Abstract: The present invention is directed toward fluid transfer devices including a vial adapter having a top wall and a cannula with a cannula tip, and an elastic O-ring like sealing element sealingly encircling the cannula and initially disposed towards the cannula tip and spaced apart from the top wall, the sealing element being brought into initial contact with the vial stopper subsequent to the cannula tip contacting the vial stopper at a puncture site and thereafter being slidingly urged towards the top wall and continuously sealing the puncture site during snap fit mounting the vial adapter on the vial.

CLAIMS:

1. A fluid transfer device for use with a medicinal vial having a longitudinal vial axis and including a vial body having a vial interior for storing a medicament, a vial rim defining a vial opening, a narrow neck intermediate the vial body and the vial rim, a vial stopper sealing the vial opening and having a stopper thickness T close to the vial axis, the vial stopper having an uppermost stopper surface, the fluid transfer device comprising:

a) a vial adapter having a longitudinal adapter axis and including a top wall transverse to said adapter axis, a downward depending skirt with flex members for snap fitting onto the vial rim for concentric mounting said vial adapter on the vial, a pointed tubular cannula for initially contacting the vial stopper at a puncture site and puncturing therethrough for establishing flow communication with the vial interior on said snap fit mounting, and a flow communication channel in flow communication with said cannula; and

b) an elastic O-ring like sealing element sealingly encircling said cannula, said sealing element being initially disposed along said cannula and spaced apart from said top wall and said cannula tip to leave an exposed cannula length L between said sealing element and said cannula tip,

said sealing element being brought into initial contact with the vial stopper subsequent to said cannula tip contacting the vial stopper at said puncture site and thereafter being slidingly urged towards said top wall and continuously sealing said puncture site during said snap fit mounting said vial adapter on the vial.

2. The device according to claim 1 wherein said sealing element includes a tubular main body and a converging tubular leading section facing towards said cannula tip.

3. The device according to either claim 1 or 2 wherein said exposed cannula length L is shorter than said stopper thickness T such that said sealing element contacts the vial stopper prior to said cannula puncturing therethrough.

4. The device according to any one of claims 1 to 3 wherein said sealing element deforms in a radial direction when axially compressed between said top wall and the uppermost stopper surface.

5. The device according to any one of claims 1 to 4 wherein said sealing element has a hardness rating less than 50 Shore A.

6. The device according to any one of claims 1 to 5 wherein said sealing element has a hardness rating in a range of 5 to 35 Shore A.

Dated this 18/04/2012

[HRISHIKESH RAY CHAUDHURY]
OF REMFRY & SAGAR
ATTORNEY FOR THE APPLICANT[S]

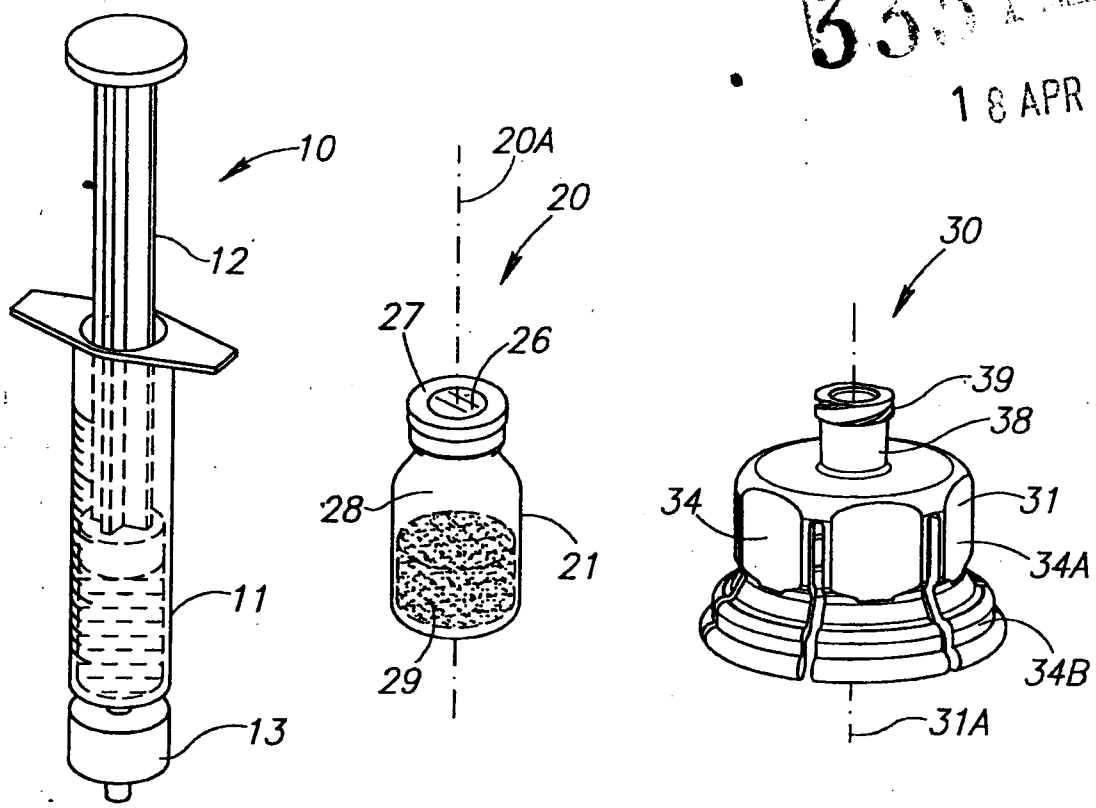

FIG.1
(PRIOR ART)

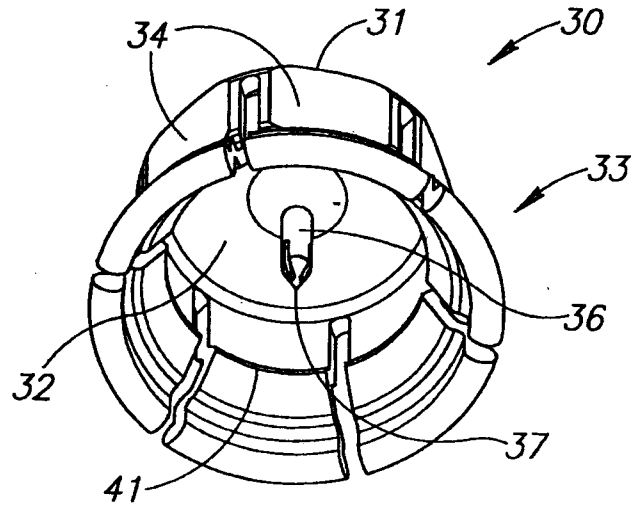

FIG.2
(PRIOR ART)

[HRISHIKESH RAY CHAUDHURY]
OF REMFRY & SAGAR
ATTORNEY FOR THE APPLICANTS

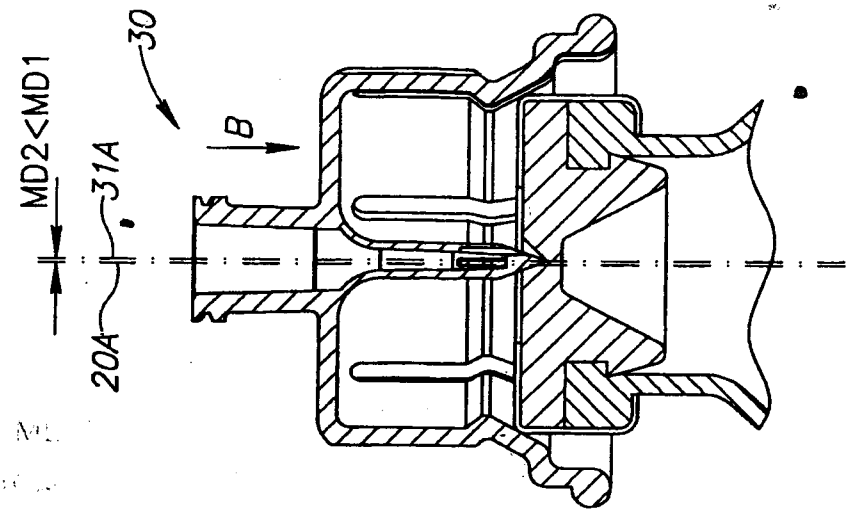

FIG.3C
(PRIOR ART)

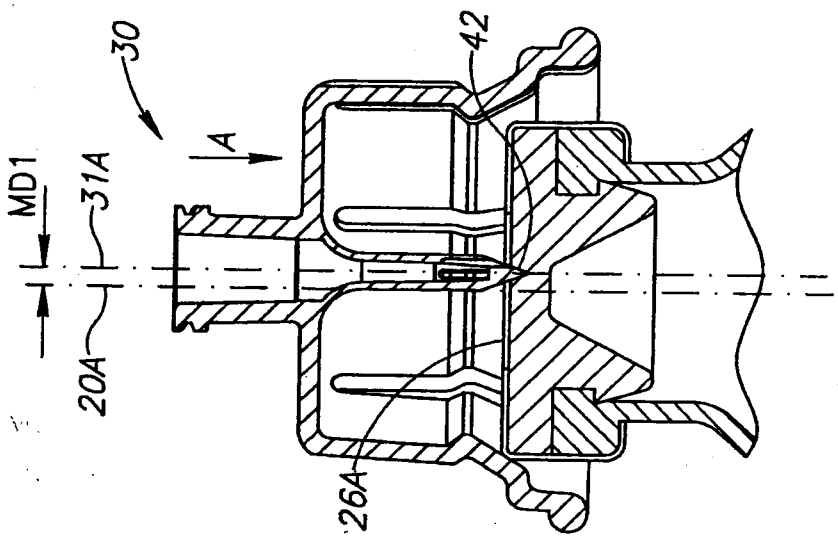

FIG.3B
(PRIOR ART)

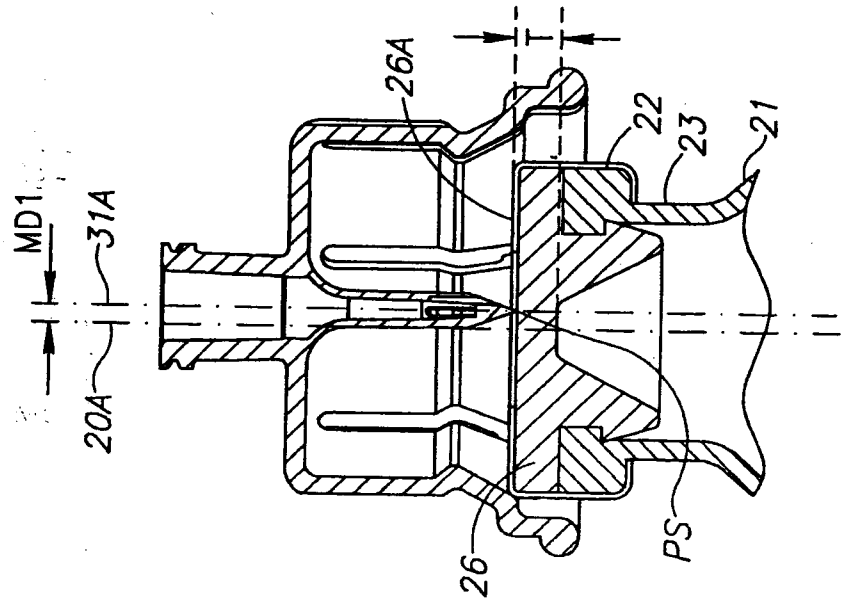

FIG.3A
(PRIOR ART)

[HRISHIKESH RAY CHAUDHURY]
OF REMFRY & SAGAR
ATTORNEY FOR THE APPLICANTS

3/8

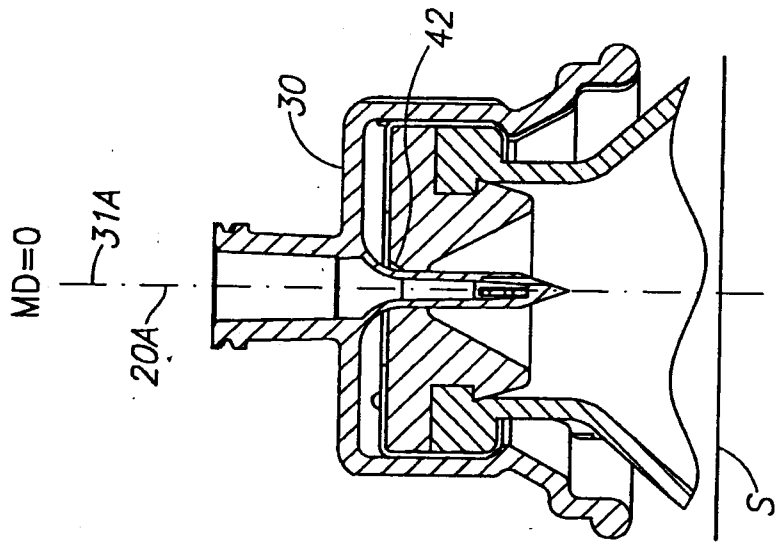

FIG.3E
(PRIOR ART)

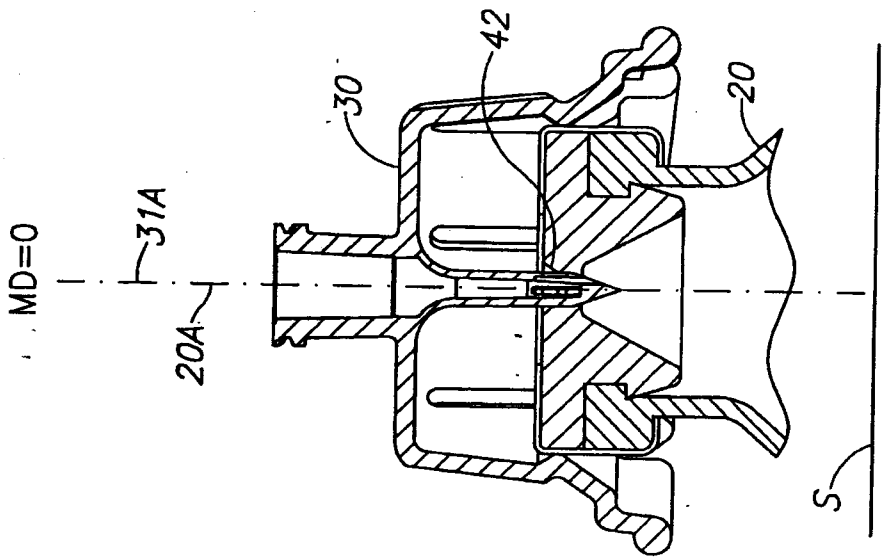

FIG.3D
(PRIOR ART)

[HRISHIKESH RAY CHAUDHURY]
OF REMFRY & SAGAR
ATTORNEY FOR THE APPLICANTS

4/8

ORIGINAL

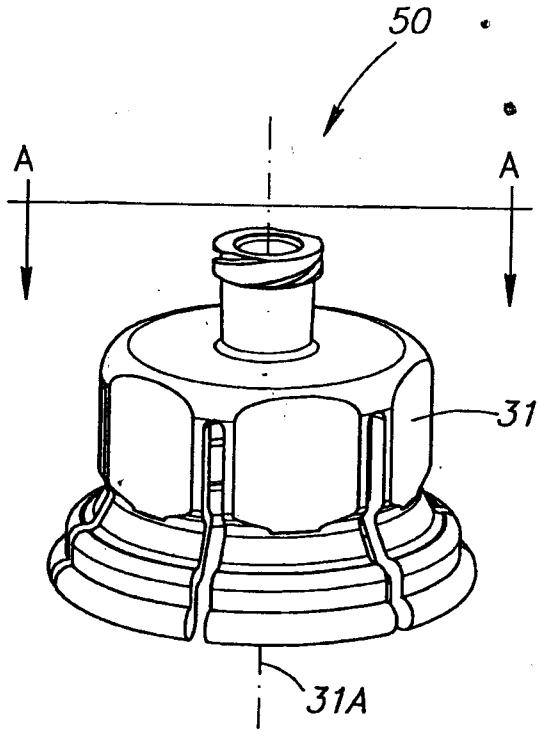

FIG.4

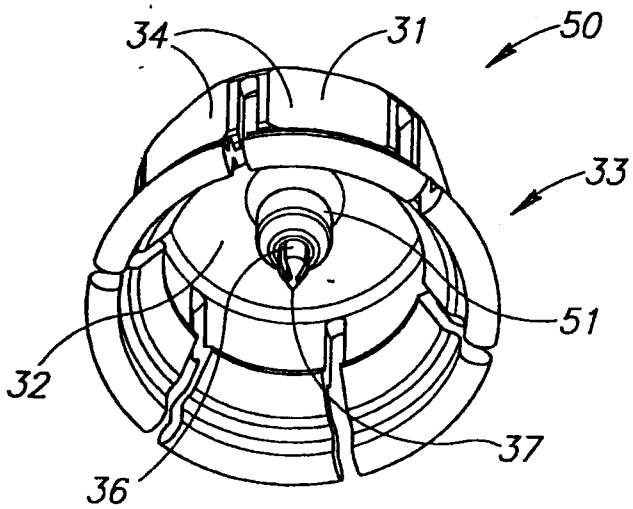

FIG.5

[HRISHIKESH RAY CHAUDHURY]
OF REMFRY & SAGAR
ATTORNEY FOR THE APPLICANTS

5/8

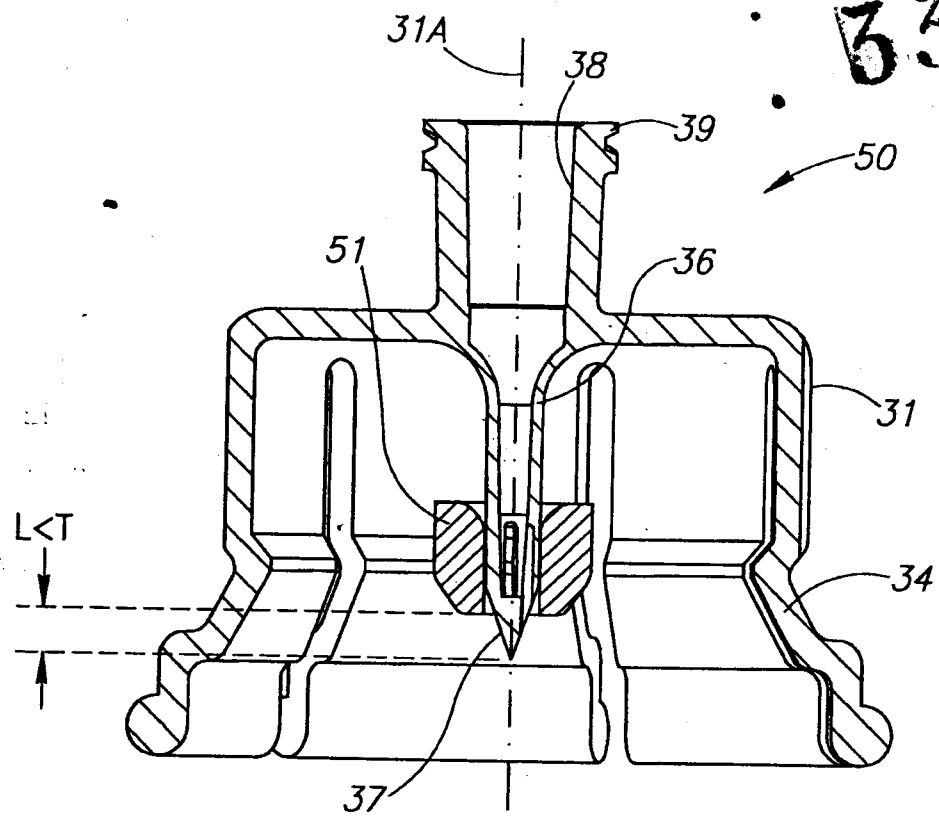

FIG.6

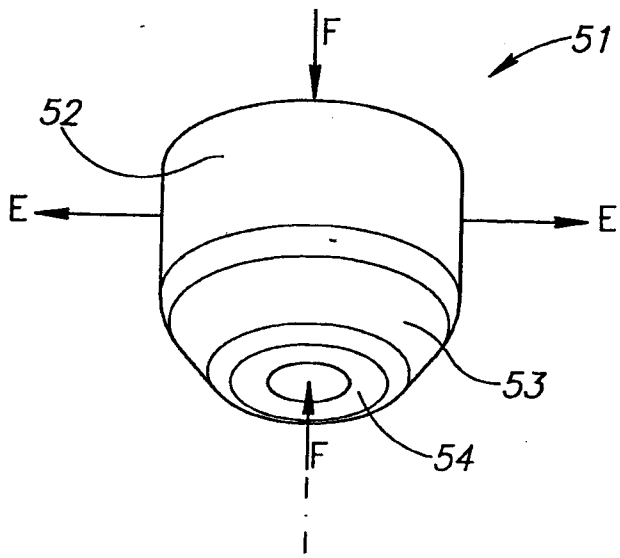

FIG.7

[HRISHIKESH RAY CHAUDHURY]
OF REMFRY & SAGAR
ATTORNEY FOR THE APPLICANTS

ORIGINAL

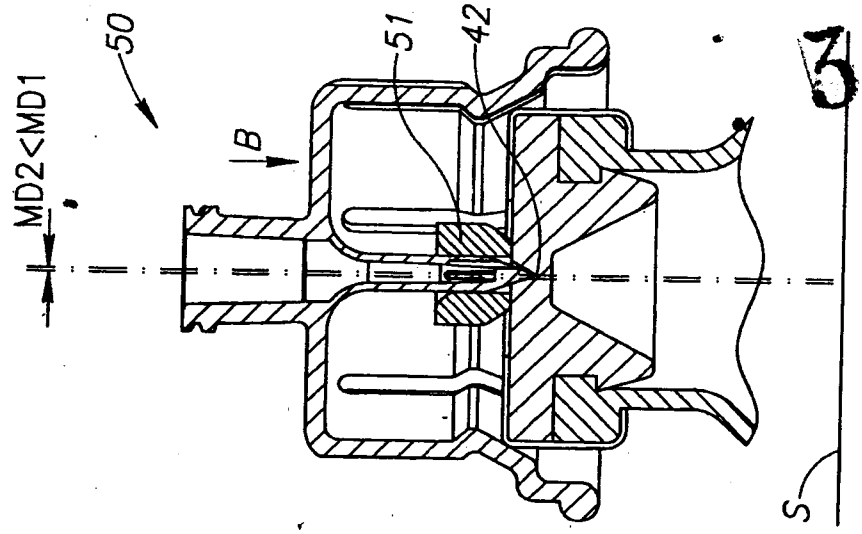

FIG.8C

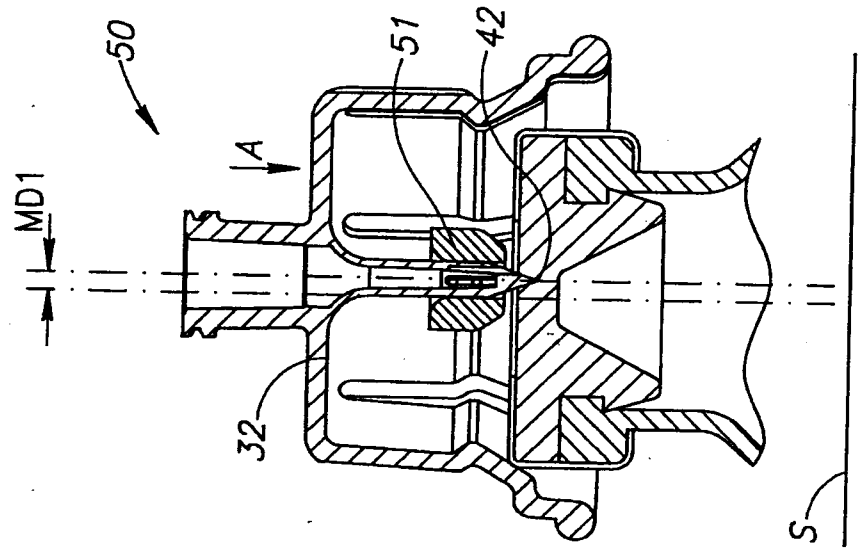

FIG.8B

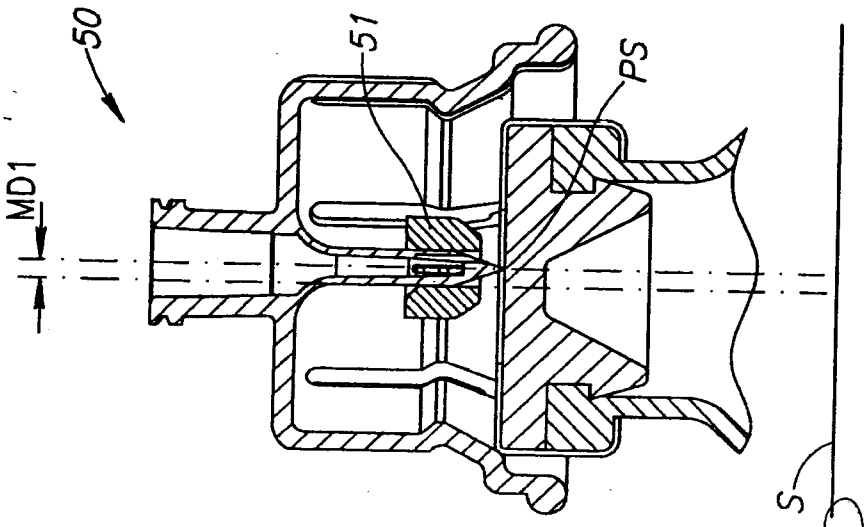

FIG.8A

[HRISHIKESH RAY CHAUDHURY]
OF REMFRY & SAGAR
ATTORNEY FOR THE APPLICANTS

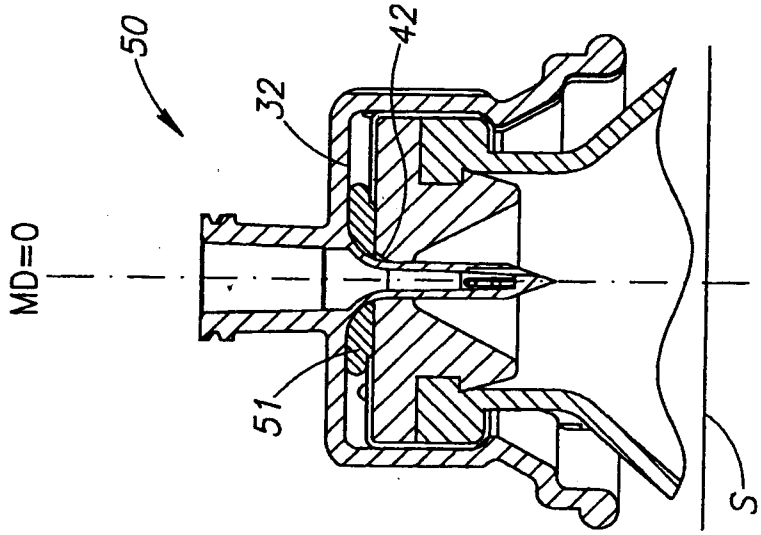

FIG.8E

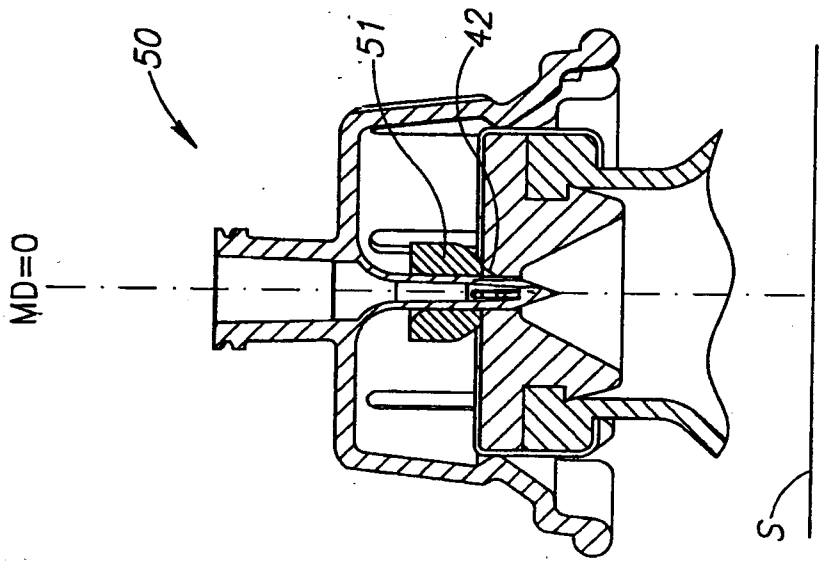

FIG.8D

[HRISHIKESH RAY CHAUDHURY]
OF REMFRY & SAGAR
ATTORNEY FOR THE APPLICANTS

8/8

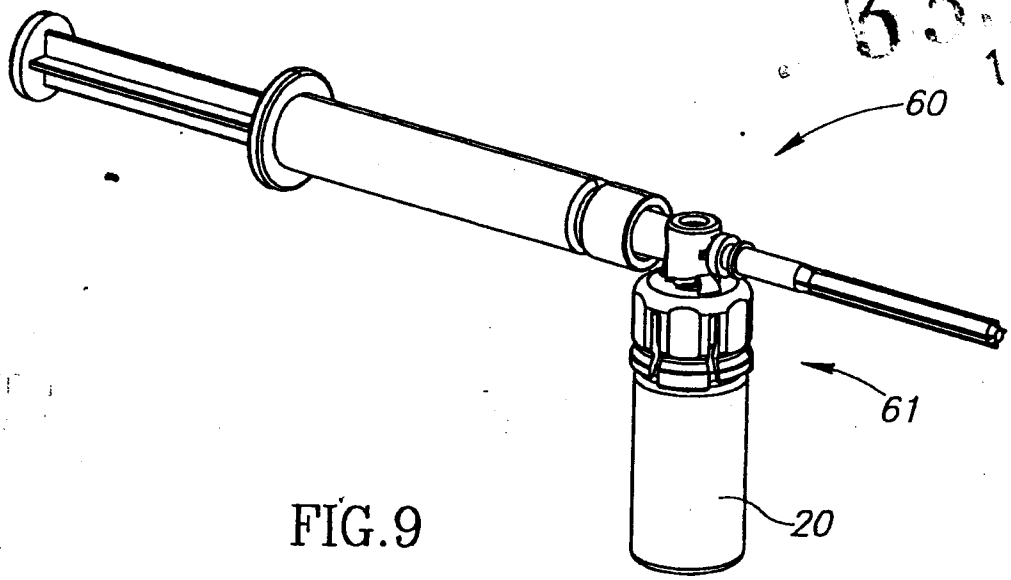

FIG.9

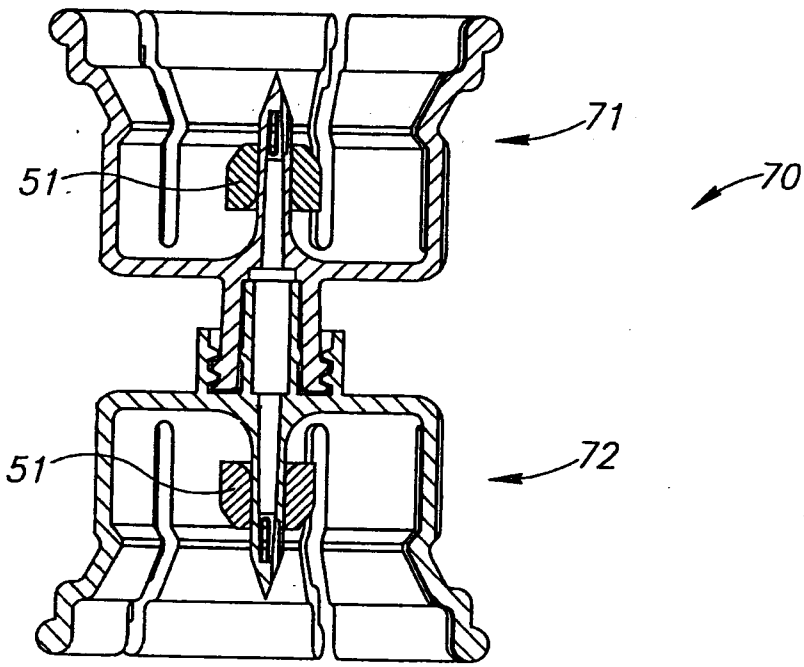

FIG.10

[HRISHIKESH RAY CHAUDHURY]
OF REMFRY & SAGAR
ATTORNEY FOR THE APPLICANTS