April 4, 1939. M. HURSTON 2,153,253

NEEDLE ADAPTER

Filed April 11, 1936

Fig. 1.

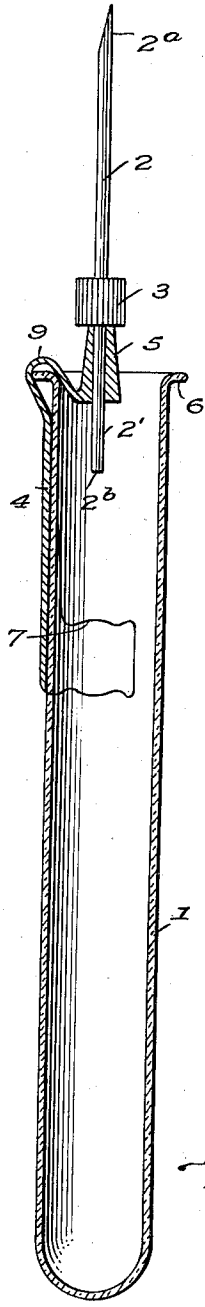


Fig. 2.

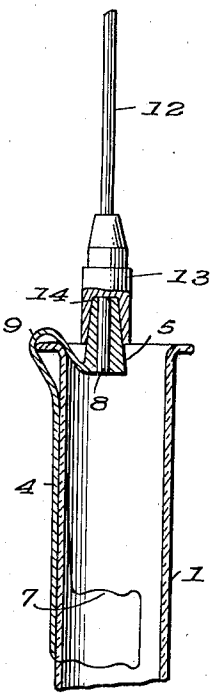


Fig. 5.

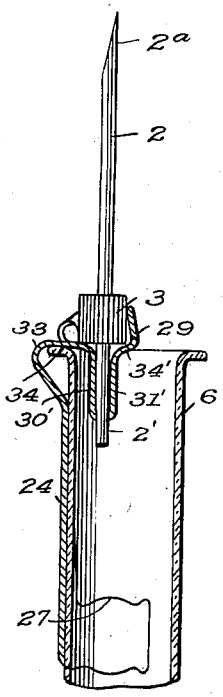


Fig. 6.

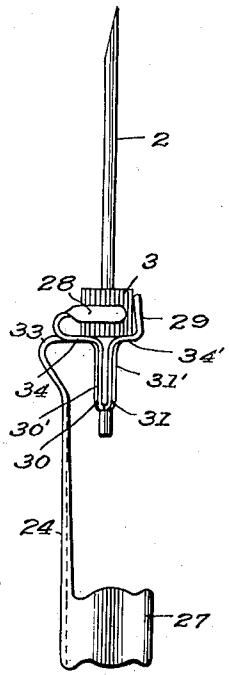


Fig. 3.

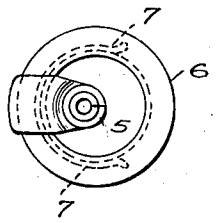


Fig. 4.

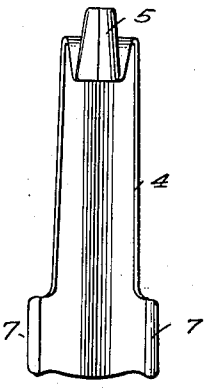


Fig. 7.

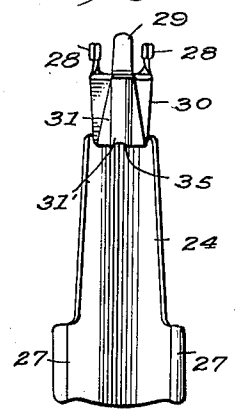
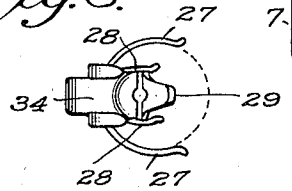


Fig. 8.



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NEEDLE ADAPTER

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Application April 11, 1936, Serial No. 73,951

5 Claims. (Cl. 128—275)

This invention relates to an adapter or holder for needles employed for drawing blood for the purpose of subjecting the same to tests or for analogous uses.

In recent times, the practice has developed in public health bureaus to circulate among physicians a packaged unit consisting of a test tube with a hollow needle therein and a closure therefor in the form of a cork, all in sterile condition, at no cost to the physicians. This unit is used by the physician to draw a blood sample from a patient which is collected in the test-tube and is returned to the bureau for analysis and testing, the needle being discarded after individual use. In view of the free circulation of such packaged units subject only to the demand made therefor by physicians, a hollow needle of simple construction and low cost is used. The use of such a needle presents several objections, the most pertinent of which are the awkwardness characterizing the handling of the needle with the test-tube dissociated therefrom to effect a collection of the blood therein and the unsanitary and untidy character of the operation, occasioned by the blood which is not completely guided into the tube dripping upon the patient and the operating physician.

It is the object of the invention to overcome the above objections by providing an adapter or holder for the hollow needle which is easily applied to the test-tube and which, in its applied form, is firmly attached to the test-tube and engages the hollow needle tightly so that the combined unit may be used deftly to introduce the needle into a patient's vein and to collect the blood extracted therefrom with neatness and dispatch and without any spilling of the blood, as is characteristic of the more costly needle units.

It is a further object of my invention to provide an adapter which is economical to produce.

It is a further object of my invention to provide an adapter for hollow needles which remains in a sterile condition for repeated use, and in the case that such sterility is impaired, it may be sterilized again with ease.

It is a further object of my invention to provide an adapter for hollow needles of different design capable of use with needles of the design circularized by the public health bureaus as well as with needles associated with the more expensive units which are used in the field of the medical profession.

Other objects and purposes will appear from the more detailed description of the invention following hereinafter, taken in conjunction with the accompanying drawing wherein:

Figure 1 is a longitudinal sectional view of one form of the adapter designed for accommodating different types of needles mounted in place upon a test tube with one type of needle fitted therein,

Figure 2 is a partial longitudinal sectional view corresponding to Figure 1 showing a different type of needle fitted upon the adapter,

Figure 3 is a top plan view of the adapter shown in Figures 1 and 2 mounted upon a test tube,

Figure 4 is a right end view of the adapter shown in Figures 1–3,

Figure 5 is a partial longitudinal sectional view, corresponding to Figure 1 showing a second embodiment of the adapter mounted upon a test tube and retaining a needle therein,

Figure 6 is a front elevation of the adapter shown in Figure 5,

Figure 7 is a right end view of the adapter shown in Figure 6, and

Figure 8 is a top plan view of Figure 7.

In the first embodiment of the invention, the adapter or holder of the needle is designed for cooperation with two types of needles. In Figure 1 is shown a hollow needle 2 of the type furnished by public health bureaus for individual use. The needle may be gripped at the enlarged knurled portion 3 for convenient handling. The pointed end 2*a* is injected into the vein of the patient and the blood issues through the hollow bore of the needle and the blunt end thereof 2*b*, and is received by a container such as a glass test tube 1. It is apparent that when the needle and the test tube are handled separately, the drawing of a sample of blood for test purposes is a clumsy task giving rise to all of the disadvantages pointed out above. However, with the use of the adapter 4 all of these disadvantages are obviated.

The adapter 4 shown in Figures 1–4 is formed of metallic sheet material having a backing arm member 4, preferably curved transversely to conform to the curvature of test tube 1, and terminating at its lower end in resilient clip portions 7 which are designed to spring over the maximum diameter of the test tube to resiliently engage the same. The adapter is formed preferably from chromium plated sheet steel. The upper end of the adapter is formed with a retaining tip or cap 5 having a frusto-conically shaped external surface and a substantially cylindrical bore 8 extending longitudinally therethrough. The cap element 5 emerges into the lateral backing portion 4 of the adapter through the intermediary of a reversely curved rest portion 9 which is so

proportioned that the flange 6 of the test tube is accommodated therein while permitting a convenient and quick assembly and disassembly of the adapter with the test tube, the whole arrangement forming a tightly fitting unit. The tip element 5 overlies the open end of the tube to direct the blood thereinto. The complete unit may be handled conveniently by gripping the test tube 1 and the overlying adapter 4 in engagement therewith, and holding as well the needle 2 at the knurled portion 3 to direct it more accurately to its point of application. Following the drawing of the blood sample the needle 2 may be discarded if desired, before or after the adapter 4 is sprung from the test tube, and the adapter is in readiness for repeated use with a new needle or with the same needle after it is sterilized again.

The adapter or needle holder 4 is also capable of use with a conventional needle 12 having a base 13, the interior flared bore 14 of which is adapted to fit tightly over the tapered lateral surface of end 5. The unit is used similarly as described above, after which a sterilization of the adapter and the needle is necesary.

Figures 3 and 4 are additional views illustrating the design of the adapter described above, Figure 3 being a plan view and Figure 4 a side view thereof.

In a different embodiment of the invention illustrated in Figures 5–8, the adapter with a backing member 24 has spring clips 27 at the lower extremity thereof. At the upper end of the adapter is shaped a holder for the needle 2 from portions forming an integral part of the original stamping for the adapter. The main portion 24 of the adapter passes into the needle holder portion through the intermediary of curved portion 33 and substantially horizontal plateau 34, whereupon the stamping passes downwardly at 30 and then upwardly at 31 in close adjacency to 30, then to horizontal portion 34, which together with 34 forms a horizontal step for seating the knurled enlarged portion 3 of the needle, terminating finally in an upwardly extending spring clip 29. From each side of plateau 34 portions 28 are cut and shaped to form resilient clips at each side of the enlarged portion 3 of the needle. An opening 35 is formed at the lowermost end of portions 30 and 31 at the juncture thereof. Furthermore, the adjacent portions 30 and 31 are grooved or bellied at 30′ and 31′, respectively, along the vertical medians thereof to provide a passage for the end 2′ of the needle 2 when the enlarged portion 3 rests upon 34 and 34′, as shown in Figure 5. Thus the needle when it is positioned in the adapter is held closely at the lower end thereof as well as upon three sides of the enlarged portion 3 by spring clips 28, 29.

When the adapter 24 is clamped upon a test tube 1 as shown in Figure 5, the unit may be handled as described above to draw a sample of blood from a patient for reception by the test tube. After use the needle may be discarded without affecting the sterility of the adapter.

Figures 7 and 8 are additional views of the adapter shown in Figures 5 and 6, Figure 7 being a side view and Figure 8, a plan view thereof.

While I have described my invention as embodied in specific forms and as operating in a specific manner for purposes of illustration, it should be understood that I do not limit my invention thereto, since various modifications will suggest themselves to those skilled in the art without departing from the spirit of my invention, the scope of which is set forth in the annexed claims.

What I claim is:

1. A holder for a hollow needle adapted to embrace selectively differently dimensioned receptacles for a fluid passing through said needle comprising an arm member, a pair of arcuate resilient clips for engaging the external lateral surface of said receptacle at opposite sides thereof extending laterally from the lower portion of said arm member, the upper portion of said arm member terminating in a rest at the upper end of said holder and mounted over the upper edge of said receptacle, and a retaining member for the hollow needle forming an extension of said rest and adapted to overlie the interior of said receptacle, said rest and resilient clips constituting the sole means of engagement of the holder onto the receptacle.

2. An adapter for a hollow needle adapted to be detachably connected to a tube for collecting a blood sample drawn through said needle comprising an arm, a pair of arcuate resilient clips for engaging the external lateral surface of the tube at opposite sides thereof extending laterally from the lower portion of said arm, the upper portion of said arm terminating in a member at the upper end of said adapter mounted over the upper edge of the tube and comprising a needle holder adapted to overlie the open end of the tube formed as a cap element having a frusto-conically shaped external surface and a bore extending through the interior thereof, said member and resilient clips constituting the sole means of engagement of the holder onto the tube.

3. An adapter for a hollow needle adapted to be detachably connected to a tube for collecting a blood sample drawn through said needle comprising an arm, a pair of arcuate resilient clips for engaging the external lateral surface of the tube at opposite sides thereof extending laterally from the lower portion of said arm, the upper portion of said arm terminating in a member at the upper end of said adapter mounted over the upper edge of the tube and comprising a needle holder adapted to overlie the open end of the tube formed as a cap element having a frusto-conically shaped external surface and a bore extending centrally therethrough, said external surface adapted to fit selectively into the tapered socket provided in the base of a hollow needle and said interior passage adapted to receive selectively the end of a hollow needle having at an intermediate point thereof an enlarged portion adapted to rest upon said cap element, said member and resilient clips constituting the sole means of engagement of the holder onto the tube.

4. An adapter for a hollow needle adapted to be detachably connected to a tube for collecting a blood sample drawn through said needle comprising an arm, a pair of arcuate resilient clips for engaging the external lateral surface of the tube at opposite sides thereof extending laterally from the lower portion of said arm, the upper portion of said arm terminating in a member at the upper end of said adapter mounted over the upper edge of the tube and comprising a needle holder adapted to overlie the open end of the tube comprising a substantially horizontal plateau for seating an enlarged portion of the needle, a tubular guide extending therebelow for retaining the end of the needle below said enlarged portion, said guide being of lesser length than said needle below said enlarged portion, and a plurality of spring clips contacting with the enlarged

portion of the needle, said member and resilient clips constituting the sole means of engagement of the holder onto the tube.

5. An adapter for a hollow needle adapted to be detachably connected to a tube for collecting a blood sample drawn through said needle comprising an arm, a pair of arcuate resilient clips for engaging the external lateral surface of the tube at opposite sides thereof extending laterally from the lower portion of said arm, the upper portion of said arm terminating in a member at the upper end of said adapter mounted over the upper edge of the tube and comprising a needle holder adapted to overlie the open end of the tube comprising a substantially horizontal plateau for seating an enlarged portion of the needle, a tubular guide formed from two adjacent reentrant portions extending below said plateau having cooperating grooves for defining the guide and an opening at the lowermost point for permitting the penetration of the end of the needle therethrough, and a plurality of spring clips bent from the plateau support and contacting with the enlarged portion of the needle, said member and resilient clips constituting the sole means of engagement of the holder onto the tube.

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