United States Patent

[11] 3,619,568

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[54] **SYSTEM AND METHOD FOR IDENTIFYING AND LABELING BLOOD PACKS**
11 Claims, 6 Drawing Figs.

[52] **U.S. Cl.** ..... **235/61.9 R,** 101/93 C, 235/61.11 D
[51] **Int. Cl.** **G06k 3/02,** G06k 7/08, B41j 3/28
[50] **Field of Search** ..... 235/61.9, 61.12, 61.14; 101/93 RC

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ABSTRACT: A system for automatically identifying and labeling the contents of blood packs designed to avoid human errors in the process of identifying and labeling of the contents of blood packs. The system includes an information storage and retrieval center having means for storing information at predetermined addresses and retrieving information from said addresses. It further includes a laboratory station having means for supplying all pertinent data needed for labeling blood packs to the aforementioned information storage and retrieval center. In addition the system includes a printout station where information is being retrieved from the information and retrieval center and automatically imprinted upon blood packs. The labeling of blood packs involves identification of the blood type and serologic data.

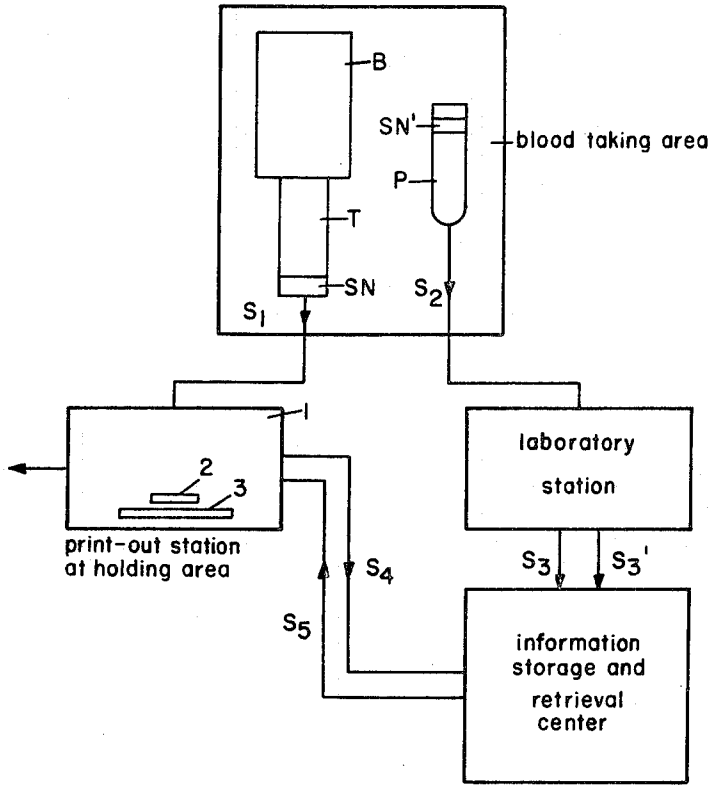


FIG. 1.

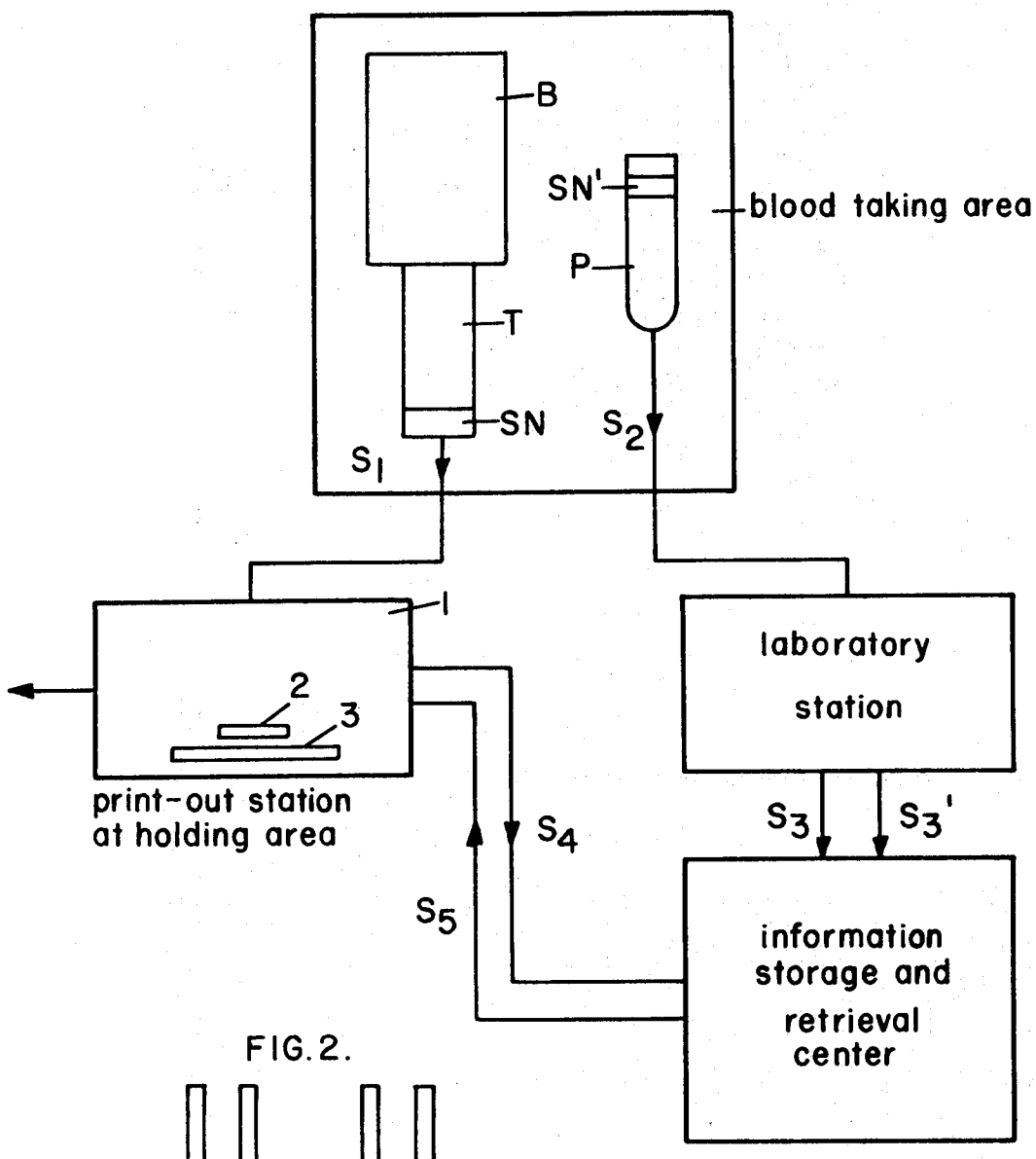


FIG. 2.

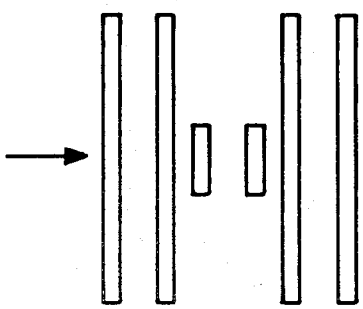


FIG. 3.



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FIG. 4.

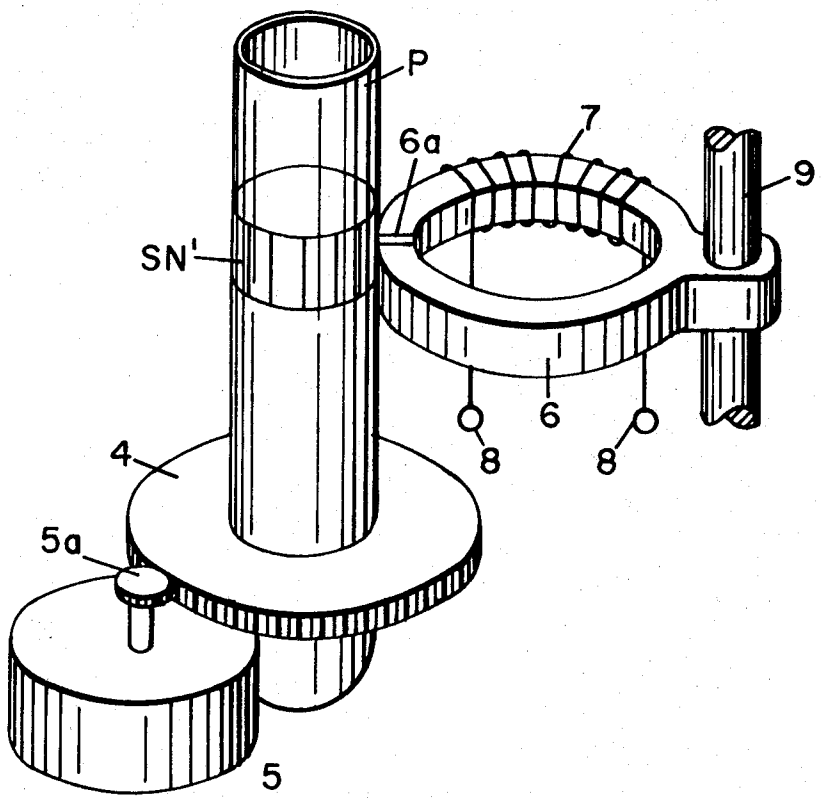
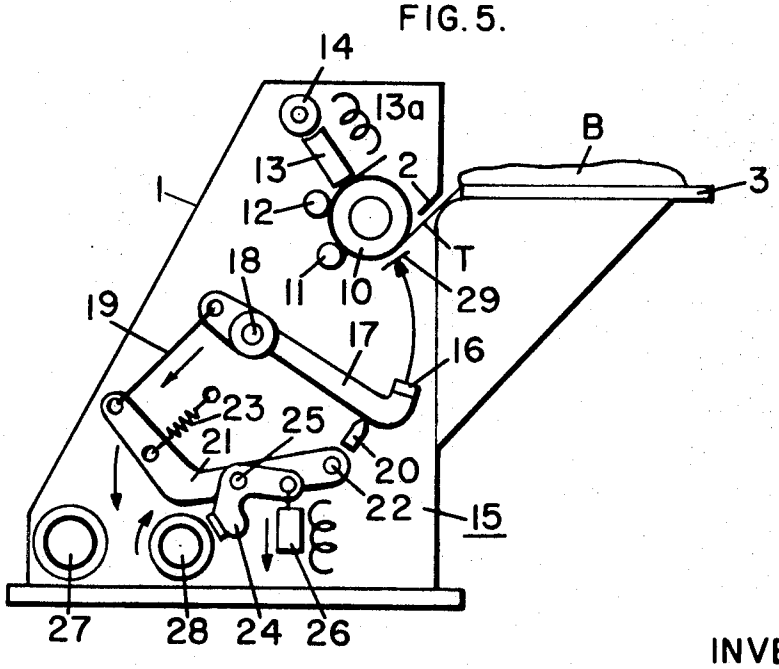
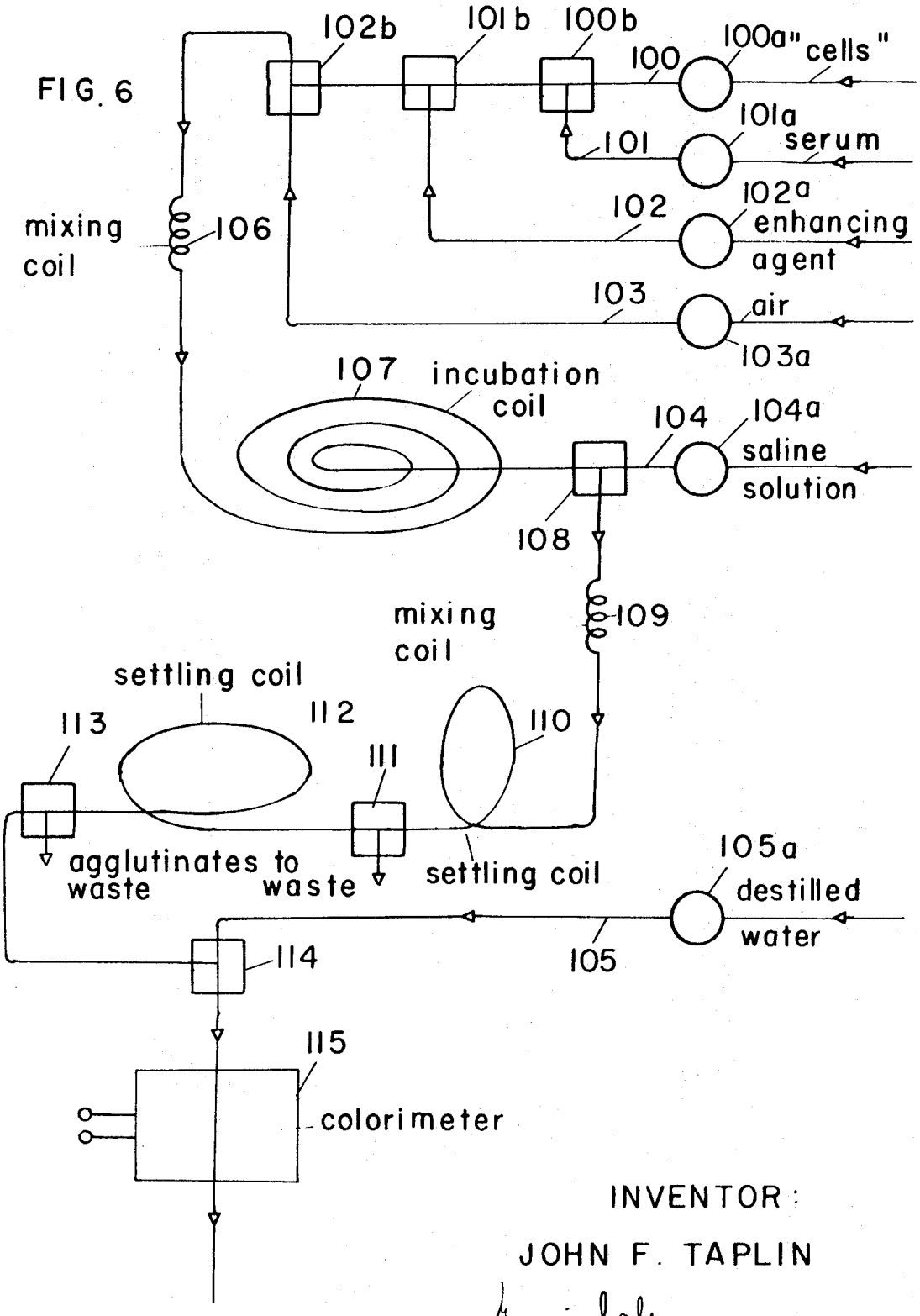


FIG. 5.



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FIG. 6



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SYSTEM AND METHOD FOR IDENTIFYING AND LABELING BLOOD PACKS

BACKGROUND OF INVENTION

Human blood intended for transfusion is stored in bags known as blood packs. At the time human blood is being taken from a donor the bulk of the blood which has been taken from the donor is filled into a blood pack, and a small sample of the donor's blood is simultaneously filled into a small test tube of glass known as pilot tube. Each blood pack and each pilot tube containing blood from the same donor are cross-referenced. To be more specific, corresponding blood packs and pilot tubes are generally labeled with labels bearing the same serial number. The blood packs are then transferred to a temporary cold storage area known as holding area, and the pilot tubes are transferred to the laboratory where the contents thereof is analyzed. The serial number of the respective pilot tube and the result of the analysis of its content are made of record, i.e., both are generally recorded on a worksheet. This operation is known as posting. The content of blood in the pilot tube not held for compatibility tests is disposed of. The worksheets bearing serial numbers and information regarding the blood samples bearing those serial numbers are then transferred to a cold storage area known as holding area. At this location the blood packs and worksheets bearing the same serial numbers are correlated. This involves affixing of a preprinted identification label to the front surface of each blood pack. This process is known as labeling. The blood packs fully identified as to their contents by statements regarding the blood group to which their contents pertains, Rh type, etc., are then transferred to a cold storage area where they are available for use.

This relatively complex operation is liable to involve errors which may result in fatalities when they occur.

The principal object of this invention is to eliminate, as far as possible, the occurrence of human errors in the above operation by a far reaching mechanization, or automation thereof.

SUMMARY OF INVENTION

A system embodying this invention consists basically of three units, or stations.

The first unit is an information storage and retrieval center having means for storing information at predetermined addresses and retrieving information from said addresses. The aforementioned center may be located wherever desired, i.e. there is no need to assign to it any specific location. Storage and retrieval of information may be effected by any known and/or desired means which lend themselves to achieving this end.

The second unit will be referred to as laboratory station. The laboratory station includes a first reading head for reading alphanumeric information supported on the surface of said pilot tubes and for converting said information into electric signal currents transmitted to the aforementioned information storage and retrieval center as addresses for information regarding the analysis of blood samples in said pilot tubes, and said laboratory station further has means for transmitting to the aforementioned center by way of electric signal currents information regarding the analysis of blood samples contained in said pilot tubes.

The third unit will be referred to as printout station. The printout station is located at the temporary cold storage area known as holding area. The printout station derives from the aforementioned information center information specifying the contents of blood packs, and prints out this information. The printout station includes a support for blood packs, means arranged adjacent said support defining a path for receiving and guiding information recording tabs integral with blood packs on said support and projecting away from said blood pack, and a second reading head arranged along said tab path for reading information carried by said tabs and for converting said information into electric signal currents for transmission to said information center. The printout station further includes a printout device for alphanumeric information under the control of electric signal currents derived from said information center and transmitted to said printout device, said printout device being arranged along said tab path and having alphanumeric type means for imprinting information upon said tabs.

BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 is a block diagram of a system embodying the present invention;

FIG. 2 shows on a very large scale a type face which may be used in reading, printing, and transmitting information;

FIG. 3 shows an electric current plotted versus time resulting from magnetic reading, or scanning, of an imprint made with the type face according to FIG. 2;

FIG. 4 is an isometric diagrammatic view of a magnetic pilot tube reading head for the laboratory station;

FIG. 5 is a diagrammatic representation of a printout station including a magnetic reading head and an electric typewriter-like printout device; and

FIG. 6 is a diagrammatic representation of a typical automatic blood analysis channel.

DESCRIPTION OF PREFERRED EMBODIMENTS OF THE INVENTION

Referring now to the drawings, and more particularly to FIG. 1 thereof, the rectangle marked "blood-taking area" refers to the location where a donor's blood is taken from him and filled into a blood pack B and where a small sample of the donor's blood is filled into a pilot tube P. The information recording tab or tag T is integral with blood pack B and projects away from blood pack B. Recording tab T may be heat-sealed to blood pack B if the latter is made of a thermoplastic material which lends itself to heat sealing. Recording tab T may also be formed by a projection of the impervious sheet material of which one of the sidewalls of the blood pack B is made. The end of tab T remote from the blood pack B proper has an area SN where a serial number, or another equivalent alphanumeric group of symbols, identifying the particular blood pack B is recorded, i.e. printed. The pilot tube P has an area SN′ on which there is the same serial number, or another equivalent alphanumeric group of symbols for identifying the corresponding blood pack B. In other words, one blood pack B and one pilot tube P are identified as corresponding pairs by identical symbols that may be read by the hospital staff.

As indicated by arrow S_1 the blood packs B upon having been filled with human blood are transported to the holding area where the aforementioned printout station is located, and as indicated by arrow S_2 the pilot tubes P are transferred for analysis to the laboratory where the laboratory station is located. In the laboratory station the identification on the area SN′ of each pilot tube P is read by a reading head and converted into electric signal currents transmitted to the information center as addresses for additional information regarding the analysis of blood samples in the pilot tubes. The arrow S_3 in FIG. 1 indicates the message path for the transmittal of information automatically read off the area SN′ of each pilot tube. The device or heading head for reading information present on the areas SN′ of pilot tubes P is shown in FIG. 4 and described below in detail in connection with this figure.

In the laboratory the blood samples in the pilot tubes P are analyzed and the result of the analysis is transmitted to the information storage and retrieval center where it is stored at the address determined by the alphanumeric information on the area SN′ of the particular pilot tube. In other words, the serial number on the pilot tube P is used as the address in the information center to identify the location of the following laboratory test data. The unidirectional flow of information regarding the analysis of blood samples in form of signal currents from the laboratory station to the information and retrieval center has been indicated by the arrow S_3'.

The type of reading head used in the laboratory station for reading information contained on the surface of pilot tube P

may vary. It may be an optical or a magnetic character recognition device. A preferred magnetic character recognition device is shown in FIG. 4 and will be considered below more in detail in connection with this figure.

All active parts of the printout station are enclosed in a housing 1 having a slot 2 for insertion of record tabs T of blood packs B into housing 1. A blood pack support or table 3 is arranged in proximity to, i.e. immediately below, slot 2 and supported by housing 1. Slot 2 forms part of a path extending into housing 1 for receiving a guiding record tabs T. Thus when a record tab T is inserted into housing 1 it is no longer accessible to the operator of the printout station, and what then happens is under the sole control of the active parts of the printout station enclosed in housing 1. There is a reading head for alphanumeric information in housing 1 capable of reading the serial number, or other equivalent information, present in the area SN on the end of tap T remote from the blood pack B proper. This information is converted into electric signal currents and transmitted as indicated by the arrow S_4 in FIG. 1 to the information center of the system. This information is, in effect, an address for searching the memory of the information center for the laboratory analysis data which are stored at the specific address in its memory. When the laboratory information pertaining to the particular serial number, or address, on tab T has been searched and found it is transmitted from the information center to the printout station by way of the message path indicated by arrow S_5 in FIG. 1. Inside of housing 1 of the printout station there is a printout device for alphanumeric information under the control of signal currents following message path S_5. This printout device is arranged along the path of tab T, and imprints upon the latter by alphanumeric type means the laboratory test data corresponding to the particular address, or identification symbol, read from the area SN of tab T.

It will be apparent from the above that processing a blood pack by the system of FIG. 1 involves the following sequence of steps:

1. Providing on a tab affixed to and projecting from a blood pack and on a pilot tube containing the same blood as said blood pack (i.e. blood derived from the same donor) machine readable identifications.

2. Machine reading one of said identifications on said pilot tube and storing one of said identifications as an address in an information storage and retrieval system.

3. Automatically analyzing the contents of said pilot tube and storing the resulting analysis information under said address in said information storage and retrieval system.

4. Machine reading the other of said identifications on said tab affixed to and projecting from said blood pack and feeding the resulting identification signal to said storage and retrieval system as address for finding said analysis information.

5. Thereafter retrieving said analysis information from said information storage and retrieval system and automatically printing said analysis information on said tab affixed to and projecting from said blood pack.

These process steps establish a fully automated closed loop in the sense that at no point of the loops human action liable to error is required. To be more specific, the sequence of these steps eliminates the correlation by human action of a given blood pack with the data obtained by automatic analysis of the contents of a corresponding pilot tube. Comparable prior art systems do not include automatic computer means for automatically correlating given blood packs and given analysis data and the printout devices of prior art systems are adapted to print the results of the analysis on a document distinct and separate from the blood packs.

Any appropriate data storage and retrieval system may be used as information storage and retrieval center, e.g., a magnetic tape system. As is well known, magnetic tape requires reading along the entire length thereof until the required information is found; but this limitation of magnetic tape systems is acceptable in the instant case. Data such as laboratory test data are stored in blocks separated by short sections of blank tape. Each block has an address which is read by a playback head. If the required data is stored, for instance, in block 265,382 the counter circuit associated with the system counts off the proper block and then stops the tape.

Instead of using a magnetic tape memory, a magnetic disc memory, or a magnetic drum memory may be used. Switching is used for reading a word from a certain address, or for writing a word at a certain address. In a magnetic drum memory each drum has a plurality of circular tracks. Each track comprises a plurality of information units, or words, separated by short empty spaces. Each track is associated with a recording-playback head. These heads are arranged in staggered relation. Several heads may have common read-write amplifiers which can be automatically switched on and off, as desired. For identification a separate track on the drum carries timing pulses which are prerecorded and read by a head whose output identifies the location of any spot on the the drum. The serial number on the tab T in the printout station may be 26,207, and this may mean that the word, or laboratory analysis, is stored at 26 on track 207. The address selector is then present to count 26, and the timing pulses of the timing track are read into a counter. When count 26 is reached, a comparison circuit produces an output signal causing the head for track 207 to be switched on. After reading the information, or word, the head goes off when it reaches the consecutive spacer.

Other storage means which might be used in the information storage and retrieval center are arrays of ferrite cores, etc. Since such data-processing equipment and the mode of its operation are well known in the art, stating any further details in regard to the information storage and information retrieval center does not appear to be necessary.

The reading heads in the laboratory station and in the printout station must be associated with appropriate auxiliary signal current processing circuitry such as, for instance amplifiers, pulse shapers or clippers, etc., which is well known in the art and does not call for detailed description.

The electric signal currents derived from the reading heads in the laboratory station and the printout station may be stored in the central station and retrieved from the central station in a form which differs from their original form. Hence there may be a need to include conversion equipment such as encoders in the message paths S_3, S_3' and S_4, and it may be necessary to arrange conversion equipment or a decoder in message path S_5.

It is preferred to execute the writing on the area SN of tag T and on the area SN′ of pilot tube P with magnetic means as, for instance, magnetic inks. Preprinted pressure-sensitive labels may be affixed to areas SN and SN′. The alphanumeric information at these areas may be of such a character as to result in a coded electric signal when read by a magnetic reading head, as will be shown below more in detail. Magnetic inks may be printed on or applied in form of a carbon paper like material and also in form of typewriter ribbons.

The preferred form of magnetic alphanumeric recording located at areas SN and SN′ of pilot tube P is by way of symbols which, when read or scanned by a reading head, result in pulse-position modulated (PPM) trains of pulses. In other words, a permutation code is being used having a given number of units. Symbols located at the areas SN and SN′ may also be used as control signals such as start, stop, blank, etc.

Referring now to FIG. 2, this figure shows the letter H formed by six bars whose interbar spacing is coded. The letter H is printed with a magnetic ink and when it is read, or scanned, by a magnetic reading head, or scanning head, an electric signal current as shown in FIG. 3 results, i.e., a pulse-position modulated train of pulses. In this form, the letter H, or any other similarly coded alphanumeric symbol, may be transmitted from the laboratory station to the information center of FIG. 1.

Referring now to FIG. 4 showing diagrammatically the serial number reading head of the laboratory station, the rotatable platform 4 is driven by an electric motor 5 by the intermediary

of a pinion 5*a* in cooperative engagement with the periphery of rotatable platform 4. Platform 4 supports a pilot tube P. The outer surface of pilot tube P supports a pressure-sensitive label SN' imprinted with magnetic ink in the bar fashion illustrated in FIG. 2, and described in connection with this figure. The label SN may be read by magnetic reading head 6 supporting winding 7 whose terminals 8 are connected to conventional electric signal current processing and transmitting circuitry (not shown). Reading head 6 is secured to an adjusting rod 9 for moving reading head 6 to close proximity to pilot tube P. Reading head 6 has a high magnetic reluctance gap 6*a* which may either be an airgap, or a gap filled with a solid substance having a high magnetic reluctance. Gap 6*a* is arranged in the flux path of reading head 6 and in a common plane with the axis of the pilot tube P identical with the axis of rotation of the platform 4 supporting pilot tube P. The area SN' has been subdivided by vertical lines into small rectangles of which each stands for an alphanumeric symbol imprinted with magnetic ink. Reading head 6 stands still while the area SN' is read by jointly rotating platform 6 and pilot tube P about the aforementioned axis. Thereupon motor drive 5,5*a* is stopped.

Referring now to FIG. 5 showing diagrammatically essential components of the printout station, housing 1 is provided with a slot 2 for insertion of the tabs T of blood packs B resting on a horizontal support, or table, 3 arranged outside of housing 1 and supported by housing 1. Slot 2 and rollers 10, 11, 12 define a path for receiving and guiding information recording tabs T of blood packs B placed on table 3. The aforementioned path has an entrance end for tabs T immediately adjacent table or horizontal support 3, and an end remote from table or horizontal support 3. A magnetic reading head 13 including a winding 13*a* is arranged at the end, or adjacent the end, of the aforementioned tab path to read alphanumeric information present on the area SN of tabs T and to convert said information into corresponding electric signal currents. To be more specific, magnetic reading head 13, 13*a* is arranged to read the area SN on tabs T remote from the blood pack B proper. Magnetic reading head 13, 13*a* is provided with drive means as, for instance, a worm gear drive 14 for moving the same transversely across tab T so as to read sequentially the alphanumeric symbols on its end area SN.

Housing 1 further houses a printout device under the control of electric signal currents and arranged along the aforementioned path for tabs T and having alphanumeric type means for imprinting information on tabs T. Reference character 15 has been applied in FIG. 5 to generally indicate the aforementioned printout device. Roller 10 is a cylindrical rotary platen impacted by alphanumeric type means 16 at a region of the path for tabs T adjacent its beginning, or adjacent blood pack-supporting table 3. Printout device 15 may include a simplified electric typewriter mechanism as indicated in FIG. 5. Type means 16 are supported by levers 17 pivotable about fulcra 18 and normally resting against abutments 20. Levers 17 are connected by tie rods 19 to levers 21 pivotally supported at 22 and biased by springs 23. Levers 24 are pivotally mounted at 25 on levers 21 and acted upon by solenoids or electromagnets 26. Reference numeral 27 has been applied to indicate an electric motor for operating a roller 28 which, in turn, operates components 24, 21, 19, 17, and 16 upon energization of electromagnet or solenoid 26. Then lever 24 engages roller 28 rotating in counterclockwise direction and thus imparting a force component to lever 21, causing the same to pivot about 22 in counterclockwise direction and to pivot lever 17 about fulcrum 18 in counterclockwise direction. Thus type 16 is caused to hit ribbon 29 in front of roller 10.

If desired a bar printer or a type wheel printer as frequently used in EDP systems as printout devices may take the place of mechanism 15.

It will be apparent from the foregoing that the reading of information located at area SN of tabs T by the magnetic reading head 13, 13*a* is not subject to human error, and that the printout device 15, or its equivalent, excludes the occurrence of human error at the location where the contents of blood packs B is identified thereon. The personnel at this station has no access to the equipment inside of housing 1. The identification process of the blood packs is fully automated, except that each blood pack B whose contents is to be identified is manually placed upon support 3 and its tab or tag T manually inserted into slot 2. These operations cannot involve human error.

In FIG. 5 the means for energizing the proper operating magnet 26 have not been shown since such means are well known in the art.

It is essential to identify blood samples by decimal numbers, and to identify blood types by the standardized symbols O, A, B and AB, and to identify the Rh factor by the usual symbols therefor. For this reason the input and the output of the system ought to be alphanumeric. It may, however, be desirable to use a general purpose digital computer as information storage and information retrieval center. This calls for conversion equipment as generally used in such instances, and well known in the computer art. Since it is easier to add conversion equipment to a general purpose digital computer which is often, or generally, available in hospitals rather than to change the computer, or provide a separate center for storage of information and retrieval thereof, the use of conversion equipment is indicated in many instances.

In some instances it may be desirable to identify the blood stored in bags B at the blood-taking area on the recording tabs T of bags B by punching holes into said tabs rather than by other means. This then calls for a substitution of a punched card reading head for magnetic reading head 13, 13*a* of FIG. 5. Since punched card reading heads are well known in the art it is not deemed necessary to describe the structural details of such apparatus. For a disclosure of such details reference may be had, for instance, to U.S. Pat. No. 3,382,347 to Wilbur C. Ahrns, issued May 7, 1968 for TABULATING CARD READER.

Referring now to FIG. 6 showing diagrammatically the essential parts of an automatic laboratory station for blood analysis, a sample of blood to be analyzed—the cells—is aspirated by an aspirator (not shown) from a pilot tube and supplied to duct 100. Duct 101 is supplied with serum, duct 102 with an enhancing agent (e.g. bromelin), duct 103 with air, duct 104 with a saline solution, and duct 105 with distilled water. Reference characters 100*a* to 105*a* have been applied to diagrammatically indicate pumps for moving the right quantities of the media contained in ducts 100–105, and reference characters 100*b*, 101*b*, and 102*b* have been applied to indicate three "add" T-connectors. The media added by the aforementioned connectors are supplied to a mixing coil 106. Incubation coil 107 is connected in series with mixing coil 106. The incubation coil 107 is the point of the laboratory station where agglutination occurs if at all. It is optional to arrange a delay coil (not shown) in series with the incubation coil 107. The substance derived from incubation coil 107 is supplied jointly with saline solution to the decanting T-connector 108, where heavier agglutinates sink to the bottom of the conduit, i.e. to mixing coil 109 and a first settling coil 110. A further separation of agglutinates is effected in decanting T-connector 111 from where some agglutinates go to waste, and in recant settling coil 112 and in decanting T-connector 113. The outflow of decanting T-connector 113 is mixed at 114 with distilled water which destroys the red cells, releasing the red oxyhemoglobin. As a result, the medium turns red. The calorimeter 115 measures the density of the red medium which is supplied to it. The higher the density of the medium supplied to the colorimeter 115 the fewer agglutinates, the more negative the reaction. The colorimeter 115 is of the photoelectric type including a first photocell for measuring the optical density of samples and a second photocell that serves a comparison standard. Both photocells are illuminated by different light beams derived from the same light source, i.e. an incandescent lamp.

The arrangements of parts diagrammatically shown in FIG. 6 is referred to as an analysis channel. A fully automated laboratory station includes a plurality of such channels. Assuming it is intended to automatically determine "ABO" typing and Rh factor, this calls for three channels of which each is identical to that of FIG. 6. In each of the three channels "-cells" are supplied to the respective duct 100. Duct 101 of the first channel is supplied with "Anti-A" serum, duct 101 of the second channel with "Anti-B" serum, and duct 101 of the third channel with "Anti-O" serum. The colorimeter in each of the three channels measures the density or absorbency of the medium supplied to its tubular flowcell. The higher the red density, the more negative is the reaction, and the smaller the red density, the more positive the reaction. The following table is based on the concept that any density value in excess of a predetermined density is deemed negative and any smaller density value deemed positive.

Channel 1	Channel 2	Channel 3	Blood Type
neg.	neg.		O
pos.	neg.		A
neg.	pos.		B
pos.	pos.		AB
		pos.	Rh pos.
		neg.	Rh neg.

It is thus apparent that the output of the three colorimeters 115 of the three channels is in suitable form to be fed to the information storage and retrieval center. The typing of blood samples by means of the signals emitted from the three colorimeters 115 of the three analyzer channels may be effected by simple logic circuitry. For instance, if channels 1 and 2 are connected to an AND gate and the latter to an inverter gate and there is no input at the AND gate when channels 1 and 2 are negative, then there will be an output at the inverter gate when there is no output at the AND gate and an output at the inverter gate means blood type O.

It will be apparent from the above that my invention may take various forms. What I have illustrated and described is a preferred embodiment of the invention which may be varied without departing from the spirit of the invention as defined by the appended claims.

I claim as my invention:

1. A system for identifying and labeling the contents of blood packs including in combination:

a. an information storage and retrieval center having means for storing information at predetermined addresses and retrieving information from said addresses;

b. a laboratory station including a laboratory station reading head for reading alphanumeric information affixed to pilot tubes and for converting said information into electric signal currents transmitted to said center as addresses for information regarding the analysis of blood samples in said pilot tubes, said laboratory station further having means for transmitting to said center by electric signal currents information resulting from the analysis of blood samples contained in said pilot tubes; and

c. a printout station for correlating blood packs and analysis information pertaining to said blood packs, said printout station including a support for blood packs, means arranged adjacent said support defining a path for receiving and guiding information recording tabs integral with blood packs on said support and projecting away from said blood packs, a printing station reading head arranged along said tab path for reading information carried by said tabs and for converting said information into electric signal currents for transmission to said center, and said printout station further including a printout device for alphanumeric information under the control of electric signal currents derived from said center and transmitted to said printout device, said printout device being arranged along said tab path and having alphanumeric type means for imprinting information upon said tabs.

2. A system as specified in claim 1 wherein said laboratory station reading head is a magnetic reading head having a high magnetic reluctance gap in the flux path thereof arranged in a common plane with the axis of one of said pilot tubes, and wherein said laboratory station includes a drive means for establishing relative rotary scanning motions between said magnetic reading head and one of said pilot tubes about the axis of one of said pilot tubes.

3. A system as specified in claim 1 wherein said laboratory station includes means including a motor for rotating said pilot tubes about the longitudinal axis thereof and wherein said laboratory station reading head is a magnetic reading head having a high magnetic reluctance gap in the flux path thereof arranged in a common plane with said axis.

4. A system as specified in claim 1 wherein said support defines a horizontal blood pack-supporting surface, wherein said printing station reading head is a magnetic reading head arranged adjacent the end of said tab path remote from said blood pack-supporting surface and provided with drive means for moving said printing station reading head relative to said tab path in a direction transverse to said tab path, and wherein said printout device includes a platen impacted by said alphanumeric type means at points situated at that end of said tab path which is adjacent to said blood pack-supporting surface.

5. A system as specified in claim 1 including a common housing for said printing station reading head and for said printout device, said housing having a slot therein for the insertion of said recording tabs into said housing and said support for blood packs being arranged outside of said housing at substantially the same level as said slot and supported by said housing.

6. An apparatus for identifying by print the contents of blood packs including in combination:

a. a support for supporting blood packs;

b. means arranged adjacent said support defining a path for recording tabs integral with blood packs resting on said support and projecting away from said bags;

c. a reading head arranged along said path to read information carried by said recording tabs and to convert said information into corresponding electric signal currents; and

d. a printout device under the control of electric signal currents arranged along said path and having alphanumeric type means for imprinting information upon said recording tabs.

7. An apparatus as specified in claim 6 including

a. a horizontal surface adapted to support blood packs;

b. a magnetic reading head for alphanumeric information arranged adjacent the end of said path situated remote from said horizontal surface;

c. drive means for moving said magnetic reading head relative to said path in a direction transversely to said path; and

d. a platen impacted by said alphanumeric type means at a region of said path adjacent said horizontal surface.

8. An apparatus as specified in claim 6 including

a. a horizontal surface adapted to support blood packs; and

b. a punched card reading head arranged along said path to read information punched into said recording tabs and to convert said information into corresponding electric signal currents.

9. A method of processing blood packs including the steps of

a. providing on a tab affixed to and projecting from a blood pack and on a pilot tube containing the same blood as said blood pack machine readable identifications;

b. machine reading one of said identifications on said pilot tube and storing said one of said identifications as an address in an information storage and retrieval system;

c. automatically analyzing the contents of said pilot tube and storing the resulting analysis information under said address in said information storage and retrieval system;

d. machine reading the other of said identifications on said tab affixed to and projecting from said blood pack and feeding the resulting identification signal to said storage and retrieval system as address for finding said analysis information; and thereafter

e. retrieving said analysis information from said information storage and retrieval system and automatically printing said analysis information on said tab affixed to and projecting from said blood pack.

10. A system for identifying and labeling the contents of blood packs including in combination:

a. an information storage and retrieval center having means for storing information at predetermined addresses and retrieving information from said addresses;

b. a laboratory station including a laboratory station magnetic reading head arranged with the reading gap thereof in a common plane with the axis of a pilot tube and motor means for establishing a relative rotary motion between said laboratory station reading head and said pilot tube about said axis for converting information affixed to the surface of said pilot tube into signal currents, a communication channel for transmitting said signal currents to said center as address for information regarding the contents of said pilot tube, and said laboratory station further having means for transmitting to said address in said center information regarding the contents of said pilot tube; and

c. a printout station for correlating a blood pack with information regarding the contents of said pilot tube, said printout station including a blood pack support, means arranged adjacent said support defining a path for receiving and guiding an information recording tab integral with said blood pack and projecting away from said blood pack, a printout station magnetic reading head arranged adjacent the end of said path for said tab remote from said support and having drive means for movement thereof in a direction transverse to said tab and said path for said tab, a communication channel for transmitting signal currents from said printing station magnetic reading head to said center as address for information regarding the contents of said blood pack, and said printout station further including a printout device under the control of said center and arranged along said path for said tab closer to said support than said printing station magnetic reading head.

11. A system as specified in claim **10** wherein

a. said printout station magnetic reading head and said printout device are arranged in a common housing having a horizontal slot for insertion of said tab into said housing; and wherein

b. said blood pack support is arranged outside of and is integral with said housing and is arranged at substantially the same level as said slot therein.

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