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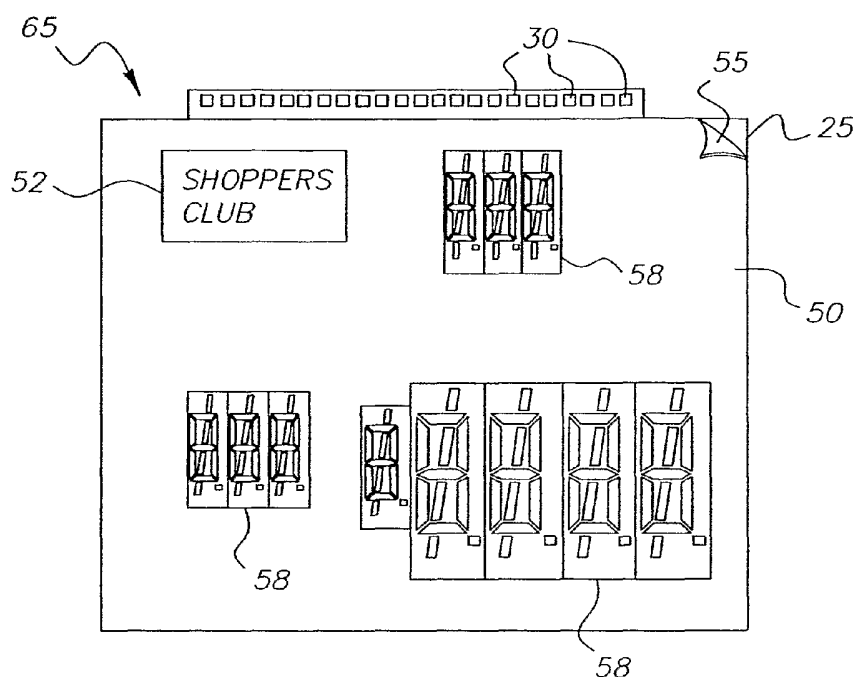
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[Continued on next page]

(54) Title: SHELF TALKER



(57) Abstract: A shelf talker for displaying short and longer term information includes a backplane including a plurality of electrical conductors; a plurality of single character display chips mounted on the backplane in electrical contact with the electrical conductors for displaying the short term information; and a graphic overlay located over the backplane bearing the longer term information and defining apertures for displaying the short term information displayed by the single character display chips.

**Declarations under Rule 4.17:**

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE,

IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for all designations

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

SHELF TALKER

FIELD OF THE INVENTION

The present invention relates to shelf talkers and shelf talker
5 display systems.

BACKGROUND OF THE INVENTION

Retailers are increasingly turning to electronic shelf label (ESL)
systems to handle the price changing needs in their stores. Along with ESL
10 systems, integrated within the shelf rails, are the use of larger shelf talkers used to
attract the customers attention by portraying a special item or price. US
5,448,226, issued September 5, 1995 to Failing, Jr., et al. shows such a system
where a shelf talker is placed at a location where an item is on sale or of special
interest to the customer. Failing refers to the shelf talkers as cards or printed
15 material attached at a particular item location. Failing claims a management
system whereby a shelf talker is detected upon insertion into an ESL, indicating to
a database that a shelf talker has been deployed at that location.

The shelf talker disclosed by Failing is a printed card that must be
removed and a new card printed when the information to be displayed, such as the
20 item price, changes. This process is not only costly from a printing standpoint,
but also labor intensive.

US 5,771,005, issued June 23, 1998 to Goodwin, III discloses a
shelf talker that is described as an auxiliary display attached to an ESL. It
electrically connects to the ESL by way of a connecting header and associated
25 rows of connector pins. Goodwin's auxiliary display is described as an LCD with
silk screening for color. One problem with using a conventional LCD display is
the thickness of the display. Goodwin illustrates his LCD displays as rather thick
allowing for the glass layers customarily found in liquid crystal displays. In one
claim, Goodwin even describes two displays back-to-back and protruding
30 orthogonally from the ESL. This makes for a very thick and rigid display jutting
out from the ESL making it susceptible to breakage due to collisions from carts
and customers. Conventional LCD displays also need continuous power in order

to display the information thereby consuming the power in the battery provided with the shelf talker.

Another problem with the shelf talker disclosed by Goodwin is that the static information, such as UPC and other long term product information is
5 screen printed on the auxiliary display. It is not convenient for stores to custom screen print their own shelf talkers to match the items and special pricing information.

There is therefore a need for an improved shelf talker that avoids the problems noted above.

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SUMMARY OF THE INVENTION

The need is met according to the present invention by providing a shelf talker for displaying short and longer term information that includes a backplane including a plurality of electrical conductors; a plurality of single
15 character display chips mounted on the backplane in electrical contact with the electrical conductors for displaying the short term information; and a graphic overlay located over the backplane bearing the longer term information and defining apertures for displaying the short term information displayed by the character chips.

20

ADVANTAGES

The shelf talker can be provided as a thin, flexible, electronically writable shelf talker that is easily manufacturable by picking and placing single bistable liquid crystal character chips on a flexible backplane. The chips require no additional power once written and the shelf talker maintains the display of
25 information until written again. The advantage of the individual character chips is that they can be manufactured in quantity prior to the design of the backplane of the shelf talker, and later placed on a custom fabricated backplane to yield any one of a number of different configurations for the shelf talker.

The printable graphic overlay that is adhered to the backplane can
30 be printed locally and may have long term static information such as store icons, UPC, static text and other product or non-product related information. This provides a simple way to address the needs of retailers who desire varying formats

on their shelf talkers, whether product specific or generic, with no effect on the fabrication of the characters. A large variety of shelf talker layouts can be designed and only the backplane and trace paths need to change. Manufacturing of the bistable character display chips are independent of any layout configuration.

- 5 Short term information such as price changes, cost per unit, and savings information can be changed electronically by way of an electronic writer.

BRIEF DESCRIPTION OF THE DRAWINGS

10 Fig. 1 is a top view of a single character display chip used in the present invention;

Fig. 2 is a cross sectional view of a single character display chip taken along lines 2-2 in Fig. 1;

Fig. 3 is a top view of a backplane that can be used with the single character display chips in the present invention;

15 Fig. 4 is a top view of a completed shelf talker;

Fig. 5 is a perspective view of a shelf talker writer used to electrically change short term information;

Fig. 6 is a cut-away view of the shelf talker writer of Fig. 5;

20 Fig. 7 is a cross sectional view of the shelf talker taken along lines 7-7 of Fig. 6;

Fig. 8 is a partial enlarged view of Fig. 7 showing the electrical contacts used to write to the shelf talker; and

Fig.9 is a schematic block diagram of a shelf talker system according to one embodiment of the present invention.

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DETAILED DESCRIPTION OF THE INVENTION

Referring to Figs. 1 and 2, a single character display chip **10** is constructed by forming a conductive common electrode layer **14** on a substrate **12**. A layer of bistable liquid crystal material **16** is deposited, for example by roll coating, on the conductive common electrode layer **14**, leaving an exposed area of layer **14** for making electrical contact. Electrically conductive character segments **18** are then formed, for example by thick film printing on the bistable liquid crystal layer **16**. The character segments **18** may be arranged, for example to produce numeric characters 0-9 as well as a slash, a decimal point, a dollar sign, and a cent sign. The optical state of the bistable liquid crystal material between the character segments **18** and the common electrode layer **14** can be changed by selectively applying drive voltages to the character segments and the common electrode layer **14**. Once the optical state bistable material has been changed, it remains in that state indefinitely without further power being applied to the electrodes. The single character display chip can be made as known in the art, for example as disclosed in USSN 10/134,185, filed April 29, 2002 by Stephenson et al.

Referring to Fig. 3, a backplane generally designated **25**, comprises a flex circuit substrate **27** on which conductive traces **35** are formed. An insulator layer **40** is formed over conductive traces **35**. Exposed contact pads **30** at the top of the backplane **25** are used for electrical contact to a writing device. Additional exposed contact dots **45** in the insulator layer **40** provide electrical contact locations with the conductive traces **35** to contact the printed conductive character segments **18** of single character display chip **10**. The single character display chips **10**, several of which are shown attached to the backplane **25**, are attached by conductive adhesive between contact dots **45** and the printed conductive character segments **18** of single character display chip **10**. The conductive adhesive can be applied as individual spots, or as a single layer of anisotropically conductive adhesive as is known in the art.

Fig. 4 shows a completed shelf talker **65**. A printable graphic overlay **50** is attached to the backplane **25** with an adhesive backing **55** on the backside of the printable graphic overlay **50**. Openings **58** are provided in the

printable graphic overlay to expose the single character display chips 10. Long term printed information 52 such as a store logo and other information may be pre-printed on the graphic overlay 50.

5 A shelf talker writer 70 shown in Fig. 5 is used to electrically change the short term information on the single character display chips 10 of shelf talker 65. The shelf talker writer 70 is electrically connected to a power supply and database having short term pricing information. The shelf talker 65 is inserted into slot 95 of writer 70 with the contacts 30 of shelf talker 65 facing downward.

10 In a cut-away of the shelf talker writer 70, Fig. 6 shows a slot 95 with alignment edges 98 and positioning surfaces 85. Also shown is a shelf talker presence sensor 100 which provides an electrical signal to indicate the presence of a shelf talker 65, which then drives the roller drive system 90 to move the shelf talker 65 downward into the shelf talker writer 70. A second home sensor 101 provides an electrical signal to indicate a seated position of edges 60 of shelf
15 talker 65 to positioning surfaces 85 of writer 70, which in turn shuts off the roller drive assembly 90. The shelf talker writer 70 includes a circuit board 75 with contact pads 80 aligned with contacts 30 of the shelf talker 65. Circuit board 75 includes a drive circuit 82 that supplies drive signals to the contact pads 80. The drive circuit is supplied with write data via a serial port 84 from an external source
20 such as a personal computer as described below.

Fig. 7 shows a partial cross section from Fig. 6 with a shelf talker 65 seated on positioning surfaces 85. An enlarged view of the interface area in Fig. 8 shows the contact pads 30 of shelf tag 65 in position adjacent to the contact pads 80 of circuit board 75. Once shelf talker 65 is seated on positioning surfaces
25 85, a solenoid 105 drives block 110 forward creating firm contact between contact pads 80 and contacts 30 of the shelf talker 65. Electrical signals are then sent to change the short term information on single character display chips 10. After the writing process is completed, the roller drive assembly drives the shelf talker 65 upward to the original inserted position for the store clerk to remove. Once
30 written, the shelf talker 65 can be attached to any shelf pricing system by way of a clip as is known in the art.

Referring to Fig. 9, a shelf talker system using a shelf talker of the present invention includes a database transceiver **175** that sends information derived from a central database computer **180**, to a personal computer transceiver **160** in the portable personal computer **140**. Commands from the keyboard interface **155** and shown on the display **145** are sent to the shelf talker writer **70** by way of the laptop central processing unit **150** through communication cable **170**. Power **130** is supplied to the shelf talker writer through power cable **135** to circuit board **75** for powering the sensors **100** and **101**, roller motor drive **90**, solenoid **105**, and a digital camera **126** located in the shelf talker writer **70**. Upon writing the shelf talker **65**, the digital camera **126** sends an image back to the portable personal computer **140** through communication cable **170** where character recognition software compares the actual written characters to the database. If the data is inconsistent, an error message is posted on display **145**.

Also shown in Fig. 9 is a printer **185** used to print long term information **52** on shelf talker **65**. The data originating from the central database **180** is sent to the portable personal computer **140**, which then sends the data to the printer **185**. The printing of long term information can thus be done locally and customized with individual store related information.

The invention has been described in detail with particular reference to certain preferred embodiments thereof, but it will be understood that variations and modifications can be effected within the spirit and scope of the invention.

PARTS LIST

10	single character display chip
12	substrate
14	common electrode layer
16	bistable liquid crystal
18	electrically conductive character segments
25	backplane
27	flex circuit substrate
30	backplane contact pads
35	conductive traces
40	insulator layer
45	contact dots
50	printable graphic overlay
52	long term printed information
55	adhesive backing
58	opening in printable graphic overlay
60	shelf talker edge
65	shelf talker
70	shelf talker writer
75	circuit board
80	circuit board contact pads
82	drive circuit
84	serial port
85	positioning surfaces
90	roller drive system
95	slot
98	slot edge
100	presence sensor
101	home sensor
105	solenoid
110	block
126	camera
130	power

135	power cable
140	portable personal computer
145	display
150	central processing unit
155	keyboard interface
160	personal computer transceiver
170	communication cable
175	database transceiver
180	central database computer
185	printer

CLAIMS:

1. A shelf talker for displaying short and longer term information, comprising:
 - 5 a) a backplane including a plurality of electrical conductors;
 - b) a plurality of single character display chips mounted on the backplane in electrical contact with the electrical conductors for displaying the short term information; and
 - c) a graphic overlay located over the backplane bearing the longer term
 - 10 information and defining apertures for displaying the short term information displayed by the character chips.
2. The shelf talker claimed in claim 1, wherein the single character chips are capable of displaying numbers between 0 and 9, a dollar sign, a cent
- 15 sign, a slash and a decimal point.
3. The shelf talker claimed in claim 1, wherein the single character chips are mounted on the backplane with conductive adhesive.
- 20 4. The shelf talker claimed in claim 1, wherein the longer term information may include a universal product code (UPC).
- 25 5. The shelf talker claimed in claim 1, wherein the longer term information may include a product description.
6. The shelf talker claimed in claim 1, wherein the longer term information may include a unit price.
- 30 7. The shelf talker claimed in claim 1, wherein the longer term information may include a graphic logo.

8. A single character display chip, comprising:
- a) support layer;
 - b) an unpatterned first conductor layer on the support layer;
 - c) a layer of bistable cholesteric liquid crystal material located over the
- 5 unpatterned first conductor layer, leaving a portion of the first conductor layer exposed for making electrical contact with the first conductor layer; and
- d) a patterned conductor layer defining a plurality of character elements located over the layer of bistable cholesteric liquid crystal material.
- 10 9. The single character display chip claimed in claim 8, wherein the single character chips are capable of displaying numbers between 0 and 9, a dollar sign, a cent sign, a slash and a decimal point.
10. A shelf talker display system, comprising:
- 15 a) a shelf talker for displaying short and longer term information, the shelf talker including a backplane including a plurality of electrical conductors, a plurality of single character display chips mounted on the backplane in electrical contact with the electrical conductors for displaying the short term information, and a graphic overlay located over the backplane bearing the longer term
- 20 information and defining apertures for displaying the short term information displayed by the character chips; and
- b) a shelf talker writer including an arrangement of electrical contacts for making contact with the electrical conductors, and a driver for applying drive signals to the electrical contacts to cause the display chips to display the short
- 25 term information.
11. The shelf talker display system claimed in claim 10, further comprising a central computer for determining the short term information to be displayed by the shelf talker, and means for communicating the short term
- 30 information to the shelf talker writer.

12. The shelf talker display system claimed in claim 10, wherein the single character chips are capable of displaying numbers between 0 and 9, a dollar sign, a cent sign, a slash and a decimal point.

5 13. The shelf talker display system claimed in claim 10, wherein the single character chips are mounted on the backplane with conductive adhesive.

14. The shelf talker display system claimed in claim 10, wherein the longer term information may include a universal product code (UPC).

10

15. The shelf talker display system claimed in claim 10, wherein the longer term information may include a product description.

16. The shelf talker display system claimed in claim 10, wherein the
15 longer term information may include a unit price.

17. The shelf talker display system claimed in claim 10, wherein the longer term information may include a graphic logo.

20 18. The shelf talker display system claimed in claim 10, further comprising a printer for printing the longer term information on the graphic overlay.

19. The shelf talker display system claimed in claim 10, wherein the
25 longer term information includes a universal product code (UPC), and further comprising a UPC reader for reading the UPC and using the UPC to locate the short term information to be displayed by the shelf talker.

20. The shelf talker display system claimed in claim 10, wherein the
30 shelf talker writer further includes a digital camera for capturing an image of the information written by the shelf talker writer, and optical character recognition means for verifying that the written information is the desired information.

21. A shelf talker for displaying short and longer term information, comprising:

5 a) a backplane including a first insulating layer, a plurality of electrical conductors and associated electrical contacts formed on the first insulating layer, and a second insulating layer arranged over the electrical conductors and defining apertures for making electrical contact to the electrical conductors;

10 b) a plurality of single character chips for displaying short term information, each character chip including an unpatterned first conductor layer, a patterned conductor layer defining a plurality of character elements, and a layer of cholesteric bistable liquid crystal material located between the first and second conductor layers, the single character chips being mounted on the backplane in selected locations such that the conductor layers make electrical contact with the electrical conductors through the apertures; and

15 c) a graphic overlay located over the backplane bearing longer term information and defining apertures for displaying the short term information displayed by the character chips.

22. A shelf talker writer for writing short term information onto a shelf talker having a bistable electronically writable display having electrical
20 conductors, comprising;

a) an arrangement of electrical contacts for making contact with the electrical conductors;

b) a driver for applying drive signals to the electrical contacts to cause the display to display the short term information; and

25 c) a digital camera for capturing an image of the display to be used to verify that the short term information was correctly written to the display.

23. A shelf talker for displaying short and longer term information, comprising:

- 5 a) a backplane including a first insulating layer, a plurality of electrical conductors and associated electrical contacts formed on the first insulating layer, and a second insulating layer arranged over the electrical conductors and defining apertures for making electrical contact to the electrical conductors;
- 10 b) a plurality of display chips comprised of multiple characters for displaying short term information, each display chip including an un-patterned first conductor layer, a patterned conductor layer defining a plurality of character elements, and a layer of cholesteric bistable liquid crystal material located between the first and second conductor layers, the multiple character display chip being mounted on the backplane in selected locations such that the character elements make electrical contact with the electrical conductors through the apertures; and
- 15 c) a graphic overlay located over the backplane bearing longer term information and defining apertures for displaying the short term information displayed by the display chips.

1/8

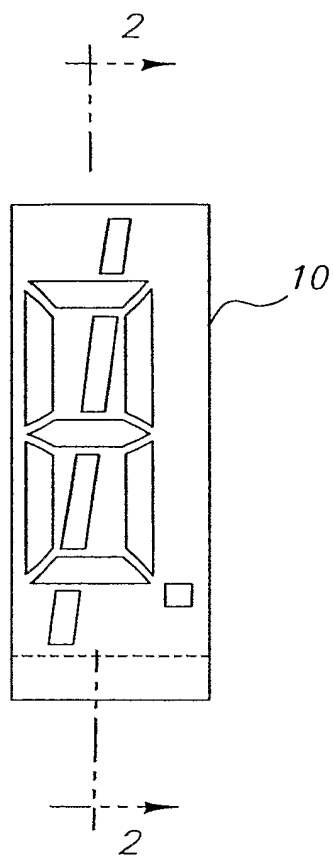


FIG. 1

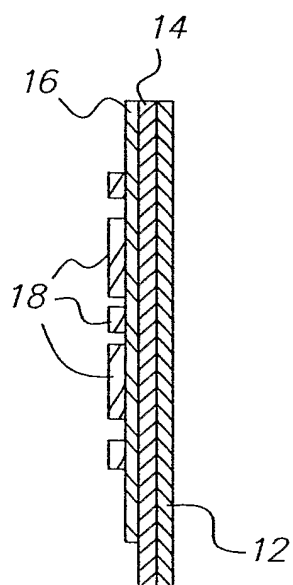


FIG. 2

2/8

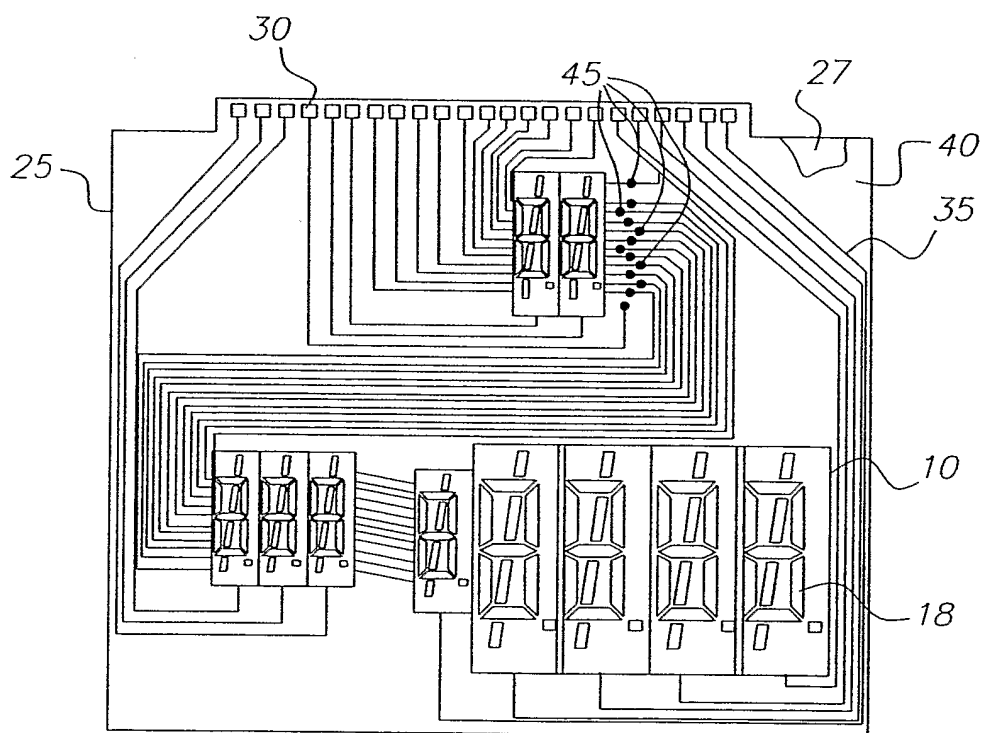


FIG. 3

3/8

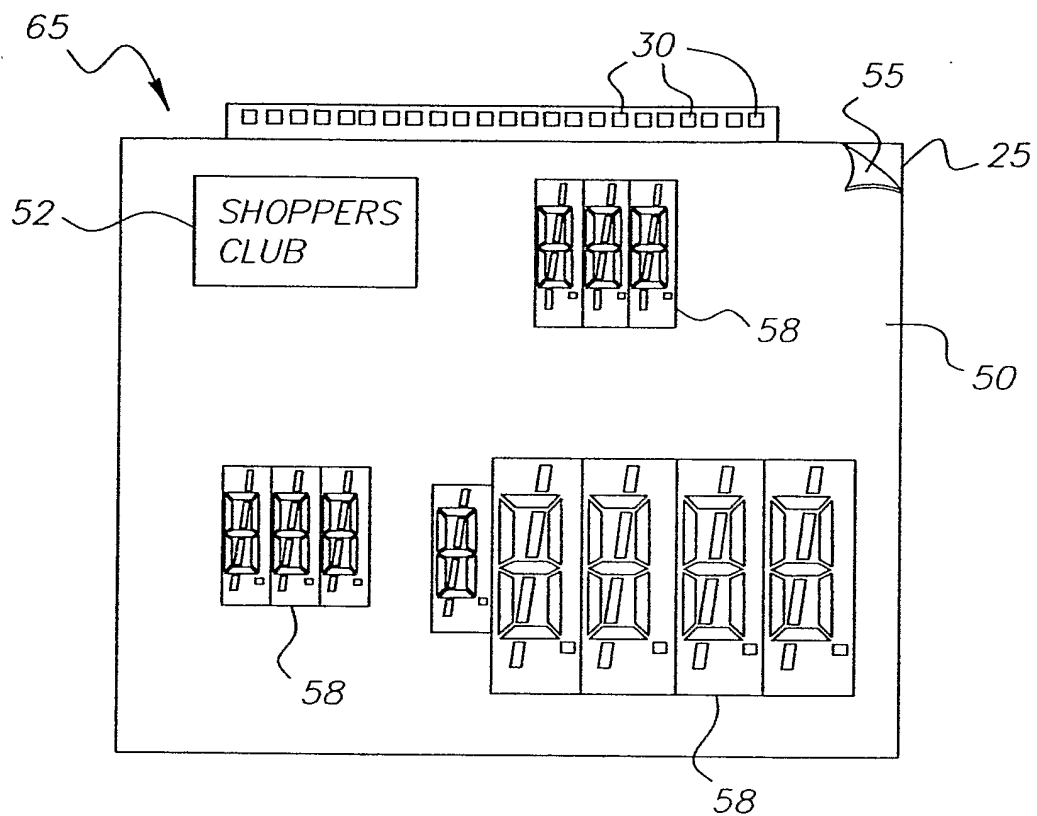


FIG. 4

4/8

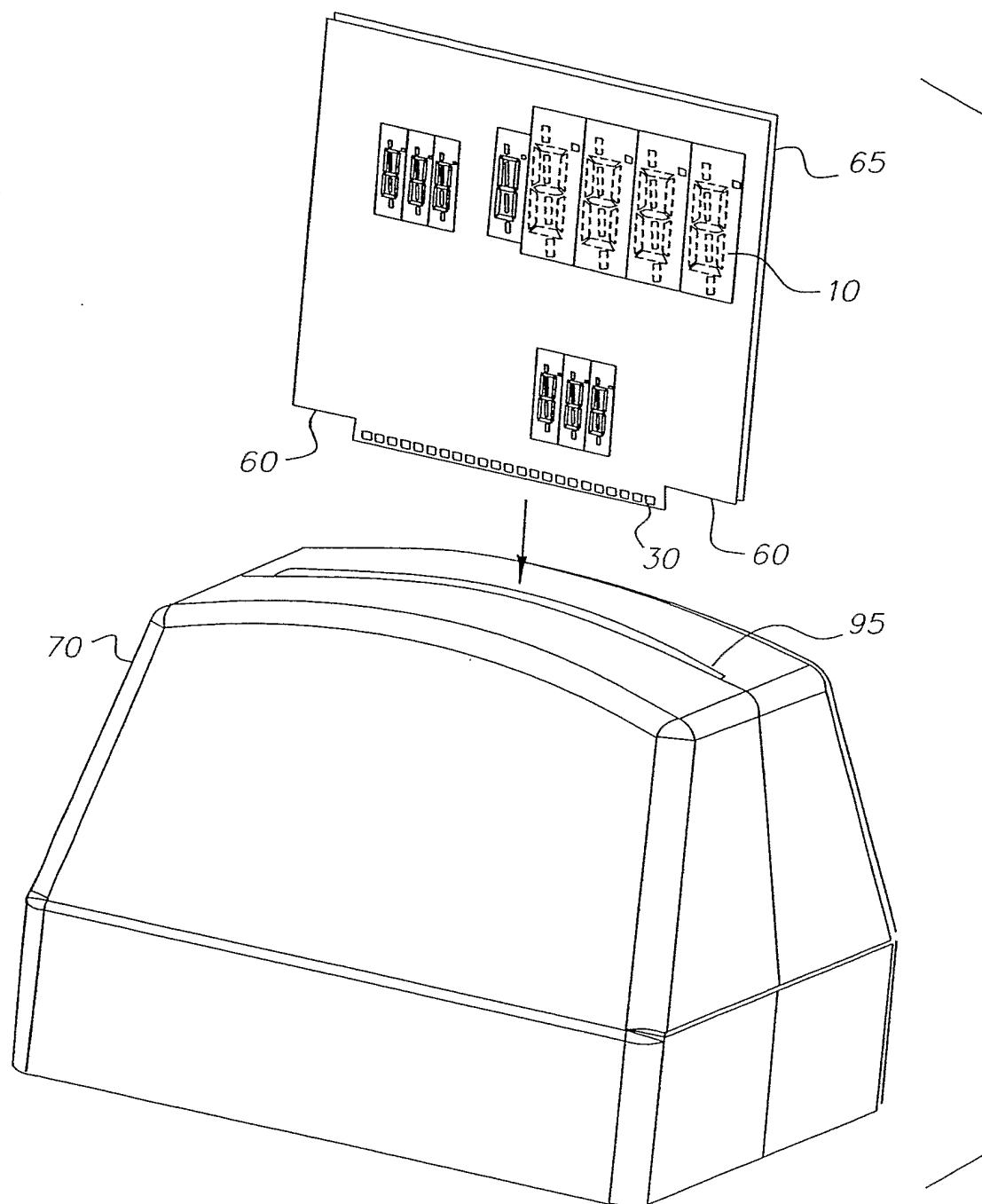


FIG. 5

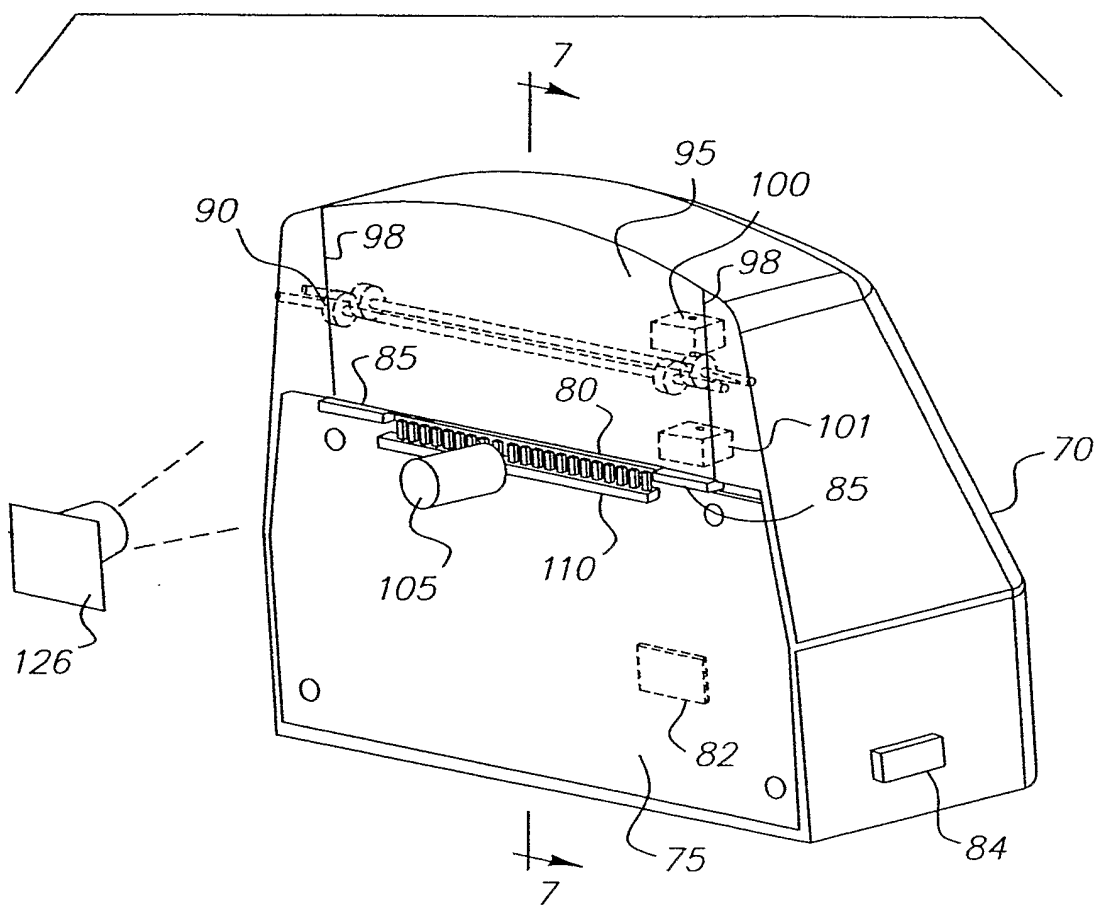
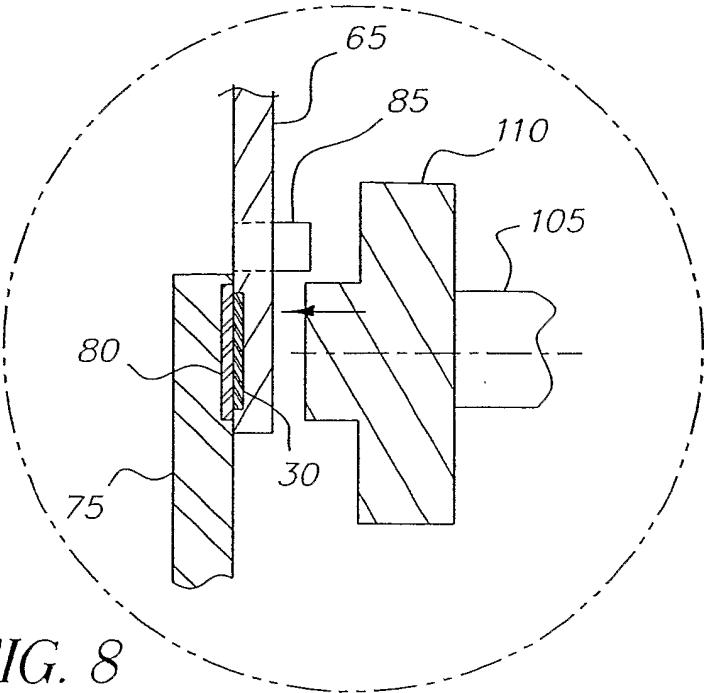
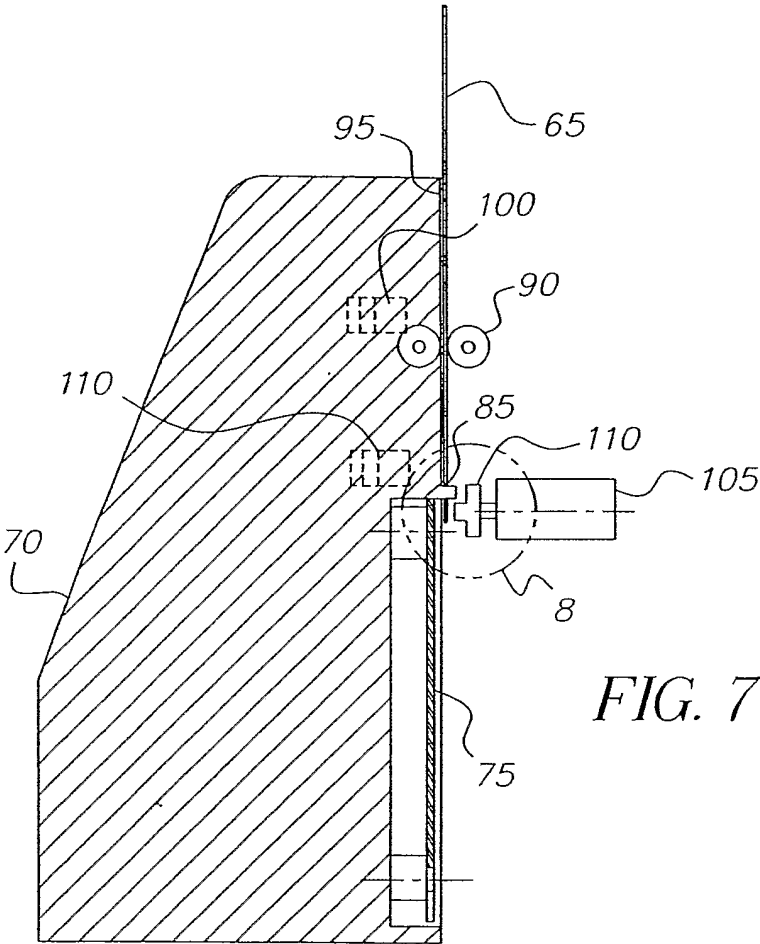


FIG. 6

6/8



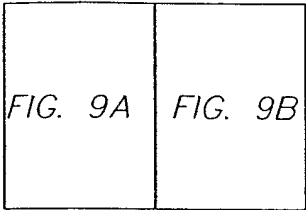
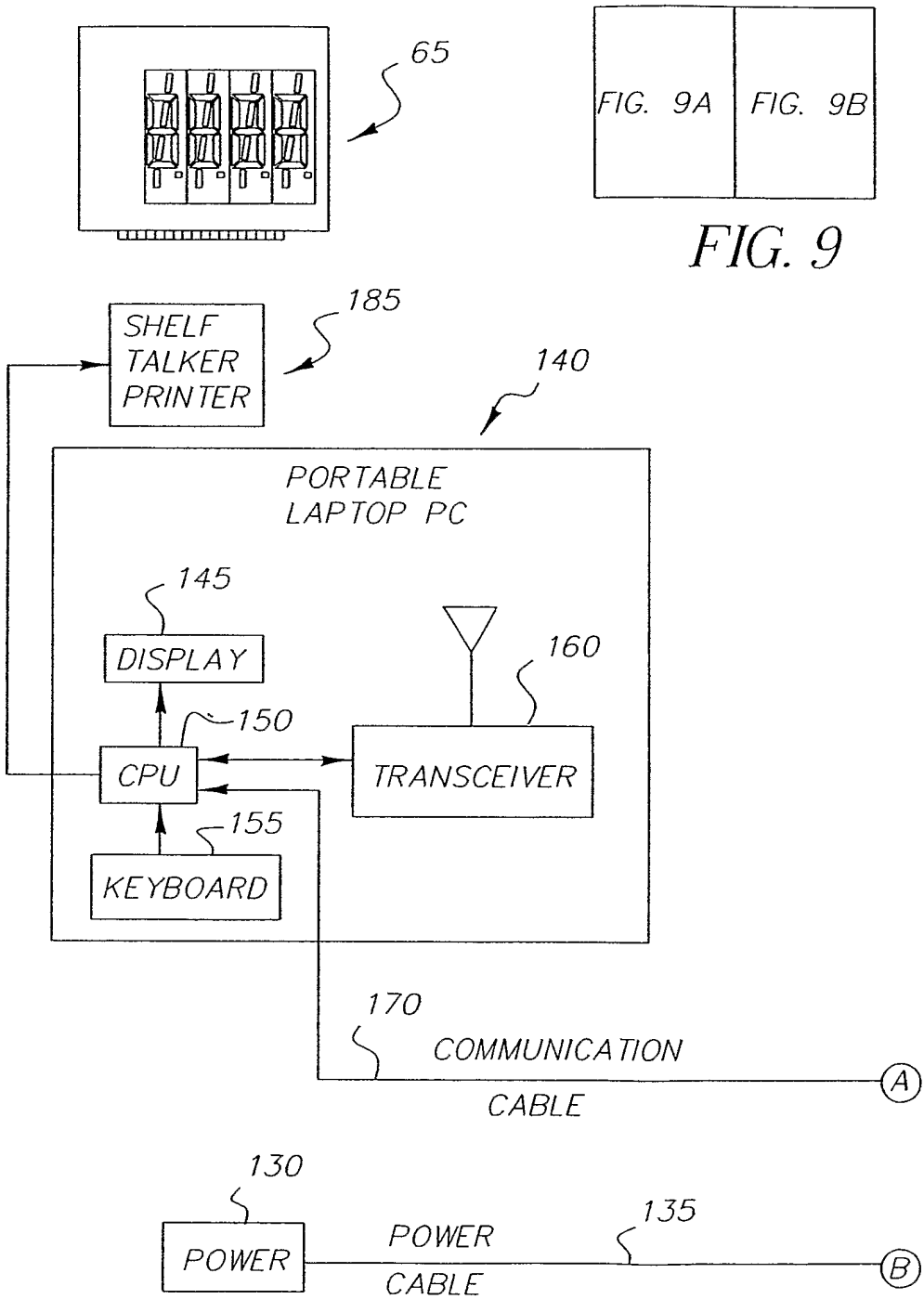
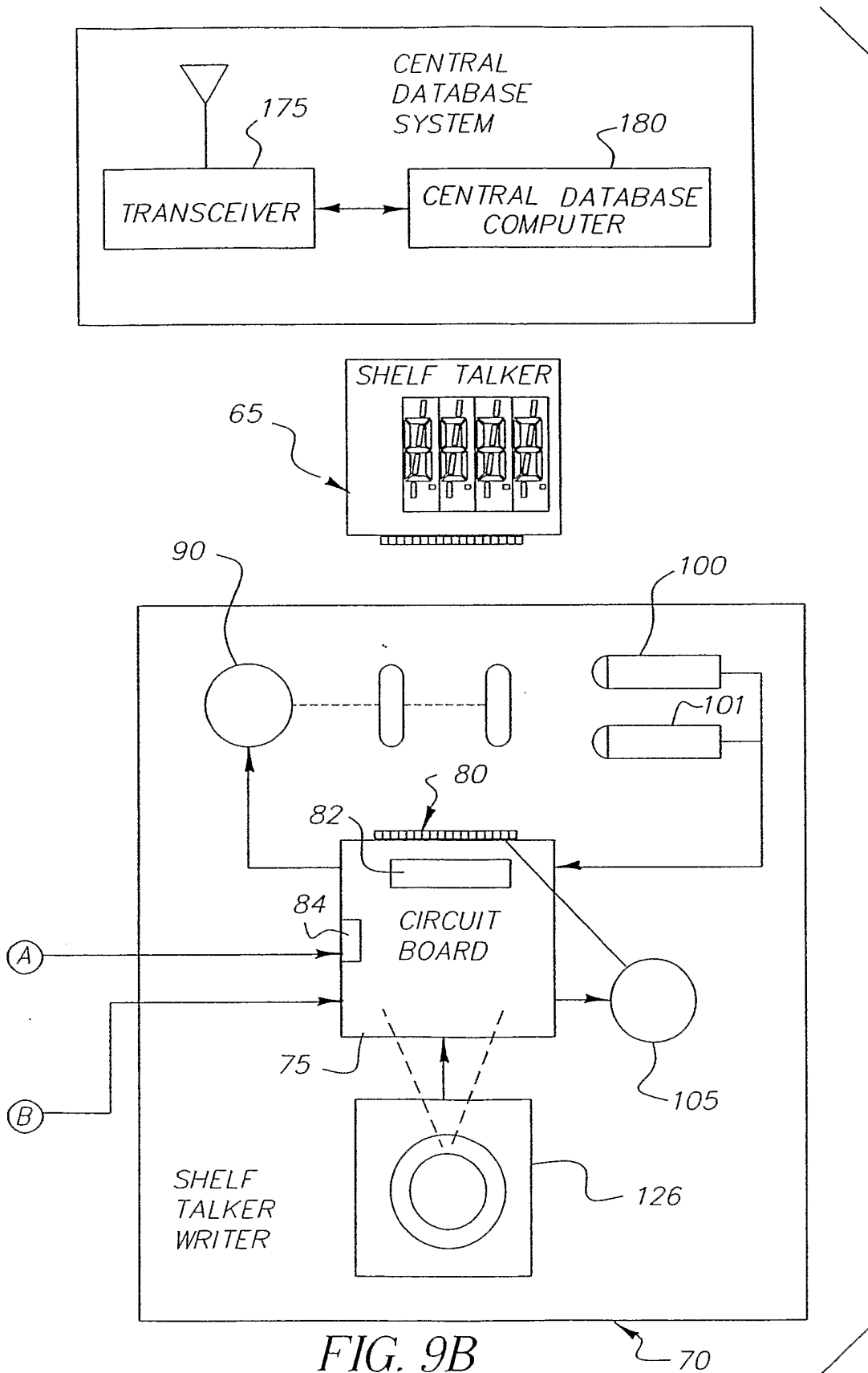


FIG. 9

FIG. 9A

8/8



INTERNATIONAL SEARCH REPORT

International Application No

PCT/US2004/024133

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G06F17/60

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G06F G09F G09G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 258 860 A (EASTMAN KODAK CO) 20 November 2002 (2002-11-20) abstract; claims 1-4; figures 1,2,6,7,10 paragraphs '0009! - '0011!, '0013! - '0015!, '0020!, '0025!, '0026! -----	1-9,21, 23
X	US 2001/054005 A1 (O'HAGAN TIMOTHY P ET AL) 20 December 2001 (2001-12-20) abstract; figures 1,2AB,9,26,27 paragraphs '0048!, '0056! -----	1-19,21, 22
X	US 4 435 047 A (FERGASON JAMES L) 6 March 1984 (1984-03-06) abstract; figures 3,4 column 3, line 17 - column 7, line 5 column 9, line 20 - line 64 ----- -/--	8,9

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

8 December 2004

Date of mailing of the international search report

15/12/2004

Name and mailing address of the ISA

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Streit, S

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US2004/024133

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 1 031 957 A (NCR INT INC) 30 August 2000 (2000-08-30) abstract; figure 9 -----	1,4-7, 10, 14-19,21
A	WO 02/13128 A (WEITMAN JACOB) 14 February 2002 (2002-02-14) claim 1 -----	10,20,22
P,X	EP 1 439 456 A (EASTMAN KODAK CO) 21 July 2004 (2004-07-21) abstract; claims 1,2; figures 1,7,9-12 paragraphs '0001!, '0002!, '0006! - '0019! -----	1-19,21, 22
P,X	US 2003/156090 A1 (WOLFF JAMES SPENCER ET AL) 21 August 2003 (2003-08-21) abstract; figures 5ABC,13,15 paragraphs '0007! - '0012!, '0027! -----	1-3, 8-13,21, 22
P,X	EP 1 369 845 A (EASTMAN KODAK CO) 10 December 2003 (2003-12-10) abstract; figures 1-5 paragraph '0001! - paragraph '0005! paragraph '0010! - paragraph '0019! -----	1,2,4-7, 10-12, 14-19, 21,22

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US2004/024133

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 1258860	A	20-11-2002	US 2002186182 A1 EP 1258860 A1 JP 2003035896 A	12-12-2002 20-11-2002 07-02-2003
US 2001054005	A1	20-12-2001	US 6269342 B1 US 5751257 A US 6253190 B1 US 5699074 A	31-07-2001 12-05-1998 26-06-2001 16-12-1997
US 4435047	A	06-03-1984	AT 60526 T AU 567868 B2 AU 1201583 A BR 8207867 A CA 1186502 A1 DE 3280302 D1 EP 0088126 A1 EP 0268877 A2 GB 2128626 A , B HK 42789 A HK 78191 A JP 6051284 A JP 2013528 C JP 4305620 A JP 7009512 B JP 3052843 B JP 58501631 A KR 9700345 B1 SG 11089 G SU 1620056 A3 WO 8301016 A1 US 4884873 A US 5082351 A US 4606611 A US 4616903 A US 4707080 A US 5089904 A US 4605284 A US 4579423 A US 4810063 A US 4844596 A	15-02-1991 10-12-1987 06-09-1984 30-08-1983 07-05-1985 07-03-1991 14-09-1983 01-06-1988 02-05-1984 09-06-1989 11-10-1991 25-02-1994 02-02-1996 28-10-1992 01-02-1995 13-08-1991 29-09-1983 08-01-1997 29-09-1989 07-01-1991 31-03-1983 05-12-1989 21-01-1992 19-08-1986 14-10-1986 17-11-1987 18-02-1992 12-08-1986 01-04-1986 07-03-1989 04-07-1989
EP 1031957	A	30-08-2000	US 6217966 B1 EP 1031957 A2	17-04-2001 30-08-2000
WO 0213128	A	14-02-2002	SE 517295 C2 SE 519405 C2 AU 7286901 A BR 0113000 A CN 1443339 T EP 1312041 A1 JP 2004506274 T SE 0002736 A SE 0004231 A WO 0213128 A1 US 2004101196 A1 AU 2425602 A CN 1474994 T EP 1336153 A1	21-05-2002 25-02-2003 18-02-2002 24-06-2003 17-09-2003 21-05-2003 26-02-2004 20-01-2002 20-01-2002 14-02-2002 27-05-2004 27-05-2002 11-02-2004 20-08-2003

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US2004/024133

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 0213128	A	JP 2004514225 T	13-05-2004
		WO 0241241 A1	23-05-2002
		US 2004017482 A1	29-01-2004
EP 1439456	A	21-07-2004	US 2004104901 A1
			EP 1439456 A2
			JP 2004184997 A
US 2003156090	A1	21-08-2003	NONE
EP 1369845	A	10-12-2003	US 2003222139 A1
			CN 1469308 A
			EP 1369845 A2
			JP 2004013158 A