

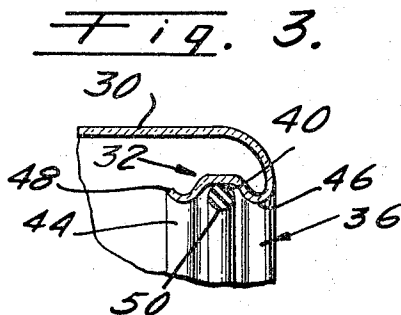
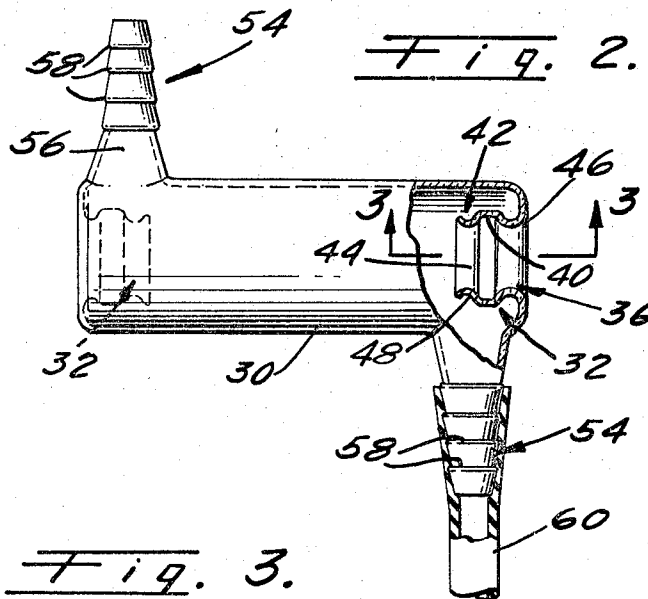
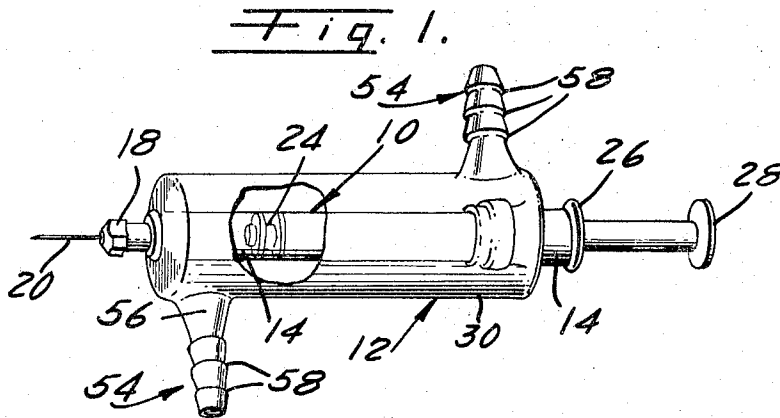
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HEAT EXCHANGE JACKET WITH SEALING MEANS FOR SYRINGE

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HEAT EXCHANGE JACKET WITH SEALING
MEANS FOR SYRINGE

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This invention relates generally to scientific instruments and relates more particularly to syringe mantles.

While the invention has particular utility embodied in mantles for syringes, and is shown and described thus embodied, it is to be understood that its utility is not confined thereto.

In various types of scientific research as, for example, where work is with low boiling hydrocarbons, viscous materials, low melting samples, and the like, it has been extremely difficult to maintain such materials in the syringe, handling such materials constantly at a required temperature.

It is therefore an object of the invention to provide means for overcoming this difficulty.

It is another object of the invention to provide means of this character comprising a mantle or jacket for the syringe through which a fluid at a given temperature may be circulated to thereby maintain the sample or material in the syringe at the required temperature.

Still another object of the invention is to provide means of this character for circulating hot or cold liquids there-through to maintain the sample in the syringe at a constant, given temperature.

A further object of the invention is to provide a device or means of this character which may be easily and quickly attached to a syringe or easily and quickly removed therefrom.

A still further object of the invention is to provide a device of this character having unique means for providing leakproof seals with the syringe therein.

Another object of the invention is to provide a device of this character that is relatively inexpensive to manufacture.

The characteristics and advantages of the invention are further sufficiently referred to in connection with the following detailed description of the accompanying drawings which represent one embodiment. After considering this example skilled persons will understand that many variations may be made without departing from the principles disclosed and I contemplate the employment of any structures, arrangements or modes of operation that are properly within the scope of the appended claims.

Referring to the drawings, which are for illustrative purposes only:

FIG. 1 is a perspective view of a measuring syringe with a mantle of the present invention operably disposed thereon;

FIG. 2 is an enlarged side elevational view of the mantle per se; and

FIG. 3 is an enlarged sectional view taken on line 3-3 of FIG. 2.

Referring more particularly to the drawings, there is shown a syringe, indicated generally at 10, and a mantle or jacket thereon, indicated generally at 12.

Syringe 10 may be of any well known type such as that used for measuring fluid samples or the like, and includes a barrel 14 having a tip to which the hub 18 of a needle 20 is removably attached.

Barrel 14 has the usual longitudinally extending bore in which a plunger 22 is slidably disposed, said plunger having a head 24 having peripheral sealing engagement with the wall of the bore of the barrel. Barrel 14 is

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provided with a flange 26 at its rear end and plunger 22 is provided with a button or disc 28 at its outer end to facilitate actuation of said plunger.

Mantle or jacket 12 may be of any suitable material, such as glass, for example, and comprises a hollow, cylindrical body 30 at each end of which is an inturned tubular support, indicated generally at 32, for reception of the barrel of a syringe, said supports being of substantially smaller external diameter than the internal diameter of the mantle body and being axially arranged relative to the body and axially aligned relative to each other.

The barrel supports are of the same construction and size and although oppositely arranged, are of the same shape and construction so that but one need be described.

Each of these supports includes an entrance opening, indicated generally at 36, flared outwardly somewhat. Intermediate the ends of the support is an annular groove 40 and at the inner end of the support is an inner end portion, indicated generally at 42, having a throat 44 of the same diameter as the throat 46 of the entrance opening. The free end portion 48 of the inner end portion 42 also flares radially outwardly somewhat to guide the adjacent end of a syringe barrel inserted into the opposite end of the body.

The bottom of the groove 40 of each support 32 is of greater diameter than the diameter of the throats 44 and 46 adjacent the inner and outer ends of the support 32 and each groove 40 has a doughnut shaped resilient sealing element 50 disposed therein, said elements being the same in dimensions and characteristics. Any suitable type of sealing element having an internal axial opening therein may be used although an O-ring of suitable material that will not be affected by the fluid being circulated through the device. For example, a very satisfactory rubber material for the O-rings is Buna-N. The term rubber is to be understood as including not only material and/or synthetic rubber, but also plastics having the desired characteristics.

The longitudinal or axial length of the groove 40 is greater than the diameter of the O-ring which facilitates installation of the mantle on the syringe barrel.

Since the inside diameter of the O-rings is greater than the inside diameter of the throats 44 and 46 so that the barrel of the syringe disposed in the device will be sealingly engaged by the inner part of the O-rings and said barrel is supported by said O-rings in spaced relation to the throats 44 and 46 so that there is no contact between the barrel and said throats. Thus the danger of breakage of the syringe barrel and/or the adjacent parts of the supports for the syringe is minimized or completely eliminated.

Adjacent the respective ends of the body 30 of the mantle or jacket are laterally extending oppositely arranged hollow or tubular fittings indicated generally at 54, which are integral with said body and may be fused to said body or otherwise formed thereon. The interiors of said fittings communicate with the interior of the body 30 and provide fluid inlet and outlet means for said body. These fittings are tubular or hollow and taper radially inwardly from the base 56 where they are connected with the body 30 toward their outer ends and there are a plurality of longitudinally spaced shoulders 58 of progressively smaller diameter toward the free ends of said fittings. Shoulders 58 face toward the body and aid in retaining rubber tubing 60 attached to said fittings.

When installing the mantle or jacket on a syringe the barrel of the latter is pushed through first one of the O-rings and then the other with the forward end of the barrel extending through the adjacent O-ring or seal, the

rear portion of the barrel being sealingly held and supported by the adjacent O-ring. To remove the mantle or jacket it is pulled off the barrel of the syringe, the flange 26 of the barrel serving to aid in holding the syringe while separating the mantle from the syringe.

By using a mantle of transparent material, the syringe on which the mantle is disposed is visible including the scale markings and the inner plunger end, so that the position of the plunger head relative to the scale can be readily seen.

By connecting tubing to the fittings, a liquid or other fluid is circulated through the jacket in the annulus between the outside of the barrel of the syringe and the inside wall of the body 30 of the mantle or jacket. The temperature of this fluid is maintained constant at the desired temperature so that the material in the syringe is also maintained constant at the desired temperature. One of the fittings provides an inlet for such fluid and the other fitting provides an outlet therefor.

Rubber tubing or other suitable flexible tubing resistant or impervious to the action of fluid flowed through the mantle or jacket is used, and by having sufficient lengths of this flexible tubing the jacketed syringe may be maneuvered for use as desired with the sample material maintained at the required or desired temperature.

The invention and its attendant advantages will be understood from the foregoing description and it will be apparent that various changes may be made in the form, construction and arrangement of the parts of the invention without departing from the spirit and scope thereof or sacrificing its material advantages, the arrangement hereinbefore described being merely by way of example, and I do not wish to be restricted to the specific form shown or uses mentioned except as defined in the accompanying claims, wherein various portions have been separated for clarity of reading and not for emphasis.

I claim:

1. In a mantle for syringes and the like:

- (A) a hollow body;
- (B) an integral tubular syringe support at each end of said body in axial alignment with each other and of substantially smaller outside diameter at the greatest radial dimension than the inner diameter of the body, each syringe support means having
 - (a) an outwardly opening outer end,
 - (b) an annular groove intermediate the ends of said syringe supports, and
 - (c) a throat adjacent the inner end and a throat adjacent the outer end of the groove;
- (C) and a tubular fitting adjacent each end of the body and communicating with the interior of the body to thereby provide inlet and outlet means for fluid flow through said body.

2. The invention defined by claim 1 wherein the syringe supports are turned inwardly in the hollow body, and the throats have substantially the same internal diameter relative to each other.

3. The invention defined by claim 1 wherein the grooves of the syringe supports are longer longitudinally of the supports than the depth of said grooves.

4. The invention defined by claim 1, including doughnut shaped seals in said grooves.

5. The invention defined by claim 4 wherein said seals are adapted to receive the barrel of a syringe therein in sealing relation to said barrel and said seals sealingly engage at least a part of the walls defining said grooves.

6. The invention defined by claim 1 wherein the syringe supports are intumed relative to the body, the greatest external diameters of said supports being smaller than the internal diameter of the body, and there are doughnut shaped sealing elements in said grooves.

7. The invention defined by claim 6 wherein grooves are axially longer than the diameter of a cross section of the part of said sealing elements defining the central opening therein.

8. The invention defined by claim 6 in combination with a syringe having a transparent barrel with a scale thereon, said barrel being disposed in the central openings in said sealing elements, said sealing elements being in sealing engagement with said barrel, the body of the mantle being transparent.

9. The invention defined by claim 1 including a doughnut shaped seal in each groove, and a syringe having a barrel removably sealed in and supported by said seals.

10. A mantle for syringes, said mantle comprising:

- (A) a tubular body;
- (B) oppositely arranged tubular syringe support means at each end of the body and turned inwardly into the body
 - (a) said support means being integral with said body
 - (b) and each of said support means flaring outwardly at the outer ends thereof,
 - (c) an annular groove intermediate the ends of said support means
 - (d) each support means also having an inwardly flaring inner end portion,
 - (e) and a tubular fixture at each end of said body and integral therewith, said fixtures being tubular and providing means for attachment of fluid conducting conduits to supply fluid to the interior of the body and carry fluid away therefrom.

11. The combination of a syringe having a barrel with a mantle therefor, said mantle including

- (A) a tubular, transparent body having an internal diameter substantially greater than the diameter of said barrel;
- (B) oppositely arranged tubular syringe support means at each end of the body and turned inwardly into said body, each of said support means having
 - (a) an outwardly flaring outer end,
 - (b) an annular groove intermediate the ends of said support means,
 - (c) a throat at each side of said groove,
 - (d) and an inwardly flaring inner end portion;
- (C) an annular seal in each of said grooves, said seals having a central opening therein for sealing but removable reception of the barrel of said syringe, said seals supporting said barrel in spaced relation to the throats of said support means and providing a seal with the walls of said grooves;
- (D) and tubular fixtures adjacent the ends of the body, said fixtures providing means for fluid conduits and communicating with the interior of said body.

12. The invention defined by claim 11 wherein the body, syringe support means and the fixtures are an integral unit.

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