(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 681 275 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **95200919.9**

(51) Int. Cl.[6]: **G08B 21/00**

(22) Date of filing: **12.04.95**

(30) Priority: **04.05.94 IT RE940034**

(43) Date of publication of application:
08.11.95 Bulletin 95/45

(84) Designated Contracting States:
AT BE CH DE DK ES FR GB GR IE IT LI LU MC NL PT SE

(71) Applicant: **Broglia, Roberto**
16, Via Previati
I-21100 Varese (IT)

(72) Inventor: **Broglia, Roberto**
16, Via Previati
I-21100 Varese (IT)

(74) Representative: **Corradini, Corrado et al**
Studio Ing. C. CORRADINI & C. S.r.l.
4, Via Dante Alighieri
I-42100 Reggio Emilia (IT)

(54) System for emitting an alarm on command, in particular in the case of robbery.

(57) The system comprises at least one belt (9, 10) to be worn by a person and having a buckle (10) carrying a radio transmitter device (51) and arranged to activate the transmitter device as a result of a variation in the circumference of that part of the body encircled by the belt (9, 10); means (60) are also provided to receive and process the signals emitted by the transmitter device (51) and to provide an alarm indication following the receipt of a predetermined signal combination.

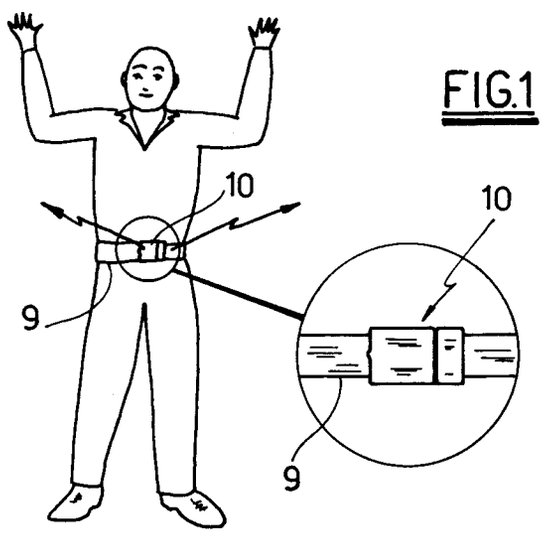
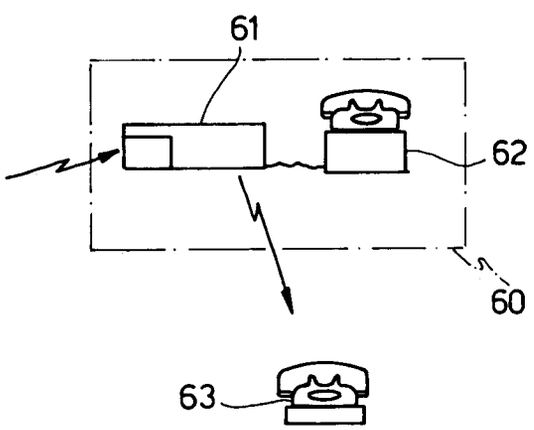


FIG.1



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This invention relates to a system for emitting an alarm on command, in particular in the case of robbery.

The system of the invention is of particular use to banks, large and small shops selling precious objects, and businesses generally susceptible to robbery.

The object of the invention is to provide one or more persons working in the bank or shop with a means which in the case of robbery can be operated in a simple, rapid and reliable manner without the robbers being aware of the fact.

To this end, the invention is based on the idea of providing at least one belt to be worn by a person and comprising a means carrying a radio transmitter device. The transmitter device operates following a variation in the circumference of that part of the body encircled by the belt. Means are also provided to receive and process the signals emitted by the transmitter device and to provide an alarm indication following the receipt of a preferred combination of signals.

Advantageously, said means carrying the transmitter device consists of the belt buckle, which has the external appearance of a usual belt buckle.

Typically, the belt with buckle according to the invention is used about the abdomen as in the case of a usual trouser or skirt belt.

In normal use the buckle emits no signal or at most a possible involuntary signal which is perceived by the signal reception and processing means as a random signal not indicating danger. In the case of robbery the person wearing the buckle emits voluntarily a predetermined combination of radio signals, for example a predetermined number of signals within a predetermined time period, by expanding the circumference of the abdomen using the body muscles. This provides an alarm indication by way of said reception and processing means, for example it may generate luminous or acoustic alarm signals or can send a prerecorded telephone call with a request for help to the police or other alerting organization.

As the transmitter device is activated by a body movement which other persons find difficult to notice and as the buckle has the appearance of a usual belt buckle, a robber will remain unaware of the situation. Moreover the person can send signals without the use of the hands or feet and hence also if he is in a state of immobilization. In practice, a robber is unable to prevent persons wearing such buckles from sending requests for aid, and remains unaware that such requests have beens ent.

The invention is described in detail hereinafter with the aid of the accompanying figures, which illustrate a preferred but not exclusive embodiment thereof.

Figure 1 is a scheme of the system according to the invention.

Figure 2 is a section on the longitudinal plane of symmetry of the buckle according to the invention.

Figure 3 is a section on the plane III-III of Figure 2.

Figure 4 is an exploded perspective view of the buckle of the preceding figures.

The illustrated buckle, indicated overall by 10, comprises a first portion 11 to be coupled, during normal belt use, to a first end 9' of the flexible web 9 (of leather, fabric or other material) of the belt.

Said portion 11 is substantially in the form of a small flat container defining a small chamber 13 to contain a transmitter device 51 and a relative small battery 52. The chamber 13 also contains an intermediate wall 14 against which there is positioned a small switch 53 arranged to activate the transmitter device 51. Externally, the portion 11 comprises a peg 12 which is inserted into holes 8 in the web 9 to couple it to the end 9'.

The buckle 10 also comprises a second portion 21, movable relative to the first portion 11 and connected to the second end 9'' of the flexible web 9. The portion 21 comprises a C-shaped element 22 the central part 22' of which is housed in the chamber 13, facing and spaced from the wall 14. The ends of the two lateral legs 22'' emerge from the portion 11 and are joined to a grooved body 23 fixed to the second end 9'' of the web 9.

Said element 22 is movable longitudinally to a small extent within the chamber 13, relative to the first portion 11 and in particular relative to the wall 14.

Between the two portions 11 and 21 of the buckle there are positioned elastic means 27 arranged to prevent movement, at least in one direction, between the two portions during normal use of the belt, but to allow this movement following a variation in the circumference of that part of the body encircled by the belt, this variation being produced by a voluntary muscular act of the person. When this movement exceeds a certain value, the transmitter 51 is activated.

Specifically, said elastic means 27 consist of precompressed springs between the central part 22' of the element 22 and the intermediate wall 14, to provide a force opposing the approach of the part 22' towards the wall 14.

The springs 27 normally maintain the element 22 spaced from the switch 53 while enabling the part 22' to approach the switch 53 when the person wearing the belt expands that part of the body encircled by the belt (typically the abdomen).

In the embodiment shown in the figures, the first portion 11 comprises a globally flat rear element 16 on which there are fixed the wall 14 and

another wall 17 located to the right of the wall 14. On the flat face of the element 16 there is positioned a rear cover plate 31, on which there is positioned a second plate 32 carrying a transmitter 51 and the switch 53. A battery 52 inserted into a a suitable battery holder 54 with relative contacts is positioned between the two walls 14 and 17. Above the element 16 there is positioned a front C-shaped element 18 which, together with the element 16, defines the left lateral region of the buckle. The two elements 16 and 18 are joined together by the threaded shank of the peg 12 inserted into respective holes 16' and 18'.

The two walls 14 and 17 are enclosed by a box element 33 to which there is joined a ring 36 acting as a passage element for the first end 9' of the web 9. The right wall of the element 33 comprises two holes 33' through which the lateral legs 22'' emerge from the first portion 11. The element 3 is joined to the wall 17 by screws 34.

The ends of the lateral legs 22' are inserted through the left face of the body 23 and fixed to this latter by screws 35.

The end 9'' is inserted into the slot 23' in the body 23 and fixed by suitable screws (not shown).

The front face (ie the exposed face) and the side region of the buckle 11 are then covered with leather, fabric or plastic elements, not shown in the figures, to both improve appearance and give the buckle 10 the appearance of a normal belt buckle.

Typically, although not exclusively, the belt is worn about the abdomen as a trouser, skirt or similar belt.

In normal use the springs 27 maintain the element 22 spaced from the switch 53 with the result that the transmitter transmits no signal and the belt behaves as a usual belt.

In the case of robbery (or other dangerous situation) the person can use the abdomen muscles to expand the belt circumference, to cause the element 22 to activate the switch 53 and hence the transmitter 51.

The radio signals emitted by the belt 10 are received and processed by an electronic means 60 positioned remotely in a preferably hidden fixed location in either the same or a different room from that in which the person is situated, said means 60 providing an alarm indication when it receives a predetermined signal combination from the transmitter 51.

Specifically, the means 60 comprises a receiver-transducer unit 61, which on receiving the predetermined combination of signals (for example a predetermined number of signals within a predetermined relatively short time period) operates an alarm device such as a bell and/or alarm lights and/or a telephone dialler 62 (of known type) which feeds by telephone a prerecorded request for aid to a predetermined destination (police, alerting organization etc.).

In addition at least one further telephone apparatus 63 can be provided to receive and make normal telephone calls and having internally a differential bell which is activated by the means 60 to confirm that said means 60 has been activated (and is hence emitting requests for aid).

The system of the invention can comprise a number of belts carrying buckles according to the invention.

The electronic part of the system is provided with further accessories. For example an alarm-executed circuit (visual memory using LEDs) is provided by which the person who has activated the alarm can be identified. Each buckle will then have in its interior a dip switch with which to set a personal code, this code being also set on the relative receiver in the unit 61, which comprises said alarm LED.

The transmission code increases transmission security, protecting it from interference or from attempts at radio intrusion.

In addition, each buckle 10 can comprise a small LED which lights when the transmitter 51 is activated, to facilitate operational and alarm simulation tests.

Claims

1. A system for emitting an alarm on command, in particular in the case of robbery, characterised by comprising:
   at least one belt (9, 10) to be worn by a person and having a means (10) carrying a radio transmitter device (51) and arranged to activate the transmitter device (51) as a result of a variation in the circumference of that part of the body encircled by the belt (9, 10); and
   means (60) to receive and process the signals emitted by the transmitter device (51) and to provide an alarm indication following the receipt of a predetermined signal combination.

2. A system as claimed in claim 1, characterised in that said means carrying the transmitter device (51) consists of the belt buckle (10), said buckle (10) having the external appearance of a usual belt buckle.

3. A buckle as claimed in claim 2, characterised by comprising:
   a first portion (11) to be coupled, during normal belt use, to a first end (9') of the flexible web (9);
   a second portion (21), movable relative to the first portion (11) and connected to the second end (9'') of the flexible web (9) of the belt;

elastic means (27) acting between the first portion (11) and second portion (21) to prevent movement between the two portions (11, 12) of the buckle (10) during normal use of the belt, but to allow movement between the two portions (11, 21) of the buckle (10) following a variation in the circumference of that part of the body encircled by the belt produced by muscular action by the person, said movement between the two portions (11, 21) of the buckle (10) determining activation of the transmitter device (51) carried by the buckle (10).

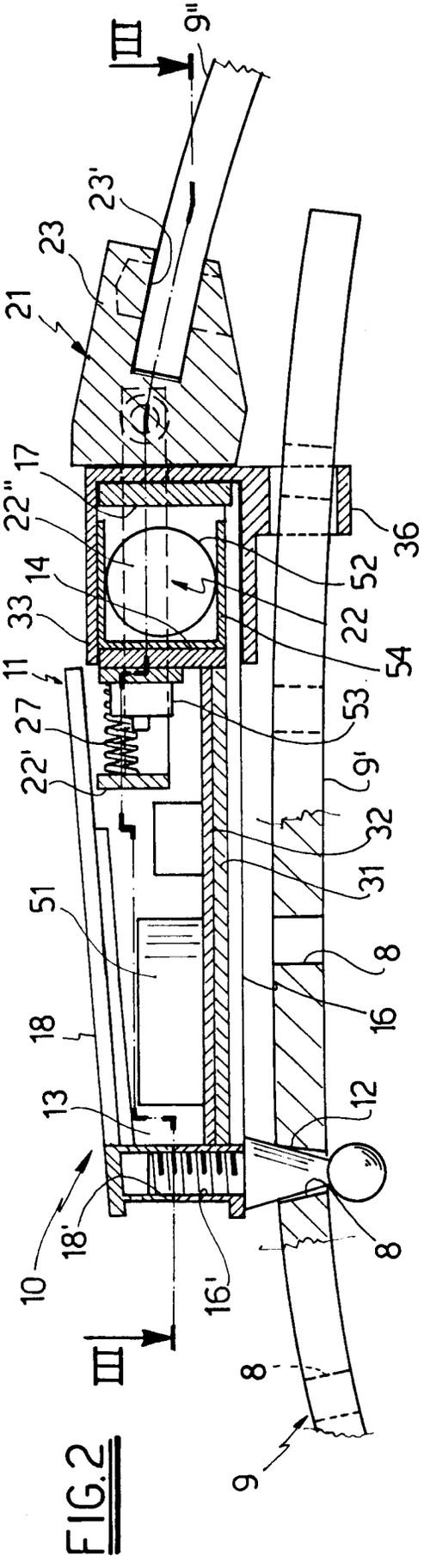
4. A buckle as claimed in claim 3, characterised in that: the first portion (11) is substantially in the form of a small flat container which defines a small chamber (13) to contain the transmitter device (51) and a relative battery (52), comprises an intermediate wall (14) on which there is positioned a switch (53) arranged to activate the transmitter device (51), and has an outer peg (12) for its coupling to the first end (9') of the flexible web (9) of the belt;
the second portion (21) comprises a C-shaped element (22) having a central part (22') housed within the chamber of the first part (11) and facing and spaced from said intermediate wall (14), the ends of its lateral legs (22'') emerging from the first part (11) and joined to the second end (9'') of the flexible web (9) of the belt, said element (22) being movable longitudinally relative to the first portion (11);
there further being provided spring means (27) compressed between the central part (22') of the element (22) and the intermediate wall (14) to provide a force opposing the mutual approach of these latter; said spring means (27) maintaining the central part (22') normally spaced from the switch (53) but enabling the central part (22') to make contact against the switch (53) following expansion of that part of the body encircled by the belt (9, 10).

5. A buckle as claimed in claim 4, characterised in that said first portion (11) comprises:
a globally flat rear element (16) to which there are fixed the intermediate wall (14) and a second wall (17); a battery (52) positioned between the two walls (14) and (17); a C-shaped front element (18) positioned on the rear element (16) to define, together with this latter (16), the lateral region and the front region of the buckle, said elements (16) and (18) being joined together by the threaded shank of the peg (12); and a box element (33) enclosing the two walls (14) and (17) and having a ring (36) acting as a passageway for the first end (9') of the web (9) and comprising two holes (33)' for passage of the lateral legs (22''); and further characterised in that the ends of the lateral legs (22'') of the element (22) are joined to a body (23) to which the second end (9'') of the web (9) is fixed.

6. A system as claimed in claim 1, characterised in that said means (60) for receiving and processing the signals comprise at least one receiver-transducer unit (61) arranged to receive the signals transmitted by the transmitter device (51) and to provide, following a determined combination of said signals, a command to a means (62) for emitting an alarm indication, said means (60) being positioned at a distance from the buckle (10).

7. A system as claimed in claim 6, characterised by comprising at least one telephone apparatus (63) for receiving and making normal telephone calls, and having in its interior a differential bell to be activated by said means (60) as confirmation of the activation of the means (60).

8. A system as claimed in claim 6, characterised by comprising an alarm-executed circuit to identify the person who has activated the alarm, said circuit comprising a dip switch within the buckle (10) to set a specific code, with which there corresponds the same code in the relative receiver.


III
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21
17
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22
33
54
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9'
22'
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31
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8
16
18
12
13
18'
10
16'
8
III
8
9

FIG.2

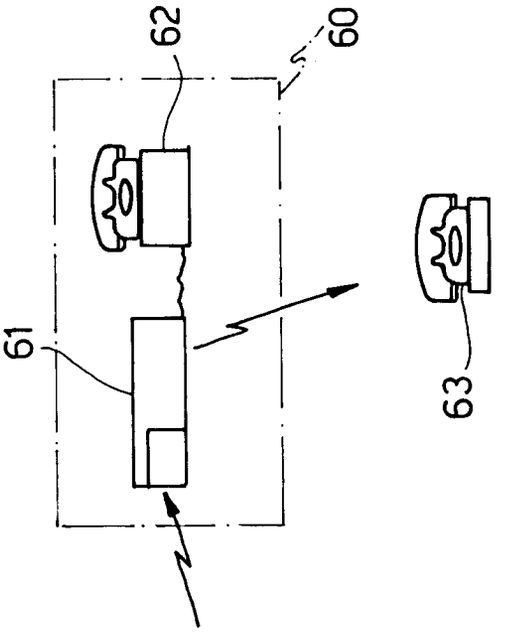
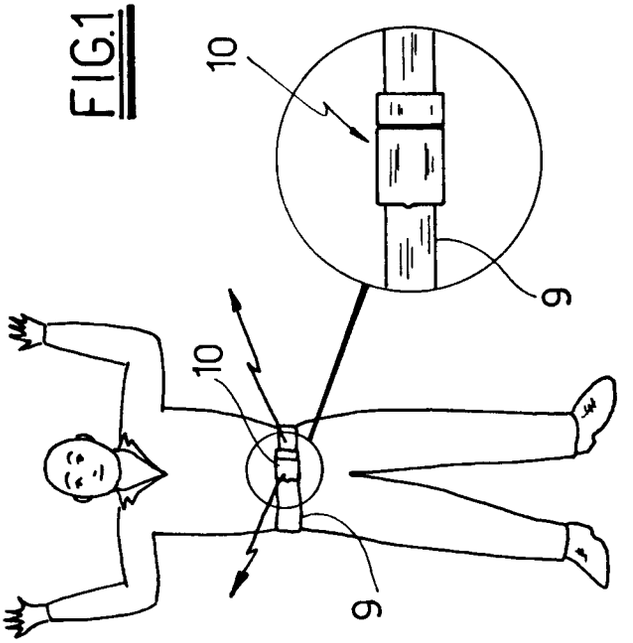
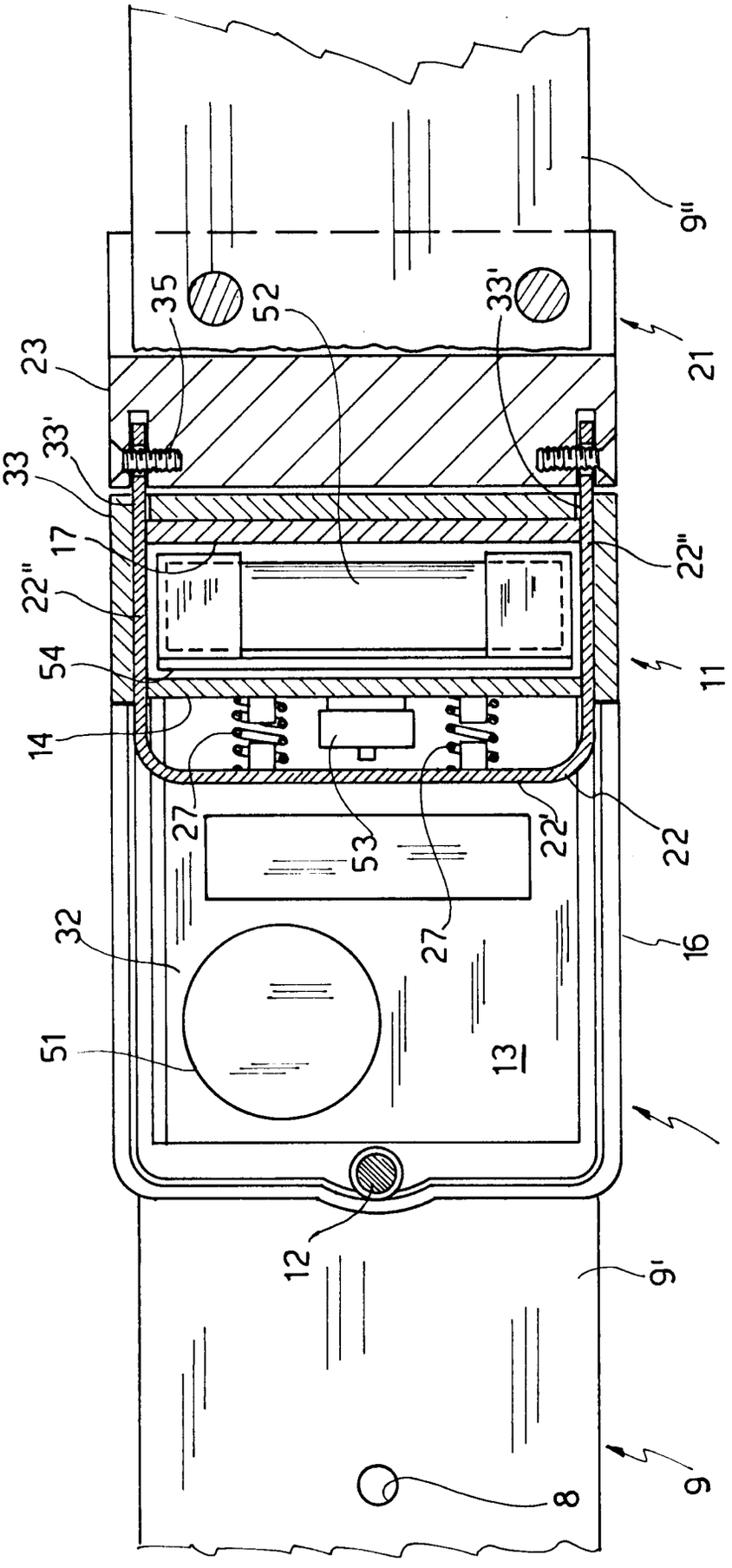

62
60
61
63

FIG.1


10
9
10
9


9"
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12
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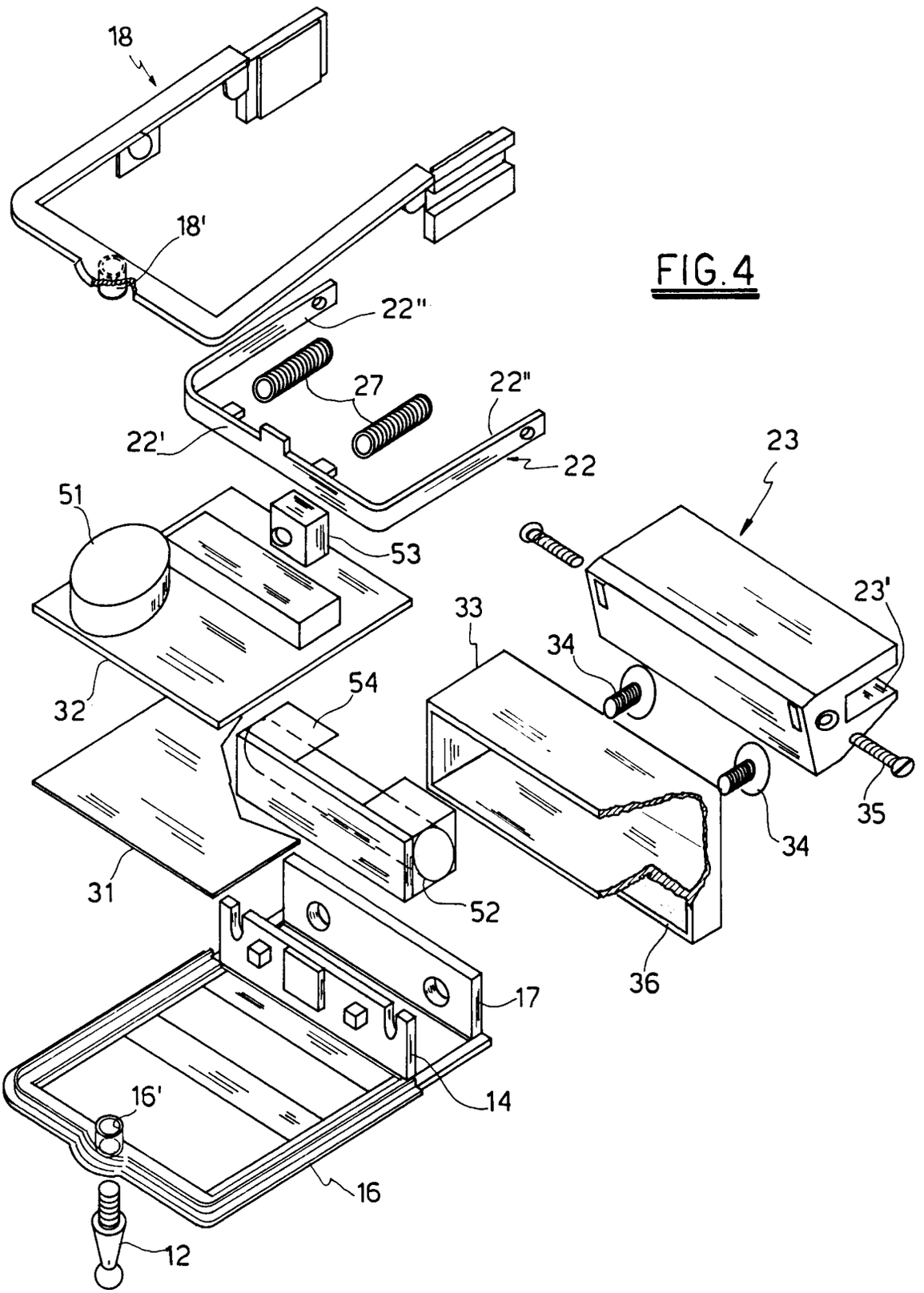
FIG.3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32
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31
52
36
17
16'
14
16
12

FIG.4

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 95 20 0919

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.6)
Y	FR-A-2 600 802 (SORANZO R.) * claims 1,2 * ---	1	G08B21/00
Y	FR-A-2 598 535 (LAUDREN & CIE) * abstract * ---	1	
A	DE-A-24 11 046 (MERTE W.) * claims 1,2 * -----	2	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

G08B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	16 August 1995	Sgura, S

CATEGORY OF CITED DOCUMENTS

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