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Erklärungen gemäß Regel 4.17:

— *hinsichtlich der Berechtigung des Anmelders, ein Patent zu beantragen und zu erhalten (Regel 4.17 Ziffer ii)*

Veröffentlicht:

— *mit internationalem Recherchenbericht (Artikel 21 Absatz 3)*

(54) Title: SERVICING SYSTEM FOR A LIFT INSTALLATION

(54) Bezeichnung : WARTUNGSSYSTEM FÜR EINE AUFZUGSANLAGE

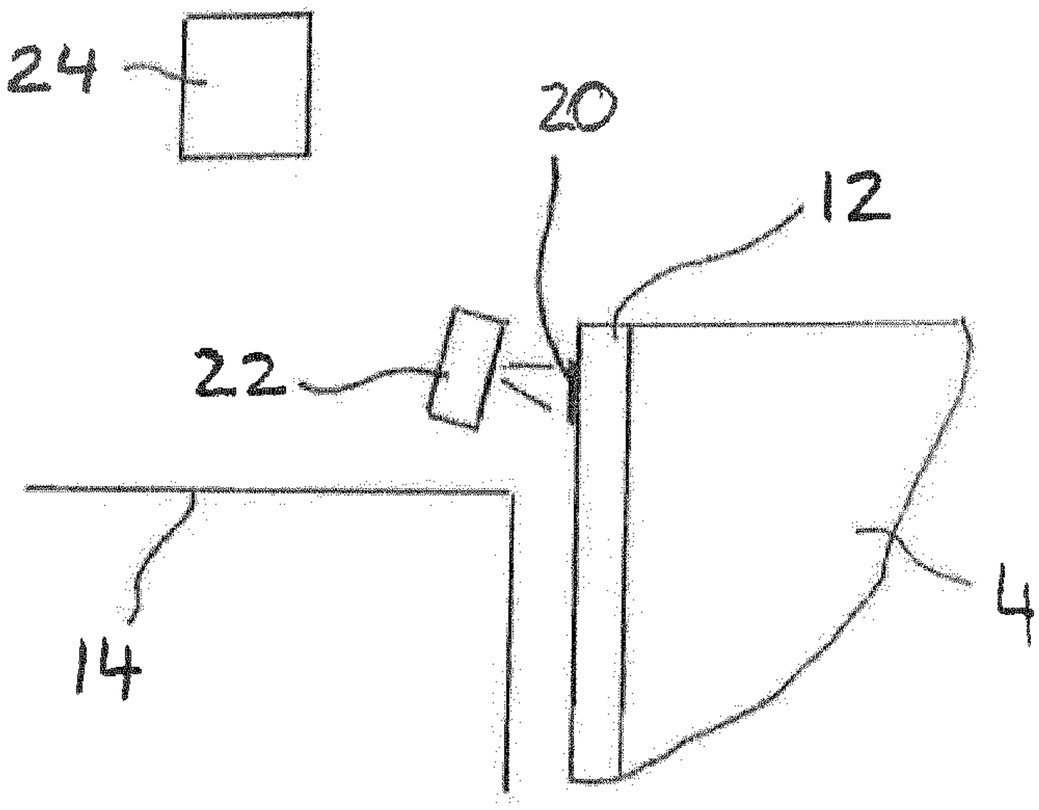

Fig. 3

(57) Abstract: A method for servicing at least one component (2, 4, 6, 8, 10.1, 10.2, 10.3, 12) of a lift installation (1) is presented, wherein the component (2, 4, 6, 8, 10.1, 10.2, 10.3, 12) is provided with a mark (20), and the mark (20) permits identification of this component (2, 4, 6, 8, 10.1, 10.2, 10.3, 12); the method comprising the following method steps: reading in the mark (20) by means of a reading device (22), listing, by means of the reading device (22), at least one working step necessary for servicing the component (2, 4, 6, 8, 10.1, 10.2, 10.3, 12), wherein the working step which is to be listed is determined on the basis of data which can be obtained from the mark (20), executing the servicing of the component (2, 4, 6, 8, 10.1, 10.2, 10.3, 12), and inputting a confirmation into the reading device (22), by means of which confirmation the servicing which has been carried out on the component (2, 4, 6, 8, 10.1, 10.2, 10.3, 12) is confirmed; and a servicing system for such a lift installation (1) and the lift installation (1) are presented.

(57) Zusammenfassung:

[Fortsetzung auf der nächsten Seite]

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Gezeigt ist ein Verfahren zur Wartung mindestens einer Komponente (2, 4, 6, 8, 10.1, 10.2, 10.3, 12) einer Aufzugsanlage (1), wobei die Komponente (2, 4, 6, 8, 10.1, 10.2, 10.3, 12) mit einer Markierung (20) versehen ist und die Markierung (20) eine Identifizierung dieser Komponente (2, 4, 6, 8, 10.1, 10.2, 10.3, 12) ermöglicht, das Verfahren umfassend die folgenden Verfahrensschritte: Einlesen der Markierung (20) mittels eines Lesegerätes (22), Auflisten mindestens eines für die Wartung der Komponente (2, 4, 6, 8, 10.1, 10.2, 10.3, 12) notwendigen Arbeitsschrittes durch das Lesegerät (22), wobei der aufzulistende Arbeitsschritt anhand von Daten ermittelt wird, welche Daten der Markierung (20) entnehmbar sind, Ausführen der Wartung der Komponente (2, 4, 6, 8, 10.1, 10.2, 10.3, 12), und Eingabe einer Bestätigung in das Lesegerät (22), mittels derer die an der Komponente (2, 4, 6, 8, 10.1, 10.2, 10.3, 12) erfolgte Wartung bestätigt wird, ein Wartungssystem für eine solche Aufzugsanlage (1) und die Aufzugsanlage (1).

SERVICING SYSTEM FOR A LIFT INSTALLATION

The invention pertains to a servicing system for a lift installation, a method for servicing a component of the lift installation, as well as such a lift installation.

Lift installations comprise several components that wear out over the course of time. In order to maintain the lift installation fully functional over a long period, these components must be respectively serviced and maintained by a service technician. In many instances, the service technician can already determine whether or not the component may require servicing by visually inspecting the component.

Each individual lift installation is serviced by a service technician within regular intervals. Such a service comprises at least one working step be carried out on the component of the lift installation such as, for example, a condition check, function check, lubricating step or cleaning step or a repair and/or replacement of this component. The working step to be carried out at an applicable time depends, among other things, on whether a labor-intensive service or a less labor-intensive service is scheduled. In addition, a recent error message of the lift installation may also lead to different servicing of the component.

Accordingly, the components of the lift installation to be serviced and the activities to be carried out on the individual component itself are already specified prior to a scheduled service in a service list assigned to the lift installation. This service list is processed sequentially during the service being carried out. The service technician subsequently confirms that the service has been carried out, wherein this confirmation is typically sent to a service center.

In such a method, however, it is problematic that the service technician can confirm to have carried out the service without actually having visually inspected the at least one component of the lift installation to be serviced. Consequently, this service technician may under certain circumstances not realize that it is actually necessary to carry out the aforementioned working step.

The invention is therefore based on the objective of improving the quality of servicing a

lift installation.

This objective is attained by means of a method for servicing at least one component of a lift installation, wherein the component is provided with a mark and the mark allows an identification of this component, with said method comprising the following steps:

- reading in the mark by means of a reading device,

- listing at least one working step required for servicing the component by means of the reading device, wherein the working step to be listed is determined based on data obtainable from the mark,

- servicing the component, and

- inputting a confirmation into the reading device in order to thereby confirm that the component has been serviced.

The above-defined objective is also attained by means of a servicing system for a lift installation comprising a component for the lift installation, a mark that is arranged on the component and allows an identification of the component, and a reading device for reading in the mark, wherein said reading device is designed in such a way that at least one working step required for servicing the component can be listed by means of the reading device based on data obtainable from the mark and that a confirmation can be input into the reading device in order to thereby confirm that the service has been carried out.

The above-defined objective is likewise attained by means of a lift installation with a component and a mark that is arranged on the component and allows an identification of this component, wherein said mark can be read in by means of a reading device and is designed such that at least one working step required for servicing the component can be listed by means of the reading device based on data obtainable from the mark.

During the service of a lift installation, at least one component of this lift installation may have to be serviced such that servicing several components of the lift installation may be

synonymous with servicing the lift installation.

The invention is based on the realization that only one step of the entire servicing process other than the at least one working step for servicing the component itself has to take place in the immediate vicinity of the component to be serviced or being serviced in order to draw the attention of the service technician to the required working steps. It was therefore attempted to realize the servicing process in such a way that the service technician has to be present in the immediate vicinity of the component in order to actually confirm that the service has been carried out.

This is achieved in that the component is provided with a mark. The mark may be arranged or fastened directly on the component or in the preferably immediate vicinity of the component. When this mark is read in by means of the reading device, the at least one working step is listed and it actually becomes possible to confirm the service itself on the reading device. In other words, the service of the component cannot be considered as having been carried out without previously reading in the mark because it is otherwise impossible to actually confirm that the service has been carried out. This makes it possible, if applicable, to determine the time period required by the service technician for servicing the component. Such a time period is determined by evaluating an assumed starting time of the service on the one hand and an assumed completion time of the service on the other hand. Such a starting time may be set when the mark is read in by means of the reading device. Such a completion time may be set when the confirmation is input into the reading device in order to confirm that the service of the component has been carried out.

According to an enhancement of the method, the mark is replaced with a secondary mark when the component is serviced. After the method has been carried out, this secondary mark makes it possible to directly determine when this component was serviced or, if applicable, replaced. Such a replacement of the mark may likewise be carried out each time the component is serviced, for example, in order to encode information on the respective last service within the mark.

According to an enhancement of the method, the input of the confirmation into the reading device respectively comprises reading in the mark or the secondary mark. This

means that the service technician reads in the mark prior to servicing the component, as well as after servicing of the component has been completed. If the mark was replaced with a secondary mark, the secondary mark may be read in instead of the mark after the component has been serviced. This ensures that the service technician is also present at the respective component after servicing of this component has been completed.

According to an enhancement of the method, the confirmation is sent to a central office for managing service data of the lift installation. Such a central management of the service data makes it possible to retrace the condition of the lift installation at any given time.

The mark or the secondary mark may not only allow the identification of the component, but also the identification of the lift installation. In this way, the mark may furthermore contain data, for example, on the installation date of the lift installation. It can therefore be ensured that the confirmation of the completed service can be biuniquely allocated to a certain lift installation. With respect to the confirmation of the completed service, mix-ups, e.g., with lift installations of the same design are therefore precluded. A thusly allocatable mark likewise makes it possible to determine which lift installation is serviced at a given time. This can be realized, for example, by sending information on the beginning of the service to a/the central office for managing the service data when the mark is read in by means of the reading device.

The working steps required for servicing the components may be stored in the reading device. Alternatively, the required working steps for the service may be transmitted to the reading device from a central office based on the identification of the component by means of the reading device. This means that the transmission of the required working step to the reading device is initiated by reading in the mark.

Before the mark is read in by means of the reading device, the required working steps for servicing the component may be respectively stored within the reading device or the central office. If the service data is stored beforehand within the central office, any service technician can service the lift installation to be serviced because the service technician can retrieve the corresponding service data at any time by means of the available reading device. It is accordingly furthermore possible to retrace the beginning of

the service of the component in the central office. For example, faults reports received prior to the service can affect the required servicing process.

According to an enhancement of the method, a storage of ambient conditions of the component to be serviced, i.e. a storage of ambient conditions of this component prior to its servicing, is initiated by reading in the mark. In this way, detectable characteristics of the component can be recorded, i.e. stored. If applicable, malfunctions of this component prior to its subsequent servicing and/or after its servicing can be retraced based on this stored information. Consequently, such stored information makes it possible to retroactively determine that a repair/replacement of this component was necessary.

According to an enhancement of the method, a storage of ambient conditions of the serviced component, i.e. a storage of ambient conditions of this component after its servicing, is initiated by respectively reading in the mark or the secondary mark. In this way, detectable characteristics of the component can be recorded, i.e. stored. Due to the fact that a test, which is usually carried out when the component is serviced and declared as a separate working step, may potentially include a restoration of the full functionality of the component, it can be retroactively retraced if the test was dutifully carried out.

If such a storage was initiated, i.e. carried out, prior to the scheduled service, as well as after the completed service, it can be determined which of the working steps that form the servicing process were actually carried out by the service technician with respect to potentially existing malfunctions prior to the scheduled service.

The storage of ambient conditions may be realized, for example, in the form of a photograph, in the form of a vibration measurement to be carried out a few seconds after reading in the mark/secondary mark by placing the reading device on the component or in the form of a noise recording. Such a storage of ambient conditions may be carried out, for example, while the component operates in a service mode. For this purpose, it may be necessary to hold the reading device on the component for a few seconds after reading in the mark/secondary mark. It may additionally or alternatively be necessary, for example, to place the reading device on the component for a few seconds after reading in the mark/secondary mark in order to measure the aforementioned vibrations.

According to an enhancement of the method, the ability to trigger an ordering process for the replacement of a part of the component to be serviced with a separate input into the reading device is initiated by reading in the mark by means of the reading device. Consequently, a part of the component, which is considered to be defective, can be ordered during the service.

According to an enhancement of the method, the lift installation features a first and a second component to be serviced and the input of the confirmation of a completed service of the first component into the reading device dictates that the second component needs to be serviced after this completed service of the first component. After an interruption in the service of the lift installation, a registration of the last component of this lift installation serviced makes it possible to inform the service technician which component of the lift installation needs to be serviced next in accordance with a predefined sequence. Time savings can thereby be achieved.

According to an enhancement of the method, parameters of the component acquired during its servicing are stored in the reading device. These parameters can be stored and accordingly retrieved during future servicing of the component such that this stored parameter can during the future servicing be compared with current parameters acquired during the future servicing. This makes it possible to draw conclusions on the wear of the component.

The mark may be realized, for example, in the form of a dot or QR or bar code or in the form of an AFID transponder or color pattern. Depending on the component to be serviced, the mark therefore can be chosen in such a way that ambient conditions, e.g. an increased risk of dirt accumulation in the surroundings of the mark, have no appreciable effect.

The invention is described in greater detail below with reference to the figures. In these figures:

Figure 1 shows a lift installation with a plurality of components;

Figure 2 shows a mark arranged on a component; and

Figure 3 shows a reading device arranged on a component while it is serviced.

Figure 1 shows a lift installation 1, wherein said lift installation 1 is essentially arranged in a lift shaft 3. The lift installation 1 comprises several exemplary components 2, 4, 6, 8, 10.1, 10.2, 10.3, 12. These components of the lift installation 1 consists of a drive unit 2, a lift car 4 that can be displaced in the lift shaft 3 and several shaft doors 10.1, 10.2, 10.3 arranged on storeys 14.1, 14.2, 14.3. The lift car 4 comprises at least one car door 12. The lift shaft 3 features a shaft pit 3.1 underneath the lowermost of the shaft doors 10.1, 10.2, 10.3. The lift shaft 3 furthermore features a shaft head 3.2 above the uppermost of the shaft doors 10.1, 10.2, 10.3.

Suspension means 8 and a counterweight 6 may form other components of the lift installation 1. The suspension means 8 may be guided in the head of the lift shaft 3 by means of the drive unit 2, wherein a first end of the suspension means 8 is coupled to the lift car 4 and a second end of the suspension means 8 is coupled to the counterweight such that the counterweight 6 and the lift car 4 can be displaced in opposite directions in the lift shaft 3.

Figure 2 shows a mark 20 that is arranged on an exemplary component 2, 4, 6, 8, 10.1, 10.2, 10.3, 12 illustrated in Figure 1. For example, the mark 20 is bonded to this component or otherwise fixed thereon. The mark 20 may be realized in the form of a source code, color code, AFID transponder or alphanumeric characters or in the form of a bar or dot code. The mark 20 represents an information storage. Consequently, the mark 20 may contain encoded data concerning, for example, the installation site of the lift installation 1, a lift number identifying the lift installation 1 and/or the installation date of the lift installation 1. Data concerning peculiarities of the component to be serviced may likewise be stored. The mark 20 may furthermore contain information that characterizes the installation date of the component 2, 4, 6, 8, 10.1, 10.2, 10.3, 12, wherein said component 2, 4, 6, 8, 10.1, 10.2, 10.3, 12 may, if applicable, have been replaced with an identically constructed component 2, 4, 6, 8, 10.1, 10.2, 10.3, 12 during a previous service. Such a new component 2, 4, 6, 8, 10.1, 10.2, 10.3, 12 may be provided with a secondary mark that replaces the original mark 20. Each mark 20 illustrated in Figure 2 may likewise be replaced with a secondary mark when the component 2, 4, 6, 8, 10.1, 10.2, 10.3, 12 is serviced. Such secondary marks have the same properties as the original

mark 20, wherein individual data of the secondary mark may be updated.

A component 2, 4, 6, 8, 10.1, 10.2, 10.3, 12 is likewise considered as being provided with a mark 20 if the mark 20 is arranged in the immediate vicinity of the component 2, 4, 6, 8, 10.1, 10.2, 10.3, 12 or in the immediate vicinity of a predefined position of this component 2, 4, 6, 8, 10.1, 10.2, 10.3, 12. For example, the counterweight 6 assumes such a predefined position when the counterweight 6 is arranged in the shaft pit and the lift car 4 is arranged in the shaft head. Consequently, the mark 20 assigned to the counterweight 6 is arranged, for example, in the immediate vicinity of such a predefined position if this mark 20 is arranged in the shaft pit. The mark 20 is preferably arranged in such a way that the service technician has to move into a position within the lift installation, from which the majority of the working steps for servicing the component 2, 4, 6, 8, 10.1, 10.2, 10.3, 12 can be carried out, in order to read in the mark 20 by means of a reading device.

Figure 3 shows a reading device 22 that is arranged on the car door 12 in order to read in a mark 20 assigned to the car door 12 of the lift car 4. Such a mark 20 assigned to the car door 12 is preferably arranged on a door leaf or a transom of the car door 12. Consequently, a service technician can read in the mark 20 with the aid of the reading device 22 from a storey 14 if the lift car 4 is arranged in a corresponding position in the lift shaft for servicing the car door 12. The service of the car door 12 may include replacing, testing or repairing different components of the car door 12 such as, for example, the door lock, the door drive, the door guide, guide shoes for guiding the door leaves of the car door in the car door sill and/or door contacts.

The reading device 22 is connected or can be connected to a central office 24 for respectively managing service data of the lift installation and service data of the exemplary component in the form of the car door 12 by means of a wireless communication network. The mark 20 is read in by means of the reading device 22 when the component 12 is serviced. In this way, a storage of ambient conditions of the car door 12 can be initiated by reading in the mark by means of the reading device 22. The ambient conditions may be stored in the form of a photograph that, if applicable, shows operational damages of the car door 12 such as, for example, door leaves deformed by lift passengers or cables of a car door control that are singed due to short circuits. Once the reading device 22 is connected to the central office 24, the at least one working step

required for servicing the component 12 is selected based on the data contained in the mark 20 and transmitted from the central office 24 to the reading device 22. Data encoded in the mark 20 therefore causes at least one working step to be selected from a plurality of potential working steps for servicing this component 12. In this context, the expression based on data contained in the mark 20 refers, for example, to accessing data that is assigned to this component 12 and stored in a database. Such a database may be stored in the central office 24 or in the reading device 22 itself.

This working step is displayed on the reading device 22 in order to provide the service technician with the required service information. For example, the data concerning the installation date of the lift installation comprising the component 12 to be serviced, which is encoded in the mark 20, may result in a listing of the working steps to be carried out during the service in dependence on this date.

Subsequently, the listed working steps for servicing the component 12 are carried out. After the service of the component 12 is completed, it is confirmed that these working steps have been carried out by means of a corresponding input into the reading device 22. This confirmation may initiate a storage of ambient conditions similar to the optional storage of ambient conditions prior to the service of the component 12.

Depending on its functional requirements, the reading device 22 may consist of a mobile telephone, a handheld device or a preferably portable computer. The exemplary service of the car door 12 described with reference to Figure 3 can likewise be applied to other components of the lift installation.

PATENT CLAIMS

1. A method for servicing at least one component (2, 4, 6, 8, 10.1, 10.2, 10.3, 12) of a lift installation (1), wherein the component (2, 4, 6, 8, 10.1, 10.2, 10.3, 12) is provided with a mark (20) and the mark (20) allows an identification of this component (2, 4, 6, 8, 10.1, 10.2, 10.3, 12), with said method comprising the following steps:

reading in the mark (20) by means of a reading device (22),

listing at least one working step required for servicing the component (2, 4, 6, 8, 10.1, 10.2, 10.3, 12) by means of the reading device (22), wherein the working step to be listed is determined based on data obtainable from the mark (20),

servicing the component (2, 4, 6, 8, 10.1, 10.2, 10.3, 12), and

inputting a confirmation into the reading device (22) in order to thereby confirm that the component (2, 4, 6, 8, 10.1, 10.2, 10.3, 12) has been serviced.

2. The method according to claim 1, wherein the mark (20) is replaced with a secondary mark when the component (2, 4, 6, 8, 10.1, 10.2, 10.3, 12) is serviced.

3. The method according to one of the preceding claims, wherein the input of the confirmation into the reading device (22) respectively comprises reading in the mark (20) or the secondary mark.

4. The method according to one of the preceding claims, wherein the confirmation is sent to a central office (24) for managing service data of the lift installation (1).

5. The method according to one of the preceding claims, wherein the mark (20) or the secondary mark allows an identification of the lift installation (1).

6. The method according to one of the preceding claims, wherein the at least one working step required for servicing the component (2, 4, 6, 8, 10.1, 10.2, 10.3, 12) is stored in the reading device (22).

7. The method according to one of claims 1 to 5, wherein the at least one working step required for the service is transmitted from a central office (24) to the reading device (22) based on an identification of the component (2, 4, 6, 8, 10.1, 10.2, 10.3, 12) by means of the reading device (22).

8. The method according to one of claims 6 or 7, wherein the at least one working step required for servicing the component (2, 4, 6, 8, 10.1, 10.2, 10.3, 12) is stored within the reading device (22) or the central office (24) before the mark (20) is read in by means of the reading device (22).

9. The method according to one of the preceding claims, wherein a storage of ambient conditions of the component (2, 4, 6, 8, 10.1, 10.2, 10.3, 12) to be serviced is initiated by reading in the mark (20).

10. The method according to one of the preceding claims, wherein a storage of ambient conditions of the serviced component (2, 4, 6, 8, 10.1, 10.2, 10.3, 12) is respectively initiated by reading in the mark (20) or the secondary mark.

11. The method according to one of the preceding claims, wherein the time of respectively reading in the mark (20) or the secondary mark is stored.

12. The method according to one of the preceding claims, wherein the ability to trigger an ordering process for the replacement of a part of the component (2, 4, 6, 8, 10.1, 10.2, 10.3, 12) to be serviced with a separate input into the reading device (22) is initiated by reading in the mark (20) by means of the reading device (22).

13. The method according to one of the preceding claims, wherein the lift installation (1) features a first and a second component to be serviced and the input of the confirmation of a completed service of the first component into the reading device (22) dictates that the second component needs to be serviced after this completed service of the first component.

14. The method according to one of the preceding claims, wherein parameters of the component (2, 4, 6, 8, 10.1, 10.2, 10.3, 12) acquired during the servicing of this

component (2, 4, 6, 8, 10.1, 10.2, 10.3, 12) are stored in the reading device (22).

15. A servicing system for a lift installation (1), comprising

- a component (2, 4, 6, 8, 10.1, 10.2, 10.3, 12) for the lift installation (1),
- a mark (20) that is arranged on the component (2, 4, 6, 8, 10.1, 10.2, 10.3, 12), wherein said mark (20) allows an identification of the component (2, 4, 6, 8, 10.1, 10.2, 10.3, 12), and
- a reading device (22) for reading in the mark (20), wherein said reading device (22) is designed in such a way that at least one working step required for servicing the component (2, 4, 6, 8, 10.1, 10.2, 10.3, 12) can be listed by means of the reading device (22) based on data obtainable from the mark (20) and that a confirmation can be input into the reading device (22) in order to thereby confirm that the service has been carried out.

16. The servicing system according to claim 15, wherein the mark (20) is realized in the form of a dot or QR or bar code or in the form of an RFID transponder or color pattern.

17. A lift installation (1) with a component (2, 4, 6, 8, 10.1, 10.2, 10.3, 12) and a mark (20) that is arranged on the component (2, 4, 6, 8, 10.1, 10.2, 10.3, 12) and allows an identification of this component (2, 4, 6, 8, 10.1, 10.2, 10.3, 12), wherein said mark (20) can be read in by means of a reading device (22) and is designed such that at least one working step required for servicing the component (2, 4, 6, 8, 10.1, 10.2, 10.3, 12) can be listed by means of the reading device (22) based on data obtainable from the mark (20).

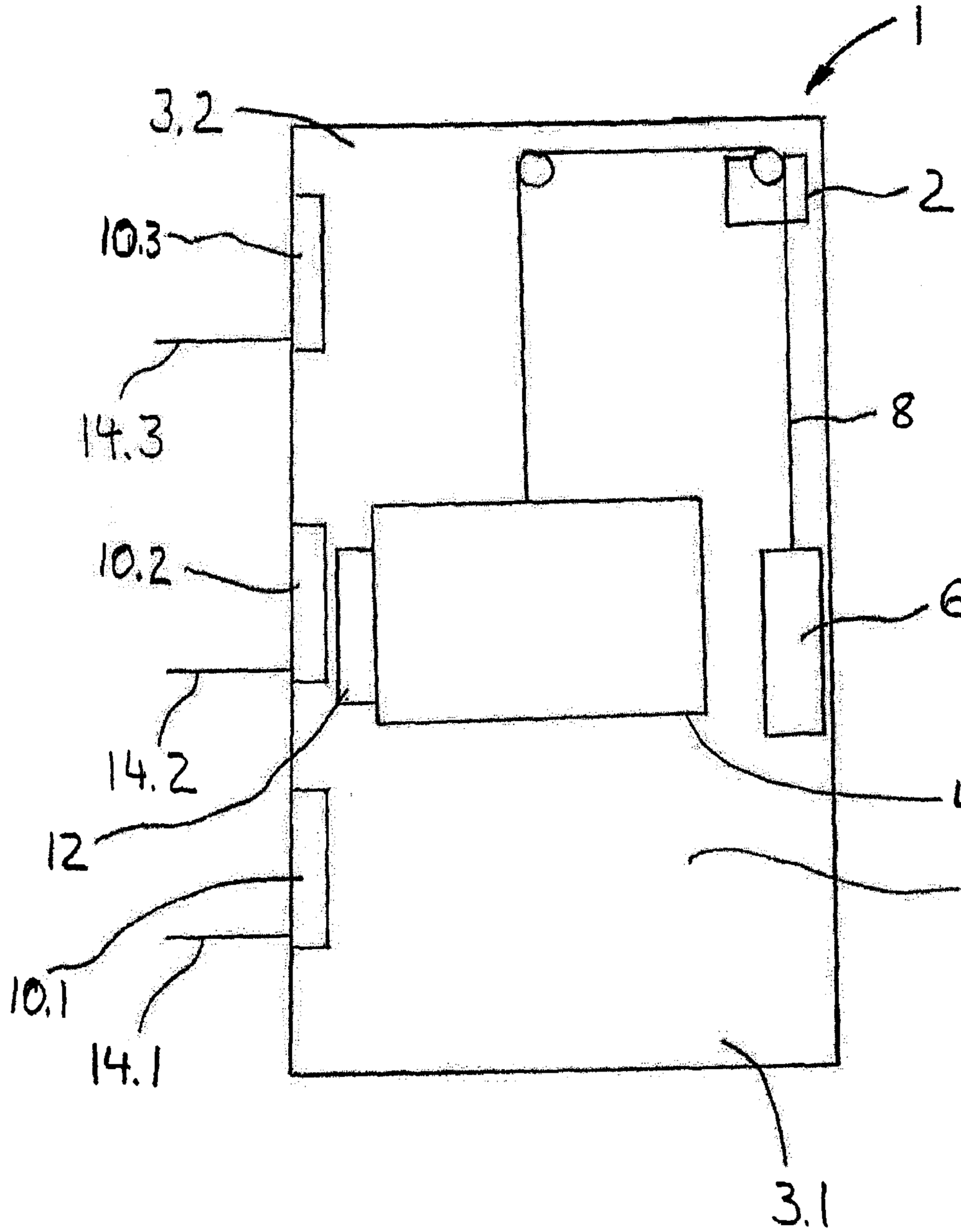

Fig. 1

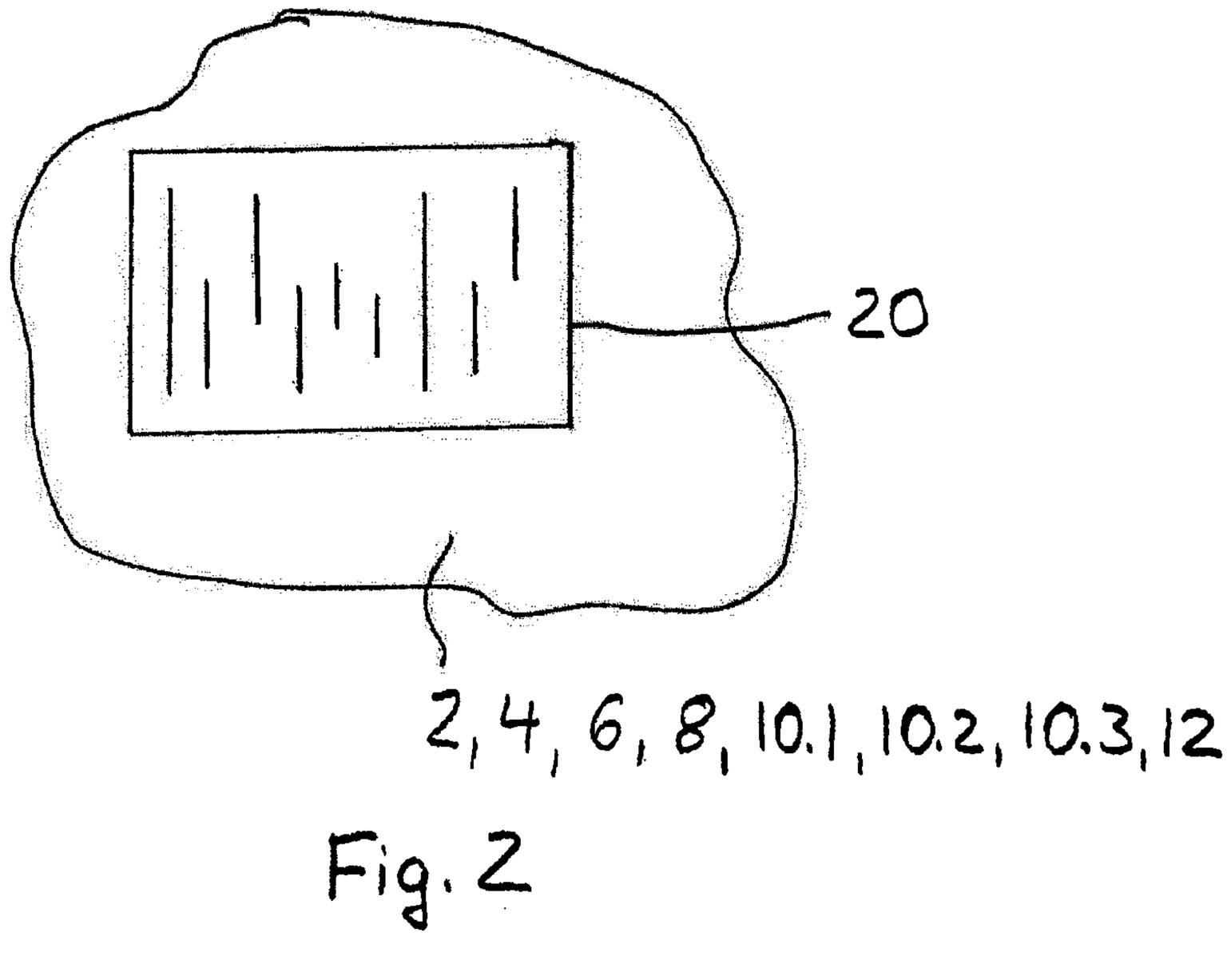

Fig. 2

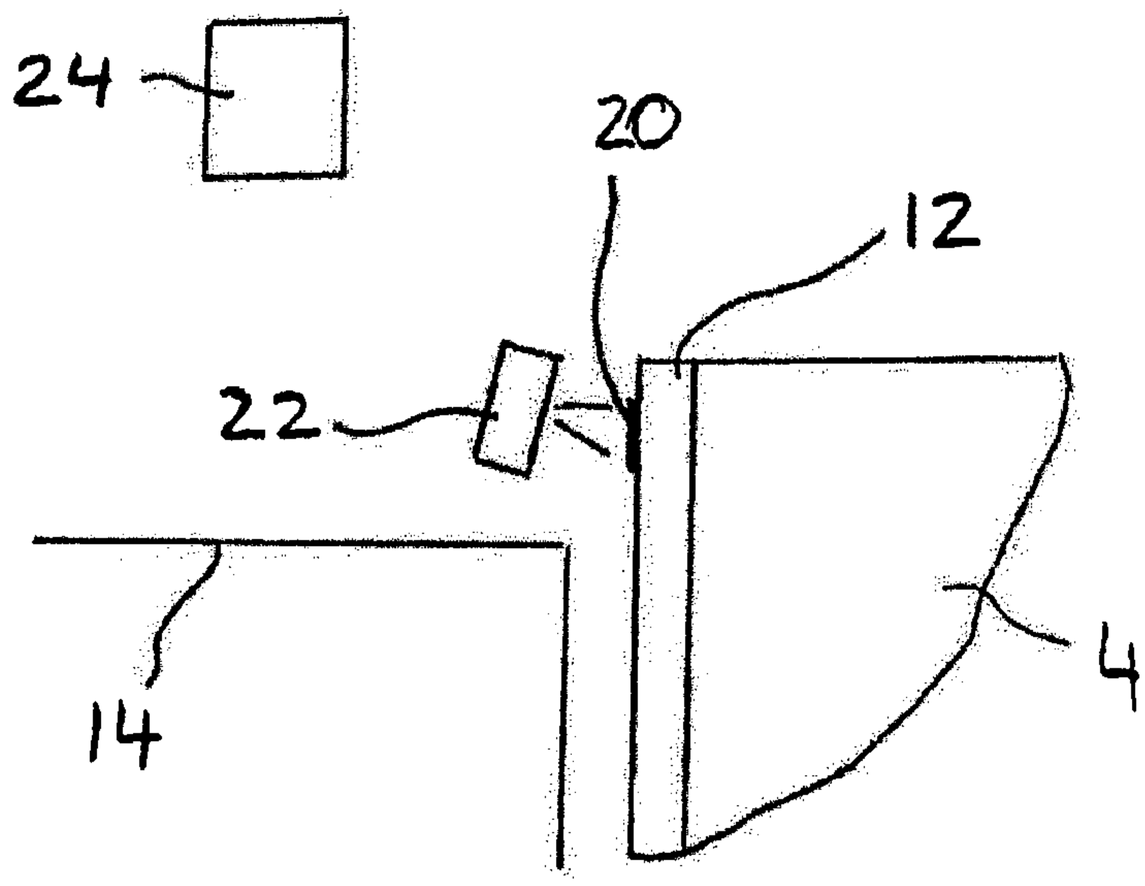

Fig. 3

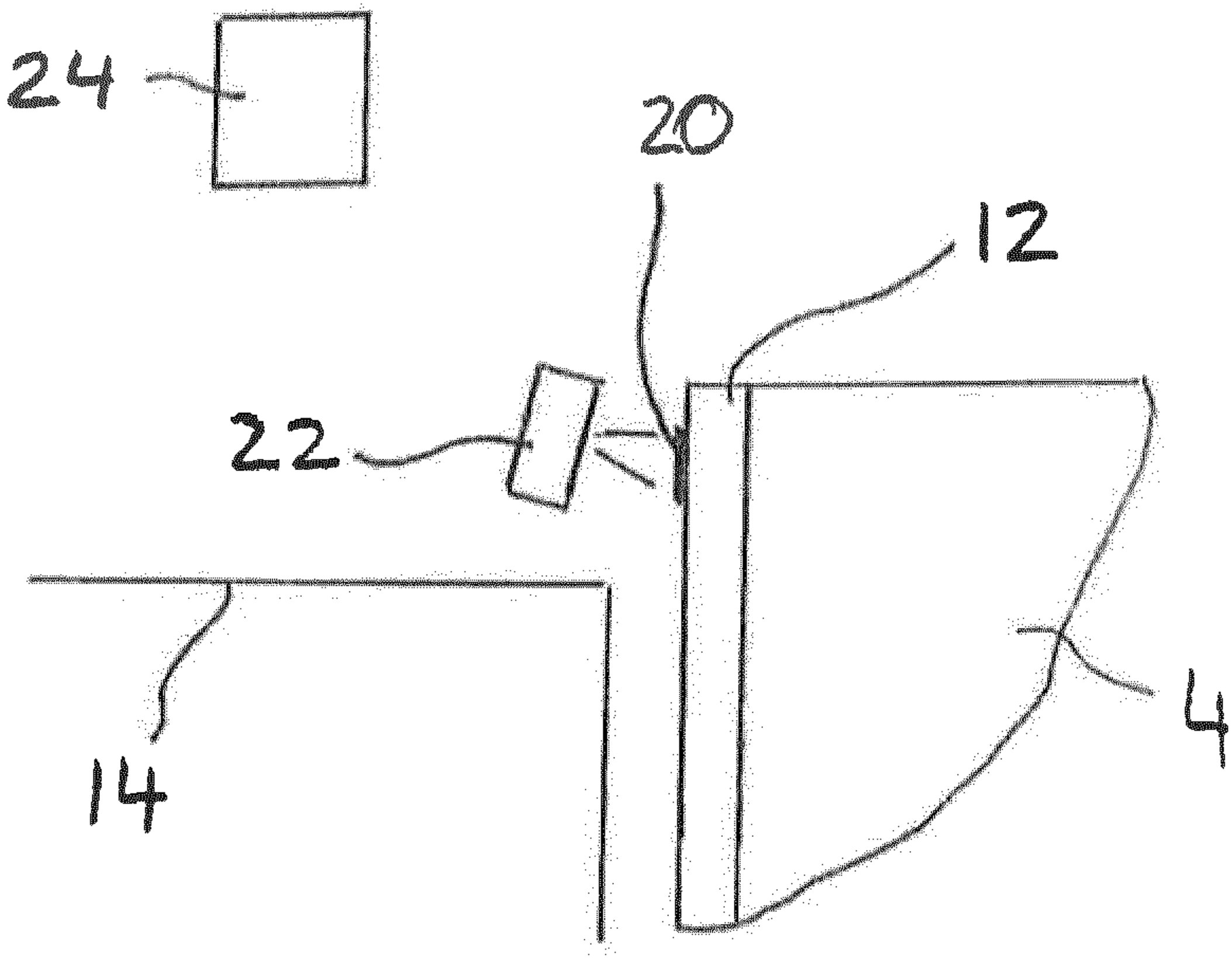

Fig. 3