Nov. 30, 1965 R. K. McCONNAUGHEY ETAL 3,220,412

HOLDER FOR HYPODERMIC SYRINGE CARTRIDGES

Original Filed Dec. 19, 1958 2 Sheets-Sheet 1

FIG. 1.

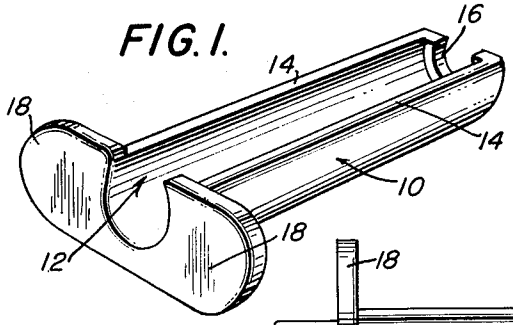
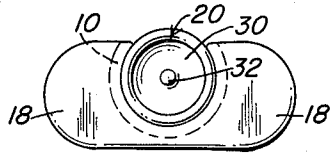


FIG. 2.



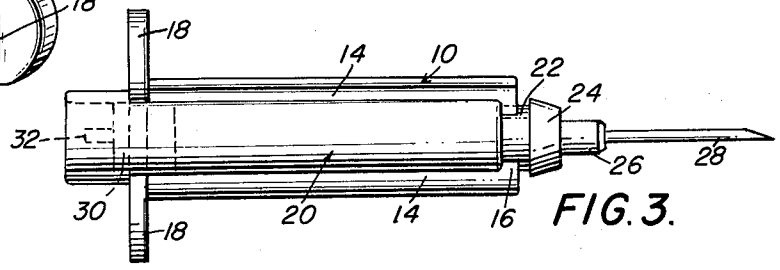


FIG. 3.

FIG. 4.

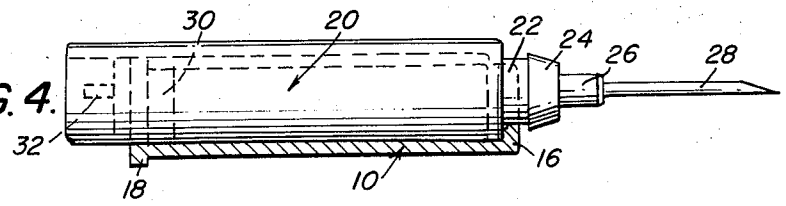


FIG. 5.

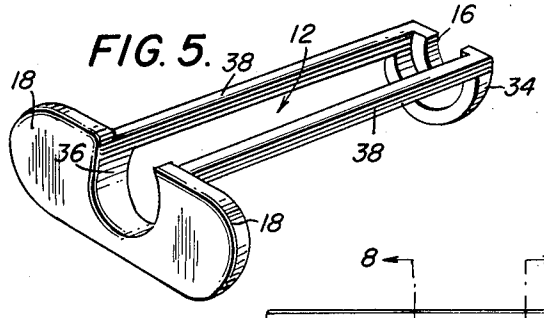
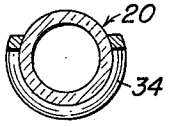


FIG. 7.



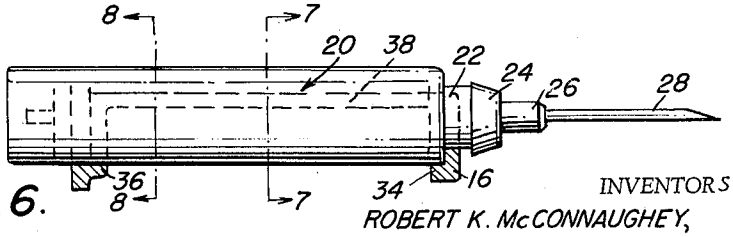


FIG. 6.

INVENTORS
ROBERT K. McCONNAUGHEY,
MILTON J. COHEN

BY Hall & Houghton
ATTORNEYS

Nov. 30, 1965 R. K. McCONNAUGHEY ETAL 3,220,412

HOLDER FOR HYPODERMIC SYRINGE CARTRIDGES

Original Filed Dec. 19, 1958 2 Sheets-Sheet 2

FIG. 9.

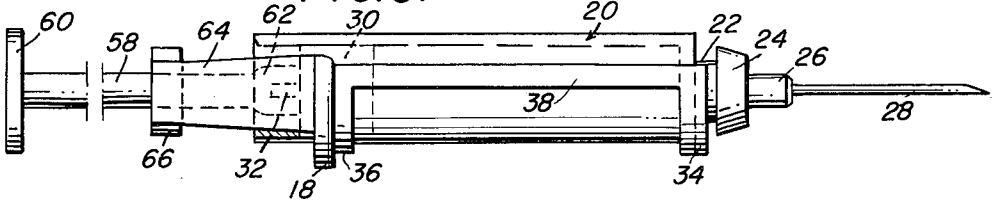


FIG. 10.

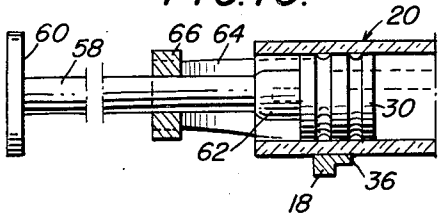


FIG. 11.

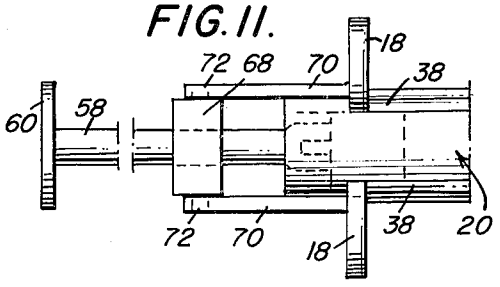


FIG. 12

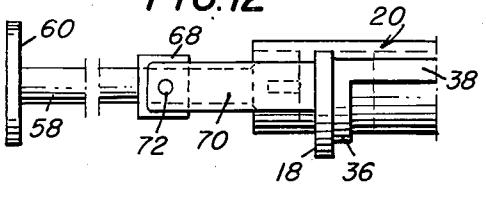


FIG. 13.

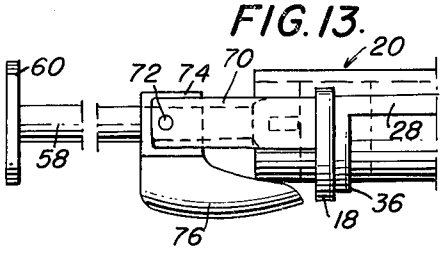
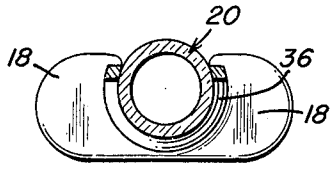


FIG. 8.



INVENTORS
ROBERT K. McCONNAUGHEY,
MILTON J. COHEN

BY Hall & Houghton

ATTORNEYS

United States Patent Office 3,220,412 Patented Nov. 30, 1965

3,220,412
HOLDER FOR HYPODERMIC SYRINGE CARTRIDGES

Robert K. McConnaughey, 5220 Parkway Drive, Chevy Chase, Md., and Milton J. Cohen, 7325 16th St. NW., Washington, D.C.

Original application Dec. 19, 1958, Ser. No. 781,607, now Patent No. 3,076,455, dated Feb. 5, 1963. Divided and this application Dec. 20, 1962, Ser. No. 258,659
14 Claims. (Cl. 128—218)

This application is a division of application Ser. No. 781,607, filed Dec. 19, 1958, now Pat. No. 3,076,455, issued Feb. 5, 1963.

This invention relates to hypodermic syringes and more particularly to devices for holding disposable medicament cartridges or the like while they are being prepared and used for making injections.

The holders for disposable hypodermic syringe cartridges which have been employed prior to the present invention are primarily of two general types. The first type comprises a heavy metal syringe device with a plunger shaft attached, which is used repeatedly with disposable cartridges. The second type is itself disposable and has an opening at the rear through which a cartridge is inserted, the cartridge being held by a lip at the rear, by threads at the front, or by other fastening means. It is a primary objective of the present invention to provide a hypodermic syringe cartridge holding device that is simpler to manufacture and use than any comparable device known heretofore.

A further object of the invention is to provide a holder of the foregoing type which can be made at a sufficiently low cost to permit disposal of the holder along with the cartridge, if desired.

Another object of the invention is to provide a holder of the foregoing type which uses a minimum of material in its manufacture.

An additional object of the invention is to provide a holder of the foregoing type that is adapted for use with cartridges having a constricted neck adjacent one end thereof.

Still another object of the invention is to provide a holder of the foregoing type which can be readily manufactured with an integral gripping means to permit relative movement of the holder and the cartridge plunger.

A still further object of the invention is to provide a holder of the foregoing type which is capable of manufacture from a wide variety of materials, such as plastic, sheet metal, or wire stock.

A still further object of the invention is to provide a holder of the foregoing type having means for guiding the plunger shaft of the hypodermic cartridge.

Another object of the invention is to provide a holder of the last mentioned type in which the plunger shaft may be tilted with respect to the axis of the holder when it is withdrawn from the cartridge.

An additional object of the invention is to provide a holder of the last mentioned type in which the plunger shaft guide means has means for ejecting the cartridge from the holder when the plunger shaft is tilted.

The foregoing and other objects, advantages, and features of the invention, and the manner in which the same are accomplished will become more readily apparent upon consideration of the following detailed description of the invention when taken in conjunction with the accompanying drawings, which illustrate preferred and exemplary embodiments of the invention, in which parts common to the various figures are designated by the same reference characters, and wherein:

FIGURE 1 is a perspective view of a first form of the invention;

FIGURE 2 is an end view of the invention of FIGURE 1 shown with the cartridge inserted and as seen from the plunger shaft end of the cartridge;

FIGURE 3 is a top plan view of the invention of FIGURE 1 shown with the cartridge inserted;

FIGURE 4 is a partly sectional side elevation view of the invention of FIGURE 1 shown with the cartridge inserted;

FIGURE 5 is a perspective view of a skeletal form of the invention;

FIGURE 6 is a side elevation view of the invention of FIGURE 5 shown with the cartridge inserted;

FIGURE 7 is a transverse cross sectional view taken along line 7—7 of FIGURE 6 in the direction of the arrows;

FIGURE 8 is a transverse sectional view taken along line 8—8 of FIGURE 6 in the direction of the arrows;

FIGURE 9 is an elevation view of another form of the invention;

FIGURE 10 is a truncated longitudinal sectional view of the invention of FIGURE 9;

FIGURE 11 is a truncated plan view of still another form of the invention;

FIGURE 12 is a truncated elevation view of the invention of FIGURE 11;

FIGURE 13 is a truncated elevation view of yet another modification of the invention.

Briefly stated, the invention is concerned with a holder for tubular disposable medicament cartridges, the holder being formed as a channel having an opening along one side thereof through which the cartridge may be snapped into and out of the holder by lateral movement. The width of the opening is less than the maximum width of the cartridge, and the channel is formed of a stiff springy material so that the holder may be distorted momentarily to permit the insertion and removal of the cartridge. Other features of the invention will be brought out as a description proceeds.

Referring to the drawings, and initially to FIGURES 1–4 thereof, in an exemplary form the holder of the invention comprises a channel **10** of stiff springy material, the channel being cylindrical in the form shown. The channel has an opening **12** along one side thereof defined by spaced longitudinal edges **14**. The holder may be molded, stamped, or otherwise formed to the contours shown from suitable material such as metal or plastic. Adjacent one end of the channel is an internal projection **16**, which is an arcuate bead in the form shown. Adjacent the other end of the channel is a gripping means, which is constituted by a pair of laterally extending external wings **18** in the form shown.

The holder thus defined is adapted to receive a tubular cartridge **20** of the type having a constricted neck **22** adjacent one end thereof, as shown in FIGURE 3. Beyond the neck is a flange **24** and then an extension **26** which receives the hypodermic needle **28**. The cartridge has a plunger **30** which may be reciprocated along the cartridge barrel by a plunger shaft **58** which in the form shown mates with a stub shaft **32** attached to the plunger piston. If the plunger is to be used merely to eject the contents of the cartridge through the hollow needle **28**, the stub shaft **32** may merely serve to guide the end of the plunger shaft, but if the cartridge is to be used for aspiration, then the plunger shaft may be attached to the stub shaft **32** as by suitable threads.

The width of the opening **12**, that is, the distance between the edges **14**, is made less than the maximum width (the diameter) of the cartridge **20**, and the depth of the channel **10** is made greater than the outer radius of the cartridge barrel. Stated differently the arc length of the cross sectional periphery of the channel **10** is more than 180°. The cartridge **20** is snapped into the holder by

lateral movement through the opening **12**, and this is accomplished by momentarily distorting the holder so as to widen the opening through which the cartridge must move. The inner cross sectional dimensions of the channel are made commensurate with the corresponding outer dimensions of the cartridge, so that when the cartridge has been pushed through the opening **12**, it is held firmly within the channel, lateral movement of the cartridge with respect to the holder thereby being prevented. When the cartridge is inserted, the bead **16** embraces and engages the neck **22** of the cartridge. Since the bead is then located between the flange **24** and the adjacent end of the barrel proper of the cartridge, longitudinal movement of the cartridge with respect to the holder (which might occur under the influence of the forces applied to the cartridge in inserting the needle or moving the plunger) is prevented. Use of the hypodermic syringe is facilitated by the wings **18** which provide convenient means for gripping the cartridge holder.

It will be noted that in some forms of the invention the barrel of the cartridge protrudes from the rear or wing end of the holder. The protruding end of the cartridge provides a convenient surface against which a force may be exerted to snap the cartridge laterally out of the holder. In other forms the holder may extend beyond the cartridge.

The thickness of the holder material is determined in accordance with the inherent stiffness and resiliency characteristics of the material, since the walls must be springy enough to permit the cartridge to be pressed laterally into the holder without difficulty or damage to the cartridge and yet must be stiff enough to hold the cartridge firmly in position. Of course, portions of the holder, such as the bead **16** and the wings **18**, may be thicker than the channel body to provide the stiffness necessary to the proper operation of the syringe.

FIGURES 5–8 illustrate a skeletal form of the invention. In this form the major portion of the body of the channel is omitted so that the holder comprises essentially a forward arc or rim **34**, a rearward arc or rim **36**, which may be constituted by the periphery of a hole in the wings **18**, and a pair of parallel bars **38** which connect the corresponding ends of the arcs and which define the opening **12** previously described. The same bead **16** is employed as before. It is apparent from this form of the invention that the term "channel" as used in the specification and claims is not restricted to a body having solid walls but may be defined by a skeletal body. The stiffness of the material of such a holder may be greater than the stiffness of the material of a solid wall holder to compensate for the loss of wall material, but the use and operation of such a holder is essentially the same as before.

FIGURES 9–13 illustrate forms of the invention in which the holder is extended rearwardly to provide a guide for a plunger shaft **58**, which may be part of the cartridge or part of the holder. As shown, the plunger shaft may have an integral button **60** at one end and an enlarged hollow portion **62** at the other end which receives the stub shaft **32** of the plunger piston **30** previously described. The holder has rearward extensions which support a bearing for the plunger shaft **58**. While in some of the forms shown two such extension members are provided, one at each of the respective sides of the holder, the extension could be constituted by a single curved member continuous from side to side around the bottom of the cartridge holder or by two rearward-extending members connected by an arcuate member.

The plunger shaft bearing may be a cylindrical sleeve **66**. This sleeve may be formed integrally with the extensions **64**, and may be split longitudinally to permit insertion of the plunger shaft **58** if the shaft has an enlarged portion **62** as shown. Splitting the bearing may also facilitate distortion of the holder during insertion and removal of the cartridge, although a continuous bearing sleeve is not objectionable if it is spaced far enough away from the channel proper so as not to impede the distortion of the channel. As will be apparent, the bearing **66** serves to guide the plunger shaft **58** and to maintain the shaft aligned with the axis of the cartridge. It also prevents accidental withdrawal of the plunger shaft from the holder if the opening in the bearing is of smaller diameter than the enlarged portion **62** of the shaft.

In the embodiment illustrated in FIGURES 11 and 12 the shaft bearing **68** is pivotally mounted on extensions **70**, as by pins **72** which are snapped into corresponding holes in the extensions **70**. Thus when the plunger shaft is withdrawn from the cartridge barrel, the shaft and its bearing **68** may be tilted with respect to the axis of the cartridge and the cartridge holder.

In the embodiment of FIGURE 13 this tilting movement is used to facilitate removal of the cartridge from the holder. In this form the shaft bearing **74** has a projecting finger **76** which extends along one side of the cartridge at the plunger shaft end and which engages the cartridge and exerts a lateral force thereon when the plunger shaft is withdrawn from the cartridge barrel and is tilted in the manner previously described. By such an arrangement the end of the cartridge is forced from the holder and cartridge removal is facilitated.

It is evident from the foregoing description that the invention provides unique forms of cartridge holders. While preferred embodiments of the invention have been shown and described, it will be apparent to those skilled in the art that changes can be made in these embodiments without departing from the principles and spirit of the invention, the scope of which is defined in the appended claims. For example, certain features of the various embodiments may be interchanged. The forms shown in FIGURES 9–13 may be made in solid rather than skeletal construction. By suitably varying the number and position of the internal beads or grooves of the holder, cartridges of diverse forms may be accommodated. Accordingly, the foregoing embodiments of the invention are to be considered illustrative, rather than restrictive of the invention, and those modifications which come within the meaning and range of equivalency of the claims are to be included therein.

The invention claimed is:

1. A holder for receiving a conventional tubular disposable medicament cartridge of the type having a constricted neck adjacent one end thereof, said holder comprising a channel of stiff springy material having inner cross sectional dimensions adapted to fit the outer cross sectional dimensions of said cartridge, said channel having a pair of parallel edges extending the length of said channel and defining an opening along one side thereof, the width of the opening being less than the maximum width of the channel whereby said cartridge may be snapped into said holder laterally by distorting said springy material to increase the width of said opening, said holder being adapted to grip said cartridge along its sides to prevent substantial lateral movement of said cartridge, said holder having adjacent one end thereof an internal projection adapted to engage the neck of said cartridge, whereby substantial longitudinal movements of said cartridge is prevented, and having adjacent its other end external hand gripping means and a guide portion traversed by a passage aligned with the longitudinal axis of said channel, said guide portion being adapted to guide the shaft of a plunger for actuating said cartridge.

2. The invention of claim **1**, said guide portion comprising a bearing pivotally connected to said holder for movement about an axis transverse to the length of said holder, whereby said bearing may be tilted with respect to the longitudinal axis of said channel.

3. The invention of claim 1, said bearing having a finger extending along one side of said cartridge and adapted to eject said cartridge laterally from said holder when said bearing is tilted.

4. The invention of claim 1, said internal projection being an annular bead.

5. The invention of claim 1, said hand gripping means comprising lateral projections.

6. The invention of claim 1, said channel being defined by a pair of parallel arcs of springy material and a pair of parallel bars joining the corresponding ends of said arcs.

7. A holder for receiving and holding against substantial lateral or longitudinal movement a conventional tubular disposable medicament cartridge having a constricted neck adjacent one end thereof, said holder comprising a first arcuate member adapted to embrace snugly and engage the neck of said cartridge, a second arcuate member adapted to embrace snugly and engage the periphery of the barrel of said cartridge at a location spaced rearward from said neck, and a pair of elongated members joining the corresponding ends of said arcuate members and adapted to lie at opposite sides of said cartridge, all of said members being formed of a stiff springy material, the distance between said elongated members being substantially less than the inside diameter of said second arcuate member, said holder extending rearward beyond said second arcuate member and having external hand gripping means and, attached to said rearward extension a guide member adapted to guide the shaft of a plunger for actuating said cartridge.

8. The invention of claim 7, said guide member being pivotally mounted and adapted to rotate about an axis transverse to the length of said holder.

9. The invention of claim 8 wherein said guide member includes a forward-extending member adapted to eject said cartridge laterally from said holder when said guide is rotated.

10. A holder for receiving a tubular disposable medicament cartridge, said holder comprising a cylindrical channel of stiff springy material having a pair of parallel edges extending the length of said channel and defining an opening along one side thereof, said channel being adapted to extend around said cartridge for more than 180° whereby said cartridge may be held within said holder against substantial lateral movement but may be snapped into and out of said holder through said opening by distorting said springy material, said holder having, adjacent its forward end, an internal projection adapted to engage the forward end of said cartridge and to prevent forward movement of said cartridge in said holder, and spaced rearward therefrom a second internal projection adapted to engage the rearward end of said cartridge and prevent substantial rearward movement of said cartridge in said holder, said holder having external hand gripping means and a guide adapted to guide the shaft of a plunger for actuating said cartridge.

11. The invention of claim 10, said channel being defined by a pair of parallel arcs of said springy material and a pair of parallel bars joining the corresponding ends of said arcs.

12. The invention of claim 10, said guide being pivotally mounted and adapted to rotate about an axis transverse to the length of said holder.

13. The invention of claim 10 wherein said guide includes a forward extending member adapted to eject said cartridge laterally from said holder when said guide is rotated.

14. A holder for receiving a tubular disposable medicament cartridge, said holder comprising a channel of stiff springy material, said channel having a pair of parallel edges extending the length of said channel and defining an opening along one side thereof, said channel having inside dimensions adapted to fit the outside dimensions of said cartridge, the width of said opening being less than the maximum width of the channel but adapted to permit said cartridge to be snapped laterally into and out of said holder by distorting said material, said holder having means adapted to engage said cartridge and prevent longitudinal movement thereof with respect to said holder, and having means for hand gripping said holder and a guide adapted to guide the shaft of a plunger for actuating said cartridge, said guide being adapted to permit relative longitudinal movement of said holder and said plunger shaft.

References Cited by the Examiner

UNITED STATES PATENTS

1,728,260	9/1929	Marcy	128—218
2,118,221	5/1938	Montouri	128—218
2,672,142	3/1954	Melton	128—218
2,859,751	11/1958	Stroop	128—218
2,871,858	2/1959	Dann et al.	128—218

RICHARD A. GAUDET, *Primary Examiner.*