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(54) Apparatus and method for making patterns, in particular for the clothing industry.

(57) The present invention relates to an apparatus and method for making patterns, in particular for the clothing industry, which comprises a bidimensional vision assembly adapted to display in a digital form two orthogonal projections of a person, a calculation assembly for calculating a plurality of measurements, controlled by the vision assembly, a sorting assembly for supplying parameters of size, heights and physiscal construction derived from the measurements, as well as a managing assembly for storing the data of each sorting operation, in order to provide statistic data which can be separated according to geographic zones.

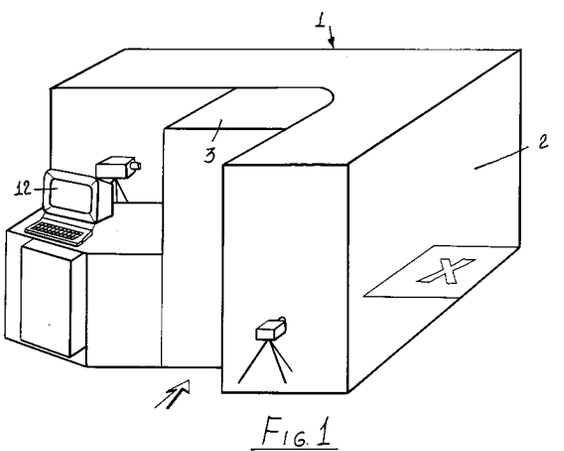

FIG. 1

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BACKGROUND OF THE INVENTION

The present invention relates to an apparatus and method for making patterns, particularly for the clothing industry.

As is known, a very important problem of the cloting industry is that of making clothing articles which, even if substantially made by series operations, do not require substantial adjustment operations to be fitted to the individual users.

In particular, in this field, the clothing article making methods are mainly based on standard types of measurement or size tables, which, however, do not afford the possibility of precisely finding the precise size of a lot of persons, or they refer to standard size which are generally different from the particular size of each individual user.

Another problem is that the users have at present stringent requirements with respect to their clothing articles, and, because of this reason, it is necessary to consider with care the main differences between the physical size of the single users.

At present no solution is available for the above mentioned problems, since all of the made previous efforts were mainly based on empirical bases.

SUMMARY OF THE INVENTION

Accordingly, the aim of the present invention is to overcome the above mentioned drawbacks, by providing an apparatus for making patterns, particularly for the clothing industry, which allows to precisely find the characteristic parameters characterizing each individual user.

Within the scope of the above mentioned aim, a main object of the present invention is to provide such an apparatus for making patterns which allows said patterns to be made in a very simple and quick way.

Another object of the present invention is to provide such a method which affords the possibility of generating a full series of different volumes, for each pattern, so as to fit the different physical characteristics of the persons, also depending on the geographic zones of residence.

Another object of the present invention is to provide such an apparatus and method which are very reliable in operation.

According to one aspect of the present invention, the above mentioned aim and objects, as well as yet other objects which will become more apparent hereinafter, are achieved by an apparatus for making patterns particularly for the clothing industry, characterized in that said apparatus comprises a bidimensional vision assembly, for displaying, in a digital form, two orthogonal projections of a person, a calculating assembly for calculating a series of measurements, said calculating assembly being controlled by said vision assembly, a sorting assembly, for supplying parameters of size, height and physical construction derived from said measurements, as well as a managing assembly for storing data of a plurality of sorting operation in order to provide statistic data which can be separated according to a plurality of geographic zones.

BRIEF DESCRIPTION OF THE DRAWINGS

Further characteristics and advantages of the present invention will become more apparent hereinafter from the following detailed disclosure of a preferred, though not exclusive, embodiment of an apparatus designed for the clothing industry, which is illustrated, by way of an indicative but not limitative example, in the accompanying drawings, where:

Figure 1 is a perspective view schematically illustrating the apparatus according to the invention;

Figure 2 is a schematic top plan view of the apparatus according to the invention;

Figure 3 is a perspective view illustrating a modified embodiment of the apparatus shown in Figure 1;

and

Figure 4 is a block diagram of the apparatus shown in Figure 3.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

With reference to the number references of the figures of the accompanying drawings, the apparatus for making patterns, particularly for the clothing industry, according to the present invention, comprises a vision assembly, generally indicated at the reference number 1, which defines a space 2 in the inside of which must be located the person to be detected or measured.

Advantageously, in a zone adjoining the space 2, there is provided a dressing room 3.

Inside the space 2 there are provided a first camera 4 and a second camera 5 which are perpendicular to one another and opposite to light sources 6 and 7, which are driven by an electronic optic relay 8, which transmits a signal coming from a central control unit, indicated at the reference number 9.

The video images are recorded by the cameras 4 and 5 through two analogic input gates of an analogic/digital converter, adapted to convert said images to "digital" images, in real time.

The two images are stored in a buffer and is calculated a method for sending to the "transputer"

the most significative points thereof.

These operations are controlled by the central control unit 10.

The first step in order to recognize the pattern is the segmenting of the digitized image.

This operation will be semplified, owing to the type of selected illumination, since the person will appear as a "silhouette", that is with a black and white representation (a binary image).

The contour of the object can be calculated by means of a gradient method or by other suitable algorithms.

Upon detection, the points of the contour are collected in adjoining regions, called contour regions.

Then, the opening and closing operations will be processed on the binary image.

The opening operation consists of calculating the subsequent erosion and expansion processes, and its object is to make the contours thinner and suppress small unevenesses such as, for example, isolated black points which are isolated through a continuous white region, the small peaks and bridges.

The opening and closing operations are double operations, that is complementary operations, such as the erosion and expansion or dilatation.

In order to clean the contour regions, the last operation is a schematizing operation, which corresponds to a plurality of erosions of the contour, so as to cause the erosion edges or fronts to collect on a single line, called scheme or backbone.

Upon calculating the segmentation of the two images, each is sent to the transputer, for performing herein improved calculations.

These improved calculations are distributed on two transputers, one for each image.

These operations are performed in order to supply the neural network of the central calculator or computer with a series of measurements which will provide a vector of the characteristics or features.

The most common operations are the calculation of the length of a given contour, the length of the horizontal segments represented on the figure with even spacings, the length of the rays drawn from the center or of gravity with even angles and the like.

The number of measurements which is necessary in order to provide the neural network with a precise classification will be determined by the classification results.

In other words, further input parameters will be added, or new figures will be calculated, so as to obtain a precise classification.

Recent methods based on neural network algorithms represent ideal solutions for this type of classification and are perfectly suitable for a parallel type of calculation.

There have been digitized and then processed only two orthogonal projections, that is the front and the contour and, moreover, each classification performed by the system has been associated accurately

Upon having classified the essential or basic parameters, that is size and or volume, height or physical construction, one will have a full outline which derives from the full set of the several performed measurements.

This classification is then related with a data base managing system which, in actual practice, will store the results of each classification and will provide statistic data related to the geographic subdivision of each individual physical construction.

In this manner, one has the possibility of generating a three dimension base holding the three-dimensional representation of each physical construction, with the related bidimensional slides and patterns.

Moreover, it is possible do detect, in a three-dimensional way, the single human types and the classification thereof, depending on the elements of the data base system of the three dimensional type.

Moreover, the subject system has afforded the possibility of classifying several antropometric data of the human body as follows: long-limbed, athletic, regular, strong, corpulent and extra-corpulent, thereby providing a further differentiation, which allows to meet all of the contingent requirements.

With reference to figures 3 and 4, the reference number 20 shows herein the data base server, the reference number 21 shows the data detection central unit, the reference number 22 shows a monitor, the reference numbers 26, 27 and 28 show cameras, the reference number 25 a laser printer, 24 a mouse and 23 the P.C. consolle.

From the above disclosure it should be apparent that the invention fully achieves the intended aim and objects.

In particular, the fact is to be pointed out that an apparatus and method have been provided for making patterns which are so designed as to satisfy all of the requirements of the clothing industries, so as to allow the latter to design their productions based on individual geographic areas.

The invention as disclosed is susceptible to several modifications and variations all of which will come within the scope of the invention.

Moreover, all of the details can be replaced by other technically equivalent elements.

In practicing the invention, the used material, provided that they are compatible to the intended use, as well as the contingent size and shapes can be any according to requirements.

Claims

1. An apparatus for making patterns particularly for the clothing industry, characterized in that said apparatus comprises a bidimensional vision assembly, for displaying, in a digital form, two orthogonal projections of a person, a calculating assembly for calculating a series of measurements, said calculating assembly being controlled by said vision assembly, a sorting assembly, for supplying parameters of size, height and physical construction derived from said measurements, as well as a managing assembly for storing data of a plurality of sorting operations in order to provide statistic data which can be separated according to a plurality of geographic zones.

2. An apparatus according to Claim 1, characterized in that said vision assembly comprises a zone for arranging therein a person to be detected, in said zone there being provided a first camera and a second camera which are arranged perpendicular to one another.

3. An apparatus, according to Claim 2, characterized in that said first and second cameras are arranged opposite to light sources.

4. An apparatus, according to Claim 3, characterized in that said apparatus comprises an electronic optic relay for driving said light sources, said electronic optic relay being controlled by a central control unit.

5. An apparatus, according to Claim 2, characterized in that said cameras are connected to two analogic input gates of an analogic/digital converter for converting analogic images into digital images.

6. An apparatus, according to Claim 5, characterized in that said apparatus further comprises buffer means for storing two digital images.

7. An apparatus, according to Claim 5, characterized in that said apparatus further comprises two transputers, one for each image, for processing said images, said transputers being controlled by a neural network.

8. A method for making patterns for the clothing industry, according to Claim 1, characterized in that said method comprises the step of detecting, by means of a two-image vision system two orthogonal projections of a person, transforming into digital terms a series of measurements derived from said two images, sorting parameters of size, height and physical construction derived from said series of measurements, storing the results of each sorting operation and supplying statistic data related to a geographic subdivision of each individual physical construction.

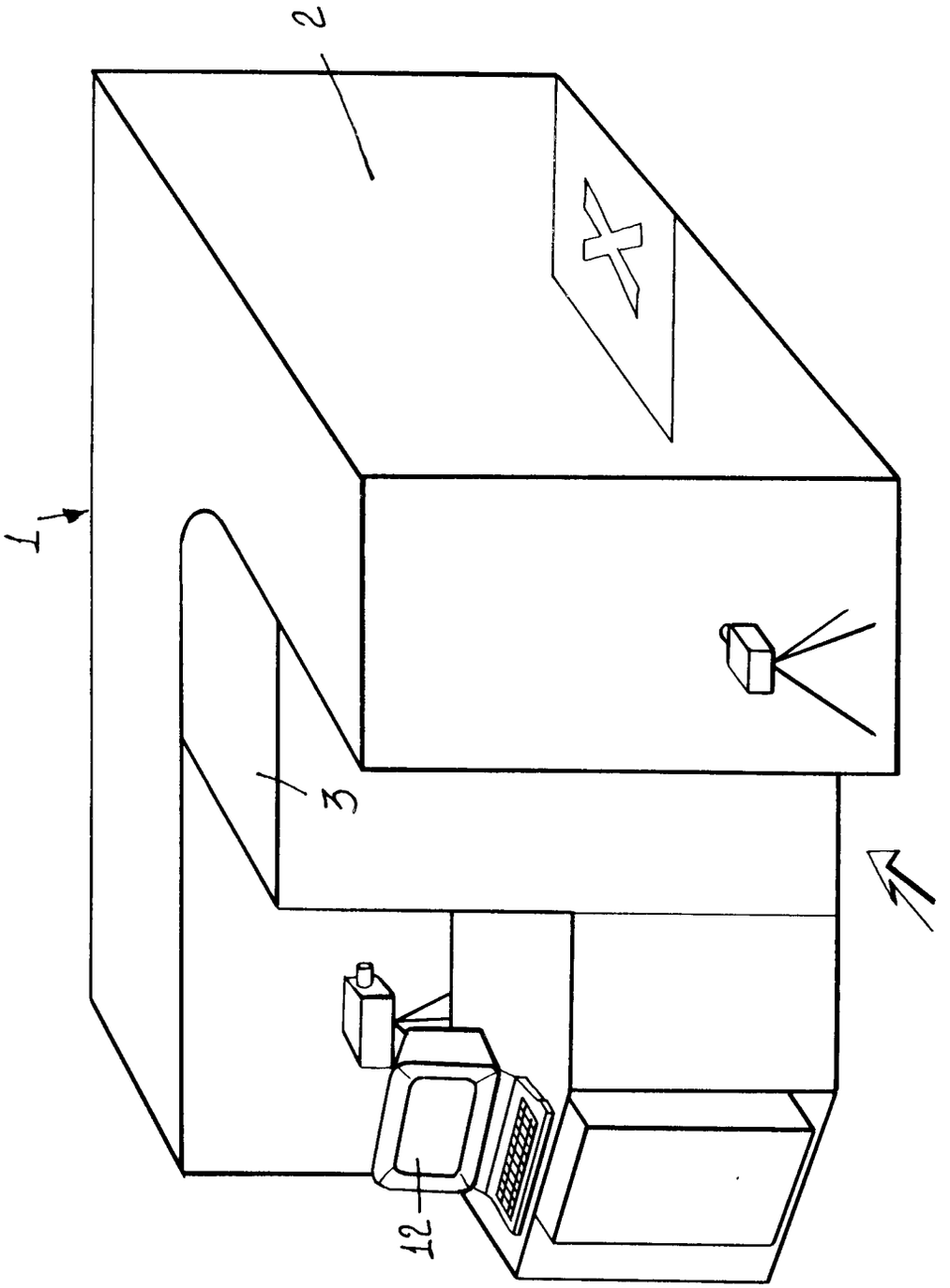

FIG. 1

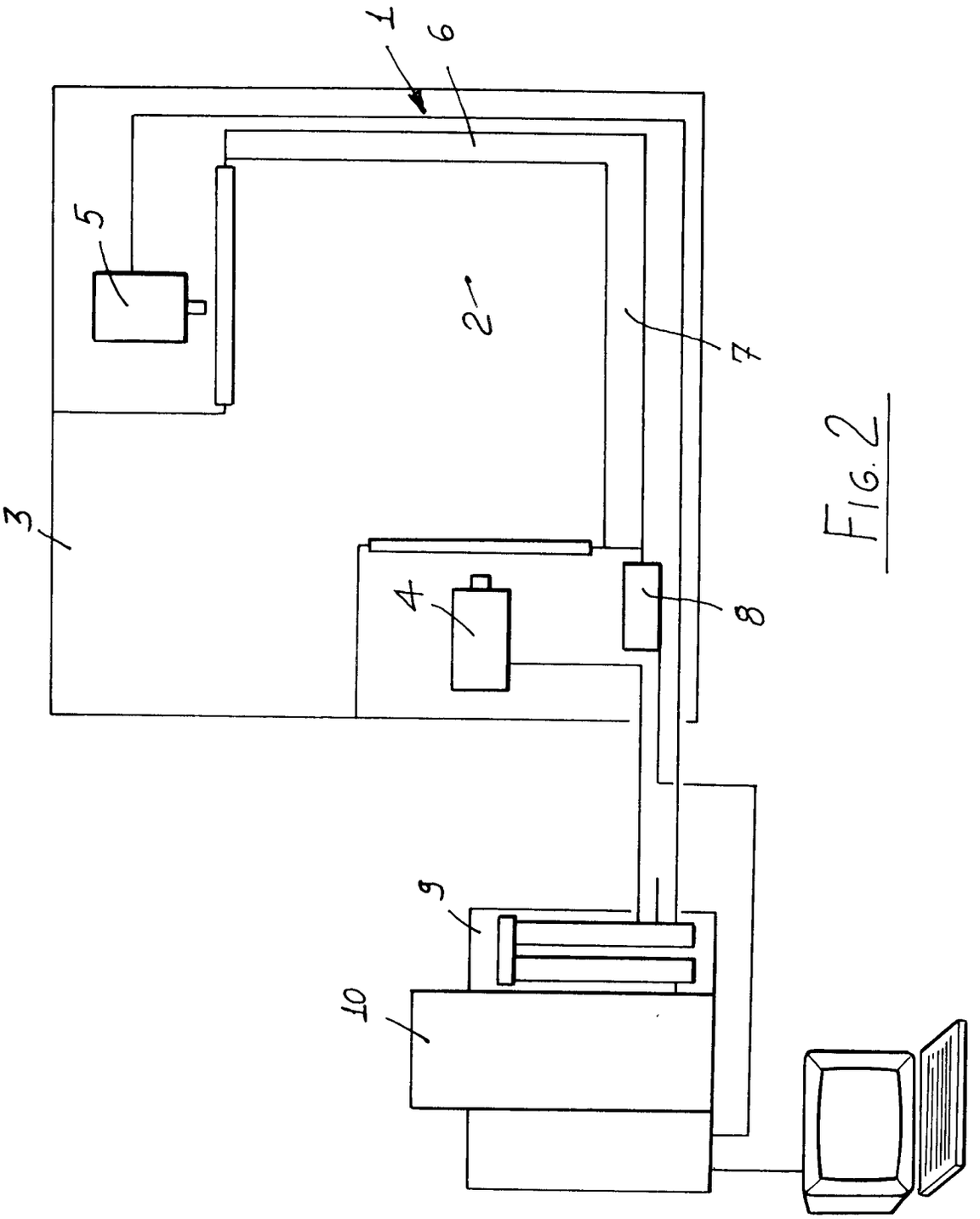

FIG. 2

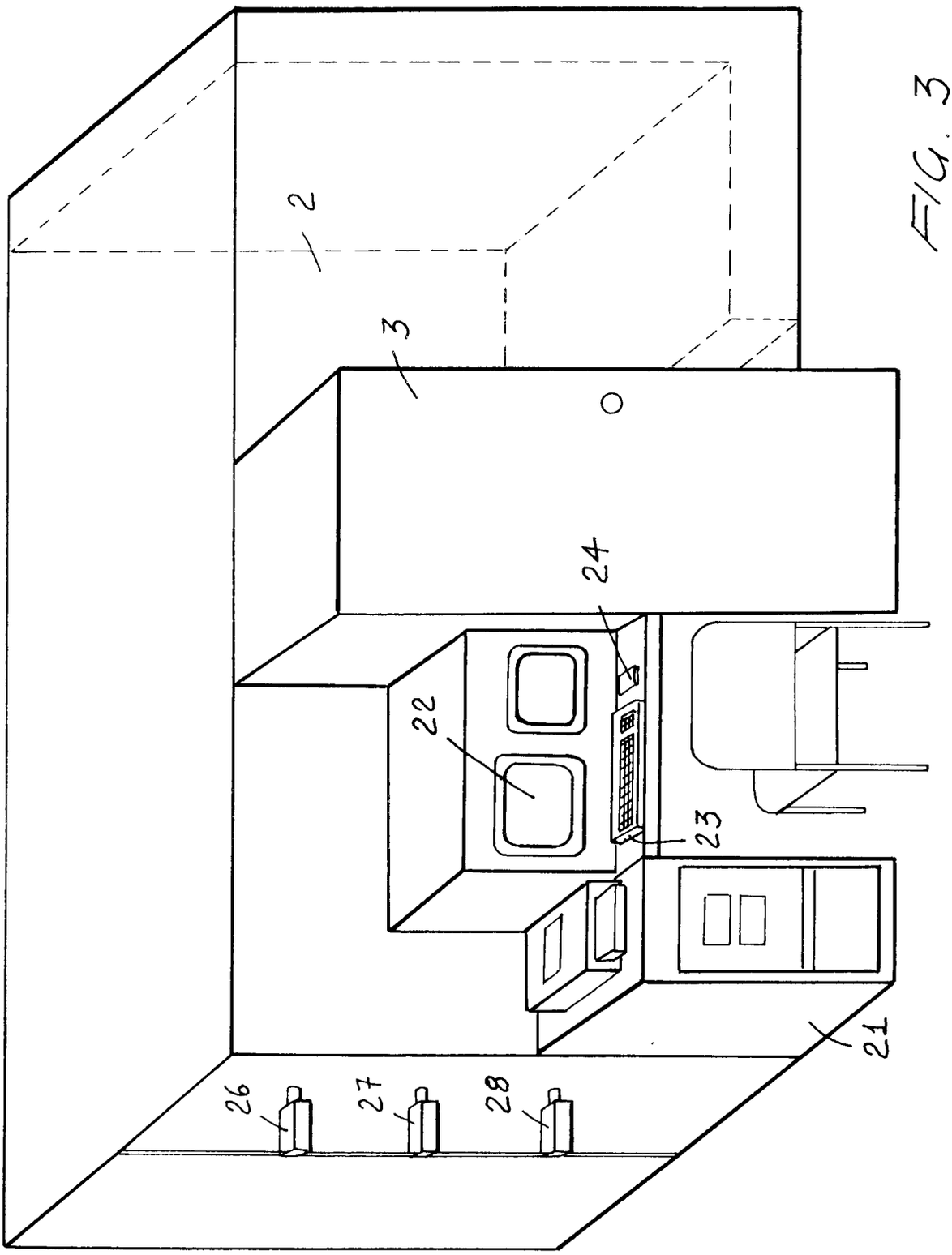

FIG. 3

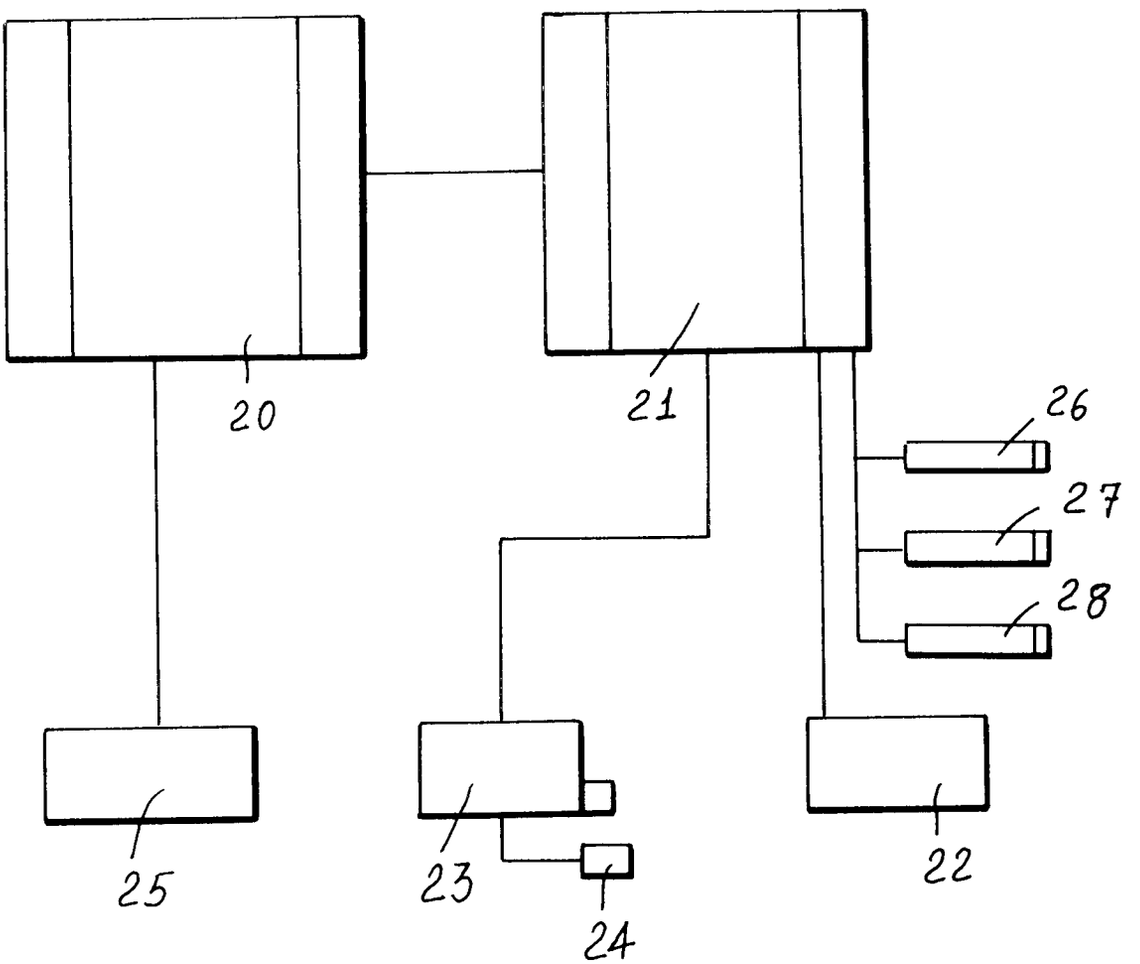

FIG. 4

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 92 83 0690

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	PATENT ABSTRACTS OF JAPAN vol. 10, no. 202 (P-477)(2258) 15 July 1986 & JP-A-61 044 306 (OOTSUKA K.K.) 4 March 1986 * abstract *	1,2,5,6, 8	A41H1/02 G06F15/64 G01B11/24
Y		7	
P,X	FR-A-2 677 151 (TELMAT INFORMATIQUE E.U.R.L.) * page 2, line 24 - page 3, line 5 * * page 3, line 26 - line 34 *	1-8	
Y	EP-A-0 294 954 (SMITHS INDUSTRIES PUBLIC LIMITED COMPANY) * abstract *	7	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

A41H
G06F
G01B
G06K

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	04 MAY 1993	NICHOLLS J.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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