

[54] **SAMPLE TUBE DEVICE**

[75] Inventors: **Pierre Durand**, Fresnes; **Gerard Lartigue**, Fontenay-aux-Roses, both of France

[73] Assignee: **Hoffmann-La Roche Inc.**, Nutley, N.J.

[22] Filed: **June 20, 1974**

[21] Appl. No.: **481,264**

Related U.S. Application Data

[63] Continuation of Ser. No. 263,537, June 16, 1972, abandoned.

[30] **Foreign Application Priority Data**

June 24, 1971 France 71.23072

[52] **U.S. Cl.**..... **40/310**; 23/253 R; 40/20 R; 40/306; 248/313

[51] **Int. Cl.**..... **G09f 3/20**

[58] **Field of Search** 40/20 R, 21 A, 21 B, 23 R, 40/23 A, 26, 19, 306, 310, 324, 2.2, 10 R, 11 R, 16 R; 23/253 R, 254, 292, 259; 35/48 R; 73/423 R, 423 A, 424; 116/121; 211/71-76; 281/36, 37; 248/313

[56]

References Cited

UNITED STATES PATENTS

2,637,246	5/1953	Wolk	350/283
2,844,893	7/1958	Keller	40/306 X
3,174,240	3/1965	Malsert	40/23 A
3,490,163	1/1970	Piper et al.	40/310
3,526,125	9/1970	Gilford et al.	40/324 X
3,618,836	11/1971	Bushnell et al.	35/48 R X
3,684,453	8/1972	Lartigue et al.	23/259
3,731,819	5/1973	Sandhage	211/74

FOREIGN PATENTS OR APPLICATIONS

1,512,473	2/1968	France	40/1.5 X
132,790	4/1933	Germany	40/11

Primary Examiner—Robert W. Michell

Assistant Examiner—Vance Y. Hum

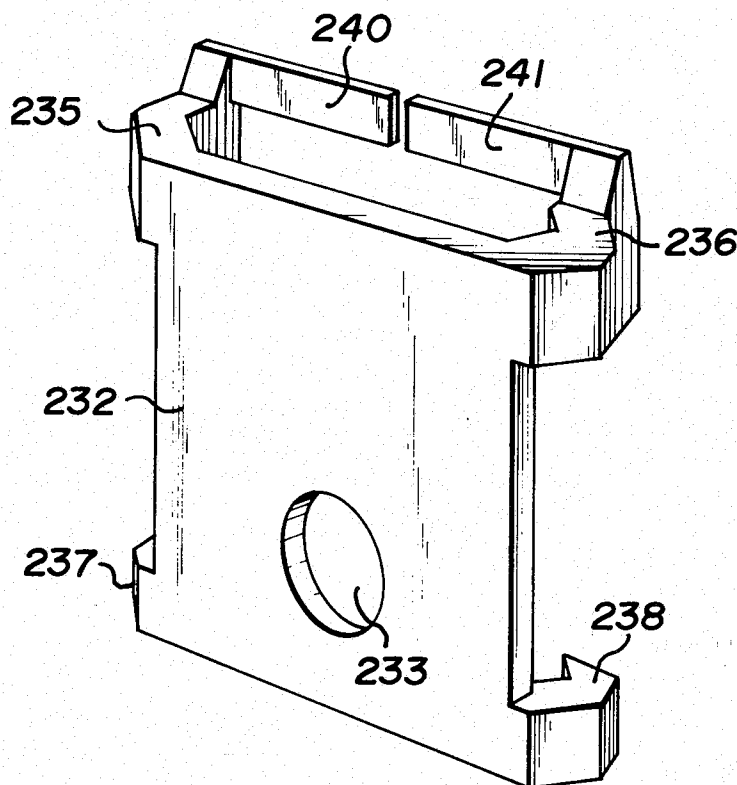
Attorney, Agent, or Firm—Samuel L. Welt; Bernard S. Leon; Mark L. Hopkins

[57]

ABSTRACT

The invention relates to a sample tube device for use in chemical and/or biochemical and/or sero-hematological analyses.

4 Claims, 11 Drawing Figures



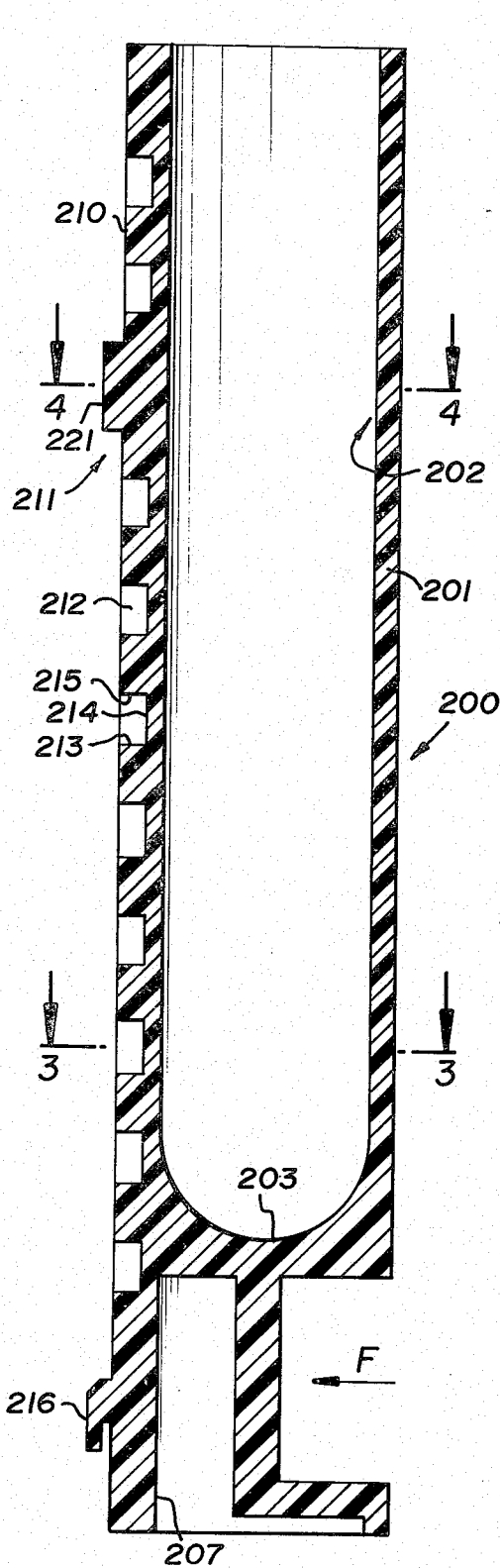


FIG. 2

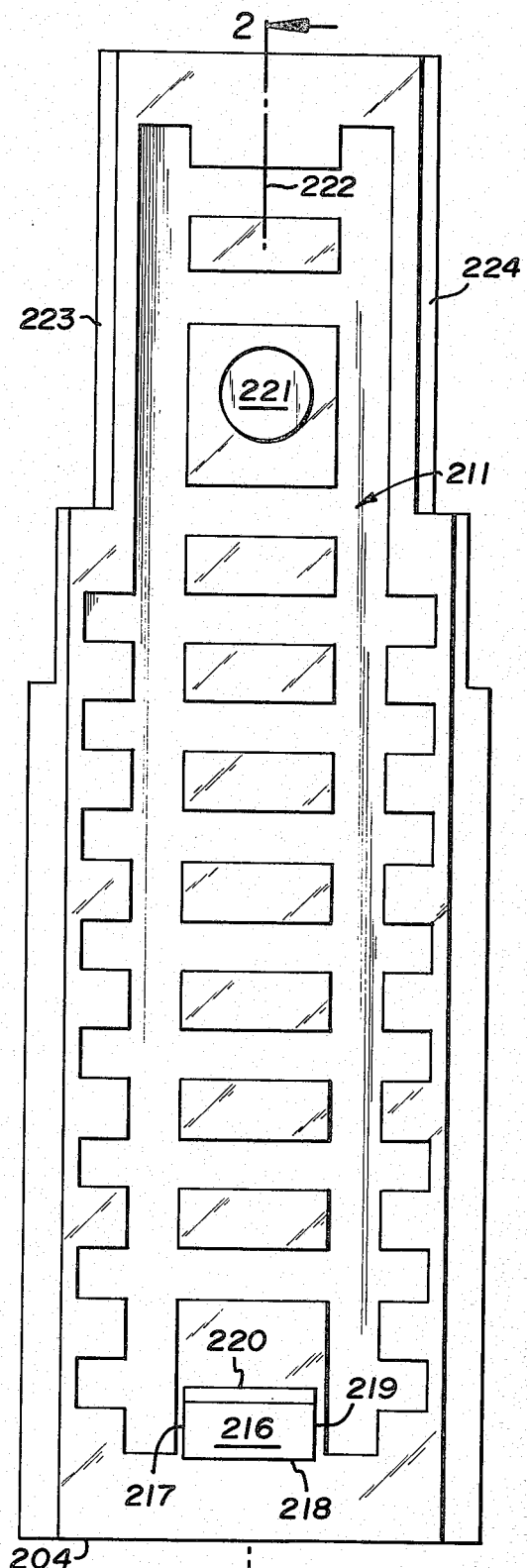


FIG. 1

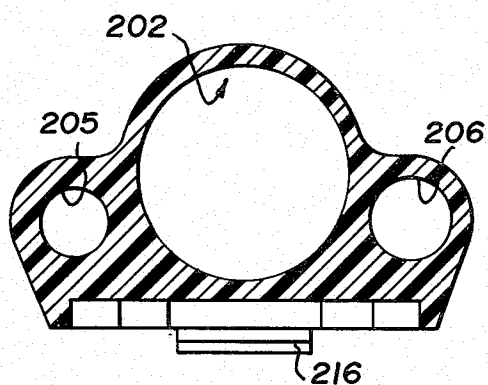


FIG. 3

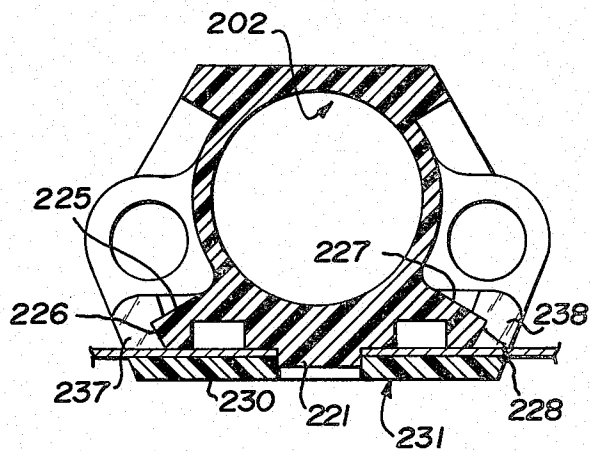


FIG. 4

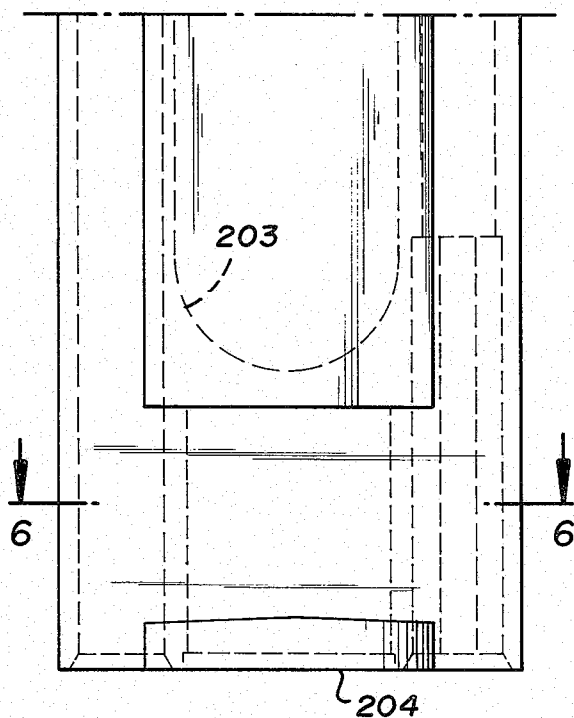


FIG. 5

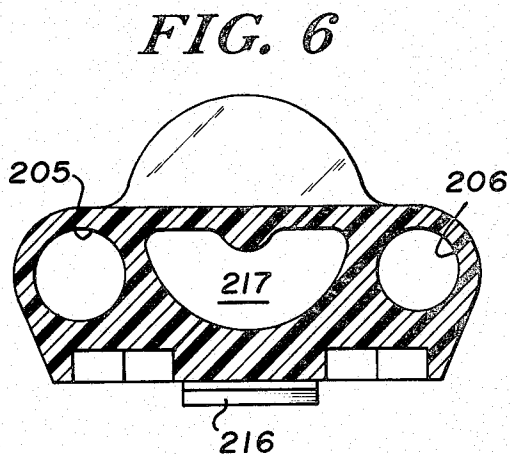
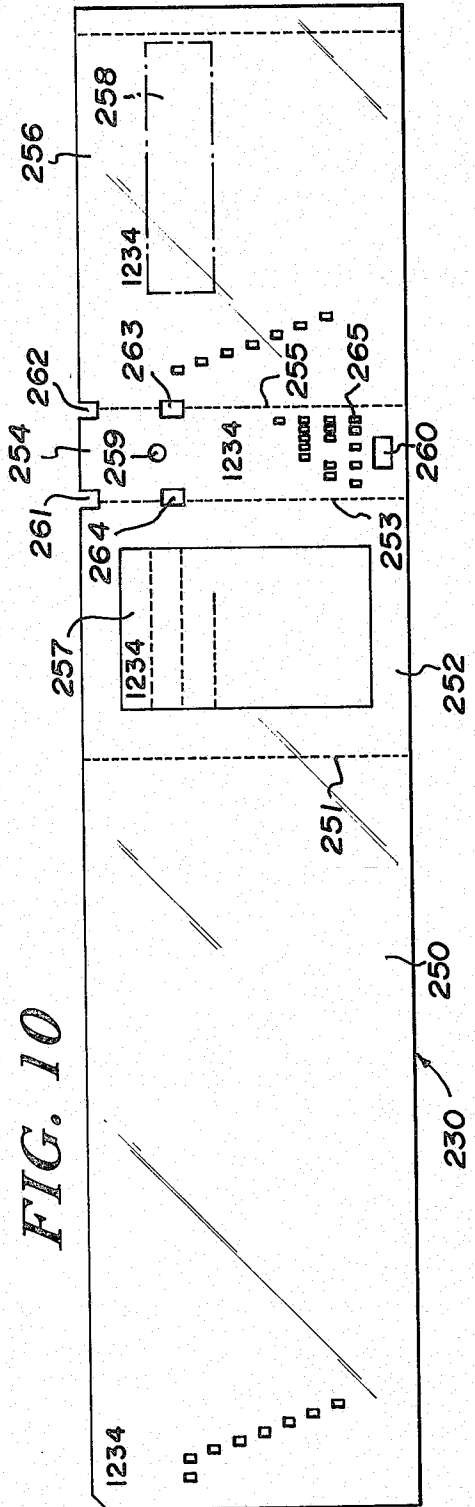
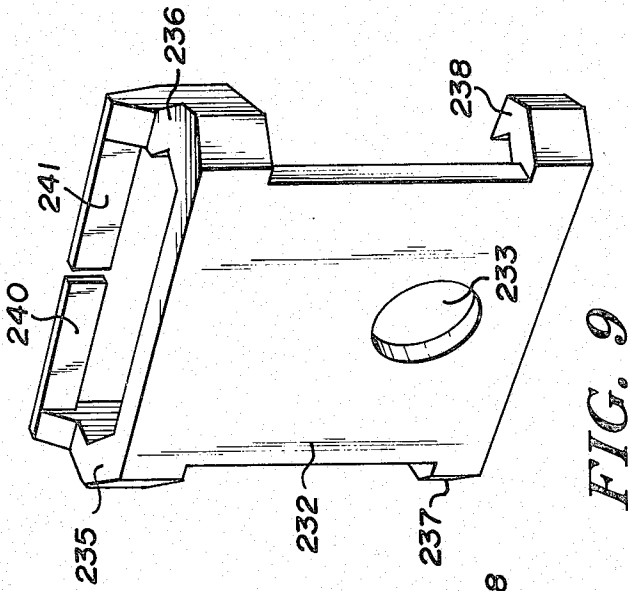
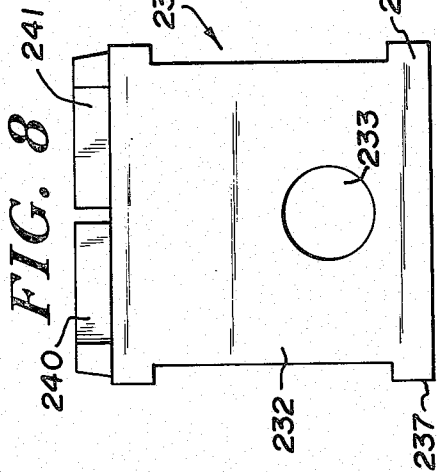
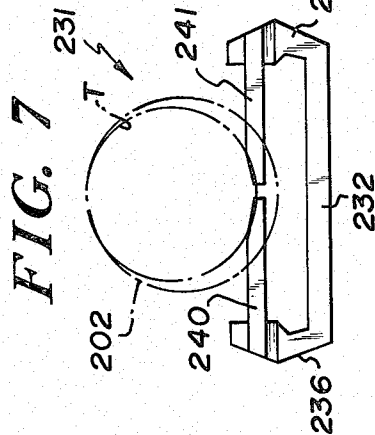


FIG. 6



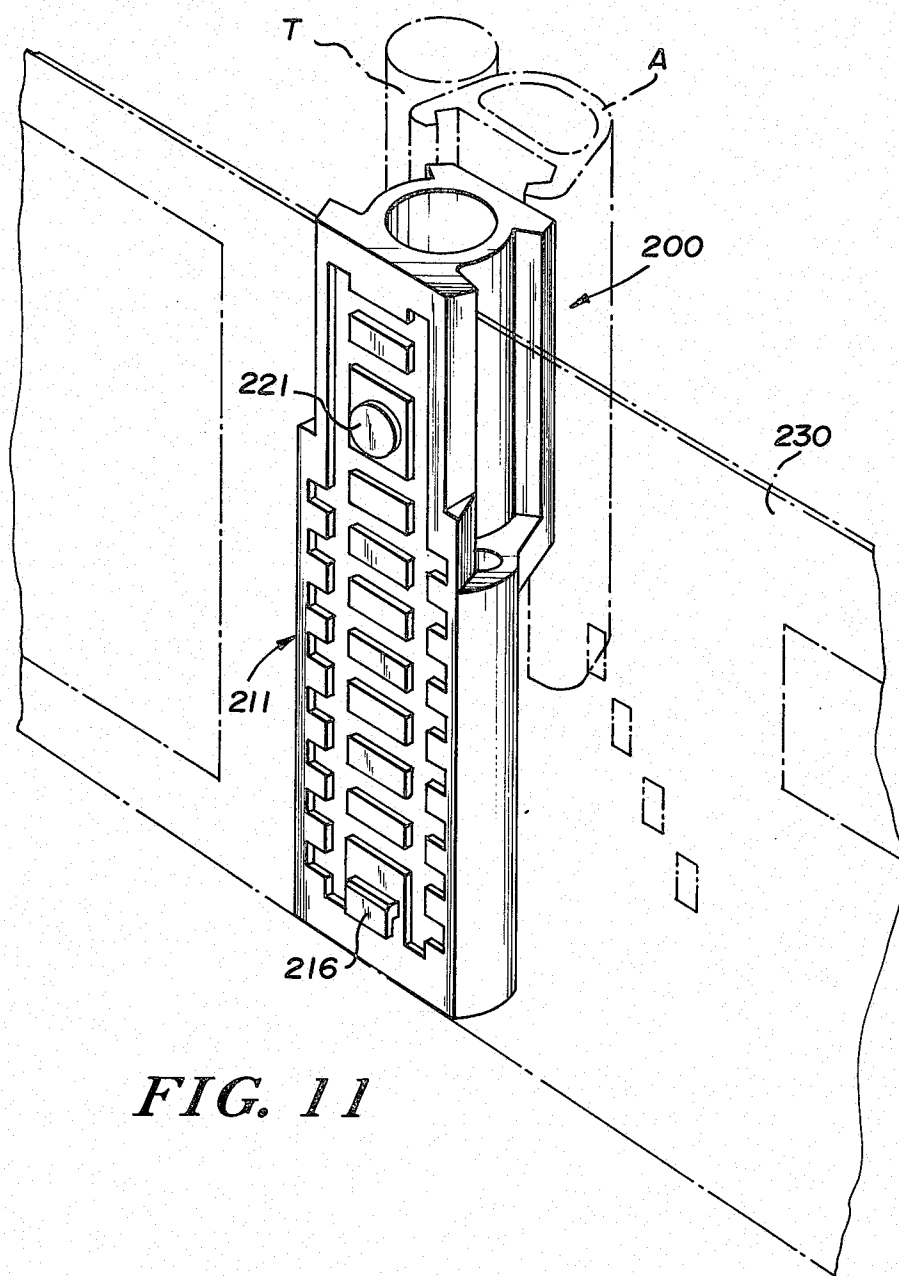


FIG. 11

SAMPLE TUBE DEVICE

This is a continuation of application Ser. No. 263,537 filed June 16, 1972, now abandoned.

DETAILED DESCRIPTION OF THE INVENTION

In apparatus for the chemical and/or biochemical and/or sero-hematological analysis of dimensions. liquids, particularly blood, it is essential that the receptacle containing the liquid to be analyzed remain identifiable throughout the analysis cycle. It is also desirable, for reasons of economy, that a receptacle can be reused for another sample once the analysis cycle for the first sample contained in it has been completed. Likewise, it is desirable, when a sample tube device is to be used in a machine which automatically carries out the operations of analyzing the contents of a plurality of tubes that the device include means for receiving and securely holding a conventional test tube. The advantages of this feature should be readily apparent since test tubes found in commerce are not of consistent dimension.

An object of the invention is to provide a tube device which satisfies the various above-mentioned requirements in a simple manner.

According to the broader aspects of the invention there is provided a sample tube device for use in chemical or biochemical analysis, more particularly the analysis of blood, comprising a receptacle to which is connected a panel or the like capable of receiving an information support such as an information carrying card means which is punched and/or marked and/or comprises magnetic means. The panel is provided with members for positioning the card relative to the panel and also with detachable means for fixing the card positively to the panel.

In one embodiment of the invention, the said fixing means is a clip device comprising flexible lugs. The lugs after passing through openings in the card means are capable of clipping on to the longitudinal edges of the panel, thereby holding the card means to the panel.

According to another feature of the invention, the clip device advantageously comprises means for positively securing a conventional test-tube to the device while at the same time assuring that the card means are removably fixed to the panel.

According to a further feature of the invention, the information carrying card means is such that it contains cut-outs enabling it to be positioned relative to the panel members and comprises a plurality of stubs so as to provide means for transcribing general information on the card means relating to the analysis.

The invention will be understood from the ensuing description, given by way of example and with reference to the accompanying drawings in which:

FIG. 1 is an elevation of a device embodying the invention;

FIG. 2 is a sectional view along a line 2—2 of FIG. 1;

FIG. 3 is a sectional view on a line 3—3 of FIG. 2;

FIG. 4 is a sectional views along line 4—4 of FIG. 2 also illustrating an information supporting card and the means for fixing it to the tube device;

FIG. 5 shows part of the device embodying the invention as seen in the direction of an arrow F in FIG. 2;

FIG. 6 is a section along a line 6—6 in FIG. 5;

FIG. 7 is a plan view of a clip forming part of a device embodying the invention;

FIG. 8 is a view in elevation of the clip;

FIG. 9 is a diagrammatic perspective view of the clip;

FIG. 10 illustrates an information support suitable for use on a device embodying the invention; and

FIG. 11 is a diagrammatic perspective view of a device embodying the invention.

A tube device 200 comprises a tubular body 201 forming a cavity or receptacle 202 with a hemispherical bottom 203. The cavity 202 can receive the sample per se. Alternatively, a test tube can be received in cavity 202 which contains the sample to be analyzed. Inside the body 201, on each side of the cavity 202, two bores 205, 206 (FIG. 3) extend substantially more than halfway up the tube device from the base 204 of the device. The bores 205, 206 are on opposite sides of a shorter, blind bore 207 leading to the underside 204 of the device. The bores are intended to hold the tube device vertical by cooperating with appropriate means, for example, pins on a belt conveyor or the like which forms a part of an automatic analysis machine, the last-mentioned machine being adapted to chemically and/or biochemically and/or sero-hematologically analyze a plurality of liquid samples.

The body 201 of the tube device has on its side 210, perpendicular to the base 204, a panel 211 which extends over substantially the entire depth of the device and which contains parallel grooves 212 having rectangular cross-sections and defined by plane orthogonal faces 213 to 215. The longitudinal edges 223, 224 of the upper portion of the panel 211 have wedge-shaped cross-sections defined by flat surfaces 225, 226 and 227, 228 respectively (FIG. 4).

In accordance with the invention, the panel 211 is provided, near its top and bottom respectively, with members for positioning an information support such as a card which is punched and/or marked and/or comprises magnetic means or generally contains information thereon.

In the embodiment illustrated, there is provided an information support positioning member on the lower portion of the device 200, which is comprised of a lug 216 having a rectangular configuration defined by surfaces 217 to 220. A portion of it projects from the plane of the face 210 in order to accommodate an information supporting card 230 (FIG. 10). On the upper portion of the device a cylindrically shaped stud 221 is provided in the center of the longitudinal plane of symmetry 222 of the device.

Clip means, advantageously, a clip 231 (FIGS. 4 and 7 to 9), is provided in accordance with the invention to detachably secure the card 230 to the tube device 200. The body 232 of clip 231 includes a small flat plate containing a circular opening 233, the diameter of which conforms to that of the stud 221. Projecting from the longitudinal edges of the body 232 are flexible lugs 235, 236 and 237, 238. The lugs are so-shaped as to conform to the configuration of the edges 223 and 224 of the panel 211 of the tube device 200 and are formed from any resiliently flexible material, e.g. spring steel, plastic material and the like.

In one embodiment in which the device 200 is designed to accommodate a test-tube T (for example, of the type known as a "Vacutainer") in the receptacle 202, the clip 231 is provided in accordance with the invention with means for positively fixing the tube T to the device 200, since any test tubes in a single series may exhibit slight dimensional differences.

The said fixing means advantageously comprise two tongues 240 and 241 extending parallel to the plane of the body 232 from the ends of the upper lugs 235 and 236 which fix the clip on to the tube device 200. When in use the tongues 240 and 241 bear on the tube T urging it to the interior of the receptacle 202 as illustrated in FIG. 7 and thereby retaining the tube T securely in place.

FIG. 10 illustrates an example of an information support 230 or data carrier of the punch card type suitable for use with a device embodying the invention. It comprises a stub 250 connected by a dotted severable line 251 to another stub 252, connected in turn by a dotted severable line 253 to a portion 254, whose dimensions are substantially the same as those of the panel 211. Stub 254 is in turn connected by a dotted severable line 255 to a stub 256.

In this example, the stub 250 is identical to that of a conventional machine-readable card. The stub 252 receives adhesive labels, and the stub 256 provides a space 258 for recording the results of analysis of a sample contained in the receptacle 202 or in a tube T mounted in the receptacle of the device 200 to which the card is detachably fixed by means of the clip 231.

The stub 254 contains a hole 259 slightly larger than the diameter of the stud 221 and a rectangular opening 260 to receive lug 216. Slots 261 and 262 and perforations 263 and 264 are provided on dotted lines 253 and 255 to permit passage of the lugs 235 to 238 of the clip 231.

The design of the panel 211 makes it possible to perforate the stub 254 of the card 230 as shown at 265 without separating the card from the panel and therefore from the tube device, so that reading and writing of the data provided by the perforations in the card are linked unequivocally to the contents of the receptacle 202 of the tube T mounted in the receptacle (or of a sample directly placed therein).

When the sample associated with the devices 200 (and contained in the receptacle 202 or in a tube T mounted in the receptacle) has been through an analysis cycle, the stub 254 of the card 230 fixed to the device 200 by the clip 231 is removed. Immediately afterwards, or after cleaning and sterilization, the device 200 is provided with another card 230 by positioning the latter on the stud 221 and lug 216 by means of its perforations 259, 260, passing the lugs of the clip 231 through the slots 261 to 264 in the card and snapping the clip 231 on to the longitudinal edges of the panel 211, so that another sample can be assigned to the device so equipped.

Because the card 231 is positioned and held on the tube device, the data carried on the card can be safely read. Some of the stubs making up the card can easily

be separated from one another along the slot lines 251, 253 and 255 by making them cooperate with the longitudinal edges of the face 210 of the tube device.

If desired the tube device 200 may be equipped with an auxiliary tube device A (FIG. 11), fitted to and removed from that side of the device 200 diametrically opposite the panel 211 by means of cooperating guides with mating cross-sections on the devices 200 and A.

We claim:

1. Apparatus for use in machine automated analysis of samples such as blood and with which there is associated an information-carrying member and a tube containing the sample to be analyzed, comprising
 - a main body defining a receptacle for a tube containing the sample to be analyzed,
 - a panel unitarily provided on said body, said panel having a plane surface and projecting longitudinal edges of predetermined shape,
 - a clip member detachably securable to said panel and including a plate portion having cooperating shape with said panel for enabling an information-carrying member to be kept between said plane surface of said panel and said plate,
 - a plurality of resilient grasping lugs provided on the periphery of said plate portion, said grasping lugs being adapted to engage with said longitudinal edges, and
 - a pair of resilient tongues extending from the uppermost pair of grasping lugs substantially parallel to the plane defined by said plate portion, said resilient tongues being arranged to bear upon the said tube when housed in said receptacle.

2. Apparatus as defined in claim 1, wherein the information-carrying member is provided in a predetermined portion thereof with a plurality of apertures corresponding to said resilient grasping lugs, for enabling said grasping lugs to pass through said information-carrying member to engage said longitudinal edges.

3. Apparatus as defined in claim 1 wherein said panel is unitarily provided with at least one stud projecting therefrom and said plate portion and the information-carrying member are each provided with an aperture therein corresponding with said at least one stud projecting from said panel, said stud being receivable in the corresponding apertures of the information-carrying member and said plate portion when said clip member is detachably secured to said panel.

4. Apparatus as defined in claim 3 wherein said grasping lugs project transversely from the plane defined by said plate portion and having a wedged-shaped cross-section for conforming to the cross-sectional shape of the longitudinal edges of said panel.

* * * * *