 30 in fluid form while the cartridge is held upright, piston end uppermost. The dye may be of any well-known type. The following are exemplary of those dyes particularly recommended: Resorcin Green; Solid Green O; Ponceau 4GB; Mordant Yellow O; Biebrich Scarlet; Benzo Purpurine B; Brilliant Green; Methyl Violet B; Eriochrome; Alizarine Blue; Methylene Blue; and Safranin. The concentration of the dye and the fluidizing medium are not critical and may be as desired to give the desired visual effect and fluidity. Of the dyes, Methylene Blue is preferred. After the dye in fluid form has been poured onto the piston, it is sealed in place with a resin or wax coating or barrier 32, which coating is fluid or viscous at above room temperature and solid at normal room temperatures. With this arrangement, when the piston is moved in either direction, streaks of color will appear on the interior wall of the tubing and on surfaces of the piston. Furthermore, even were all parts recleaned prior to refilling of the tube with another fluid and replacement of the piston, it would be difficult to replace the particular dye and thus make it appear as before the displacement of the piston. Likewise penetration of the piston by a needle or insertion of a needle between the piston and the inner wall of the cartridge would carry into the interior of the cartridge some of the dye which condition would be evident upon visual inspection. The dye may be in the form of a thin fluid film of about .05" though the thickness of the film is unimportant.

In a still further modification of the invention, and as illustrated in FIG. 4, the piston end of the cartridge is coated with a wax 36 impregnated with a dye which has the property of permanently changing color when heated. The dye chosen should have a color-changing temperature a few degrees higher than the flow temperature of the wax so that were an attempt made to relocate the wax without using precise temperature control apparatus, the temperature applied to the wax to melt the same would be above the color-changing temperature of the dye, thus facilitating detection by simple inspection of tampering with the contents of the cartridge.

Dyes of the type described which are useful herein are numerous and well known. Some specific dyes are disclosed in the patents to John G. Hainsworth, 2,798,855 and 2,798,856, and in J. C. Davis Patent 2,606,654. These dyes in their environments may be used to impregnate the wax or paraffin, or other resin, whose flow temperature should be selected to be slightly below the color-change temperature of the dye selected.

In FIG. 4 the piston 14 is coated with the impregnated dye-carrying vehicle 36, the impregnating dye and its suspension vehicle being indicated as a dotted structure.

Any attempt to efface a needle prick through the piston by remelting the resin vehicle will be made apparent by reason of the permanent color change of the dye.

While particular embodiments of this invention have been illustrated and described, modifications thereof will occur to those skilled in the art. It is to be understood, therefore, that this invention is not to be limited to the particular arrangements disclosed, and it is intended in the appended claims to cover all modifications within the spirit and scope of this invention.

Having thus described the invention, what is claimed is:

1. A cartridge with an antipilfering piston comprising: a tube adapted to contain a medicament,

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- a piston at one end of the tube having a sealing compound thereon covering the whole area thereof, said sealing compound being brittle at normal temperatures in order to function as a means indicative of the pilfering of the contents of the cartridge through the piston or displacement of the piston, and a coupling stud affixed to the piston and extending through the sealing compound. 5
2. The structure of claim 1 wherein the sealing compound is of heat fusible material, covers the entire face of the piston, except for the area occupied by the coupling stud, and has a stamping thereon distorted by the application of heat to the compound. 10
3. The structure of claim 1 wherein the coupling stud is of two diameters, with the outer portion of the stud of smaller diameter than the portion closest to the piston, said larger diametered portion extending beyond the thickness of the sealing compound and said smaller diametered portion being threaded for engagement with a plunger, the shoulder between the two diametered portions preventing the plunger from penetrating into the sealing compound as the plunger is threaded onto the stud. 20
4. The structure of claim 1 wherein the sealing compound is of heat fusible, puncturable material, said sealing compound having a stamping thereon distorted by the application of heat to said compound. 30
5. A cartridge with an antipilfering piston comprising:

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- a tube adapted to contain medication, a closure for the tube, a liquid dye on that face of the closure which is not in contact with the medication, and a resin coating on the dye sealing the dye in the space between the inner walls of the tube, resin, and closure.
6. A cartridge with an antipilfering piston comprising: a tube adapted to contain medication, a closure for the tube, and a dye-impregnated wax on that face of the closure which is not in contact with the medication, said dye being of a character to change color permanently when heated above the flow temperature of the wax.
7. A cartridge with an antipilfering piston comprising: a tube containing medication, a piston at one end of the tube, a needle at the other end of the tube, and a dye-impregnated wax on the face of the piston not in contact with the medication, the dye changing color permanently when heated below the wax-melting temperature.

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