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G1N NAAA N1B3 N7H1 N7N
G1M MCBC M12B M12N M13D
U1S S1288 S2145 S2170

(56) Documents Cited
GB 2223101 A **GB 2140157 A** **GB 2095839 A**
US 3808694 A

(58) Field of Search
UK CL (Edition L) **G1N NAAA NACNH NAHJA NAHJD , G1W**
INT CL[5] **A61B 5/107 , G01G 19/50**
ONLINE DATABASES: WPI

(54) Height and weight measuring machine

(57) A machine for measuring height and weight of a person comprises a base (3) with a load cell (18), and an automatic sliding detecting element (15) to measure the height of a person standing on the load cell. Signals detected are transmitted by r.f. to a remote receiver (20) which has two displays (221 and 222) to display the weight and height. The remote receiver (20) incorporates a buzzer (25) to give an alert signal upon display of the weight and height. The separation of the measuring devices from the display unit provides great convenience for measuring weight and height of a number of persons in sequence.

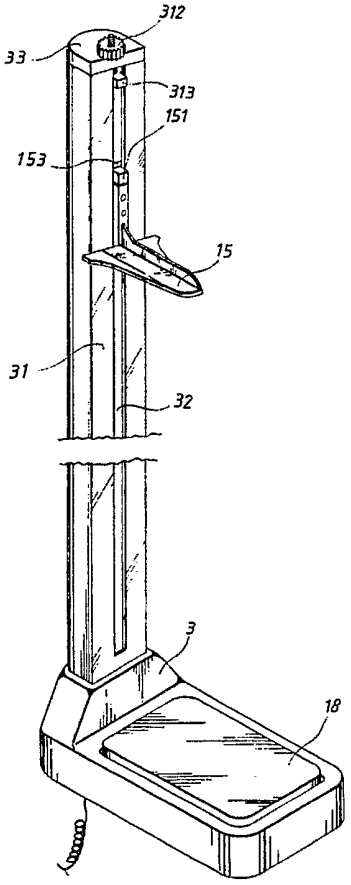

FIG.3

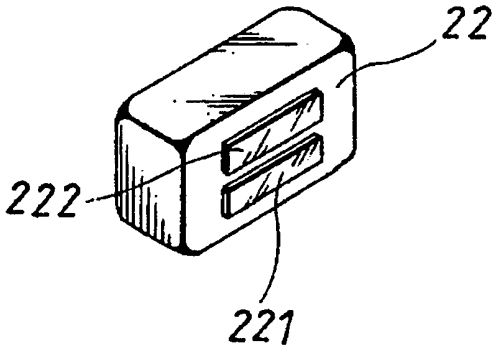

FIG.4

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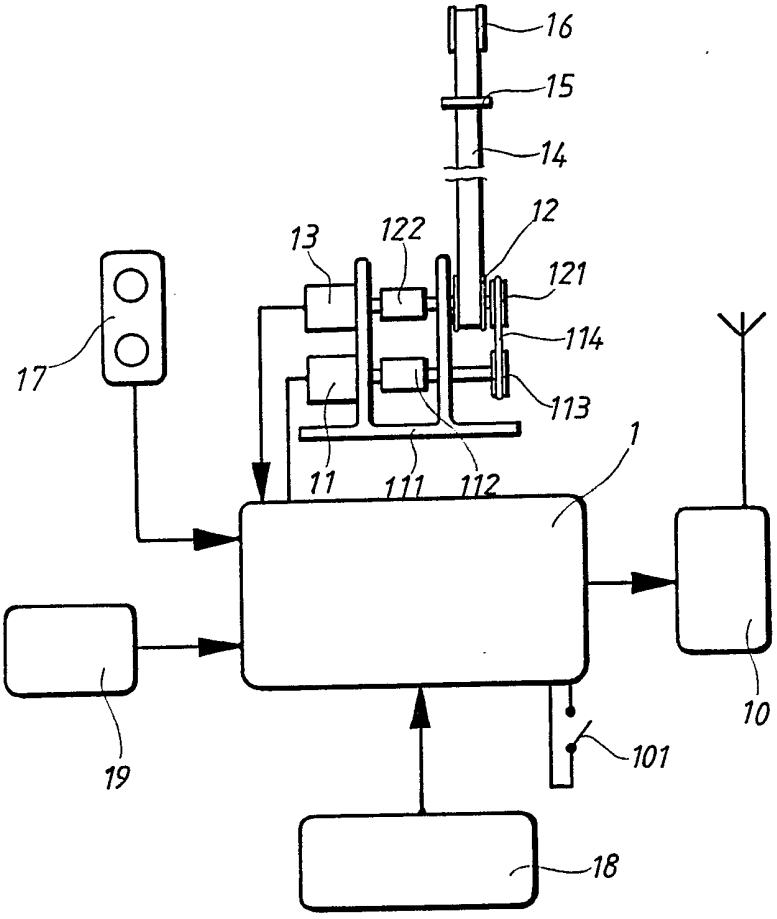

16
15
14
12
13
122
121
114
113
17
11
111
112
1
10
19
101
18

FIG.1

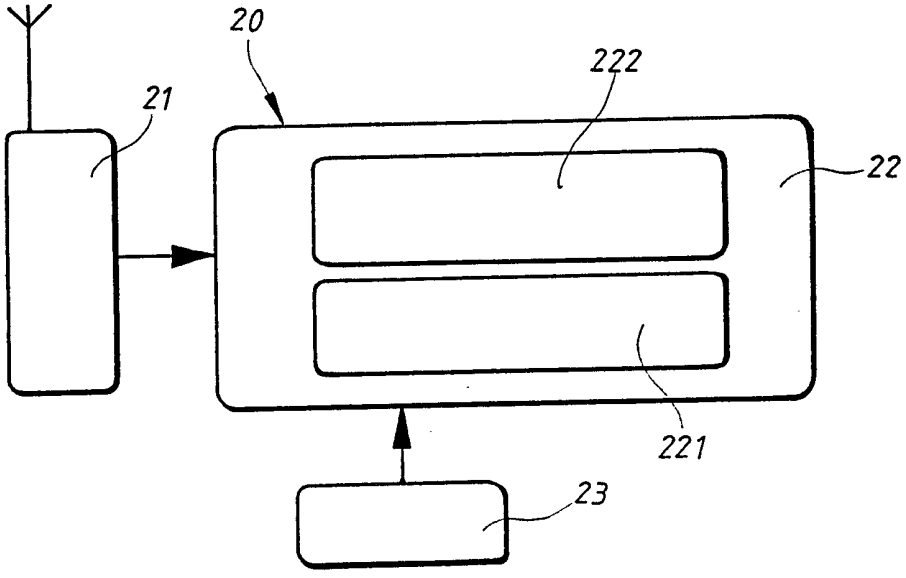

20
222
21
22
221
23

FIG.2

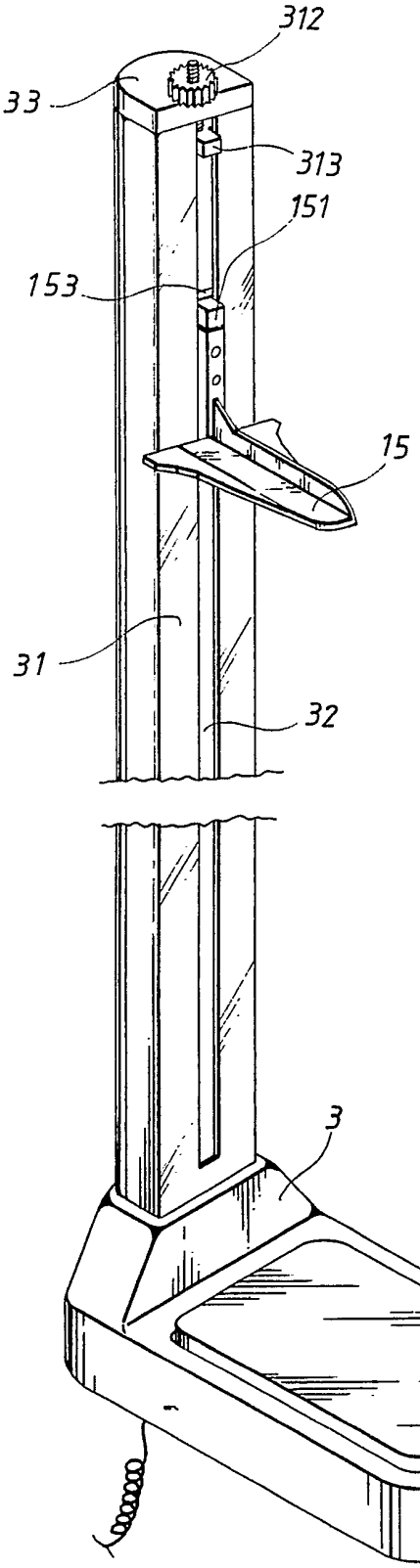


FIG.3

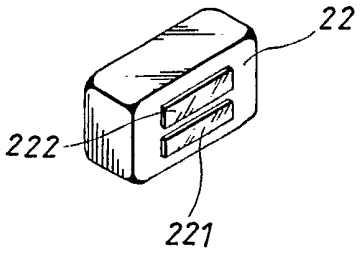


FIG.4

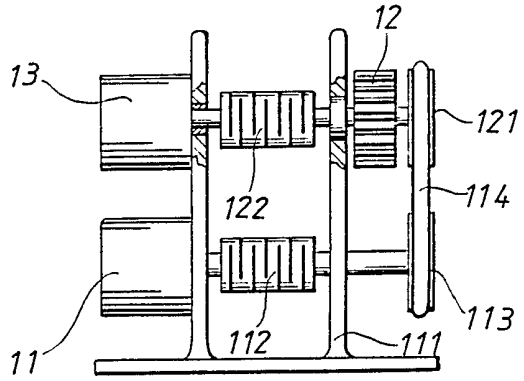

12
13
121
122
114
113
112
111
11

FIG.6

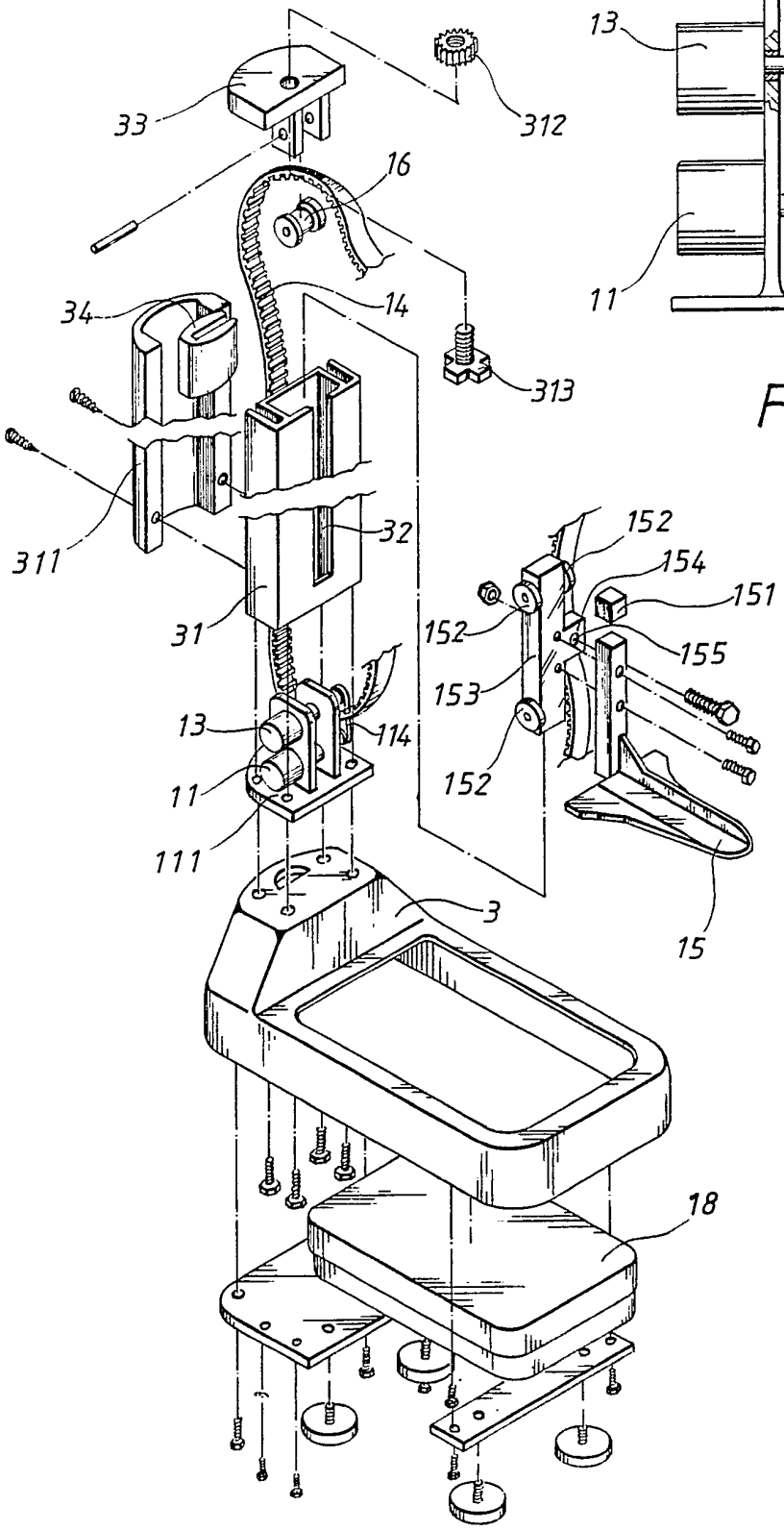

33
312
16
34
14
313
311
32
31
152
154
151
152
155
153
152
13
114
11
111
3
15
18

FIG.5

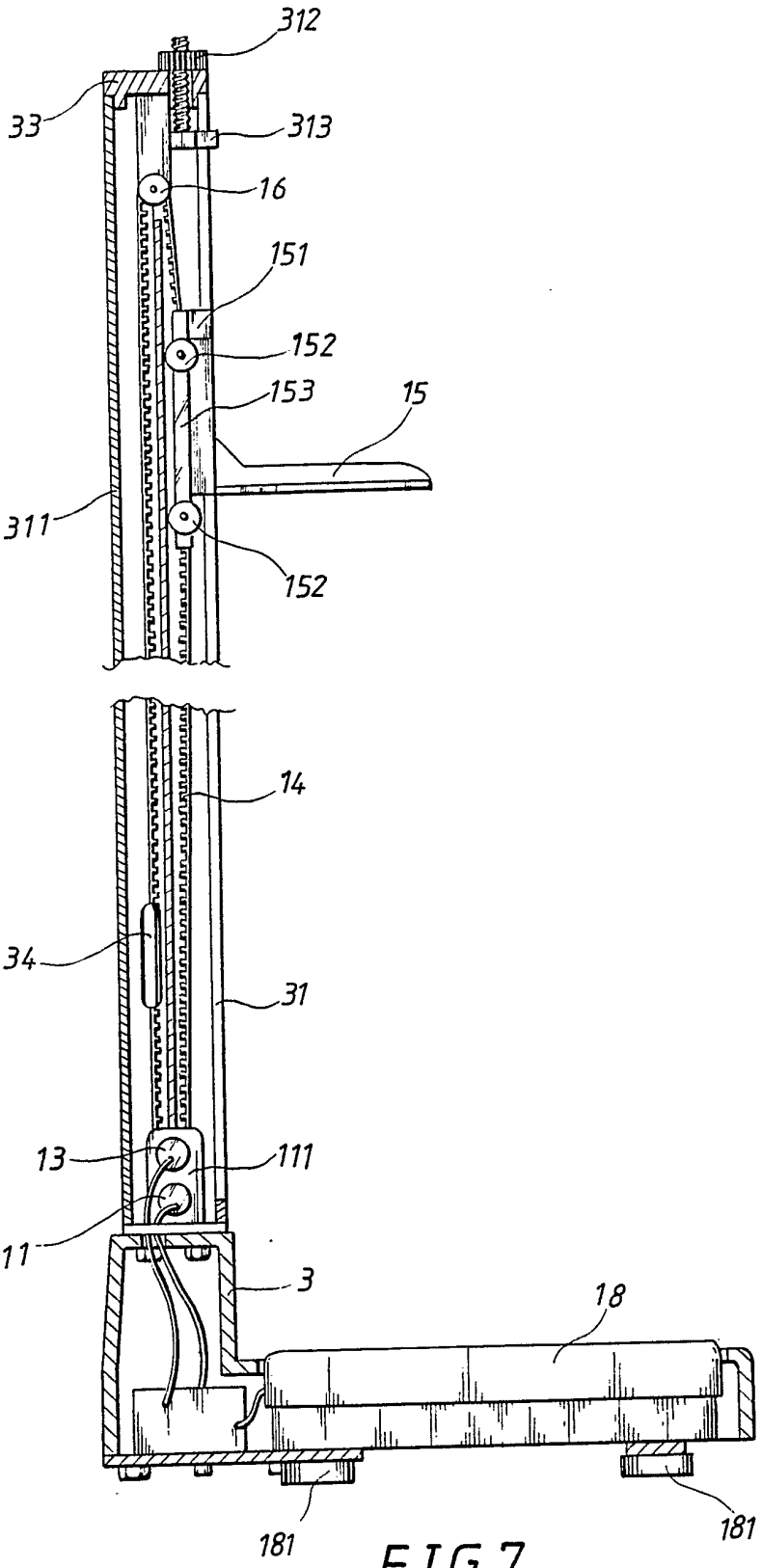


FIG.7

FIG. 8A

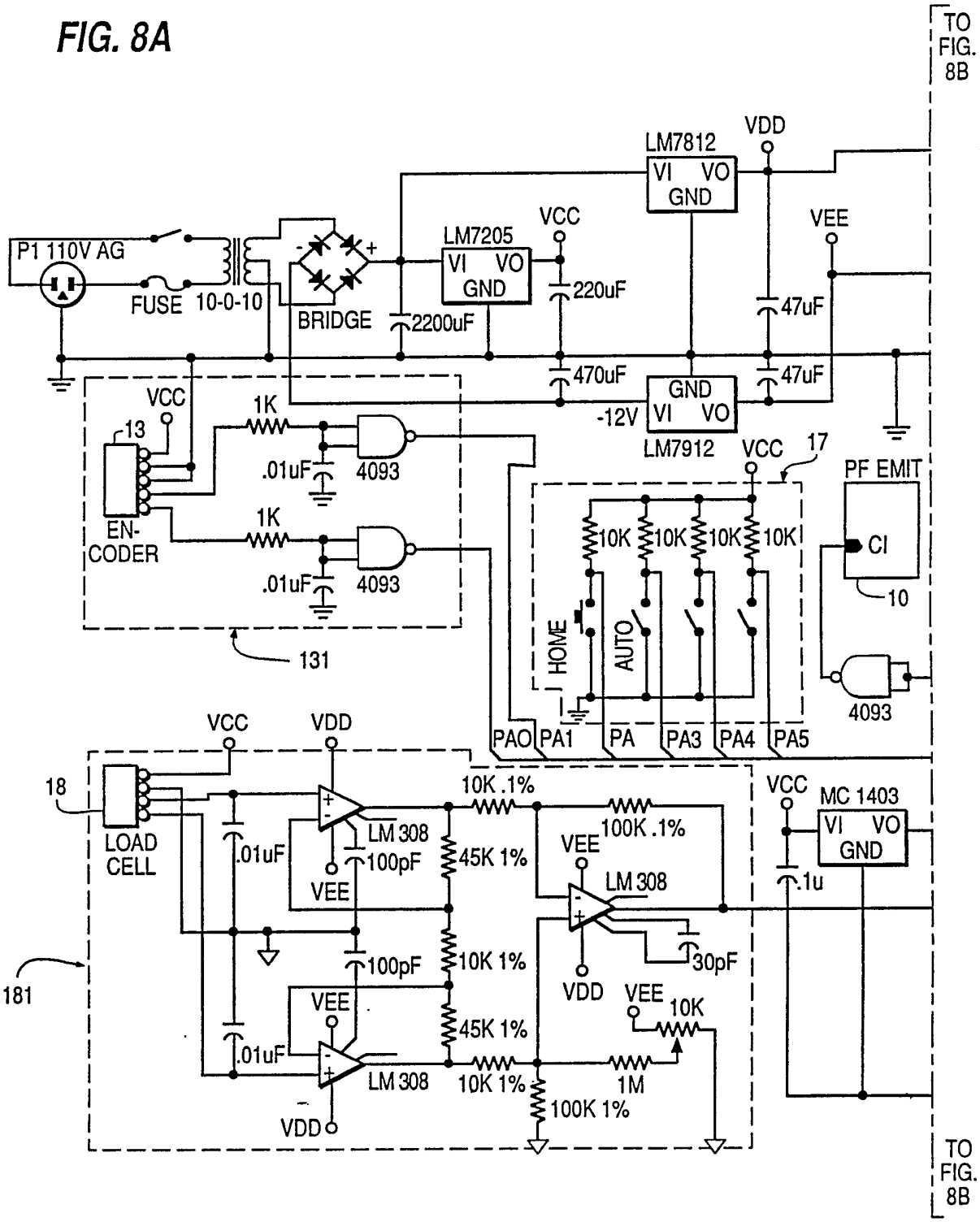
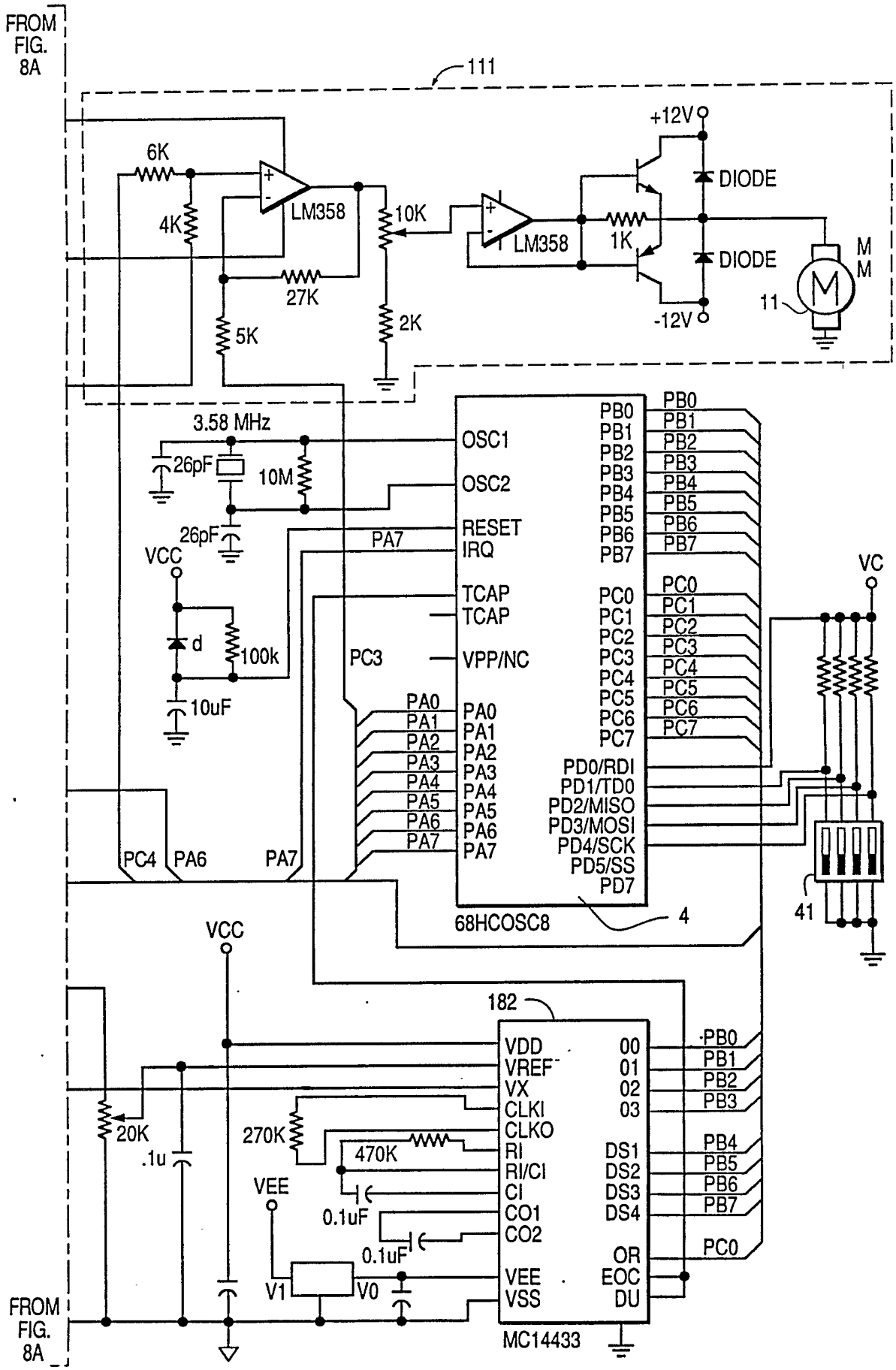

TO FIG. 8B
LM7812
VI VO GND
VDD
VCC
VEE
P1 110V AG
FUSE 10-0-10
BRIDGE
LM7205
VI VO GND
2200uF
220uF
47uF
470uF
GND VI VO
-12V
LM7912
47uF
VCC
13
1K
.01uF
4093
EN-CODER
131
17
PF EMIT
10K
CI
10
HOME
AUTO
4093
PAO PA1 PA PA3 PA4 PA5
18
LOAD CELL
LM 308
100pF
10K .1%
100K .1%
45K 1%
10K 1%
30pF
MC 1403
.1u
181
1M
100K 1%
TO FIG. 8B

FIG. 8B


FROM FIG. 8A
111
+12V
6K
4K
LM358
10K
LM358
1K
DIODE
DIODE
-12V
27K
5K
2K
11
M
3.58 MHz
26pF
10M
26pF
OSC1
OSC2
RESET
IRQ
PA7
VCC
d
100k
10uF
TCAP
TCAP
PC3
VPP/NC
PB0
PB1
PB2
PB3
PB4
PB5
PB6
PB7
PC0
PC1
PC2
PC3
PC4
PC5
PC6
PC7
PA0
PA1
PA2
PA3
PA4
PA5
PA6
PA7
PD0/RDI
PD1/TD0
PD2/MISO
PD3/MOSI
PD4/SCK
PD5/SS
PD7
68HCOSC8
4
VC
41
PC4
PA6
PA7
VCC
182
VDD
VREF
VX
CLKI
CLKO
RI
RI/CI
CI
CO1
CO2
VEE
VSS
00
01
02
03
DS1
DS2
DS3
DS4
OR
EOC
DU
MC14433
20K
.1u
270K
470K
0.1uF
0.1uF
VEE
V1
V0
FROM FIG. 8A

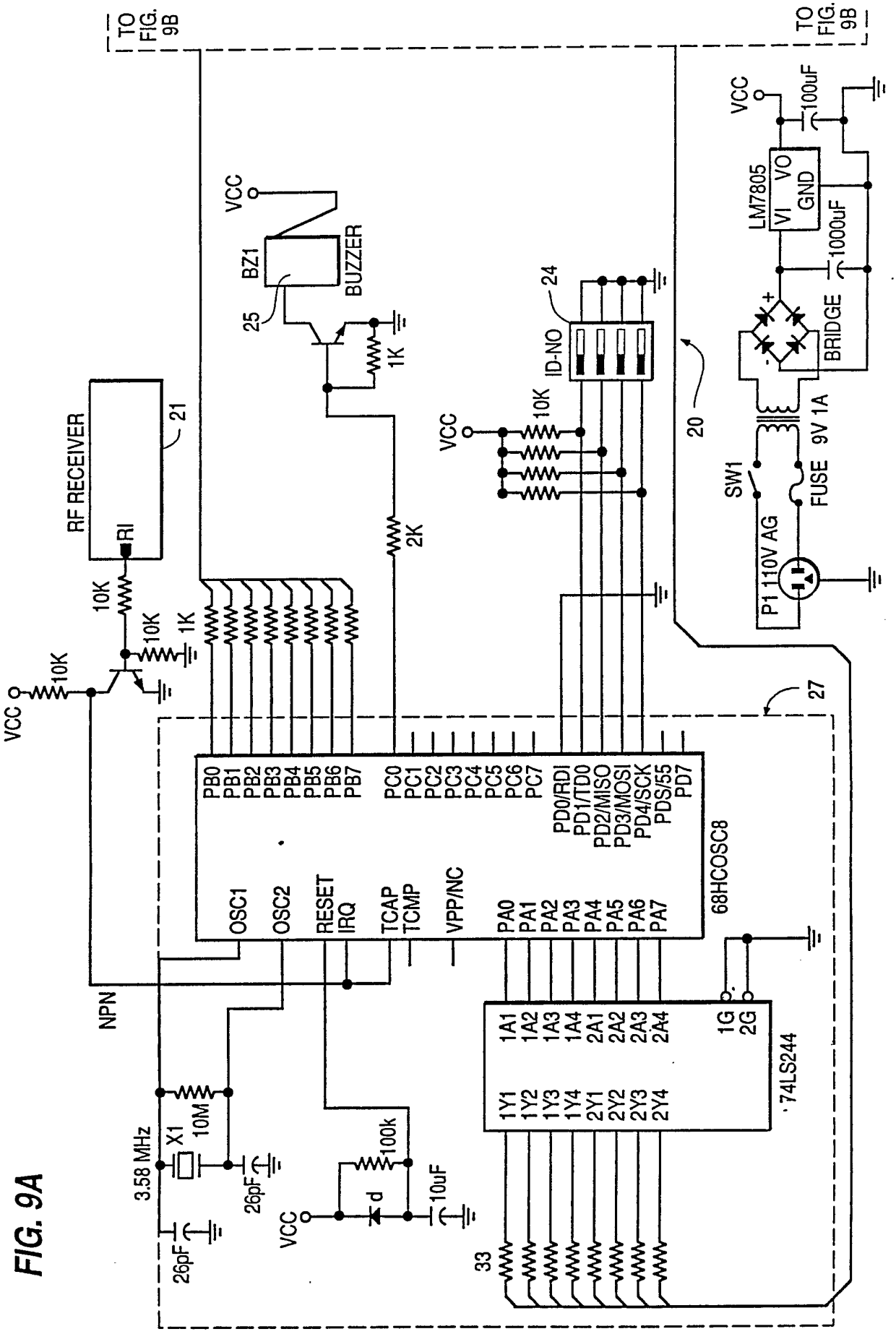
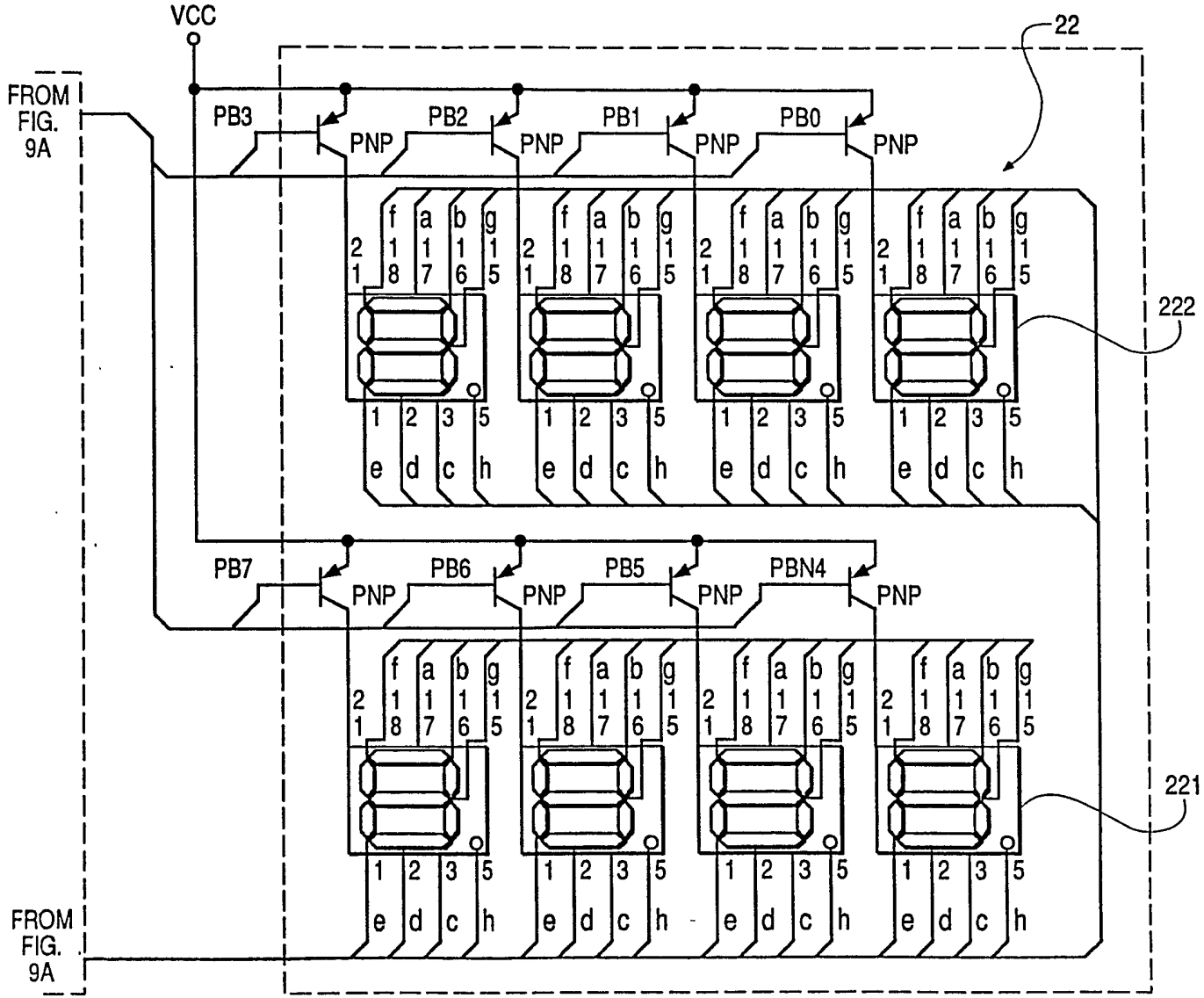

TO FIG. 9B
TO FIG. 9B
VCC
BZ1
BUZZER
25
1K
RF RECEIVER
RI
21
10K
10K
1K
10K
VCC
2K
VCC
10K
ID-NO
24
20
LM7805
VI VO
GND
1000uF
100uF
VCC
BRIDGE
SW1
FUSE 9V 1A
P1 110V AG
27
PB0 PB1 PB2 PB3 PB4 PB5 PB6 PB7
PC0 PC1 PC2 PC3 PC4 PC5 PC6 PC7
PD0/RDI PD1/TDO PD2/MISO PD3/MOSI PD4/SCK PDS/55 PD7
68HCOSC8
OSC1 OSC2 RESET IRQ TCAP TCMP VPP/NC
PA0 PA1 PA2 PA3 PA4 PA5 PA6 PA7
NPN
1A1 1A2 1A3 1A4 2A1 2A2 2A3 2A4
1G 2G
1Y1 1Y2 1Y3 1Y4 2Y1 2Y2 2Y3 2Y4
74LS244
3.58 MHz
X1
10M
26pF
26pF
100k
d
10uF
VCC
33

FIG. 9A

FIG. 9B


VCC
22
FROM FIG. 9A
PB3
PB2
PB1
PB0
PNP
222
PB7
PB6
PB5
PBN4
221
FROM FIG. 9A

HEIGHT AND WEIGHT MEASURING MACHINE

The present invention provides a height and weight measuring machine comprising mainly a measuring unit and a remote receiver/display. The measuring machine includes a base with a load cell, a stand extending upwards from the base, a vertical sliding detecting element driven by a motor via a belt to detect the height of a person standing on the load cell by a signal to the decoder when it stops on the person's head, data of the weight and height being transmitted to a receiver where the data are displayed.

A common height and weight measuring machine on the market is a coin-operated type infrared machine which is characterised by a simple mechanical structure for height measurement. However, in actual operation, measurement results are not precise because the use of infrared detection can be affected by the presence or condition of the person's hair, e.g. their hair style. Therefore, there is a need for improvement in accuracy.

Moreover, in all the height and weight measuring machines seen on the market, the display is fixed to the machine body, and it is quite inconvenient to read and record the data when height and weight of a number of persons are

measured in sequence, such as in the case of medical checkup in school.

The main objective of the present invention is to provide a height and weight measuring machine which uses a automatic sliding type detecting element to measure precisely the height of body by giving a decoder a signal when it stops on the head of the person to be measured. Such signal is processed and displayed separately.

Another objective of the present invention is to provide a height and weight measuring machine with an separated remote receiver to receive signal from the measuring machine and to display data for the weight and height measured to ease reading and recording of such data, and to facilitate measurement of height and weight for a number of persons in sequence.

Another objective of the present invention is to provide a height and weight measuring machine with motor and decoder not operating coaxially, but both of them are driven via pulley and belt so that vibration of the motor would not affect reading function of the decoder, and hence the signal transmitted from the decoder is accurate.

Another objective of the present invention is to provide a height and weight measuring machine in which a coupler is used for connection between gear and spindle of the decoder so that tension subject by the gear when the gear is engaging with the belt would not affect the spindle of the decoder and hence the reading by the decoder is accurate.

An embodiment of the present invention will be described by way of example and with reference to the accompanying drawings, is which:

Fig. 1 is a block diagram of a height and weight measuring system according to the present invention.

Fig. 2 is a block diagram for the remote receiver according to the present invention.

Fig. 3 illustrates the appearance of a measuring unit according to the present invention.

Fig. 4 is a perspective view of the remote receiver according to the present invention.

Fig. 5 is a perspective fragmental view of the measuring unit according to the present invention.

Fig. 6 is a sectional view illustrating assembly of the motor, gear, and decoder in the measuring unit according to the present invention.

Fig. 7 is a sectional view illustrating assembly of the measuring unit according to the present invention.

Fig. 8 is a block diagram of the remote receiver according to the present invention.

Fig. 9 is a circuit diagram of the remote receiver according to the present invention.

The height and weight measuring machine according to the present invention comprises mainly a measuring unit and a remote receiver, as shown in Figs. 1 and 2. The measuring unit has a load cell (18) to measure weight of any person standing on it, a mother board (1) to drive a motor (11) and a gear (12) while consequently driving a belt (14) engaging with a detecting element (15) which is falling down automatically from a pulley (16) till it gets in touch with such person's head, and a decoder (13) driven by the gear (12) coaxially to receive signal from the stop of the said detecting element (15) and output of the load cell (18). The signal from the stop of the said detecting

element (15) and the output of the load cell (18) are then processed by the mother board (1) to get data for the actual height and weight of the person. Such data is then transmitted by a transmitter (10) to a remote receiver (20) shown in Fig. 2. The remote receiver (20) includes a receiver (21) to receive RF signal, and incorporates with a processor unit (22) to decode the data to get data of such height and weight, which are then displayed respectively in two displays (221 and 222) for viewing at a distance from the measuring unit.

As shown in Fig. 1, the present invention can be operated manually as well. The mother board (1) can be incorporated with a control button (17) for setting of either automatic mode or manual mode by means of a selector switch (101). If manual mode is selected, the rising and falling of the detecting element (15) can be done manually. The present invention can be incorporated with a buzzer (25) to give an alert signal at the end of data procession to remind the person or recorder to view the result.

An embodiment of the measuring unit is shown in Fig. 3. The load cell (18) is supported by a base (3), on which there is a vertical aluminum stand (31) with a sliding channel (32) for vertical displacement of the detecting

element (15). The back of the vertical aluminum stand (31) is covered by a back cover (311) which is fixed by means of bolts. A magnet (151) is placed on the top of the detecting element (15) so that it can be positioned at its highest position at the top of the vertical aluminum stand (31) by adhesion to a block (313) beneath a top stop (33) on the top of the vertical aluminum stand (31). The position of the detecting element (15) can be adjusted by a adjusting knob (312) on the top stop (33) for calibration of the reference level for measurement. The remote receiver (20) is separated from the measuring unit. It is in the form of a rectangular structure with two displays (221 and 222) to display the data about height and weight respectively.

Fig. 4 illustrates an arrangement for vertical movement of the detecting element (15). The detecting element (15) has a sliding block (153) with rollers (152) on the back. The sliding block (153) is designed so as it can slide vertically within the vertical aluminum stand (31). A projection (154) is formed in the middle of a lateral side of the sliding block (153). A bolt hole (155) is designed on the projection (154) for fixing to the belt (14) by means of a blot. The lower turning portion of the belt (14) is engaging with the gear (12) which is located

on a support (111). For dynamic balance purpose, a weight (34) is attached to the belt (14).

As shown in Figs. 4 and 5, the motor (11), the gear (12), and the decoder (13) are placed on a support (111). The motor (11) and the decoder (13) are not placed coaxially. The motor (11) drives a pulley (113) via a coupler (112). The pulley (113) in turn, via a belt (114), drives a pulley (121) incorporated with the gear (12) coaxially above the pulley (113), and the gear (12) drives the spindle of the decoder (13) via a coupler (122). As shown in Fig. 6, the belt (14) is driven by the motor (11) via the gear (12), and the belt (14) causes the sliding block (153) to slide upwards or downwards, and consequently causes the detecting element (15) to rise or fall till the head of person standing on the load cell (18).

Please refer to Figs. 7 and 8 for wiring of the measuring unit and circuit diagram of the remote receiver. The measuring unit is connecting to a power source (19), and the remote receiver is connecting to a power source (23). Signal from the load cell (18) is amplified by an amplifier circuit (181) and then led to a central processor unit (4) via an analog-to-digital converter (182). Signal from the decoder (13) is led to the central processor unit

(4) through an input circuit (131). A transmitter (10) is used to transmit RF signal according to the status set up by a coding switch (41). The motor (11) is driven by input from the central processor unit (4) through a driving circuit (111).

After the signal is received by the receiver (21) in the remote receiver, as shown in Figs. 8 and 9, it is processed by a central processor unit (27) to provide two data, one for the height, and one for the weight. These data are then displayed in two displays (221 and 222), and a buzzer (25) is initiated to give an alert signal to remind reading and recording of such data.

As described above the present invention has a detecting element which falls down automatically till the head of the person standing on the load cell for measurement of height of the person. Such a measuring method is more accurate than the prior art which applies infrared to detect the height. Moreover, it makes use of a remote receiver with displays to show height and weight, and hence, it is very convenient for measurement and recording of height and weight of a number of persons in sequence. It is indeed a simple, convenient and easy-to-use height and weight measuring machine.

CLAIMS

1. A height and weight measuring machine comprising

- a base with a load cell thereon for determining the weight of the user;

- a stand extending upwards from one side of the base, having a channel at its front;

- a detecting element for determining the weight of a user sliding in the channel of the stand;

- a belt engaging with respective pulleys at the upper and lower turning points of its runs and driven by a motor via a gear; one run of the belt being secured to the detecting element;

- a decoder, connected to the said gear via a coupler, and driven by the motor indirectly;

- a board to receive input signals from the decoder and the load cell, and provide input signals to the motor and a RF transmitter; and

- a remote receiver including a RF receiver, a central processor unit and a display circuit to receive signals from the board and display data about height and weight.

2. A height and weight measuring machine as claimed in claim 1 wherein the display circuit has two displays to display height and weight respectively, and the central processor unit at the remote receiver includes a buzzer to

give an alert signal when the height and weight are displayed.

3. A height and weight measuring machine as claimed in claim 1 or claim 2 wherein the detecting element has a magnet on top, a top stop at a top portion of the stand including a block for adhesion of the magnet for positioning when the detecting element reaches its upper limit, and positioning of the block can be adjusted by an adjusting knob for calibration of the level of the detecting element.

4. A height and weight measuring machine substantially as herein described with reference to the accompanying drawings.

Patents Act 1977 —|| —
Examiner's report to the Comptroller under Section 17 (The Search Report)

Application number

GB 9221653.0

Relevant Technical fields

(i) UK Cl (Edition L) G1N (NAAA, NACNH, NAHJA, NAHJD; G1W)

(ii) Int Cl (Edition 5) A61B 5/107; G01G 19/50

Search Examiner

M G CLARKE

Databases (see over)

(i) UK Patent Office

(ii) ONLINE DATABASES: WPI

Date of Search

5 JANUARY 1993

Documents considered relevant following a search in respect of claims 1 TO 4

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
Y	GB 2223101 A (MAN DESIGN CO LTD) see especially page 1 line 4 - page 2 line 16	1
Y	GB 2140157 A (LI-FU CHEN) see especially Figures 2, 4 and 9 (equivalent US 4518052)	1
Y	GB 2095839 A (LI-FU-CHEN) see especially Figure 2 (equivalent US 4336855	1
Y	US 3808694 (ass to CONTINENTAL SCALE COPRN) see especially Figure 1 and column 2 lines 20-38	1

Identity of document and relevant passages	Relevant to claim(s)

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family, corresponding document.

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