

Dec. 10, 1963

R. R. CAMPBELL

3,113,688

BLOOD COLLECTOR

Filed Sept. 14, 1961

FIG. 1

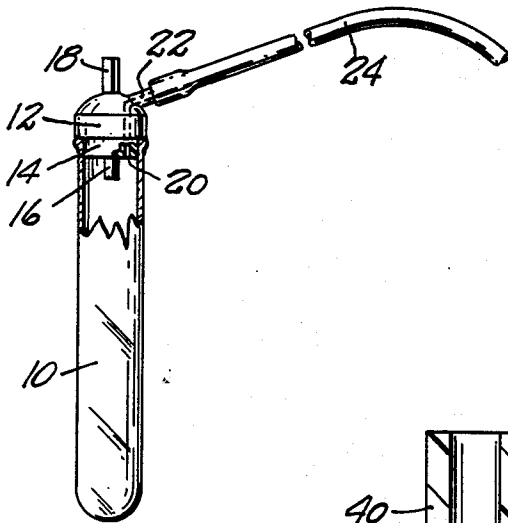
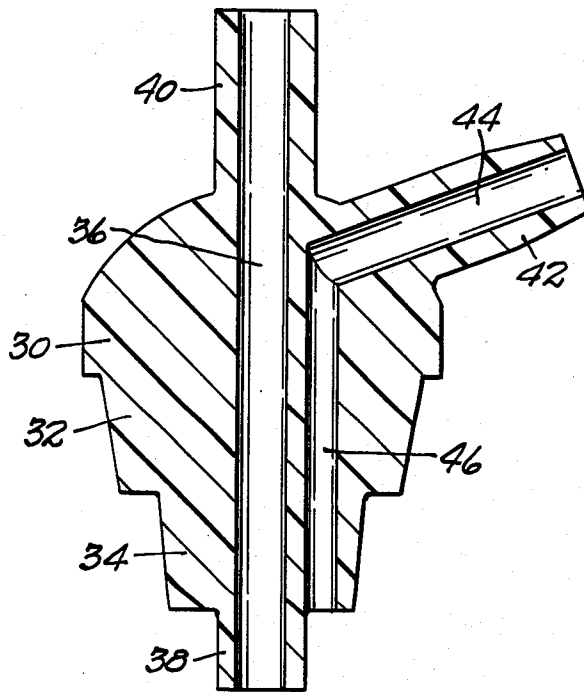


FIG. 2



INVENTOR.
RUTH RASMUSSEN CAMPBELL.

BY
Eugene C. Knoblock
ATTORNEY

1

3,113,688

BLOOD COLLECTOR

Ruth Rasmussen Campbell, Clay Township, St. Joseph County, Ind. (18301 Douglas Road, South Bend 17, Ind.)

Filed Sept. 14, 1961, Ser. No. 138,086

2 Claims. (Cl. 215-79)

This invention relates to improvements in blood collectors, and more particularly to a device for collecting capillary blood, that is, blood from capillary veins, as at the fingers, toes, heels or ear lobes of a patient.

Blood examinations can now be made by using only small quantities of blood, such as one or a few drops of blood. It is desirable for physiological and psychological reasons that the amount of blood withdrawn from a patient be limited to that needed for purposes of testing. The collection of a small quantity of blood for testing purposes has heretofore presented problems with respect to avoidance of drawing excess blood and avoidance of loss of blood as drawn by spreading upon the skin of the patient in the area around the point at which the blood is drawn.

The primary object of this invention is to provide a simple and inexpensive device by means of which a small quantity of blood can be drawn from a patient without wastage in collection thereof within a vessel for testing, and which will require the withdrawal of only that amount of blood required for purposes of a test.

A further object is to provide a device of this character which is simple in construction, which can be readily cleaned and sterilized, which is readily adapted for use in collecting blood at the point from which it is drawn from the patient, which can be operated simply and effectively, and which utilizes manually produced suction for collection of blood within a receptacle and insures collection within the receptacle of all blood withdrawn without passage thereof into the suction tube and thence into the mouth of the operator.

Other objects will be apparent from the following specification.

In the drawing:

FIG. 1 is a view of the device in side elevation with parts shown in section;

FIG. 2 is an enlarged axial sectional view of a device constituting a modified embodiment of the invention.

Referring to the drawing, and particularly to FIG. 1, the numeral 10 designates a collecting vessel, such as a glass test tube. The member 12 has a tight releasable fit upon the open end of the vessel 10. In the form shown, the member 12 is in the nature of a plug having a reduced diameter end portion 14 adapted to be inserted in the mouth of the collecting vessel or tube 10. The body 12 has a tubular projection 16 extending from the part 14 within the receptacle 10 and has an external tubular projection 18. A passageway (not shown) extends through the body 12 providing communication between the bores of the tubular parts 16 and 18. A second passage 20 is formed in the body 12, the same being open at the innermost end of the plug portion 14 spaced from the tube projection 16 and communicating with a tubular projection 22 extending from the body 12 in spaced and angularly extending relation to the tubular portion 18. A flexible suction tube 24 has a constrictive fit at one end upon the tube part 22 and may be of any convenient length to permit an operator to place the free end thereof in his or her mouth and at the same time place the end of the tubular part 18 near or in contact with the skin of the patient at the area or point at which blood has been drawn, i.e., within a globule of blood.

The bore of the tubular parts 16 and 18 and the part in the body 12 communicating therewith is such as to be

2

feasible for the purpose of drawing a small amount of blood therethrough by a gentle manual suction without wastage of the blood within the tube. The bore will preferably be of a diameter greater than the diameter of a capillary tube, and I have found that a bore of a diameter of from one to two millimeters will serve satisfactorily. It will be understood that these dimensions are cited as illustrative only and are not intended to be limiting, inasmuch as the bore of the tube may be of capillary size if desired, or may be of a diameter substantially larger than two millimeters. It is also preferable that the length of the bore shall be held at a minimum, but it is necessary that the inner end of the tube 16 shall be spaced from the inner face of the plug 14 and that the outer end of the tube portion 18 shall project from the body 12. The purpose of maintaining the length of the bore at a minimum is to reduce the waste of blood incident to or resulting from wetting of the walls of the bore incident to use of the device. The diameter of the bore 20 may be of any convenient diameter and may be the same as the diameter of the bore of the parts 16 and 18 or larger or smaller than said bore.

In the use of the device, the operator will first assemble the device, taking care to preserve the parts in clean condition. Then the operator will pierce the skin of the patient, as at a finger, toe, heel or earlobe, to cause one or few drops of blood to be drawn and to appear at the surface of the skin of the patient. The operator then applies the tip of the tube portion 18 to the globule of blood and sucks gently upon the tube 24. This produces a flow of the blood through the tube 18 and the communicating passages for discharge at the inner end of the tube part 16 into the receptacle 10. The location of the point of discharge of the blood at the inner end of the tube part 16 spaced longitudinally and laterally from the mouth of the opening 20 is important to prevent entrainment of blood discharged from the tube 16 into the air stream entering the passage 20. In this connection it is preferable to hold the device in an upright or inclined position with the receptacle 10 lowermost so that blood which is discharged from the free end of the tube 16 will fall by gravity into the bottom of the receptacle 10. It has been found that, even though the diameter of the bore of the tube parts 16 and 18 is smaller than the diameter of the drop of blood, a gentle suction applied to the suction tube 24 causes the blood to flow through the tube bore and then to drop into the receptacle 10. It has also been found that by the use of this device substantially all blood which is drawn from the wound can be collected within the container 10 and that waste of blood is avoided as is the retention of blood upon the skin of the patient.

The device has the further advantage that the parts thereof can be readily disassembled after a test has been made upon the blood collected therein, and that the constituent parts can readily be washed and cleaned or sterilized by known techniques utilizing readily available equipment. For simplicity it is preferred that the parts 12, 14, 16, 18 and 22 be formed integrally as by molding from rubber, synthetic rubber or synthetic resin material. Integral formation of these parts is not required, however, so that the tubular parts 16, 18 and 22 may be formed separately from the body if desired.

It may be desirable in some instances to provide a device which can be used with receptacles or collectors of different sizes, such as with test tubes of different diameters. A device of this character is illustrated in FIG. 2 and constitutes an integral unit molded from rubber or synthetic resin and constituting a body 30 having a reduced tapered frusto conical part 32 of a size adapted to fit snugly within the mouth of one test tube and having a second and smaller reduced tapered part-spherical tapered portion 34 of a diameter adapted to fit within the

3

mouth of a still smaller size of receptacle. The body 30 has a central bore 36 extending therethrough and has tubular projection 38 concentric with the bore 36 extending from the end of the body portion 34. The body also has a second tubular projection 40 concentric with the bore 36 extending from the opposite end of the body 30. An integral tubular projection 42 projects from the body 30 adjacent to the tubular part 40 and at an angle thereto, and has a bore 44 which communicates with a bore 46 spaced from and preferably substantially parallel to the bore 36 and terminating at the inner end face of the portion 34 of the body 30. It will be apparent that the device shown in FIG. 2 can be mounted upon a collecting receptacle and can have a flexible suction hose detachably and constrictively connected to the tubular projection 42 so as to produce an assembly capable of functioning in the same manner as described above with respect to FIG. 1.

While the preferred embodiments of the invention have been illustrated and described, it will be understood that changes in the construction may be made within the scope of the appended claims without departing from the spirit of the invention.

I claim:

1. A device for collecting by manual suction a drop of blood appearing at the surface of the skin of a person at a point at which the skin has been pierced, comprising a receptacle having an opening at its upper end, a closure member mounted on said receptacle and spanning said

4

opening, said closure member having a pair of spaced passages therethrough communicating with said receptacle, tubular inlet means projecting outwardly from said closure member and adapted to be inserted in the drop of blood to be collected, tubular discharge means projecting inwardly and downwardly from said closure member, said tubular inlet and discharge means defining parts of one of said passages and said tubular inlet having a diameter less than the diameter of the drop of blood to be collected, said tubular discharge means terminating in said receptacle in laterally spaced relation to and below the level of the inner end of the other of said passages, and an elongated flexible suction conduit detachably connected to said closure exteriorly of said receptacle in communication with the outer end of said other passage and adapted to be placed in the mouth of the user.

2. A device as defined in claim 1, wherein a tubular part communicates with said other passage and projects outwardly from said closure spaced from and at an angle to said tubular inlet means, one end of said suction conduit constrictively encircling said last named tubular part.

References Cited in the file of this patent

UNITED STATES PATENTS

283,692	Ballard	Aug. 21, 1883
1,913,393	Jones	June 13, 1933
2,842,276	Butler	July 8, 1958