

INSTRUCTIONS

- (a) If Convention application insert "Convention"

(a) Convention
625029

AUSTRALIA

Patents Act 1990

- (b) Delete one

REQUEST FOR A (b) STANDARD/~~PETTY~~ PATENT

- (c) Insert FULL name(s) of applicant(s)

~~I/We~~ being the person(s) identified below as the Applicant, request the grant of a patent to the person identified below as the Nominated Person, for an invention described in the accompanying Standard/~~Petty~~ (b) Complete Patent Specification.

I ~~am~~/We are (b) not an opponent or eligible person described in Sections 33-36 of the Act.

[70,71] Applicant and Nominated Person (c): Toa Medical Electronics Co., Ltd.

- (d) Insert FULL address(es) of applicant(s)

of (d) 2-1, Minatojima Nakamachi, 7-chome, Chuoku, Kobe, Japan

- (e) Insert TITLE of invention

[54] Invention Title (e) IDENTIFICATION CODE READER FOR A SAMPLE CONTAINER

- (f) Insert Names of actual Inventors.

[72] Names of Actual Inventors (f)

Takashi Demachi

[74] Address for Service:

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Attorney Code: PO

(Note: The following applies only to Convention applications)

- (g) Insert number, country and filing date for the/or each basic application

Basic Convention Application Details

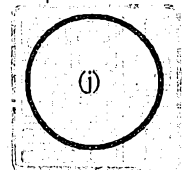
(g)	[31] Application No.	[33] Country	Country Code	[32] Date of Application
	2-105318	Japan		October 5, 1990
	(utility model)		JP	

- (h) Signature of applicant(s) (For body corporate see headnote*)

- (i) Insert date of signing

- (j) Corporate seal if any

Note: No legalization or other witness required



(h) Signature of Applicant

(i) Date

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NOTICE OF ENTITLEMENT

INSTRUCTIONS

- (a) Name of person making statement. I (a) Reizo Hashimoto
- (b) Position of that person. (b) Representative Officer, Managing Director
- (c) Name of applicant of (c) Toa Medical Electronics Co., Ltd.
- (d) Address of applicant of (d) 2-1, Minatojima Nakamachi, 7-chome, Chuoku, Kobe, Japan
- (e) Delete as necessary
- (f) Insert details if not covered by (i) or (ii)
- (g) Delete as necessary
- (h) Delete for non-convention applications
- (i) Insert DATE of signing
- (j) Signature(s) of person making statement

I (a) Reizo Hashimoto

(b) Representative Officer, Managing Director

of (c) Toa Medical Electronics Co., Ltd.

of (d) 2-1, Minatojima Nakamachi, 7-chome, Chuoku, Kobe, Japan

State the following:-

1. The nominated person (applicant) is entitled to the grant of a patent
(e) (i) as assignee of the actual inventor(s)
~~(ii) by contract of employment of the actual inventor(s)~~
or (iii) (f)
2. The nominated person (applicant) is entitled to claim priority from the basic convention application(s).
(g) (i) as applicants of the said application(s)
~~(ii) as the assignee of the applicants of the said application(s)~~
~~(iii) with the consent of the applicants of the said application(s)~~
3. The basic convention application(s) was/were the first made in a Convention country in respect of the invention the subject of the application. (h)

Dated (i) June 17, 1991

(j) Reizo Hashimoto
Reizo Hashimoto
Managing Director

Note: No legalization or other witness required

To: The Commissioner of Patents

PHILLIPS ORMONDE AND FITZPATRICK
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Melbourne, Australia

(12) PATENT ABRIDGMENT (11) Document No. AU-B-81345/91
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 625029

- (54) Title
IDENTIFICATION CODE READER FOR A SAMPLE CONTAINER
- International Patent Classification(s)
(51)⁵ G06K 007/01 G06K 007/10 G06K 007/015
- (21) Application No. : 81345/91 (22) Application Date : 25.07.91
- (30) Priority Data
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2-105318 U 05.10.90 JP JAPAN
- (43) Publication Date : 25.06.92
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- (71) Applicant(s)
TOA MEDICAL ELECTRONICS CO., LTD.
- (72) Inventor(s)
TAKASHI DEMACHI
- (74) Attorney or Agent
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- (56) Prior Art Documents
EP 326796
- (57) Claim

1. A identification code reader for a sample container
for reading a identification code of a sample
container set up on a sample rack, with a identification
code label glued on the outer wall thereof, comprising
an elastic member disposed on the upper side of a
sample container,
rotary means for rotating the elastic member,
up and down moving means for moving the elastic member
up and down,
rotating/up and down moving control means connected to
the rotary means and up and down moving means,
a identification code reader for reading the
identification code of the sample container, and
reading control means connected to the identification
code reader for reading the identification code while
rotating the sample container in any direction by abutting
the elastic member to the upper part of the sample
container.

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COMPLETE SPECIFICATION
(ORIGINAL)

	Class	Int. Class
Application Number: Lodged:		
Complete Specification Lodged: Accepted: Published:		
Priority		
Related Art:		

Name of Applicant:

Toa Medical Electronics Co., Ltd

Actual Inventor(s):

Takashi Demachi

Address for Service:

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Invention Title:

IDENTIFICATION CODE READER FOR A SAMPLE CONTAINER

Our Ref : 223124
POF Code: 136233/93441

The following statement is a full description of this invention, including the best method of performing it known to applicant(s):

TITLE OF THE INVENTION

IDENTIFICATION CODE READER FOR A SAMPLE CONTAINER

BACKGROUND OF THE INVENTION

The present invention relates to a identification code reader for a sample container for reading a sample identification code, such as bar code attached to a sample container, when automatically supplying blood or other samples to a sample analyzer.

To prevent mistake in sampling, a bar code label or similar label for distinguishing from others is glued to the outer wall of a sample container. The code marked on this label is read by a code reader installed in a blood analyzer or a smeared sample preparation unit.

If the sample container having the bar code label is merely set in the sample rack, the reading face of the bar code label is directed in various sides. But the code cannot be read unless the label is correctly facing the bar code reader.

As the prior art for eliminating reading error, for example, a device for reading a bar code while rotating the container as being lifted from the container supporting surface is disclosed in the Japanese Laid-open Patent Sho. 57-199958.

As far as the bar code label is glued neatly, by

rotating the sample container, the bar code can be read regardless of the label position.

However, for example, when the edge of the label is slightly peeled, the peeled portion may be stuck in the sample rack when rotating, and the sample container cannot be rotated, and hence the bar code cannot be read.

OBJECTS AND SUMMARY OF THE INVENTION

It is hence a primary object of the invention to present a device capable of reading the code favorably regardless of the label position if the identification code label is not glued completely.

To achieve the above object, the invention presents, in a preferred embodiment thereof, a identification code reader for a sample container for reading a identification code of a sample container set up on a sample rack, with a identification code label glued on the outer wall thereof, comprising an elastic member disposed on the upper side of a sample container, rotary means for rotating the elastic member, up and down moving means for moving the elastic member up and down, rotating/up and down moving control means connected to the rotary means and up and down moving means, a identification code reader for reading the identification code of the sample container, and reading control means connected to the identification code reader

for reading the identification code while rotating the sample container in any direction by abutting the elastic member to the upper part of the sample container.

In this apparatus, with the elastic member abutting against the upper part of the sample container, first by rotating in one direction, the identification code is read by the identification code reader, and if it is not read, then the elastic member is rotated in the other direction to read the identification code again, which is achieved by the reading control means connected to the rotary means through the rotating/up and down moving control means.

Meanwhile, in this apparatus, it is preferable to form the bottom of the elastic member in a circular form.

By the up and down moving means, the elastic member is moved toward the sample container to abut against its upper part. By the rotary means, the sample container rotates together with the elastic member. At this time, the identification code is read by the identification code reader. If the sample container is not rotated and the identification code cannot be read, it is rotated reversely to read again. After reading, the elastic member stops rotating, and is departed from the sample container.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a side view showing an embodiment of a

identification code reader for a sample container of the invention (as seen from the direction of arrow A in Fig. 3).

Fig. 2 is a magnified view around the sample container (as seen from the direction of arrow B in Fig. 3).

Fig. 3 is a schematic plan view showing an example of application of the apparatus of the invention in a comprehensive hematological examination system.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

In Fig. 3, numeral 10 denotes rack transportation means of sample rack, and this rack transportation means 10 comprises a rack start unit 12, a conveyor unit 14, and a rack stock unit 16. Transportation is done, for example, by belt conveyor system. A sample rack 26 is shaped like a test tube stand for accommodating plural, for example, ten sample containers 28, and has an opening 30 at the rack side surface so that the bar code label or similar label glued to the outer wall of the sample container 28 to distinguish from others may be read from outside the rack. An example thereof is disclosed in the Japanese Laid-open Patent Sho. 63-217273. The sample container 28 may be used whether the plug of the upper opening is detached or set in. The plug is made of rubber or synthetic resin. It is hereinafter referred merely to as rubber plug. Anyway, the

sample in the container may be stirred or sucked up by the known technology.

In the first place, the racks containing sample containers are arranged in a parallel row in the rack start unit 12, and a start switch 25 is pushed. Then the racks entirely advance downward in Fig. 3, and the beginning rack is sent out to the conveyor unit 14 at the left side. Numeral 24 is a controller.

Facing the transfer unit 14, from the upstream to the downstream of the rack flow, there are disposed blood analyzer 18 such as blood corpuscle analyzer (e.g. model NE-8000 of Toa Medical Electronics), blood analyzer 20 such as reticulate red blood corpuscle analyzer (e.g. model R-1000 of Toa Medical Electronics), smeared sample generator 22 (e.g. model SP-1 of Toa Medical Electronics), and others. The NE-8000 is a blood corpuscle analyzer capable of obtaining leukocyte data in five classifications, in addition to the conventional blood cell countings, the R-1000 is a reticulate red blood corpuscle analyzer for obtaining the reticulate red blood cell count and ratio, and the SP-1 is a smeared sample generator for preparing smeared samples of blood by wedge method.

The rack conveyed in the conveyor unit 14 is first stopped before the blood analyzer 18.

Fig. 1 shows an embodiment of the apparatus of the

invention, which is a side view around the blood analyzer 18 and conveyor unit 14 (as seen from the direction of arrow A in Fig. 3). Fig. 2 is a magnified view around the sample container, observing the sample rack 26 on the conveyor unit from the blood analyzer 18 side (as seen from the direction of arrow B in Fig. 3). In this embodiment, the rubber plug is set in. If the rubber plug is removed, the bar code may be similarly read favorably.

The rack 26 coming in from the left side in Fig. 2, riding on the belt 36, abuts against, for example, the contact member 38, and is stopped at specified position. By the bar code reader 19 incorporated in the front portion of the blood analyzer 18, the bar code of the sample container 28 is read, but the bar code label 32 is not always located at the same position. For example, the sample container may be rotated during conveyance. Thus, if the bar code label is not facing the opening 30 of the rack 26, the bar code cannot be read. It is therefore necessary to arrange so as to read the bar code label 32 wherever it may be located. For example, it may be considered to read while rotating the sample container 28.

If, however, the label is not glued correctly (for example, if the end of the label is peeled off slightly or the label is creased or projected), the label may be caught in the sample rack, and the sample container may not be

rotated.

It is known that this problem may be solved by rotating the sample container not only in one direction but also in the other direction.

Numeral 40 is an example of rotary means of the sample container. Numeral 42 is a columnar elastic member made of rubber or synthetic resin, slightly bulged in the bottom, and a shaft 44 is provided in the center of the elastic member. The shaft 44 is rotatably supported by a supporter 46 through a bearing. A pulley 48 is also fitted to the shaft 44, and a timing belt 50 is applied on the pulley 48, and the elastic member 42 is rotated by a driving source 52 such as motor. The supporter 46 is designed to reciprocate linearly in the vertical direction by a driving source 54 such as air cylinder. The driving sources 52, 54 are controlled by the rotating/up and down moving control means 56.

First, as the driving source 54 is put in action, the rotary means 40 moves down, and the elastic member 42 abuts against the rubber plug 34 of the sample container 28. Next, the driving source 52 is put in action, then the elastic member 42 begins to rotate slowly in one direction, while the sample container 28 also rotates slowly. The rotating speed is 30 to 60 rpm.

At this time, by the command from the reading control

means 57, the bar code reader 19 is put in action, and reads the bar code of the rotating sample container. If the sample container does not rotate and the bar code cannot be read, the driving source is rotated in the reverse direction by the signal from the control means 57, 56, and the sample container is rotated in the reverse direction. Then the bar code is read again.

Or, regardless of success or failure of bar code reading, it is also possible to read the bar code by rotating the driving source 52 in both normal and reverse directions.

If the bar code label is not glued correctly, it may be possible to rotate in reverse direction if failing in one direction. The invention is devised by taking notice of this point. Besides, by the rotation of the sample container, the imperfect glued portion of the bar code label may be glued completely as being corrected in the gap between the sample container and the sample rack, which is another effect of the invention. Besides, the bottom of the elastic member 42 is formed approximately in an arc form. This is intended to raise the contact performance with the rubber plug of the sample container or the upper open end (without rubber plug) of the sample container, thereby decreasing uneven rotation.

Meanwhile, a light interrupting plate 58 and sensors

S1, S2 (for example, photo interrupters) are monitoring the upward-downward motion of the rotary means 40. Usually, the light interrupting plate 58 is located at the sensor S1 part, and while the elastic member 42 is abutting against the rubber plug 34 of the sample container 28, the light interrupting plate 58 is located between the sensor S1 and sensor S2. Without sample container, the light interrupting plate 58 is in the sensor S2 part, so that the presence or absence of the sample container may be judged. Thus, the bar code may be read easily and securely. Meanwhile, numeral 59 is a plate for mounting the sensors S1, S2.

After the bar code is read, as the contact member 38 moves to the right in Fig. 2 for the portion of one sample, and the rack 26 also moves for the portion of one sample, and is tumbled and stirred in the sample agitating part. The rack is similarly sent transversely for the portion of one sample, and the agitated sample container is taken out, and the sample is sucked out from the suction part having a thin tube shaped like a syringe needle. Then the blood corpuscles are analyzed. In this way, the rack is intermittently sent sideways by one sample each, and similar processing is done sequentially. When processing of 10 samples, that is, one rack is over, the rack is further conveyed to the left in Fig. 3, and in the next

blood analyzer 20 such as reticulate red blood corpuscle analyzer, similarly, reading of bar code by bar code reader 21, agitation and suction of sample, and analysis are carried out sequentially.

Being thus composed, the invention brings about the following effects.

(1) If gluing of the bar code label is imperfect, the code may be read favorably regardless of the label position.

(2) When designed to rotate the sample container in either direction, if the label is glued imperfectly, the sample container is rotated in possible direction, so that the bar code may be read securely.

(3) When the bottom of the elastic member is formed in a circular form, the contact of the sample container with the rubber plug or the upper open end of the sample container may be raised, so that uneven rotation may be reduced.

Having described preferred embodiments of the invention with reference to the accompanying drawings, it is to be understood that the invention is not limited to those precise embodiments, and that various changes and modifications may be effected therein by one skilled in the art without departing from the scope or spirit of the invention as defined in the appended claims.

~~XXXXXXXXXXXXXXXXXXXX~~

The claims defining the invention are as follows:

1. A identification code reader for a sample container
for reading a identification code of a sample
container set up on a sample rack, with a identification
code label glued on the outer wall thereof, comprising
an elastic member disposed on the upper side of a
sample container,
rotary means for rotating the elastic member,
up and down moving means for moving the elastic member
up and down,
rotating/up and down moving control means connected to
the rotary means and up and down moving means,
a identification code reader for reading the
identification code of the sample container, and
reading control means connected to the identification
code reader for reading the identification code while
rotating the sample container in any direction by abutting
the elastic member to the upper part of the sample
container.
2. A identification code reader for a sample container of
claim 1, wherein with the elastic member abutting against
the upper part of the sample container, first by rotating
in one direction, the identification code is read by the
identification code reader, and if it is not read, then the

elastic member is rotated in the other direction to read the identification code again, which is achieved by the reading control means connected to the rotary means through the rotating/up and down moving control means.

3. A identification code reader for a sample container of claim 1 or 2, wherein it is preferable to form the bottom of the elastic member in a circular form.

DATED: 25 July 1991

PHILLIPS ORMONDE & FITZPATRICK
Attorneys for:
TOA MEDICAL ELECTRONICS CO., LTD

David B Fitzpatrick

ABSTRACT OF THE DISCLOSURE

A identification code reader for a blood sample container is incorporated in a blood analyzer. This reader incorporates an elastic member 42 disposed on the upper side of the sample container 28, rotary means 42 for rotating this elastic member, up and down moving means 53 for moving the elastic member up and down, rotating/up and down moving control means 56, identification code reader 19 for reading the sample code, and reading control means 57 for reading the identification code while rotating the sample container in either direction.

With the elastic member 42 abutting against the upper part of the sample container 28, first by rotating in one direction, the identification code is read by the identification code reader 19, and if reading is unsuccessful, the elastic member 42 is rotated in the other direction to attempt to read the sample identification code again.

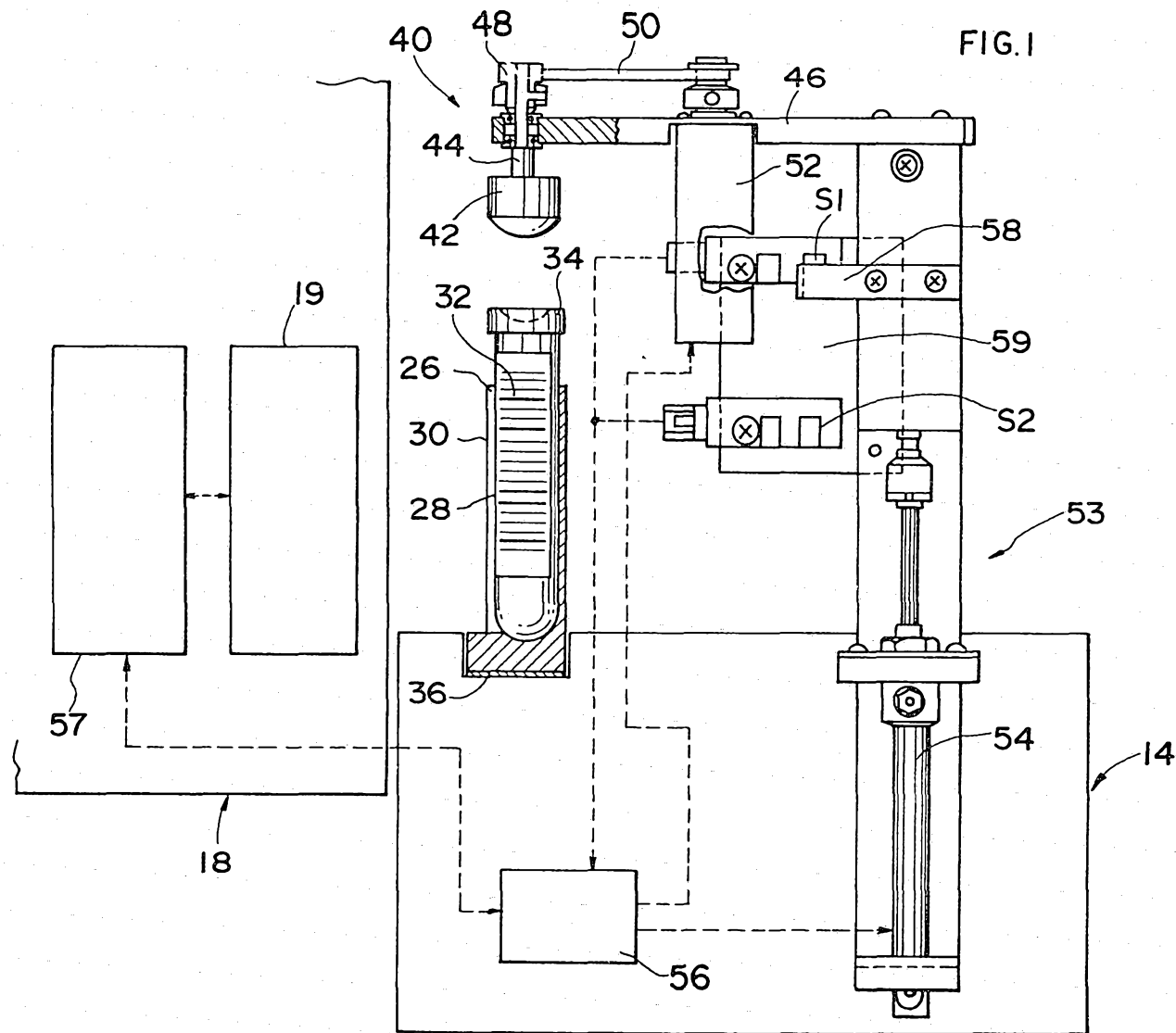


FIG.2

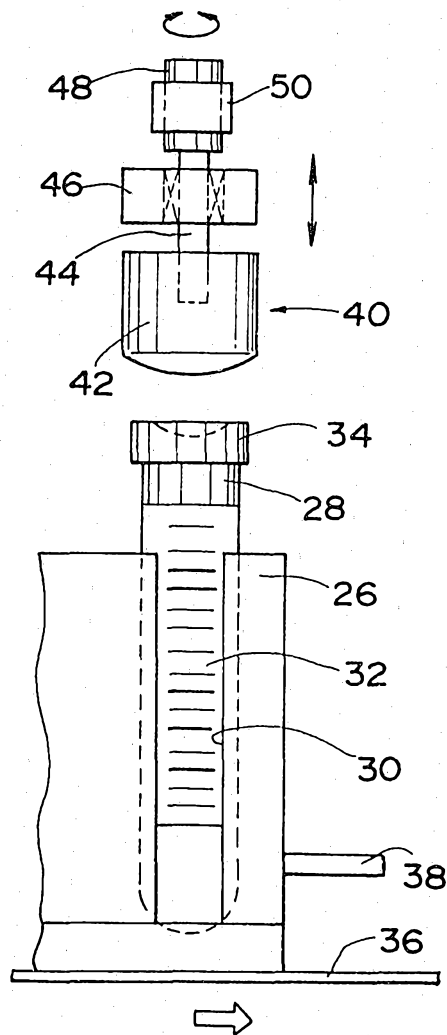


FIG.3

