

CLAIMS

1. An injection device including:

a barrel having a proximal end for a needle to protrude therefrom;

a plunger;

a needle assembly having a double-pointed hollow needle and a biasing means operable to bias the double-pointed hollow needle away from the proximal end of the barrel; and

a cartridge;

their arrangement being concentric once assembled to form the device, with the biasing means being located at the proximal end of the barrel; and

a mechanism operable to cause the cartridge to be punctured by the first end of the needle, and to cause the second end of the needle to protrude from the proximal end of the barrel, and to be locked in the protruded position prior to any movement of the plunger, wherein the mechanism is adapted to ensure that the action of puncturing and the protruding occur simultaneously.

2. The injection device as claimed in claim 1, wherein the mechanism further enables the needle to be unlocked from its protruding position and in the unlocked position, the needle automatically retracts completely back into the barrel.

3. The injection device according to any one of the preceding claims, wherein the cartridge is pre-filled with a medicament and the needle assembly including the double-pointed hollow needle and biasing means adapted to initially be housed completely within the barrel.

4. The injection device according to any one of the preceding claims, wherein the barrel is so shaped and dimensioned as to cooperatively engage at least one of the mechanism, needle assembly or cartridge.

5. The injection device according to claim 4, wherein the cooperative engagement between the barrel and at least one of the mechanism, needle assembly and cartridge is provided by the presence of;

a) respective male and female screw threads;

b) a respective shoulder and a respective peripheral aspect adapted to sit on the shoulder;

c) movable catches, and catch receiving apertures; or

d) an interference fit.

6. The injection device according to claim 4 or claim 5, wherein the mechanism forms part of the cartridge.
7. The injection device according to any one of claims 4 to 6, wherein it is the distal end of the barrel that is so shaped and dimensioned as to cooperatively engage at least one of the mechanism, needle assembly or cartridge.
8. The injection device according to claim 5, wherein the mechanism includes a resilient plug to enable the interference fit with the barrel.
9. The injection device according to claim 1, wherein the mechanism includes:
 - a rubber plug having a first portion and a second portion such that the second portion is arranged to urge the cartridge against the inner wall of the barrel; and
 - a complementary coupling means formed from first and second parts such that as the first and second parts are coupled together, the cartridge is punctured by the first end of the double-pointed hollow needle, and the second end of the double-pointed hollow needle is protruded from the barrel and held in the protruded position.
10. The injection device according to claim 1 or claim 2, wherein the mechanism includes a pair of flaps arranged proximate to the distal end of the barrel to prevent the cartridge from being ejected from the barrel due to the biasing means.
11. The injection device as claimed in any one of the preceding claims, wherein the cartridge is formed of a composite material.
12. The injection device as claimed in claim 11, wherein the composite material includes an inner layer made of glass and outer layer made of plastics material.
13. The injection device as claimed in any one of the preceding claims, wherein the cartridge includes a number of demountable seals.