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PIPETTE ADAPTOR

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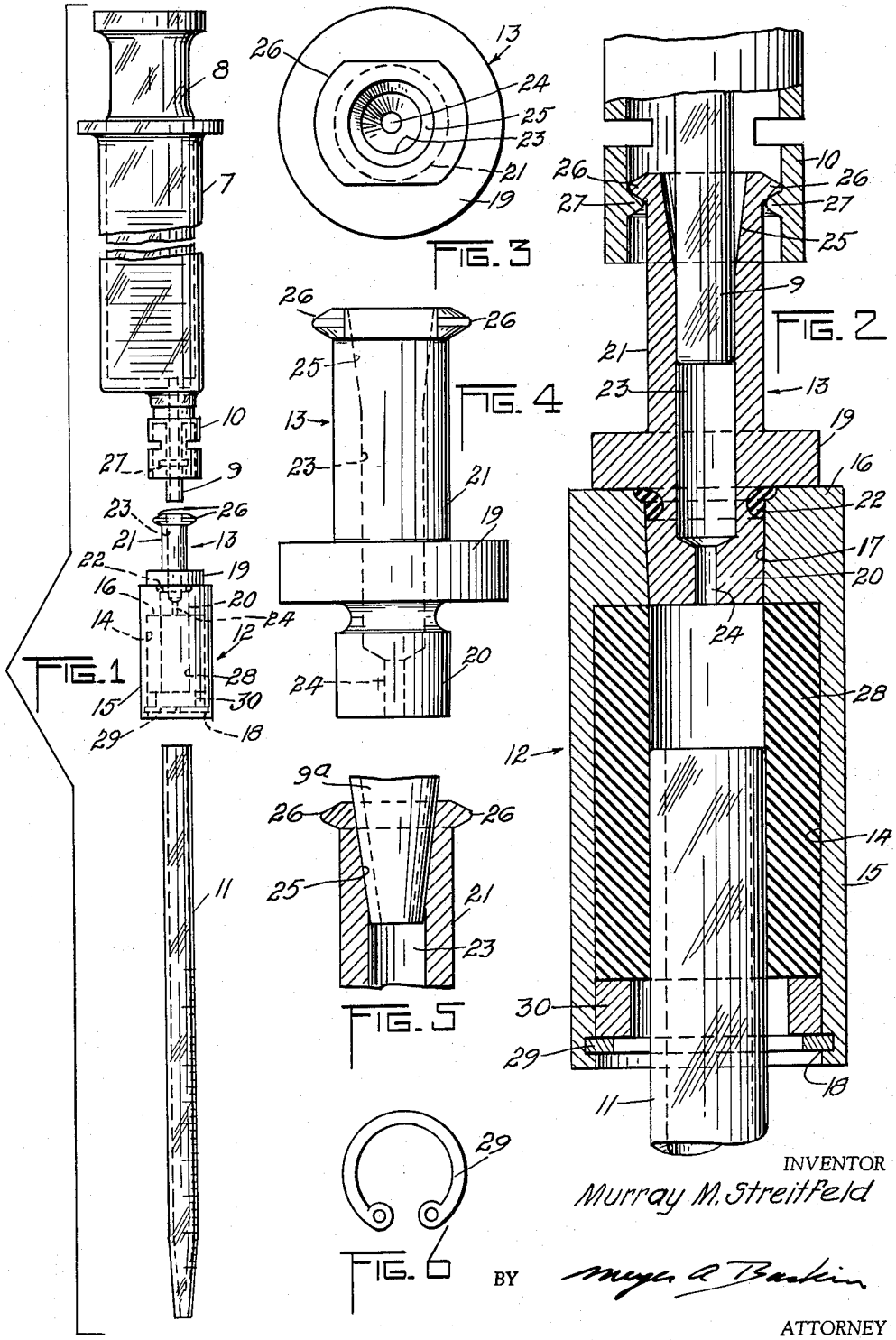

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PIPETTE ADAPTOR

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4 Claims. (Cl. 73—425.6)

This invention relates to the detachable coupling of pipettes or like slender tubing to suction devices and has more especial reference to a pipette-to-syringe adaptor, the main object of the invention being, first, the provision of a connection of this character which enables dangerous biological or chemical fluids to be measured quantitatively and safely transferred from one container to another; and, second, to design the adaptor for use with available laboratory equipment.

Another and important object of the invention is the elimination of oral pipetting of dangerous fluids.

The invention is particularly adaptable for use with the standard type of glass syringe having a tapered nipple around which the adaptor makes an air-tight connection. In some instances this type of syringe is provided with means encircling the nipple, such as the well known Luer-Lok, for the attachment of a needle, and it is a further object of the invention to so form the tip, or nipple engaging end of the adaptor, as to detachably engage such needle attaching means in interlocking relation.

Removable connection of the pipette is by its insertion into the bore of a pliable sleeve housed within the adaptor, and it is a further object of the invention to make provision for this sleeve being readily removable in order that sleeves of differing internal diameter may be substituted one for another to accommodate pipettes of various sizes.

A still further object of the invention is the provision of means for the accurate control of air pulled through the adaptor.

Briefly described the invention consists of a detachable coupling between a suction device and a pipette, such coupling having means in its air passage for accurate control of air drawn through the passage. This coupling, or adaptor, has a reduced tip end and a body portion, the latter preferably being cylindrical. The tip end has a sliding fit over the tapered nipple of the suction device and is formed with means for interlocking engagement within a needle attachment should such device be so equipped. The body portion is formed with a chamber open at one end for receiving a sleeve of pliable material which makes an air-tight seal with that part of a pipette inserted therein. The sleeve is interchangeable for the reason herein set forth, with others of different internal diameter and means provided for removably holding the sleeve in place.

The accompanying drawings illustrating a preferred embodiment of the invention and forming a part of the following more detailed description are as follows:

Fig. 1 is an exploded view showing in elevation the adaptor and associated parts viz., a syringe and a pipette with which the adaptor is to be coupled, intermediate portions of the syringe being broken away.

Fig. 2 is a greatly enlarged sectional view taken axially through the adaptor, fragmentary portions of the syringe and the pipette to which the adaptor is connected being seen in elevation.

Fig. 3 is a plan view of the neck or tip end portion of the adaptor.

Fig. 4 is a view in elevation of the part seen in Fig. 3.

Fig. 5 is a fragmentary sectional detail of the tip end of the adaptor showing a variation of the invention to be explained below.

Fig. 6 is a detail in plan view of the split retaining ring.

In the drawings similar reference numerals refer to similar parts throughout the several views.

The illustrated embodiment of the suction device is a standard type of glass syringe comprising a barrel **7**, a manually operable plunger **8** slidable in and longitudinally of the barrel **7**, a nipple **9** extending downward from the bottom of the barrel, and a needle attachment **10** encircling the nipple **9** and commonly known as the Luer-Lok. A pipette having calibration markings thereon and a tapered tip end is shown at **11**.

The adaptor comprises a jacket preferably of metal and formed of two parts, viz., a body portion, indicated generally by numeral **12**, and a neck portion similarly indicated by numeral **13**. The body **12** has an axial bore which provides a chamber **14** open at its outer end, this chamber **14** having a side wall **15** and an end wall **16**. Extending through the end wall **16** is a bore **17** communicating with the chamber **14**. Adjacent to the open end of chamber **14** is an annular recess **18** in the inner face of the side wall **15**.

The neck portion **13** of the jacket is tooled to form a flange or shoulder part **19** from the opposite faces of which are axially aligned inner and outer extensions **20** and **21**, respectively. Extension **20** is rigidly fixed to the body **12** by having a force fit within the opening **17**, the joint between the end wall **16** of the body **12** and the shoulder part **19** of the neck portion **13** being sealed by a packing ring **22**. The neck **13** has an axial bore **23** which terminates adjacent the inner end of the neck in a restricted opening **24** communicating with the chamber **14**. The outer extension **21** of the neck is the tip end of the adaptor and forms an air-tight slip connection with the inserted nipple **9** of the syringe as illustrated in Fig. 2. Should the nipple be tapered, as at **9a** in Fig. 5, there will be a like slip fit with the correspondingly tapered outer end **25** of the bore **23**.

Formed on the free end of the neck part **21** are outwardly turned, opposing flange segments **26** which enter the locking sleeve comprising the part **10** encircling the nipple **9**. By relative rotation of the adaptor and the syringe through an angle of 90° the segments **26** will engage with cam action above and against similar opposing segments **27** of an internal thread on the part **10**. In this manner the adaptor and syringe are detachably held in interlocking engagement without danger of accidental separation.

An air-tight seal at the same time is made between the nipple **9** and the tip end **21** of the adaptor in the manner above stated.

Housed within the chamber **14** in contact with the side wall **15** and end wall **16** of the body portion **12** is a resilient sleeve **28** made preferably of a pliable material such as silicone rubber. This sleeve **28** is held in place by a split spring ring **29** inserted in the recess **18** and a spacing ring **30** interposed between the sleeve and the split ring. The upper end of the pipette **11** is inserted in the resilient sleeve **28**, as clearly illustrated in Fig. 2, which yieldingly holds the pipette against removal. The connection thus made between the pipette **11** and the adaptor is air-tight.

It will be observed that the sleeve **28** is readily and easily removable by compressing and removing split ring **29** and removing spacing ring **30**. The sleeve **28** can then be removed and replaced with any one of a set of

a plurality of sleeves of differing internal diameters. This is for the interchange of sleeves differing in internal diameter so as to accommodate pipettes of correspondingly various sizes.

Drawing back the syringe plunger 8 induces the necessary vacuum to suck fluids up into the pipette 11. And, pushing the plunger 8 back into the barrel 7 forces fluid out of the pipette, quantitatively, as measured by the pipette and governed by the pressure on the plunger 8. The restricted opening 24 serves to give close and accurate control of quantitative pipetting of dangerous fluids to a greater extent than has been possible with prior art devices.

Furthermore the advantage of this technique is the elimination of oral pipetting of dangerous fluids, while allowing transfer of such materials accurately measured by standard quantitative laboratory equipment.

It is believed that from the foregoing the construction and operation of the invention have been made clear and is limited only by the following claims.

I claim:

1. As an article of manufacture, a detachable pipette to syringe coupling comprising in combination a rigid structure including a tubular body portion, an elongated neck portion and a transverse intermediate portion providing a dividing wall from which the said body and neck portions extend in opposite directions, said body portion providing an outwardly opening end chamber and having an inner annular recess, said neck portion having a longitudinal bore from its outer end for slip fit connection with a syringe nipple and said dividing wall having a restricted aperture communicating with said bore and said chamber, the said bore, chamber and restricted aperture being in axial alignment; a liner of resilient material for said tubular body portion and in endwise abutment with said dividing wall, a split ring removably insertable in said recess and a spacing sleeve interposed between said resilient liner and said split ring.

2. As an article of manufacture, a means for coupling two rigid tubes in axial alignment, one of such tubes being a pipette, and the other the taper tip end of a syringe nipple, said coupling means comprising in combination a rigid member having a longitudinal passage therethrough, with such passage constituting in axial alignment an annular chamber at one end having an annular recess in its side wall, a bore of less diameter than said chamber for slip fit engagement with said nipple, and a short restricted opening between said bore and said chamber, a resilient liner insertable in said chamber and in

which the pipette is slidably held in relative yielding engagement, and laterally expandable liner retaining means insertable in said recess.

3. As an article of manufacture, a means for coupling in axial alignment a pipette and a hypodermic syringe, the latter having a nipple and a guard surrounding a portion of the nipple, said coupling means comprising in combination a rigid body member having a longitudinal passage therethrough with such passage constituting in axial alignment an annular chamber at one end having an annular recess in its side wall, a bore of less diameter than said chamber for slip fit engagement with said nipple and a short restricted opening between said bore and said chamber, a resilient liner insertable in said chamber and in which the pipette is slidably held in relative yielding engagement, laterally expandable liner retaining means insertable in said recess, and means integral with said body member for interlocking engagement with the said nipple guard.

4. An adaptor comprising a body portion and a neck portion, said body portion including an annular side wall and an end wall to provide a chamber open at its outer end, said end wall having an axial opening therethrough and said side wall having an annular recess in its inner surface, the said neck portion including a flange abutting said end wall and opposing outer and inner extensions from said flange, said inner extension being seated and rigidly held by force fit in said end wall opening and said outer extension being the tip end of the adaptor, said neck having an axial bore from the outer end of said tip and terminating in a restricted opening communicating with said chamber, a removable inner sleeve of resilient material in said chamber and in engagement with the said side and end walls of said body portion, a split retainer ring removably seated in said annular recess, and a spacing ring interposed between said sleeve and said retainer ring.

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