Title: ANTI-REUSE SYRINGE (MODE C)

Abstract

An Anti-Reuse Syringe (Mode C) comprising: a hollow body (10) having a protruding conduit (14 to 16) at one end, a plunger (20) associated with the body (10) for reciprocal movement therein, a needle (37) mounted within a carrier (30), wherein the carrier (30) is mounted externally onto the wall of the protruding conduit (14 to 16) of the body (10), the plunger (20) comprising a piston (201) connected to an end of a shaft (23), the shaft (23) being manually operable to move the piston (201) towards the carrier (30) to expel liquid from the body (10) through the needle (37) wherein the piston (201) and the protruding conduit (14 to 16) include an interlocking means (141 and 202) for locking the plunger (20) with the protruding conduit (14 to 16) upon fully depressing the plunger (20) thereby trapping the plunger (20) firmly inside the body (10) wherein the shaft (23) of the plunger (20) includes a fragile portion adjacent the piston (201) to allow the shaft (23) to break upon a reuser trying to take out the plunger (20) from the protruding conduit (14 to 16) inside the body (10).
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ANTI REUSE SYRINGE (MODE C)

1/. TECHNICAL FIELD OF THE INVENTION:

The present invention relates in general to an Anti Reuse Syringe (Mode C).

2/. BACKGROUND OF THE INVENTION:

One of the ways in which Acquired Immune Deficiency Syndrome (AIDS) spread is by sharing the same injection needle with an infected person. In order to reduce spreading of AIDS, a disposable syringe is used. However, a drug-user usually reuse a spent syringe which then practically is circulated among the group of drug-users for convenient purpose or other reasons. It is therefore, important to stop them from using a spent syringe.

USA-5344403 to Rahnfong Lee (1994) discloses a retractable safety syringe which has a hub at the end of its plunger which engages a needle carrier when the plunger is depressed so that the needle carrier can be withdrawn into the syringe along with the needle. It has a V-shaped notch located near the hub which can be broken off at any angle, thereby trapping the spent needle within the syringe for preventing it fallen off to injure people. However, the broken V-shaped notch in practical can be glued to recover for reusable.

Malaysian Patent Filing Certificate No. PI-9600638 dated 17th, February 1996, by Teng Jun Piao, same Inventor of the present application, discloses a non-reusable syringe, in
which the piston and the needle carrier include interlocking means for locking the plunger to the needle carrier upon fully depressing the plunger whereby withdrawal of the plunger causes the needle and the carrier to enter the hollow body. The shaft of the plunger includes a fragile portion which is adjacent the piston to allow the shaft to break upon a reuser trying to take out the retracted needle with the carrier inside the hollow body. The needle carrier includes a fragile portion which can be broken off and is important that it should do so, so that the spent syringe cannot be reused. Even though an attempt may be made to glue the broken needle carrier together again, the rejoined structure will generally not functions properly. In one embodiment, the structure is such that an air-leaking hole will generally be formed at the join.

In the present invention, it is entitled as "Anti Reuse Syringe (Mode C)", which Patent has been filed by the inventor in Singapore on August 10th, 1996 (File No.: 9610429-4. It discloses the end of the plunger shaft and the protruding conduit of the syringe hollow body include interlocking means for locking the plunger to the lower end inside the syringe hollow body upon fully depressing the plunger. The shaft of the plunger includes a fragile portion which is adjacent the piston to allow the shaft to break upon a reuser trying to withdraw the plunger which is locked inside the protruding conduit of the syringe hollow body, and is important that it should do so, so that the spent syringe cannot be reused. Even though an attempt may be made to glue the broken shaft together again, the rejoined structure will generally be broken again upon repeated withdrawal of the plunger.
3/. SUMMARY OF THE INVENTION:

Accordingly, it is a primary object of the present invention to provide an Anti Reuse Syringe (Mode C).

According to the most general aspect of the present invention there is provided an Anti Reuse Syringe (Mode C) comprising: a hollow body having a protruding conduit at one end, a plunger associated with the body for reciprocal movement therein, a needle mounted within a carrier, wherein the carrier is mounted on the external wall of protruding conduit, the plunger comprising a piston with a pipe-shaped portion extended forward connected to an end of a shaft, the shaft being manually operable to move the piston with the pipe-shaped portion towards the protruding conduit to expel liquid from the hollow body through the needle, wherein the pipe-shaped portion and the protruding conduit include the interlocking means for locking the plunger to the protruding conduit of the hollow body upon fully depressing the plunger, whereby the shaft of the plunger includes a fragile portion adjacent the piston to allow the shaft to break upon a reuser trying to withdraw the shaft violently after locked.

 Preferably, interlocking means located at the protruding conduit of the hollow body is a male locking section and the interlocking means located at the pipe-shaped portion adjacent the piston is a female locking section.

 Preferably also, the fragile portion in the plunger shaft between the plunger and the shaft comprises four weak connected wings of the shaft with an isolated gap in central position.
4/. BRIEF DESCRIPTION OF THE DRAWINGS:

Embodiments of the invention will now be described, by way of example only, with reference to the drawings.

In the drawings:

Figure 1: shows a perspective view of the dismantled parts of the syringe.

Figure 2: shows a cross-sectional view of the assembled syringe.

Figure 3: shows a cross-sectional view of the assembled syringe when the plunger is fully depressed and interlocked with the protruding conduit of the hollow body.

Figure 4: shows an enlargement of the protruding conduit in its original position in the syringe and how the plunger interlock with it.

Figure 5: shows a cross-sectional view of the assembled syringe which is interlocked at the protruding conduit in its original position in the syringe and the plunger broken off at its fragile portion when it is withdrawn violently.

Figure 6A: shows an enlargement of a cross-sectional view of the fragile portion of the plunger when it is under normal circumstance.

Figure 6B: shows an enlargement of a cross-sectional view of the fragile portion of the plunger when it is depressed under normal circumstance.

Figure 6C: shows an enlargement of a cross-sectional view of the fragile portion of the plunger when it is on the way to withdraw violently under interlocked circumstance.

Figure 7A: shows an enlargement of the glued broken parts
of the fragile portion of the plunger.

Figure 7B: shows an enlargement of the glued broken parts of the fragile portion of the plunger, broken again when the reuser tries to release the plunger from the interlocking means by way of violent withdrawal of the shaft.

Figure 8: shows another embodiment of the assembled syringe with eccentric opening of the hollow body at the lower end with the similar designed structures of the fragile portion of the plunger and the interlocking means of both male and female locking sections in the hollow body.

Reference Numerals In Drawings:

10  hollow body
11  first flange
14  protruding conduit (upper part)
14A first flangible hook
14B first notch
141 male locking section
15  protruding conduit (middle part)
16  protruding conduit (lower part)
20  plunger
201 piston
202 female locking section
21  second flange
23  cross-shaped flanged shaft
24  fragile portion
241 gap
25  conically shaped flangible section
26  third flange
27  fourth flange
5/. DETAILED DESCRIPTION OF THE DRAWINGS:

Figure 1 shows the respective parts of the syringe which comprises a hollow body (10), a plunger (20) and a needle carrier (30). Body (10) has a first flange (11) at the upper end and a protruding conduit (14 to 16) at the lower end. Protruding conduit (14 to 16) is designed such that the wall is not parallel against one another with same internal and external diameter, instead, its internal diameters are approximate from 4.5 mm. (14) through 2.5 mm. (15) to the end of 2 mm. (16), and its external diameters are approximately of 6.5 mm. (14), 4.5 mm. (15) and 4 mm. (16) respectively, wherein a first flangible hook (14A) is designed along the internal wall of protruding conduit (14) which acts as a male locking section (141) of the interlocking means. The chemical composition of the raw material used is the same as the existing single-use syringe sold in the market, i.e. thermoplastic Polypropylene with the same physical and chemical characteristics. The capacity of the medication liquid (not shown) is indicated as scaled marks on the wall of body (10). Plunger (20) consists of a second flange (21) at the upper end, a cross-shaped flanged shaft (23) in the middle which is
declining in sizes towards the upper end, a piston (201), a fragile portion (24) which is adjacent to piston (201), a third flange (26) connected to a conically shaped flangible section (25) and piston (201) terminating with a female locking section (202) surrounded with a rubberlike material (29). Female locking section (202) consists of a fourth flange (27) connected with a smaller fifth flange (27') which are to support a pipe-shaped portion (28) extended forwards at the lower end, wherein a second flangible hook (28A) is fixed for the interlocking means. The chemical composition of raw materials used in plunger (20) is the same as the existing single-use syringe sold in the market with the same physical and chemical characteristics. Rubberlike material (29) keeps the internal body (10) in somewhat vacuum condition.

Needle carrier (30) has no critical point, except that its internal diameter of upper end (31) must be in the appropriate sizes, so as to fit tightly onto the external wall of protruding conduit (14 to 16) of body (10). Needle carrier (30) is terminated with a holding means (36) to hold needle (37). Chemical composition of the raw materials used are the same as the existing single-use syringe sold in the market, with the same physical and chemical characteristics.

The assembled syringe with plunger (20) in its initial depression stage when injection is carried out as shown in Figure 2.

Plunger (20)'s raw material has its own slight elastic characteristic plus the slippery characteristic of the medical liquid to compensate the minimum friction force, so that plunger (20) is easily depressed along body (10)
until it reaches the end where it is smoothly locked into protruding conduit (14) as shown in Figure 3.

Figure 4 shows plunger (20) is going to interlock with protruding conduit (14 to 16) of body (10), wherein female locking section (202) has a gap about 4 mm. in depth and 1.5 mm. in width, to separate pipe-shaped portion (28) into two parts, each of which is a second flangible hook (28A), with 1.5 mm. in thickness, declining at an angle of 26 degree, being inserted into male locking section (141), which is 1.75 mm in thickness, with 3 mm in length, inclines at an angle of 14 degree till reaching at a first notch (14B) which is about 0.75 mm. in depth. Thus male locking section (141) with its notches (14B) are strong enough to hold against the force when a reuser tries to take out plunger (20) from protruding conduit (14) inside body (10).

The surrounding thickness of interlocking means (141 & 202) when connected together is strong enough to hold piston (201) and shaft (23) firmly, so that when the reuser attempts to take out plunger (20), all the force will be concentrated in fragile portion (24) which is weakly connected to third flange (26), thus breaking plunger (20) as shown in Figure 5.

Fragile portion (24) is at the lower end of shaft (23) with 4 wings, each of which is approximate 0.5 mm. in thickness and 1.5 mm. in depth connected to third flange (26), adjacent is a gap (241) approximate 0.5 mm. in width between the central point of shaft (23), and conically shaped flangible section (25) which is designed at the peak approximate 1.5 mm. in diameter inclining towards the base approximate 4.5 mm. in diameter connected to third flange.
(26) as shown in Figure 6A.

In its initial stage of injection, its pushing force will depress the central point of shaft (23) across gap (241) against the peak of cone (25) whereby fragile portions (24) with approximate 0.5 mm. thickness connected to third flange (26) are so weak that at this moment to be folded a little, and so plunger (20) is depressed towards the lower end of body (10) until locked at protruding conduit (14) as shown in Figure 6B.

When pumping the medicine before locked, the pulling force on shaft (23) should be usually slow and gentle which only stretches the central point of shaft (23) a little bit distance off cone (25), and so fragile portions (24) are to be stretched tightly against third flange (26) surface as shown in Figure 6C. But when after locked, the pulling force on shaft (23) must become so violent that fragile portions (24) are easy to be torn off, and so piston (201) is locked at the position of male locking section (141) inside body (10).

The reuser then perhaps attempts to repair the broken fragile portions (24), as well as the central point of shaft (23) against the peak of cone (25) with the glue at (242) and (243) respectively as shown in Figure 7A. But due to each broken part at fragile portions (24) is only 0.5 mm (thick) x 1.5 mm (deth) = 0.75 sq. mm. in area and the peak of cone (25) is 1.5 mm. in diameter as shown in Figure 7B, thus they are too small and weak even after gluing to support the violent pulling force upon attempting to withdraw piston (201) from interlocking means (141 & 202).

Another type of syringe with eccentric opening of body (10) at the lower end as shown in Figure 8. The same
principles apply here as mentioned above where plunger (20) is being depressed towards protruding conduit (14 to 16) of body (10).

While the preferred embodiments of the present invention and their advantages have been disclosed in the above detailed description, the invention is not limited thereto but only by the spirit and scope of the appended claims.
CLAIMS

1. An Anti-Reuse Syringe (Mode C) comprising: a hollow body (10) having a protruding conduit (14 to 16) at one end, a plunger (20) associated with said body (10) for reciprocal movement therein, a needle (37) mounted within a carrier (30), wherein said carrier (30) is mounted externally onto the wall of said protruding conduit (14 to 16) of said body (10), said plunger (20) comprising a piston (201) connected to an end of a shaft (23), said shaft (23) being manually operable to move said piston (201) towards said carrier (30) to expel liquid from said body (10) through said needle (37) wherein said piston (201) and said protruding conduit (14 to 16) include an interlocking means (141 & 202) for locking said plunger (20) with said protruding conduit (14 to 16) upon fully depressing said plunger (20) thereby trapping said plunger (20) firmly inside said body (10), characterized in that said shaft (23) of said plunger (20) includes a fragile portion adjacent said piston (201) to allow said shaft (23) to break upon a reuser trying to take out said plunger (20) from said protruding conduit (14 to 16) inside said body (10).

2. An Anti-Reuse Syringe (Mode C) according to claim 1 wherein said fragile portion adjacent said piston (201) is a cross-shaped flange (24) with limited thickness and length connected to said piston (201).

3. An Anti-Reuse Syringe (Mode C) according to claim 1 wherein said interlocking means located at said protruding conduit (14 to 16) is a male locking section (141) and said interlocking means adjacent
said piston (201) is a female locking section (202).

4. An Anti-Reuse Syringe (Mode C) according to claim 1 wherein the main supporting portion by force to push said piston (201) associated with said fragile portion (24) at end of said shaft (23) is a conically shaped flange (25).

5. An Anti-Reuse Syringe (Mode C) according to claim 1 wherein a gap (241) in between the central point of said shaft (23) and said conically shaped flange (25), acts as a subsidiary fragile portion of said piston (201).