United States Patent

Romney et al.

[15] **3,656,687**

[45] **Apr. 18, 1972**

[54] DATA SYSTEM FOR MEDICAL AND OTHER ENVIRONMENTS

[72] Inventors: **Russell H. Romney**, 3259 Bon View Drive, Salt Lake City, Utah 84109; **Billy M. Jensen**, 8129 South 1475 East, Sandy, Utah 84090

[22] Filed: **Oct. 24, 1969**

[21] Appl. No.: **868,982**

Related U.S. Application Data

[63] Continuation of Ser. No. 772,622, Nov. 1, 1968, abandoned.

[52] **U.S. Cl.** **234/2**, 234/78, 234/131

[51] **Int. Cl.** **G06k 1/08**

[58] **Field of Search** ..... 234/76–78, 45, 234/89, 131, 213, 2; 40/21 C

[56] **References Cited**

UNITED STATES PATENTS

1,140,505	5/1915	Day	234/45
1,285,837	11/1918	Swanson	234/45
1,476,273	12/1923	Swanson	234/45 X
2,906,335	9/1959	Love	234/78
3,008,633	11/1961	Pennington	234/78 X
3,137,441	6/1964	Forsyth et al.	234/78
3,471,083	10/1969	Barnes	234/45 X
3,519,202	7/1970	Rogers	234/45 X
3,526,125	9/1970	Gilford et al.	234/131 UX

FOREIGN PATENTS OR APPLICATIONS

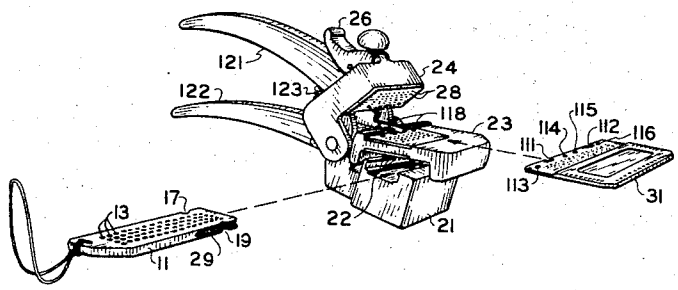
89,160	11/1896	Germany	234/78

Primary Examiner—James M. Meister
Attorney—Lynn G. Foster

[57] **ABSTRACT**

For maintaining error-free records in hospitals and other environments, a master identification tab or device for a primary subject or object receives indicia including coded information and later the coded information is directly transferred to a dependent identification tab or device which in turn is affixed to a subordinate subject or object. Thus, manual transfer of information is avoided and high accuracy assured. Additional data may be recorded on the dependent identification tab. When the present system is used in hospitals, the primary subject may be a patient and the subordinate subject may be a prescription container, a specimen tube or the like.

5 Claims, 10 Drawing Figures



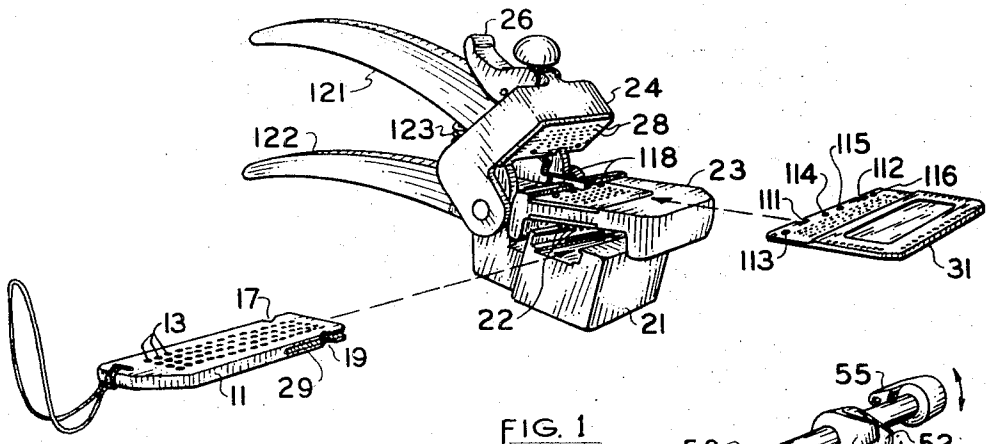


FIG. 1

FIG. 2

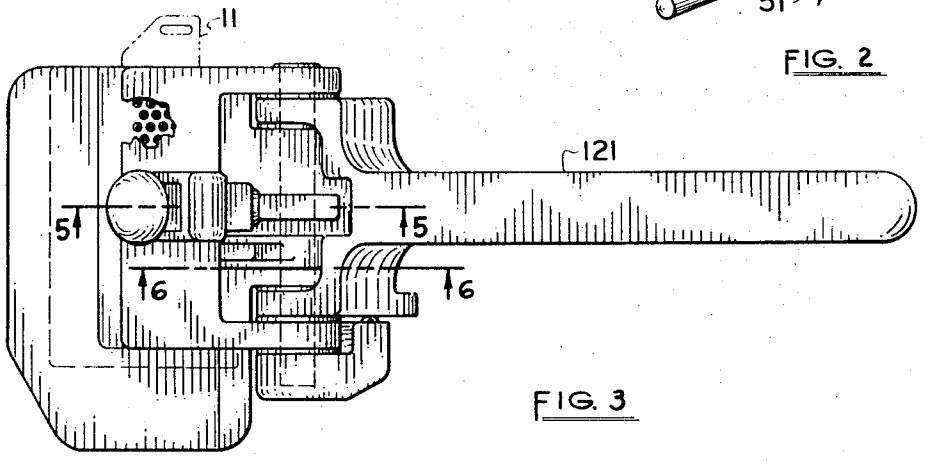


FIG. 3

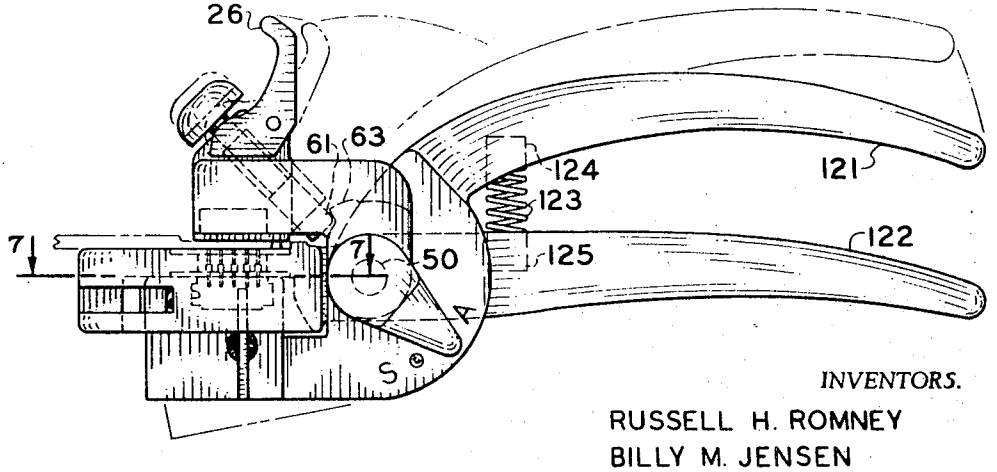


FIG. 4

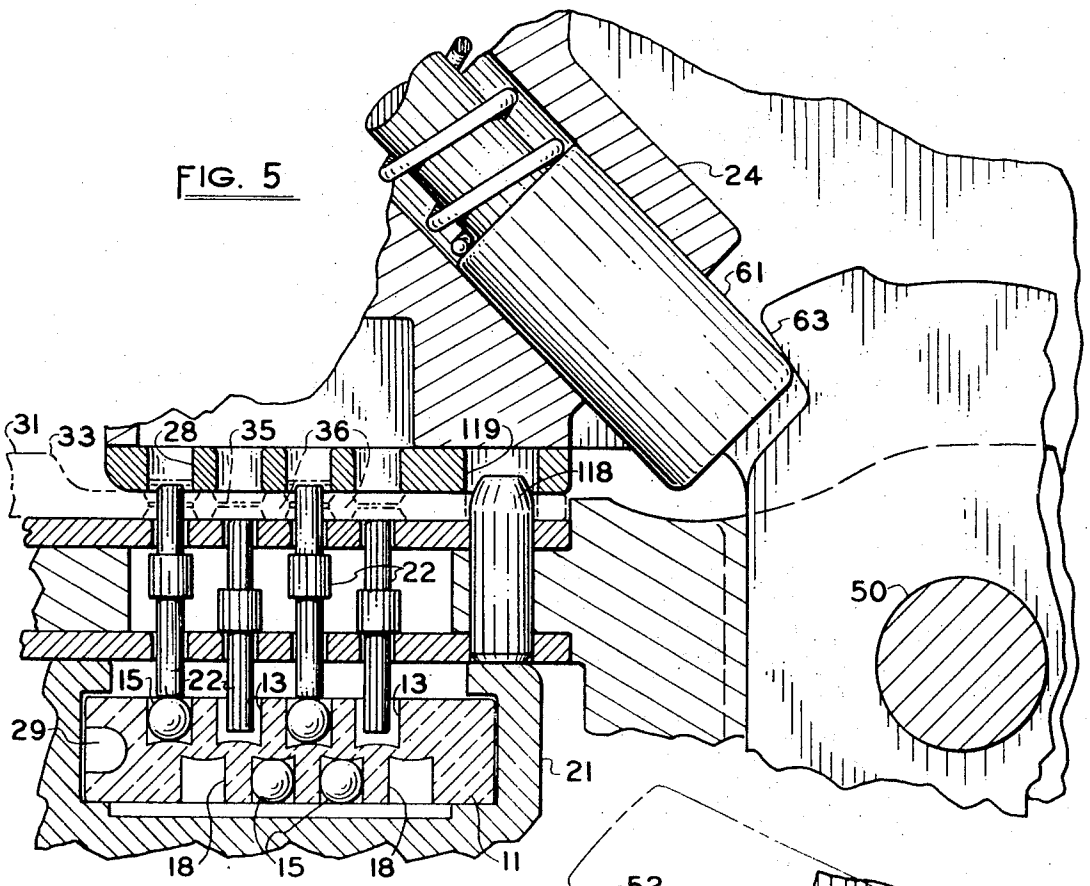
INVENTORS.

RUSSELL H. ROMNEY

BILLY M. JENSEN

ATTORNEY:

FIG. 5



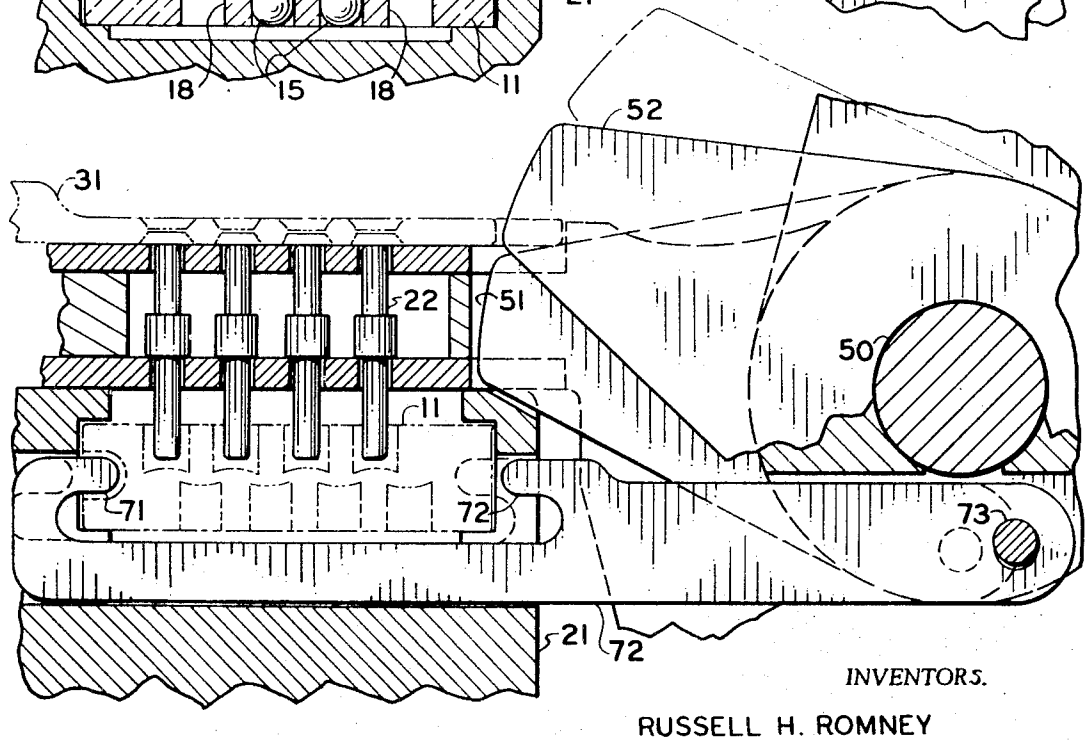


FIG. 6

INVENTORS.
RUSSELL H. ROMNEY
BILLY M. JENSEN
ATTORNEY

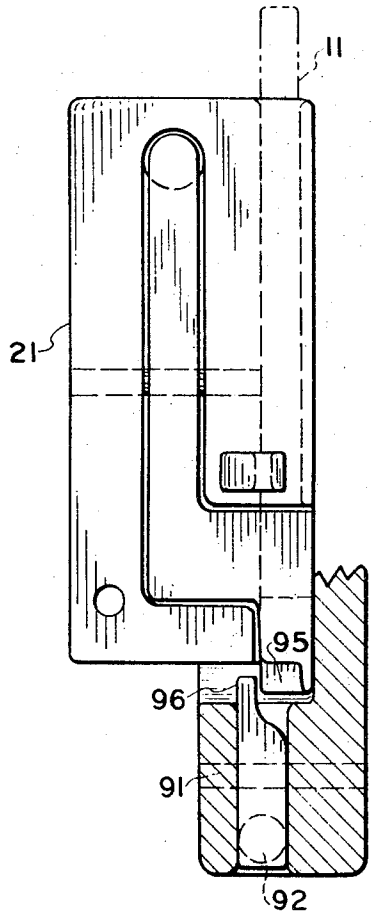


FIG. 8

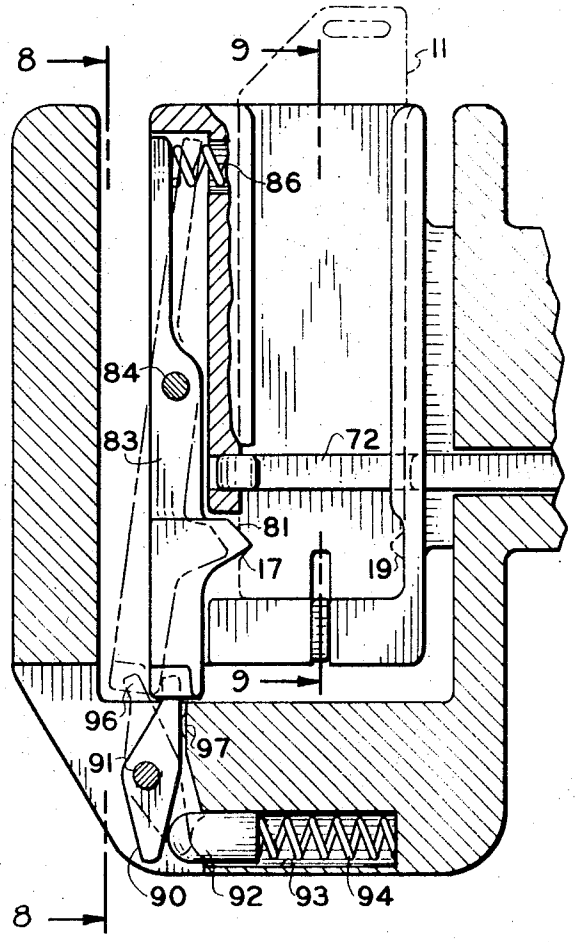


FIG. 7

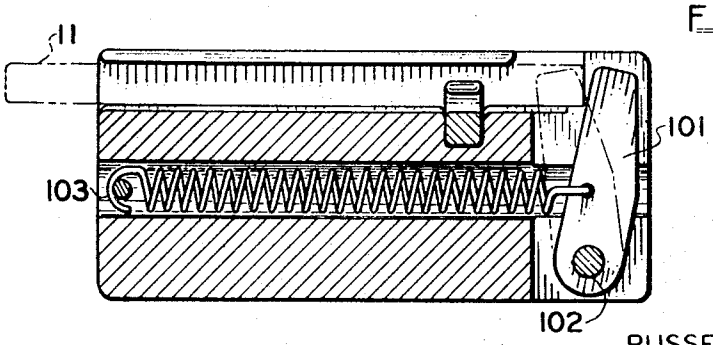


FIG. 9

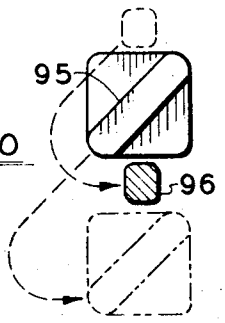


FIG. 10

INVENTORS.

RUSSELL H. ROMNEY

BILLY M. JENSEN

ATTORNEY: Lynn L. Foster

DATA SYSTEM FOR MEDICAL AND OTHER ENVIRONMENTS

This application is a continuation of our earlier filed copending U.S. Pat. application Ser. No. 772,622, filed Nov. 1, 1968 now abandoned.

BACKGROUND

1. Field of Invention

The present invention relates generally to data systems and more particularly to novel methods and apparatus for transferring encoded information from a master identification device to a subservient identification device.

2. Prior Art

Accurate correlation and identification of a subservient subject or object with respect to a master subject or object has presented monumental problems. These problems are particularly serious in the health care fields, where the well-being of patients depends upon proper correlation or reference between each patient and his or her medication, laboratory analysis, diet or the like.

In current medical practice, patients in hospitals, clinics, etc., are commonly identified by a wrist band, neck band, or the like, bearing the patient's name and other desired data. When samples of blood or other body fluids are taken, the identifying data for the patient is copied manually onto the sample container. If the sample is subdivided, as is common practice, the sub-samples likewise must be identified in similar ways. The transfer of data from patient to specimens, and from specimen to sub-specimen, etc., requires much time on the part of hospital attendants, nurses, etc. There is a critical shortage of such personnel and their time is urgently needed for other matters.

In spite of efforts to avoid mistakes in identity of patient and sample, etc., the current system of recording and transcribing medical data often results in error. Names or numbers are misread or copied wrong; serious consequences result when samples of blood, for example, are incorrectly identified. Mistakes in identity of babies with respect to their mothers sometimes occur and are serious; mistakes in identification or recording of specimens and samples are more frequent and often lead to serious consequences.

Hence, there is urgent need for a simple error-free system of identifying primary persons and subordinate elements, such as infants being correctly identified with their mothers, identifying blood and other specimens with the proper patients, identifying sub-specimens with main specimens and recording laboratory results with the proper patients, etc.

Aside from prevention of errors, as recited above, there is need for a very simple but rapid and sure system for recording all data obtained in various and sometimes numerous sample and sub-sample tests and analyses. Once properly recorded, it is most desirable to be able to transcribe, read or tabulate, assemble and/or summarize the data obtained. Current procedures in hospitals and clinics involve normally a human operator for each step of copying, transcribing, assembling, tabulating, etc., of such test data. Each step is subject to possible human error.

BRIEF SUMMARY AND OBJECTS OF THE INVENTION

A novel data system, comprising methods and apparatus, is provided for accommodating transfer of information from one identification device associated with a principal subject or object to another identification device associated with a subject or object subordinate to the principal subject or object. In health care applications, the initial identification device is fastened to a patient and receives information, at least some of which is in coded form, either before or after it is affixed to the patient. At least the coded information is transferred only at bedside by a novel encoding mechanism to subservient identification devices associated with subordinate specimen tubes, prescription containers, diet instructions, accounting statements, etc., so that transcription or like errors are not introduced.

It is a primary object of the present invention to provide novel apparatus and methods for transferring information from one device to another.

Another significant object of the present invention is to facilitate the proper recording, transcription and tabulation of information between related subjects or objects while positively preventing human errors or omissions.

An additional important object of the present invention is to make available non-complex, reliable tools which can be wholly manually operable, if desired, and which will accurately transcribe data.

Another major object of the present invention is to provide novel apparatus and methods for the handling of medical data so that manual writing or manual transcription or records is greatly reduced if not eliminated.

Another important object of this invention is the provision of a novel data system for producing accurate medical records while at the same time freeing medical and clerical personnel for other tasks.

These and other objects and features of the present invention will become more fully apparent from the following description and appended claims taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an exploded view of a master tab, a data transfer punch and a slave tab, illustrating the general method of this invention.

FIG. 2 is a detail view of a position controlling cam or switch element.

FIG. 3 is a top plan view of the data transfer punch.

FIG. 4 is a side view of the punch of FIG. 3.

FIG. 5 is an enlarged sectional view taken substantially along the line 5—5 of FIG. 3.

FIG. 6 is a transverse sectional view taken substantially along line 6—6 of FIG. 3.

FIG. 7 is a horizontal sectional view taken substantially along the line 7—7 of FIG. 4.

FIG. 8 is a sectional view taken substantially along the line 8—8 of FIG. 7.

FIG. 9 is a sectional view taken substantially along the line 9—9 of FIG. 7.

FIG. 10 is a diagrammatic view showing a tab-latching feature.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the accompanying drawings, FIG. 1 shows an encoded master tab or principal identification device 11, a data transferring mechanism 21, and a slave tab or subordinate identification device 31. The master tab 11 is so designed and arranged that when it is inserted in the data transfer punch 21 certain slidable pins or punch elements 22 will be activated and others will not be. Assuming that the secondary or slave tab 31 is placed above the pins on a platform 23 and that the overlying hinged head 24, mounted on a pivot pin 50, is locked in place by a pivoted manual release latch 26, the pin or punch elements 22 will be forced upwardly where perforations in data tab 11, indicated at 13, are filled with a solid element. Thus, the data represented by the filled holes 13 in master tab 11 will be transferred by actuation of the pins 22, or certain selected ones of them, to punch holes in and thereby encode the slave tab 31. The material The material removed by punching is forced into small openings 28 in the cover member 24.

While the master tab 11 does not form a part of the present invention, being described per se in a companion application, it may be explained that this tab preferably has a plurality of rows of data elements 13 on each face.

Referring, for example, to FIGS. 5 and 6, where the tab is shown in cross section or outline, the upper face may have a row of, say, four indentations or holes 13. Two of these con-

tain tiny solid pellets 15, as shown best in FIG. 5. When the lower jaw element 21 of the punch 21 is forced upwardly with respect to the upper hinged member 24, the latter being latched firmly in position by latch pin 61 engaging the cam surface of member 63, those pin elements 22, which overlie the balls or pellets 15, will be forced upwardly to remove a thin frangible section from the plate or slave tab 31 which overlies member 23. As will be seen in section in FIG. 5, the slave tab 31 has a thicker portion 33, shown at the left, and it has very thin frangible sections 35 between thicker elements 36. It is these thin frangible elements which are broken out of the plate and forced upwardly into the perforations 28 when the punch is closed.

It will also be noted from FIG. 5 that whereas the master tab 11 has rows of recesses, say, four in number, in its upper face, it also has other rows 18 of similar perforations in its lower face. Some of these may have been selectively filled with solid pellets or balls 15 similar to those in the upper face. However, the indentations in the lower face are preferably staggered with respect to those in the upper face. The reason for this is to provide for reading the tab, which is made of translucent, transparent or otherwise light, permeable material, by means of optical viewing equipment. The latter forms no part of the present invention but may comprise Lucite or analogous fibers through which light can be passed even around curves, etc. By providing a sufficient number of such light transmitting elements all of the data elements in the tab may be viewed simultaneously, that is both those in the upper surface and those in the lower surface. With this arrangement, assuming four indentations in a transverse row and, say, 18 rows of such perforations totaling 72 on each face, a total of 144 encodable data elements are presented in a small master tab.

Because of the staggered arrangement of the data in the two faces of master tab 11 it is necessary to provide for its proper positioning in the lower jaw element 21. When the upper face elements of data are to be transferred to the slave tab, the tab 11 obviously should be in a position such that the data element properly underlie the slidable pin or punch elements 22. If the tab is reversed so that the elements on its reverse side are presented, to be transferred by the punch elements, the position of the slidable bar 72 must be shifted from the solid to the dotted position as shown in FIG. 6 so that the master tab 11 can be inserted.

Referring to FIG. 6, there is shown a transverse section of the punching or data transferring apparatus with the slave tab 31 lying on top of the slidable pins 22 which, in this case, have not been moved.

A cam shaft or "switch" mechanism, indicated at 50 in FIG. 2, is provided with two lobe elements 51 and 52 which are separated angularly for operation in slightly different degrees of rotation. This cam shaft 50 also bears a manually operable actuator element 55 which is adapted to indicate one of two positions, indicated S, and A, respectively, in FIG. 4. When the master tab is in a first position, it should be engaged in such a manner that its data elements or holes will be aligned with the pins 22 and, as shown in FIG. 6, this requires that the slidable bar member 72 be shifted to the left relative to the base member 21. On the other hand, if the face shown at the bottom of FIG. 6 should be put on top, the slidable bar 72 should be shifted to the right relative to the base member 21 and the apparatus next to be described is arranged to make certain that proper alignment is provided.

Referring to FIG. 6, it will be seen that the cam element 52 is latched in an upper or clockwise position by a detent provided within the manually operable indicator element 55, which may be rotated to select either the S or A positions, FIG. 4. The master tab is provided with a notch 17 in one side and a corresponding notch 19 in its other edge. See FIG. 1. It also is slotted at 29 to receive a finger element 70 or 71 in a longitudinally slidable bar 72. The latter is attached by a pin 73 to an eccentric element of the cam assembly 51, 52. Hence, when shaft 50 is rocked, the bar 72 can slide from the full line position, shown in FIG. 6, to the dotted line position. With this arrangement, finger 71, shown in the full line position, is engaging a notch or groove element 29 on one side of the tab whereas in the dotted line position the element 70 engages the notch 29 on the other side of the tab.

Means shown in FIGS. 7, 8 and 9 are provided for engaging the notch 17 or, selectively, the notch 19 in the master tab 11, depending on which face of the tab is up. Referring to FIG. 7, the tab 11 is shown inserted in the holder mechanism with notch 17 engaged by a detent member 81. The latter is mounted on a rocker arm 83, pivoted on a pin 84 to the base member 21. Rocker arm 83 is urged in a counterclockwise direction about its pivot 84 by a compression spring 86 which pushes against the upper end of the arm, as shown in FIG. 7.

A pivoted latch member 90, mounted on pivot pin 91, is normally urged clockwise, as seen in FIG. 7, by a plunger 92 urged outward in its socket 93 by a compression spring 94. The lower end of the lever 83 is formed with a bevel surface 95, FIG. 10. The upper end 96 of latch member 90 swings out of the way when the punch is closed, as shown in FIG. 10, so that the latch or locking element 81 on lever 83 continues to engage the notch 17 in the tab 11. However, when the punch is opened the element 96 is held against a rigid stop element 97 and cannot yield. For an opening of the punch it pulls the lever 83 to the dotted line position, FIG. 7, and releases the tab which can then be removed.

A pivoted pusher arm 101, mounted on a pin 102, is urged counterclockwise or to the left, as shown in FIG. 9, by a tension spring 103. When the tab 11 is released by rocking the lever 83 in the manner just described, the pusher 101 ejects the tab from the machine.

The cam elements 51 and 52, previously mentioned, are designed to fit respectively in notches 111 and 112 on the slave tab 31. These notches are so positioned with respect to the separate ends of the tab 31 that one or the other will engage the tab and hold it in proper alignment for punching.

The slave tab 31 also has two pairs of holes, a total of four, indicated at 113, 114, 115 and 116. The plate 23 on which the slave tab is placed for punching has two upstanding pins 118 which will project into holes 119, FIG. 5, when the die 24 is latched down in punching position. Depending on the area of tab 31 which is to be punched, one pair or another of the holes 113, 114, etc. will be engaged over the pins 118 to hold the tab against lateral displacement. One or the other of the cam or detent elements 51, 52 is adapted to be engaged in one or the other of notches 111 and 112, depending on how the tab 31 is placed in the punching apparatus. By these means appropriate area for punching are presented to the punch elements. The parts just described constitute a locking or holding mechanism for keeping the slave tab 31 in its proper position or, rather, in one of two selected positions. Depending on the position of notch 111 or 112 with respect to the cam lobe or switch elements 51, 52, one or the other of these will engage a notch 111, or 112, as a result of having manually rotated the actuator 55 to one or the other of the positions indicated at S and A in FIG. 4. By operating actuator element 55 and its pivot 50, the cam lobe 51 and 52 may be positioned to the appropriate notch position of tab 31. Depending on which lobe 51 or 52 is engaged in a notch in the slave tab, the master tab 11 will be keyed to one side or the other by the locking bar 72 which shifts right or left as the shaft 50 is rocked from one position to another. This arrangement assures that the master tab will always be properly aligned with respect to the areas to be punched in the slave tab, and determines which side of the master tab will be facing upward.

As shown in FIG. 4, the punch operation is effected by squeezing together the handles 121 and 122 which normally are urged apart by a coiled compression spring 123 inserted in sockets 124 and 125 in the respective handles. The lower handle is rigidly connected or integral with the slave support member 23 which carries the sliding punch pins 22. The upper handle is integral with the lower jaw member 21 which supports the master tab and which forces the punch pins upwardly through their guiding channels to effect perforation of the

slave tab, the punching element being movable to openings **28** in the backing member **24**. The latter, as previously noted, is pivoted and is independent of both handles but is latched down by latch member **61** during the punching operation.

From the foregoing, it will be understood that the manually operated apparatus is capable of selectively positioning the master tab with either side up and with appropriate position of its data bearing elements when it is firmly latched in place. The slave tab, likewise, is securely and accurately positioned above the master tab where it is locked precisely in proper position so that appropriate elements can be punched to transfer the data, identification, etc. from the master tab to the slave tab. The master tab is so designed that data from both sides of the tab can be transferred to the slave tab. With a relatively small tab made of transparent plastic material and containing only **18** rows, with four elements in a row of indicia elements on one face, a total of **72** different elements may be punched onto the slave tab. By this arrangement, a considerable amount of information may be recorded on the master tab and transferred by a very simple operation to the slave tab. The latter may, for example, be secured by appropriate fastening to a container for a blood sample or to other appropriate materials.

The means by which the data are read out, interpreted and used form no part of the present invention. The invention envisions a system where the master tab is attached to the wrist band of a patient in a hospital, for example. It remains with that patient during the stay in the hospital or clinic. The data applied to the tab when the patient is admitted to the hospital identifies that patient completely and uniquely. When a sample is taken from the patient, for example, the punch device is used to transfer from the patient's master tab to the slave tab or specimen tab **31** the identifying data which will completely associate the specimen tab with that particular patient so that no mistake can be made. The means by which the tab is secured to the patient's wrist and the means by which the little spheres or particles are inserted in selected openings in the tab form no part of the invention. Of the present invention, likewise, the means by which the data on the master or original tab **11** are read form no part of the present invention, these matters being the subject of a separate application.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiment is, therefore, to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore to be embraced therein.

What is claimed and desired to be secured by United States Letters Patent is:

1. Apparatus for transferring data from a dual faced master tab bearing operative and inoperative data elements, to slave tab having perforable data-indicating elements which comprises a punch having a multiplicity of reciprocable punch elements arranged individually to overlie individual data elements on the master tab, selective aligning means for positioning and positively holding the dual faced master tab in either of two positions dependent on which face of said tab faces the punch elements, means for positioning the slave tab with its perforable elements aligned with said punch elements, means for forcing the master tab against said punch elements whereby said operative data elements on the adjacent face of said master tab force the respective aligned punch elements to perforate said slave tab.

2. Apparatus for transferring data from a master tab bearing operative and inoperative data elements, to slave tab having perforable data-indicating elements which comprise a punch having a mutiplicity of reciprocable punch elements arranged individually to overlie individual data elements on a master tab, means for positioning a slave tab with its perforable elements aligned with said punch elements, latching and aligning means to hold both the master tab and the slave tab, said means being adapted to place the slave tab in one of two positions dependent upon the orientation of the master tab and means for forcing the master tab against said punch elements whereby said operative data elements on said master tab force the respective aligned punch elements to perforate said slave tab.

3. Apparatus for transferring data from a master tab bearing operative and inoperative data elements, to slave tab having perforable data-indicating elements which comprise a punch having a set of slidable punch elements arranged individually to overlie individual data elements on a master tab, means for positioning a slave tab with its perforable elements aligned with said punch elements, a relatively fixed support for the slave tab, the set of slidable punch elements being mounted therein, a separate support for a master tab pivoted to said fixed support, a separate hinged reaction member adapted to overlie said slave tab, means for latching said reaction member firmly to the fixed support, means for locking both the master tab and the slave tab in aligned positions for punching and means for forcing the master against said punch elements whereby said operative data elements on said master tab force the respective aligned punch elements to perforate said slave tab.

4. A method of correlating one subject or object with another subject or object comprising:

fastening a first identification device to one subject or object;

providing the first identification device with indicia defining the identity of the one subject or object;

using at least selected parts of the indicia of the first identification device while so fastened to the one subject or object to provide a second identification device with mechanically derived congruent indicia also defining the identity of the one subject or object; and

physically joining the second identification device to the other subject or object.

5. A method of correlating a health care patient with another subject or object subordinate to the patient comprising:

fastening a first identification device to a patient with a leash spanning therebetween;

providing the first identification device with indicia defining the identity of the patient;

bringing the patient and an indicia-transferring machine together at a common location;

placing the first identification device in the machine with the leash continuing to span between the first identification device and the patient;

placing a second identification device in the machine;

actuating the machine to sense and mechanically transfer at least selected parts of the indicia of the first identification device to the second identification device as patient-identifying indicia;

physically joining the second identification device to the other subordinate subject or object.

* * * * *