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CONDENSER

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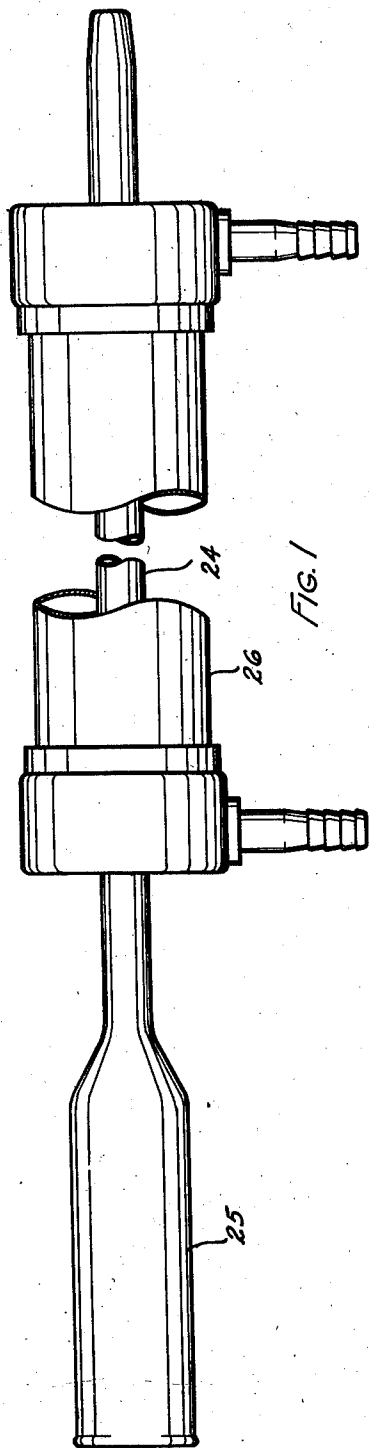


FIG. 1

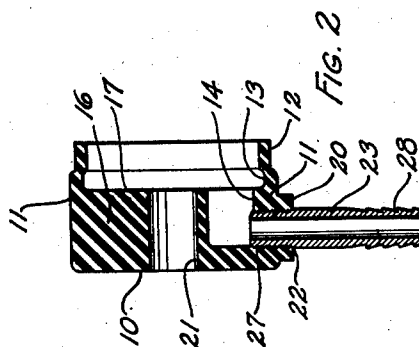
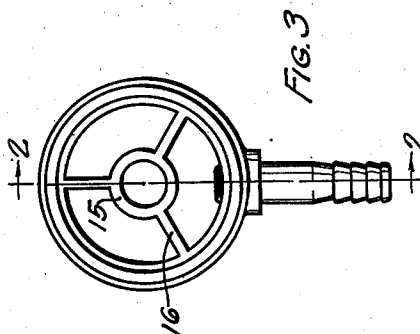


FIG. 2

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CONDENSER

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7 Claims. (Cl. 257—28)

This invention has to do with a condenser and relates particularly to a coupling or end member therefor.

The objects of the invention, among others, include the provision of the following:

- 1 An improved condenser comprising concentric tubes and a novel end member;
- 2 An improved detachable coupling member for maintaining concentric tubes in assembly;
- 3 A new condenser coupling member having as a part thereof an inlet or outlet nipple;
- 4 A novel coupling member which provides a cushioning support for a condenser;
- 5 An improved condenser coupling member for spacing apart concentrically disposed tubes and for maintaining such tubes at a predetermined spaced-apart relation;
- 6 A unique construction for a member used for spacing concentrically arranged tubes or the like.

7 A condenser coupling member having as a part thereof an inlet or outlet nipple to eliminate an inlet or outlet nipple passing through the wall or fused to the wall of the jacket.

8 A new condenser jacket coupling member having as a part thereof an inlet or outlet nipple, and so attached to the inner and outer tubes of the condenser that the inlet and outlet tubes may be adjusted in angular relationship to each other as desired.

9 These objects, and such other objects as may hereinafter appear, are obtained by the novel construction, unique arrangement, and improved combination of the several elements which constitute the invention, a single embodiment of which is illustrated in the sheet of drawing appended hereto and made a part of this application.

In said drawing:

10 Figure 1 is a side elevation of an assembled condenser comprising concentric tubes and in which two of the coupling members hereinafter described are employed, the intermediate tube portions being broken away;

11 Figure 2 is a diametric section of one of said coupling members; and

12 Figure 3 is an elevation of the coupling member shown in Figure 2.

13 Like reference characters are used for designating the same parts in the drawing and in the description which follows.

14 The several figures may be read concurrently for convenience. Figure 1 illustrates an assembled condenser comprising a long tube 24, a shorter tube 26 of larger diameter than that of

the tube 24, and two coupling members, one being at each end of the tube 26. A thistle, funnel, or modified thistle end 25 may be supplied upon long tube 24.

Between the two coupling members and upon the exterior thereof, the tube 24 is of a uniform diameter and the tube 26 is of uniform diameter throughout its length. Each coupling comprises an end 10 which is relatively thick and has integral therewith the remainder of the parts now to be described, except the nipple.

The material of the coupling may be of soft rubber, this being particularly appropriate for laboratory use.

Depending from the end 10 is an annular flange 11 which is moulded or otherwise formed to provide different thicknesses of material from the end 10 to the open side thereof. The main body of the exterior of the coupling is of a uniform diameter, there being a constricted short section 12 depending from the main body adjacent its open side.

Interiorly there is an annular surface 14 defining the relatively thick flange and extending from the end 10 to a groove 13. The groove 13 is nearer the end 10 than the shoulder between the flange 11 and the short constricted section 12. The interior of the section extending from the groove 13 to the open side of the coupling is of uniform diameter.

Concentric of the face 14 is a hub 15 which has radially extending ribs 16. The actual length of the hub 15 and of the ribs 16 is equal to that of the thick part of the flange 11. The flat ends 17 of the ribs 16 form a stop or shoulder. An aperture 21 is arranged concentrically of the inner wall of the hub 15 and extends through the end 10. On flange 11 there is a boss and a second aperture 22 is concentric with the boss and extends radially of the coupling through the flange 11.

Within the aperture 22 there is inserted a nipple 23 having a threaded end 27, the other end 28 being specially shaped or peripherally ribbed to retain soft rubber tubing slipped thereover. Cement may be used to hold the nipple in boss 20.

In use, one of the couplings is attached to the stem of the long tube 24 and moved therealong in the direction of the thistle end or tip 25. The open end of the coupling is away from the thistle end. The tube 26 is slipped over the tube 24 and into the coupling member, the periphery of the tube 26 being engaged by the interior of section 12 of the coupling and the end of the tube abutting

the shoulder 17. The material of part 12 is quite flexible or elastic and firmly holds the tube 26.

A second coupling is then slipped over and moved along the tube 24 with the open end of the coupling in the direction of the tube 26. The coupling is secured to the tube 26 in the same manner as the first referred to coupling was attached thereto. By the arrangement shown, a condenser is provided in which the nipples may be at any desired angle relative to one another. The flow of liquid into and out of the condenser by way of the nipples 23 is uninterrupted, the inner ends of such nipples being in a pocket or opening between two of the ribs 16 and the hub 15. The ends 17 of ribs 16 prevent the coupling members from being moved too closely together and the groove 13 and the lip section 12 provides a firm, leak-proof connection maintaining the tube in spaced relation to tube 24. Threaded or locking connections may be substituted for the friction connections between the parts. The interior of the hub 15 snugly fits about the tube 24 and hence provides a clinging leak-proof connection between the tube 24 and the coupling member.

The coupling members provide resilient bumpers preventing damage to the glass tubes, the diameter of the coupling being greater than that of the outer tube 26 to receive the shocks which would otherwise be absorbed by the tube itself.

What is claimed as new and is desired to be secured by Letters Patent of the United States is:

1. In combination, concentric tubes, a coupling member of resilient material, said coupling member comprising a hub for holding the inner tube and a flange for holding the outer tube, there being radial ribs between said hub and said flange.

2. In combination, concentric tubes, a coupling member of resilient material, said coupling member comprising a hub for holding the inner tube and a flange for holding the outer tube, there being radial ribs between said hub and said flange, and the hub being of less length than said flange.

3. In combination, concentric tubes, a coupling member of resilient material, said coupling member comprising a hub for holding the inner tube and a flange for holding the outer tube, there being radial ribs between said hub and said flange, and the hub being of less length than said flange, and a nipple extending through said flange between adjacent ribs.

4. A flexible coupling for concentric tubes comprising a cylindrical relatively thick body with a closed end and having a constricted mouth of relatively thin material, there being in said body a hub of less length than said body, ribs radiating from said hub, and a peripheral groove about the interior of said body in a transverse plane adjacent said ribs and dividing said relatively thick body from said relatively thin constricted mouth.

5. In combination, concentric cylindrical glass tubes, and a coupling member comprising a cap of relatively soft rubber, having a hub for holding the inner tube, a lipspaced from said hub for holding the outer tube, said cap being of larger outside diameter than the outer of said concentric tubes and a conduit opening through the coupling into the space between the said tubes.

6. A condenser comprising a glass outer tube of selected length open at the ends thereof and having walls without apertures between the ends, a glass inner tube longer than the outer tube and adapted to fit in spaced relation within the outer tube with its ends extending beyond the ends of the outer tube, a coupling for said tubes, comprising a rubber cap having a lip adapted to fit resiliently about an end of the outer tube, an end wall adapted to close the space between said tubes and having an aperture adapted resiliently to receive said inner tube, and a conduit opening through said coupling into the space between said tubes.

7. A condenser comprising a glass outer tube of selected length open at the ends thereof and having walls without apertures between the ends, a glass inner tube longer than the outer tube and adapted to fit in spaced relation within the outer tube with its ends extending beyond the ends of the outer tube, a coupling for said tubes comprising a rubber cap having a lip adapted to fit resiliently about an end of the outer tube, a relatively thick end wall adapted to close the space between said tubes and having an aperture adapted to receive resiliently said inner tube, said end wall spacing said tubes apart, a hub having an aperture in alignment with the apertures in said end wall and adapted to fit resiliently about said inner tube, and a conduit opening through said coupling into the space between said tubes.

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