

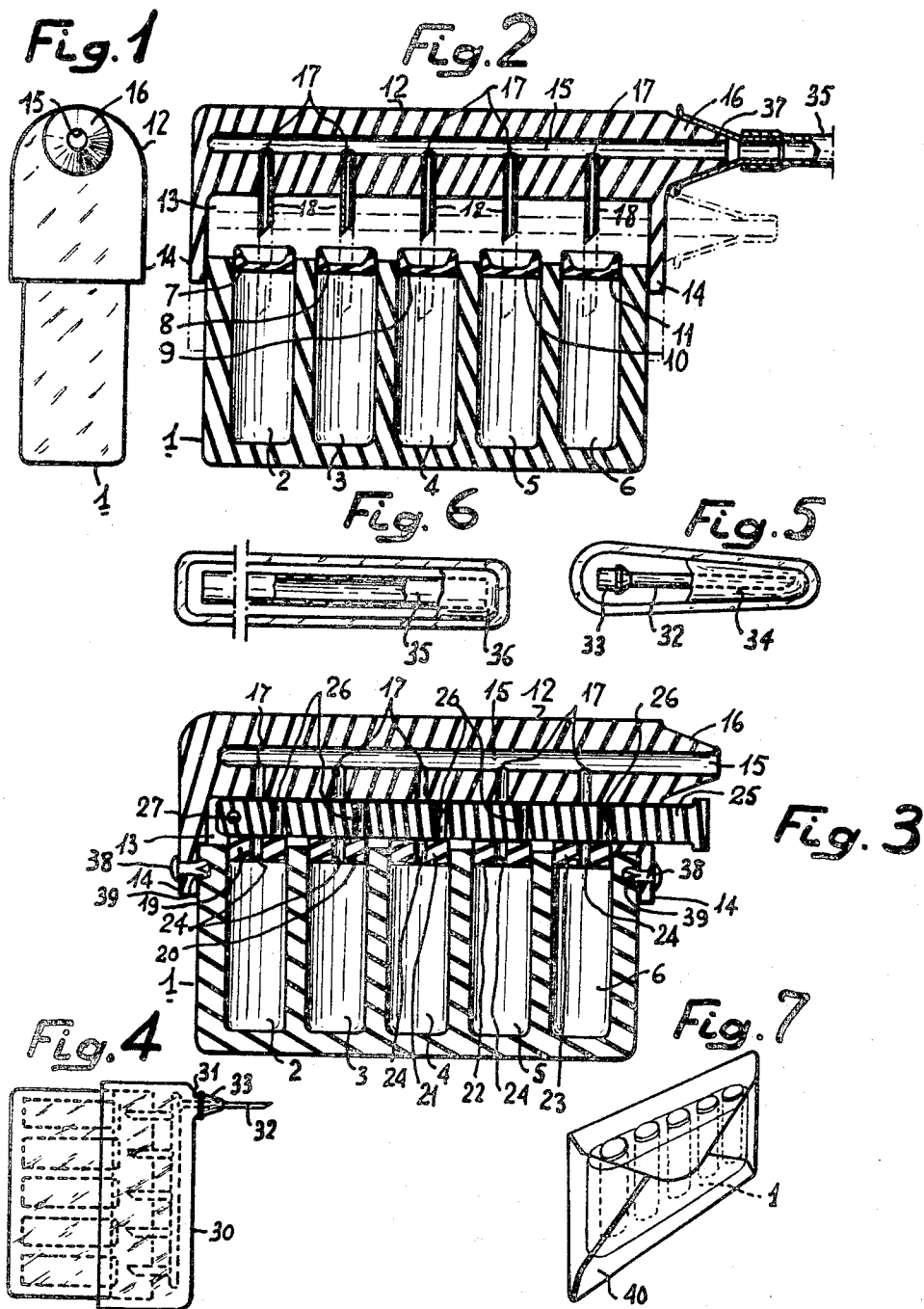
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ARRANGEMENT FOR TAKING BLOOD

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## ARRANGEMENT FOR TAKING BLOOD

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### ABSTRACT OF THE DISCLOSURE

A blood-taking arrangement comprises a body divided into several separate compartment that are sealed and evacuated and that contain separate products to be added to the received blood. A cover caps the body and is provided with a main channel adapted to be connected with the channel of a blood-taking needle and by auxiliary channels with each compartment. Means are provided for establishing and breaking communication between each compartment and a separate auxiliary channel thereby to maintain the blood samples in the individual compartments separate from each other.

My invention has for its object an arrangement for simultaneously executing all the blood taking operations which are required for the various investigations forming part of a complete analysis and for which investigations the sample blood is to be tested either alone or in admixture with various anti-clotting substances and various solutions.

Blood taking arrangements as known hitherto show numerous drawbacks and, in particular, there is a risk of error if the sampled blood is introduced into containers which are unsuitable by reason of their preparation or of their contents. The necessity of repeating the taking of blood when the first samples are inadequate and the necessity for the practitioner to select the product to be added to the sampled blood and to define the amount required for such a product are also serious drawbacks.

My invention has for its object an arrangement for sampling blood, eliminating said drawbacks and leading to advantages which have never been obtained hitherto.

The blood taking arrangement according to my invention comprises a partitioned body carrying a blood-taking system, each compartment defined by said partitioning of the body being previously sterilized and adapted to carry the product to be added to the blood; if required for one of the special investigations considered forming part of the compartment subsequent analysis, after which the said compartment is subjected to vacuum and sealed. The actual blood-taking system includes means for connection with the taking or letting needle and further means for simultaneously connecting each compartment with the channel extending inside the blood-taking needle.

Further features and advantages of my invention will appear in the reading of the following description, reference being made to the accompanying drawings, wherein:

FIG. 1 is a front view of an embodiment illustrating the whole blood-taking arrangement according to my invention.

FIG. 2 is a cross-sectional view of said embodiment in a longitudinal plane.

FIG. 3 is a further cross-sectional longitudinal view of a modification.

FIG. 4 is a side view of a further modification.

FIG. 5 is a plan view of a blood-taking needle carried inside a sterile package.

FIG. 6 is a plan view of a catheter.

FIG. 7 is a perspective view of the body forming part of the arrangement when carried inside a casing which serves for its transportation after operation.

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Turning to FIGS. 1 and 2, the arrangement illustrated and intended for blood taking includes a partitioned body 1 inside which are formed a succession of compartments 2, 3, 4, 5 and 6, the shape of which is irrelevant, although it is preferably cylindrical. Each compartment 2 to 6 is sealed by a plug 7, 8, 9, 10 and 11 respectively. The plugs 7 to 11 are perfectly formed by an elastic material such as rubber.

The partitioned body 1 is capped by a removable cover or blood taking system 12 provided in its lower surface with a recess 13 and its side walls enclose partly the upper end of the body 1 round which they form a sort of skirt 14. Said skirt 14 matching the outer lateral surface of the body 1 allows the blood-taking system to slide over the body. Inside the blood taking cover 12, there is also provided above the recess 13 a main channel 15 opening outwardly through a projecting section 16 forming a connection to be described hereinafter. Into said main channel 15, there open vertical branch channels 17, in each of which is fitted a hollow auxiliary needle 18. Each hollow auxiliary needle 18 faces the center of a corresponding plug 7 to 11 and the tip of each auxiliary needle 18 is located, before any blood is taken, at a short distance above the corresponding plug 7 to 11 as clearly illustrated in FIG. 2 in solid lines.

In the modification illustrated in FIG. 3, the blood taking arrangement comprises again a body 1 inside which are formed compartments 2 to 6 which are closed in this case by corresponding elastic plugs 19 to 23. Each plug 19 to 23 is provided with a central port 24. The body 1 is capped by the removable blood taking system 12 enclosing, as in the case of FIG. 2, a main channel 15 into which open the branch channels 17. Said branch channels 17 are arranged coaxially with the central ports 24 corresponding thereto. As in the case of FIG. 2, the blood taking system 12 is provided in its lower surface with a recess 13 and it includes a skirt matching the outer lateral surface of the upper section of the body 1.

Within the free space extending between the blood taking system 12 and the body 1, there is fitted a member 25 in which are provided channels 26 parallel with the branch channels 17 and with the ports formed centrally of the plugs at 24. Said member 25 acts as a slide valve so as to connect through the agency of its channel 26 the branch channels 17 with the ports 24 in the corresponding plugs. As in the preceding case, the main channel 15 extends into a lateral projection 16 of the blood-taking system and opens outwardly. FIG. 4 illustrates a modification according to which the arrangement intended for taking blood in conformity with my invention is constituted by sections each of which is similar to the embodiment illustrated in FIGS. 1 and 2. However, in this embodiment, there is provided on the blood taking system 30 a projecting section 31 forming a connection for the actual sampling needle the axis of which is parallel with the axes of the compartments formed in the body 1, whereas the axis of the connection 16 provided for the same purpose in the precedingly described embodiments was perpendicular to the axes of such compartments.

FIG. 5 illustrates a needle 32 rigid with its connecting base 33 and enclosed inside a fluidtight and sterile plastic package 34. In FIG. 6 is illustrated a catheter 35 also enclosed inside a fluidtight and sterile plastic package 36.

The operation of the arrangement described according to my invention is as follows: Said arrangement is handed over to the practitioner after sterilization of each compartment 2 to 6 formed in the body 1 said compartments being then set under vacuum and filled with an anti-clotting or the like product intended for use during the subsequent analysis.

Of course, the amounts of products introduced into the different compartments are accurately measured. At the moment of the taking of blood, a needle 32 is connected through its base 33 with the connection 16 or 31 either directly or through the agency of a catheter 35 and of a connecting cone 37 (FIG. 2). After it has been thus connected, the needle 32 is introduced into the patient's vein and when said operation is accurately executed, blood enters the main channel 15, as may be seen through the transparent material forming the blood taking system 12 or 30, said channel 15 being originally filled with air. As soon as the blood flows in the desired manner, in the case of the embodiments illustrated in FIGS. 1, 2 and 4, the practitioner exerts a manual pressure to urge the body 1 into the recess 13 of the cover 12, which causes the auxiliary needles 18 to enter the compartments 2 to 6 after passing through the plugs 7 to 11. By reason of the vacuum prevailing in the compartments 2 to 6, the latter are simultaneously filled with blood.

In the modification illustrated in FIG. 3, the first operations are the same as those described hereinabove; as soon as the blood flows in the desired manner in the main channel 15, it is then sufficient to depress the head of the slide valve 25, so as to set simultaneously the compartments 2 to 6 of the body of the modified arrangement in connection with the main channel 15 through the agency of the channels 26 in the slide valve and of the branch channels 17. Consequently, the compartments 2 to 6 are simultaneously filled with blood by reason of the vacuum produced at the start in said compartments. At the end of the blood taking operation, the blood taking system 12 or 30 is removed away from the body 1 and, in the case of the embodiment illustrated in FIGS. 1 and 2 and of the modification illustrated in FIG. 4, the holes produced by the engagement of the auxiliary needles 18 in the corresponding plugs 7 to 11 close again, by reason of the elasticity of the material forming said plugs.

In the case of the modification illustrated in FIG. 3, the cover 12 is again taken finally off the body 1, after which the central ports 24 in the plugs 19 to 23 are closed by the member 25. At this moment and in all cases the body 1, of which the closed compartments are filled with the sampled blood, is ready for transportation towards a specialized laboratory.

The operation of said arrangement is a very easy one, since it is sufficient to exert a slight pressure on the body or on the slide valve 25 so as to ensure the desired connections as soon as the needle has entered the patient's vein. The possibilities of error as to the selection of the different anti-clotting or the like products required for the preservation of the blood are eliminated by my invention. My improved arrangement provides, after the sampling of blood ample time for deciding as to the biological tests which are to be selected as a support for the clinical examination. The selection of biological tests may thus be increased without it being necessary to take further amounts of blood. Said improved arrangement provides reliably the amounts, variety and grade of blood samples required for investigation.

My invention allows executing a taking of blood under conditions allowing the use of the sampled blood in accordance with techniques and in amounts which have not been contemplated at the moment of the taking. The tests executed at practitioner's request may be in fact lead to the necessity of further biological or serological tests, which would require a further taking of blood in the case of prior art which does not provide simultaneously a number of samples.

With the arrangement according to my invention, the practitioner is certain he is capable of executing any desired biological test whereas the present day methods and apparatus may frequently lead to the execution of the necessary tests in tubes or flasks which have not been prepared for such tests.

The arrangement being sterile, it is possible to grow a

culture in the blood without resorting to a further taking of blood whereas such a further taking is essential with any conventional means.

The distribution of the blood into a plurality of subdivided samples allows executing a large number of tests with a much lower amount of blood than is required nowadays with conventional means, even for rough checking or detecting purposes.

The shape of the apparatus limits the mutual misgivings between the practitioner and the patient since there is no ground for any justified anxiety on patient's side whereas the practitioner can operate in a much easier manner at the patient's bedside.

My improved arrangement allows dealing with all conventional tests to be executed at the present day. The number of compartments and of chemical products or biological material introduced into said compartments may be varied, so as to allow the application of said arrangement to various modifications of analyzing technique.

The incorporation with the arrangement of an independent sterile needle allows angularly setting the bevel of the latter in the direction selected by the practitioner, whereby the latter may operate in accordance with circumstances.

Lastly, the size of the body 1 is such as will allow its easy packaging and conveyance after operation after the manner of an ordinary letter. Numerous modifications and additions may of course be brought to the arrangement described, without widening the scope of my invention as defined in the accompanying claims.

What I claim is:

1. An arrangement for taking a number of blood samples in a single operation for use during a complete subsequent analysis, said arrangement comprising a body provided with a plurality of upwardly open compartments, elastic plugs closing the upper ends of said compartments and a removable cover forming a blood-taking system provided with a longitudinal main channel fitted over, said compartments, a blood sample needle removably connected with said main channel and means whereby the said main channel is adapted to be simultaneously and transiently connected with the inside of the compartments of a shifting of at least a part of said blood taking system with reference to the body, each of said compartments being under vacuum and containing a product to be mixed with received blood for permitting a complete blood analysis.

2. An arrangement as claimed in claim 1, wherein at least part of the combined body and cover is transparent.

3. An arrangement as claimed in claim 1, wherein the connection between the needle and the main channel includes a projection incorporated with the cover and adapted to fluidtightly engage the needle.

4. An arrangement as claimed in claim 1, wherein cover is provided with branch channels extending in alignment with the location of the compartments, when the cover is positioned over the body, the arrangement including auxiliary hollow needles forming extensions of said branch channels, facing the plugs of the corresponding compartments and adapted, upon manual shifting of the cover towards said compartments, to engage the plugs and provide thereby a transient connection between the blood-taking needle and the main channel, on the one hand, and the inside of the different compartments on the other hand, the elasticity of the plugs closing again the perforations produced by said shifting upon release of the auxiliary needles with reference to the plugs.

5. An arrangement as claimed in claim 1, wherein the cover is provided with branch channels opening into said main channel at one end and into the surface of the cover facing the body at points registering with the different plugs and the plugs are centrally ported, said arrangement comprising a slide valve fitted between the cover

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and the body and provided with channels the distribution of which corresponds to the distribution of the ports in the different plugs, the shifting of said slide valve between an operative and an inoperative position providing a connection between the different branch channels and the ports in the corresponding plugs through the cooperating channels in the slide valve, said slide valve fluid-tightly closing said ports when in its inoperative position and auxiliary plugs adapted to close the ports in the first-mentioned plugs.

6. An arrangement for taking a number of blood samples in a single operation for use during a complete subsequent analysis, comprising a body provided with a plurality of separate compartments, means sealing said compartments from communication with each other, each said compartment being under vacuum and containing a product to be mixed with received blood, a removable cover forming a blood-taking system and having a longitudinal channel extending therethrough, said removable cover being disposed over said compartments, means for connecting a blood sampling needle removably to said longitudinal channel, and means for selectively establishing and breaking communication between said main channel and the interior of said compartments thereby to permit the drawing of a separate blood sample into each said compartment and then the resealing of

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each compartment against communication between the various taken blood samples.

7. An arrangement as claimed in claim 6, said establishing and breaking means comprising a plurality of parallel hollow needles communicating with said channel and registrable with and penetrable into each compartment and carried by said cover, and means mounting said compartments and said cover for movement relative to each other parallel to said plurality of needles.

8. An arrangement as claimed in claim 6, said establishing and breaking means comprising a slide valve having a plurality of passages therethrough movable simultaneously into and out of communication with said channel and said compartments.

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