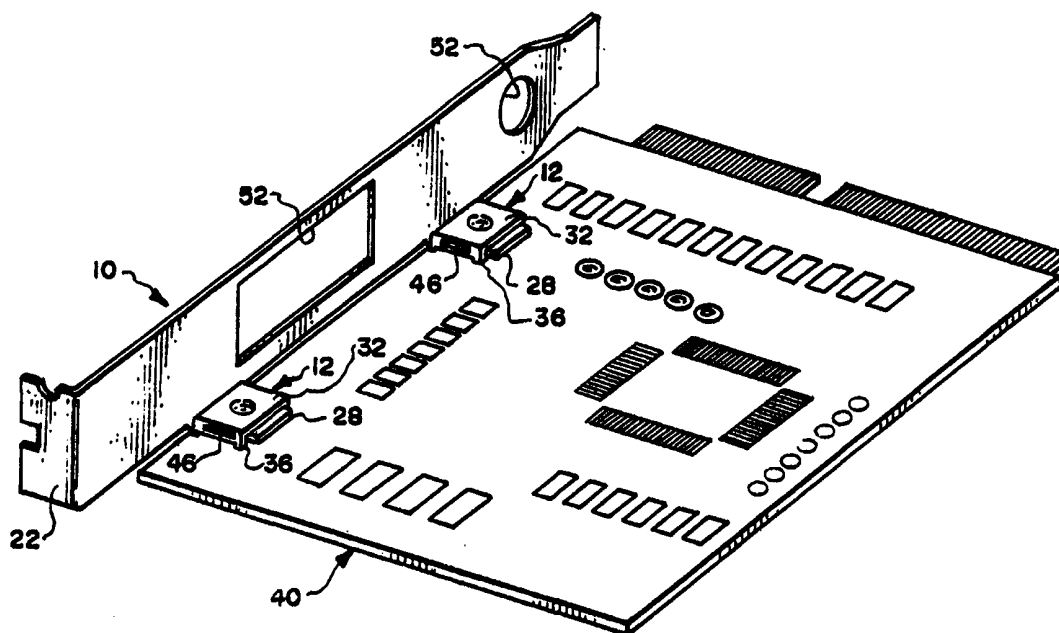




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(54) Title: CIRCUIT BOARD MOUNT



(57) Abstract

A circuit board mount includes a mounting bracket (10) having detent means (26) thereupon and receiver means (12) providing a recess (46) for the acceptance of said detent means (26), the mounting bracket (10) being securable to an electronic device and the receiver means (12) being securable to the circuit board (64) whereby the circuit board (64) and bracket (10) can be operatively connected to each other by robotic assembly means.

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CIRCUIT BOARD MOUNT

This application claims the benefit of U.S. Provisional Application No. 60/054,929, filed August 8, 1997.

5 This invention relates to circuit board mounts and, more particularly, to a circuit board mount which will permit the robotic assembly of the circuit board bracket with the board.

Background of the Invention

10 In recent years, the circuit board industry has produced increasing quantities of add-in boards for LAN, WAN, and communication type applications. Thus, fewer D-SUB type connectors are being utilized on the boards and modular jacks, mini-pin B and C connectors and RCA type
15 connectors are being used.

Consequently, the mounting of the circuit boards in the mother board and within the housing has become a greater problem since present mounts for circuit boards all entail the utilization of some form of manual
20 securement of the mounts to the boards.

Various expedients have been utilized to mount add-in and other circuit boards to the computer housing. For instance, the most prevalent practice is the utilization of a mount consisting of a bracket having right-angularly
25 oriented tabs incorporating fastener receiving holes. The circuit board is secured to the tabs by the insertion of screws through openings in the circuit board corresponding with threaded openings in the tabs.

Alternatively, the openings in the tabs are not pre-
30 threaded and the screws inserted through the openings are maintained in operative relationship with the circuit board and tabs by means of corresponding nuts.

Attempts have also been made to rivet circuit boards to the tabs of associated mounting brackets, but the
35 vagaries of the riveting process have militated against the acceptance of this method due to the unpredictable

cracking and other damage imposed on the boards by the riveting process.

In any event, all of these methods entail the manual assembly of the brackets with the boards and, thus, prevent the utilization of currently accepted robotic processing which is characteristic of circuit board manufacture.

Objects and Advantages of the Invention

A primary object of my invention is the provision of a circuit board mount which will permit the mounting bracket to be assembled in operative relationship with a circuit board automatically, thus dispensing with the conventional hand assembly of the bracket with the circuit board.

Another object of my invention is the provision of a circuit board mount which includes engagement means on the circuit board bracket and receptor means on the circuit board whereby the automatic insertion of the engagement means in the receptor means accomplishes the permanent mounting of the bracket on the circuit board.

An additional object of my invention is the provision of a circuit board mount wherein the aforesaid engagement means on the bracket includes one or more connector elements or tabs formed integrally with the bracket and protruding therefrom for engaging one or more receptor means on said circuit board during the automatic assembly of the bracket with the circuit board.

Another object of my invention is the provision of a circuit board mount incorporating latching means to ensure the optimum securement of the aforesaid bracket to the circuit board. The latching means performs two functions, namely: the location of the engagement means in the receptor means at the proper location and the retention of the engagement means in the receptor means.

A further object of my invention is the provision of engagement means on said bracket incorporating detent means cooperative with latching members on said receptors.

5 An additional object of my invention is the provision of a circuit board mount wherein the latching means provided on the female receptors are spring biased into engagement with the tab detent means resulting in the automatic engagement of the tab detent means by said latching means.

10 An additional object of my invention is the provision of a computer mount of the aforesaid character wherein conductor means is provided between said engagement means and said receptor to ensure the proper grounding of the circuit board through the associated mounting bracket.

15 A further object of my invention is the provision of a circuit board mount wherein the conductor means is incorporated in the latching means to establish a ground with said tabs when said latching means engages said detent means.

20 Another object of my invention is the provision of a mount for add-in printed circuit boards which can be assembled in operative relationship with the boards by the utilization of the pick-and-place equipment assembly being utilized to install components on the circuit board.

25 A further object of my invention is the provision of a circuit board mount incorporating receptors which can be placed on the board during the component placement sequence which permits the installation of the bracket on the receptors at the end of the assembly line.

30 Other objects and advantages of the invention will be apparent from the following specification and the drawings accompanying the same.

Brief Description of the Drawings

35 FIG. 1 is an isometric view of the circuit board mount of the invention;

- FIG. 2 is an isometric view of the receptors secured to the circuit board;
- FIG. 3 is a side elevational of the mount installed on the circuit board;
- 5 FIG. 4 is a top plan view showing the bracket engagement means detents;
- FIG. 5 is an isometric top view showing one of the receptors;
- FIG. 6 is an isometric bottom view of the receptor of
10 Fig. 5;
- FIG. 7 shows an alternative embodiment of the receptor;
- FIG. 8 shows the receptor of Fig. 7 prior to installation on a circuit board;
- 15 FIG. 9 illustrates the mounting of the receptor on a circuit board with the bracket tab detent means engaged by the latching means to maintain the tab in operative relationship with the receptor;
- 20 FIG. 10 is a fragmentary view of a tab constructed in accordance with the teachings of the invention; and
- FIG. 11 shows a pair of tabs on a circuit board bracket.

25 Preferred Embodiment of the Invention

Referring to the drawings, and particularly to FIGS. 1-4 thereof, I show the components of a circuit board mount which consists of a bracket 10 and a pair of receptors 12. The bracket 10 is fabricated from cold-
30 rolled steel which is nickel-plated after the completion of the bracket by various well-known stamping procedures.

The body 16 of the bracket 10 includes an elongated shank 18 having a right-angularly oriented head 22 formed integrally therewith. The shank 18 and head 22 are common
35 configurations of presently utilized circuit board brackets and are installable in a computer chassis, not

shown, to create a ground between the circuit board and the chassis.

Formed integrally with an edge of the shank 18 is a pair of engagement means or tabs 24, said tabs having
5 detent means or notches 26 provided in the opposite edges thereof for a purpose which will be described in greater detail below. The tabs 24 have entry heads 28 which are adapted to cooperate with and facilitate the entry of the tabs into mounting engagement with the receptors 12 of
10 FIGS. 2 and 3.

The receptors 12, as best shown in FIGS. 5 and 6, are formed from cold rolled steel stampings which are subsequently nickel-plated and essentially include an upper or top wall 32 and depending side walls 34, the side
15 walls 34 having attachment feet 36 which facilitate the securement of the receptors in operative relationship with the circuit board 40, in a manner to be described in greater detail below. The top wall 32 and depending side walls 34 define a receptacle cavity 42 when the receptor
20 12 is operatively associated with the circuit board 40.

Latching means 44 is provided on the receptors 12 by punching slots 46 in the side walls 34 to form latching tongues 48, as best shown in FIG. 6, which snap into the detent notches 26 formed in the tabs 24 to lock the
25 circuit board 40 to the bracket 10 and to accurately position the circuit board 40 on the bracket 10.

At this juncture, it should be noted that the bracket 10 incorporates various ports 52 for the location of sockets, conductors, or other inputs or outputs to or from the
30 circuit board 40.

Although I have shown and described the components of the circuit board mount as including brackets having particular forms of engagement means receivable in corresponding receptors, it will be understood by those
35 skilled in the art that various types of receptors and various configurations of tabs may be utilized to achieve

the desired result. For instance, a tongue and groove relationship between tab and receptor would function in a manner analogous to the functioning of the presently disclosed tabs and receptors.

5 The securement of the receptors 12 to the circuit board 40 is shown in FIG. 3 of the drawings wherein the lower edges of the depending side walls 34 of the receptors 12 impinge upon the upper surface of the circuit board 40 and the depending legs 36 are engaged in
10 openings, not shown, through the circuit board 40. The securement of the receptors 24 to the circuit board can be accomplished by such means as soldering or the like during the robotic pick-and-placement of the various components of the circuit board, thus eliminating manual assembly of
15 the receptors 12 upon the board 40.

 At the end of the assembly line, the tabs 24 are registered with the corresponding receptacles 42 defined between the upper surface of the circuit board 40 and the under surface of the top wall 32 as shown at 42. The tabs
20 24 are urged into the recesses 42 and the heads 28 thereof deflect the spring tongues 48 of the latching means 44, thus permitting the passage of the heads 28 to the position shown in FIG. 1 of the drawings wherein they protrude from the recesses 42.

25 When the heads 28 are located in the positions shown in FIG. 1, the tongues 48 spring into the detent notches 26 and lock the tabs 24 against dislocation from the receptors 12. In addition, the snapping of the tongues 48 into the detents 26 ensures the proper location of the
30 tabs 24 with reference to the circuit board 40 ensuring that the ground between the circuit board and the bracket will be achieved and maintained.

 To facilitate the maintenance of the ground, each of the receptors 12 incorporates a concave recess 56, best
35 shown in FIGS. 5-6 of the drawings, which impinges on the respective tab 24 located beneath it to ensure that the

maintenance of the ground will persist during the securement of the circuit board 40 to the bracket 10.

Shown in Figs. 7-11 of the drawings is an alternative embodiment of the mount of Figs. 1-6 of the drawings
5 wherein the mounts are essentially similar in construction and mode of operation but have additional features distinguishing the mount of Figs. 7-11 from that of the previously described mount.

The circuit board mount of Figs. 7-11 includes a
10 bracket 60 and a pair of receptors 62, which are mounted on a circuit board 64 in the same manner as in the previously discussed embodiment of the invention. Mounting tabs 66 are provided on the bracket 60 and have entry heads 68 which facilitate the introduction of the
15 tab 66 into operative engagement with the receptors 62. Detent means 72 is provided in the tabs 66 in the form of openings 74 with the leading edge 76 of the opening 74 serving as the detent portion of the detent means.

The receptors 62 are stamped from cold, rolled steel
20 and are, subsequently, nickel-plated. The receptors 62 include an upper or top wall 82 and depending side walls 84 having bifurcated attachment feet 86. The attachment feet 86 incorporate bifurcated legs 88 which have retention protrusions 92 thereupon.

25 The top wall 82 and depending side walls 84 define a receptor cavity 94 when the receptor 62 is mounted in operative relationship with a circuit board 64 in a manner to be described in greater detail below.

Latching means 104 is provided on the receptor 62 and
30 includes a latching tongue 106 punched out of the top wall 82 and being spring-biased downwardly into the receptor cavity 94.

When the tabs 66 are inserted into the receptor cavity 94, the ends 68 of the tabs displace the latching
35 tongues 106 of the receptors 66 upwardly until the leading edges 76 of the detent means 72 of the tabs 66 register

with the corresponding free edges of the tongues 106 which are then urged downwardly by the spring action thereof to engage said leading edges 76 and lock the tabs 66 in the cavities 94 of the receptors 62.

5 After such locking occurs, the bracket 60 is maintained against displacement from the circuit board 64. The installation of the receptors 62 in operative relationship with the circuit board 64 is shown in Figs. 7 and 9 of the drawings. The lower extremities of the
10 bifurcated legs 86 are forced into the openings 108 of the circuit board and the retention projections 92 lock the receptors 62 in position on the circuit board 64.

Subsequently, the bifurcated legs 86 can be silver soldered or otherwise permanently affixed to the circuit
15 board 102 if such subsequent affixation appears necessary.

The grounding function of the mount is accomplished by the spring tongue 106 of the latching means 104. When the spring tongue 106 engages the extremity 76 of the opening 74 constituting the detent means 72, a grounding
20 circuit is established through the tabs 66 and the bracket 60.

By the utilization of the mount consisting of the bracket and receptors of my invention, the robotic assembly of the bracket in operative relationship with the
25 board 40 can be accomplished, thus eliminating any manual assembly of any kind and permitting the utilization of the pick-and-place equipment presently utilized in depositing and securing board components on the circuit board.

It will, of course, be obvious to those skilled in
30 the art that, as suggested above, the physical relationship which is the heart of the matter in the present circuit board mount can be achieved by equivalent means without departing from the scope of the invention.

CLAIMS

I Claim:

1. In a circuit board mount, the combination of: a circuit board mounting bracket, said mounting bracket
5 having engagement means thereupon; and receptor means secured to said circuit board, said receptor means incorporating a receptacle for slidable engagement by said engagement means.
2. The mount of claim 1 in which said engagement
10 means is formed integrally with said mounting bracket.
3. The mount of claim 2 in which said engagement means is electrically conductive.
4. The mount of claim 1 in which said engagement means and receptor means are electrically conductive.
- 15 5. The mount of claim 4 in which said receptor means incorporates electrical contact means for ensuring electrical grounding of said circuit board through said bracket.
6. The mount of claim 1 in which said engagement
20 means is formed integrally with said bracket and incorporates detent means and said receptor means includes latching means engagable with said detent means to locate and latch said engagement means in said receptor means.
7. The mount of claim 6 in which said detent means
25 is formed by detents on said engagement means and said latching means is constituted by latching members on said receptor.
8. A mounting bracket for a circuit board having an engagement tab thereupon for slidable engagement with a
30 circuit board receptor on said board.
9. The bracket of claim 8 in which detent means is provided for securement and location of said tab in said receptor.
10. The bracket of claim 9 in which said detent
35 means on said tab engages latching means on said receptor.

11. The bracket of claim 8 in which said mounting bracket and said tab are electrically conductive and electrically communicable with said receptor.

5 12. The bracket of claim 11 in which said receptor has contact means thereupon to ensure conduction between said circuit board and said mounting bracket through said tab.

10 13. A mounting bracket for a circuit board having engagement means thereupon for automatic engagement with a circuit board receptor to automatically secure said circuit board to said mounting bracket.

14. The bracket of claim 13 in which said bracket is electrically conductive to electrically connect said bracket to said circuit board.

15 15. The bracket of claim 13 which incorporates detent means for engagement with said receptor.

20 16. A receptor mountable on a circuit board for reception of engagement means on a mounting bracket, said receptor including a receptacle for the slidable reception of said engagement means.

17. The receptor of claim 16 which incorporates electrical contact means for establishing a current between said receptor and said engagement means.

25 18. The receptor of claim 17 having latching means thereupon for retaining said engagement means in said receptor.

30 19. In a circuit board mount, the combination of:
a mounting bracket, said mounting bracket having securement means thereupon, said securement means incorporating detent means; and

receiver means, said receiver means defining a recess for the reception of said securement means, said receiver means being securable to said circuit board; and

incorporating latching means engagable with said
detent means to maintain said bracket in operative
relationship with said circuit board.

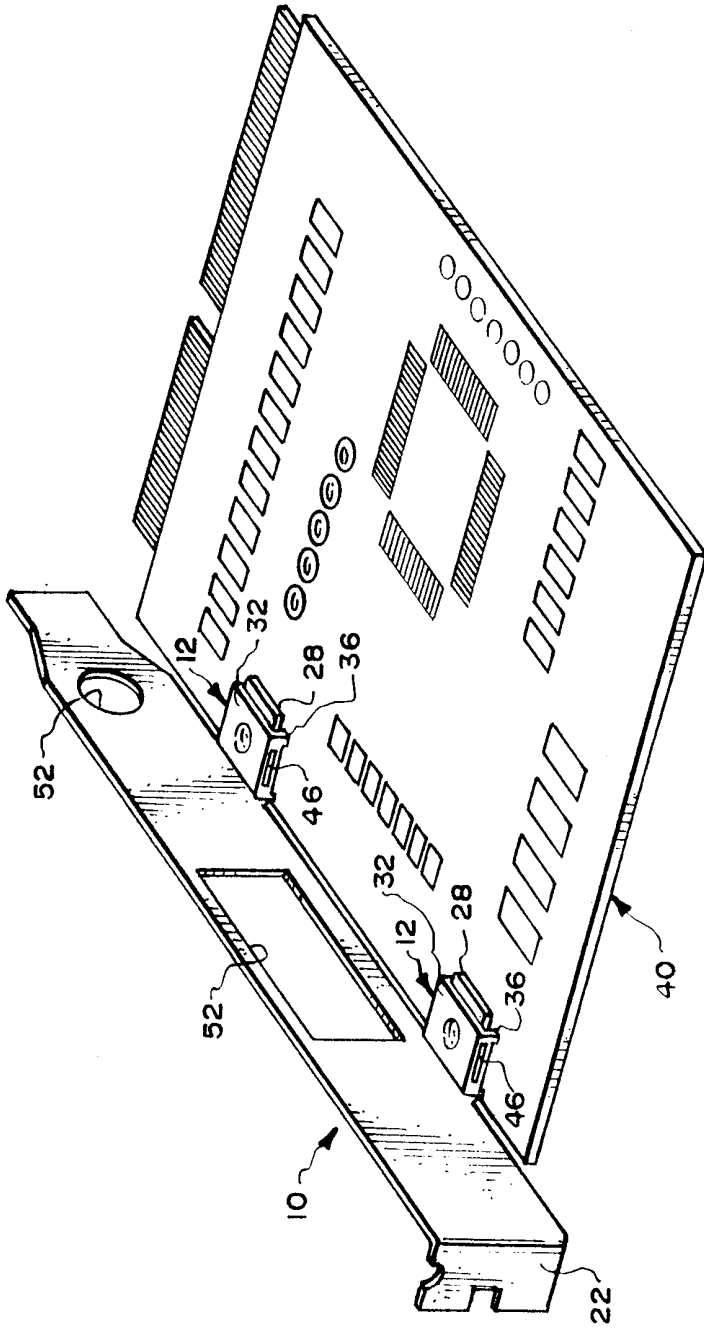


Fig. 1.

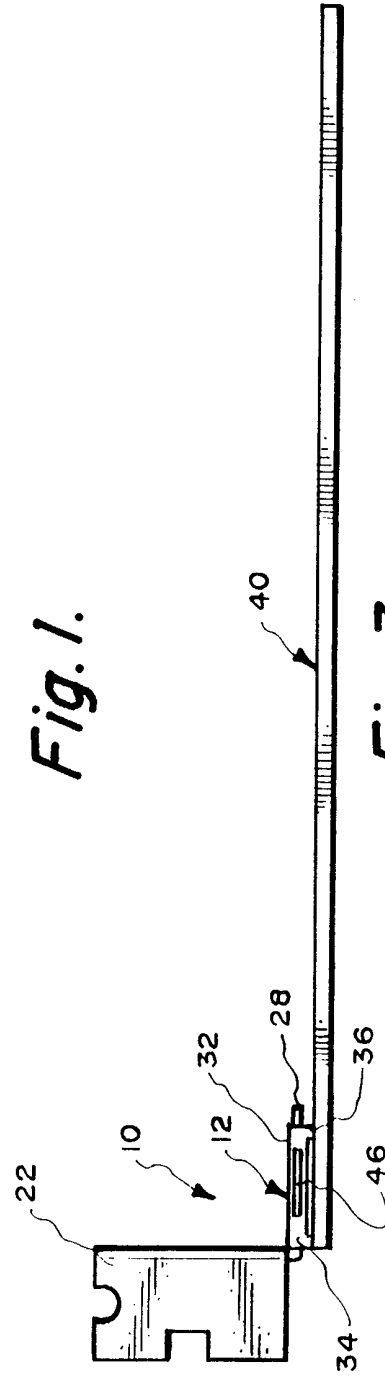


Fig. 3.

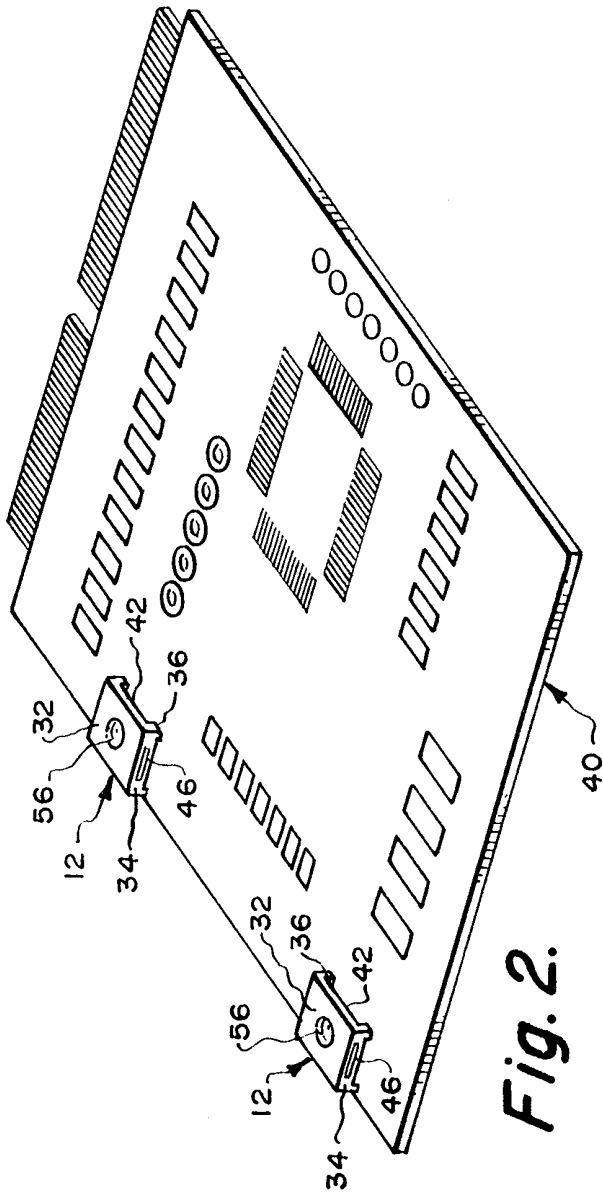


Fig. 2.

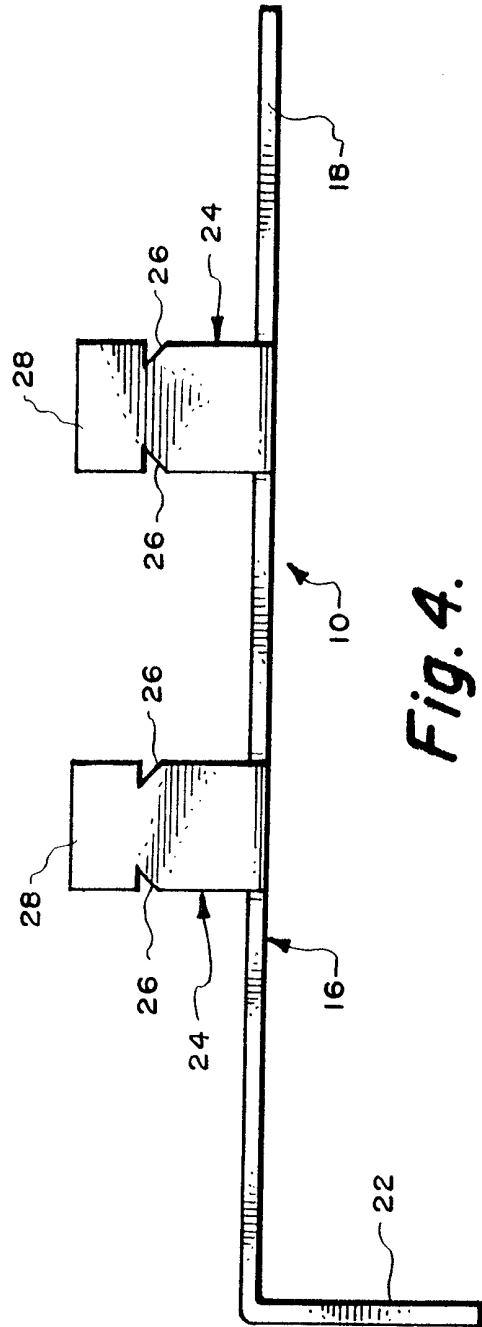


Fig. 4.

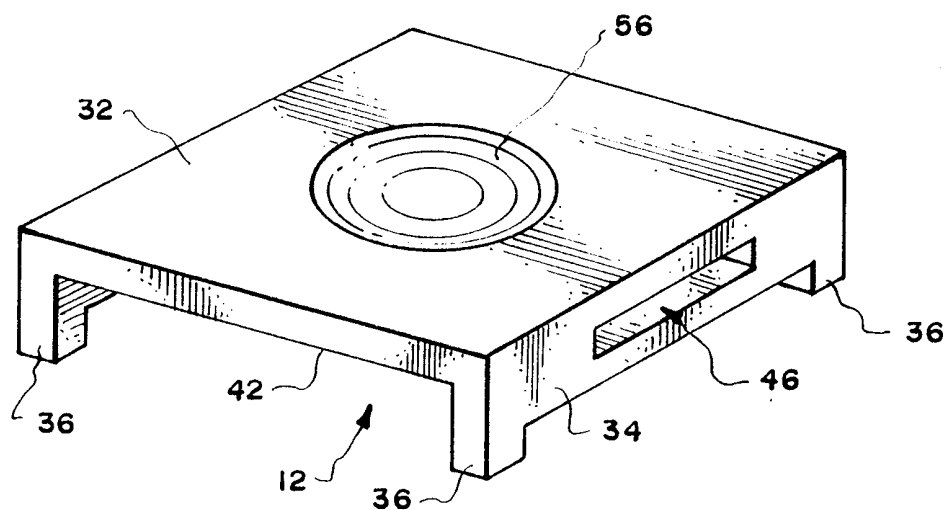


Fig. 5.

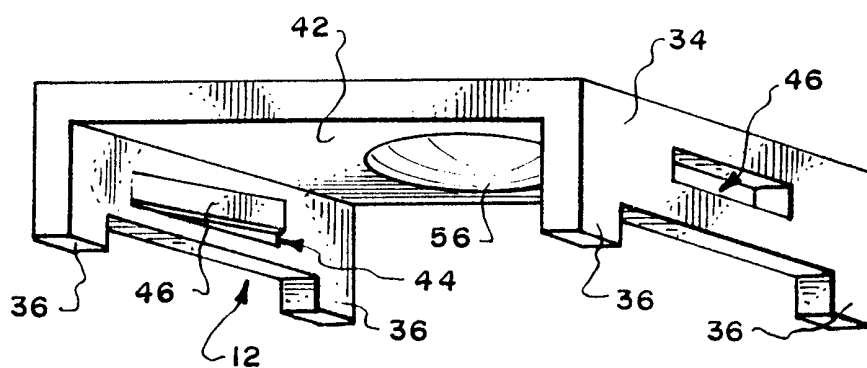


Fig. 6.

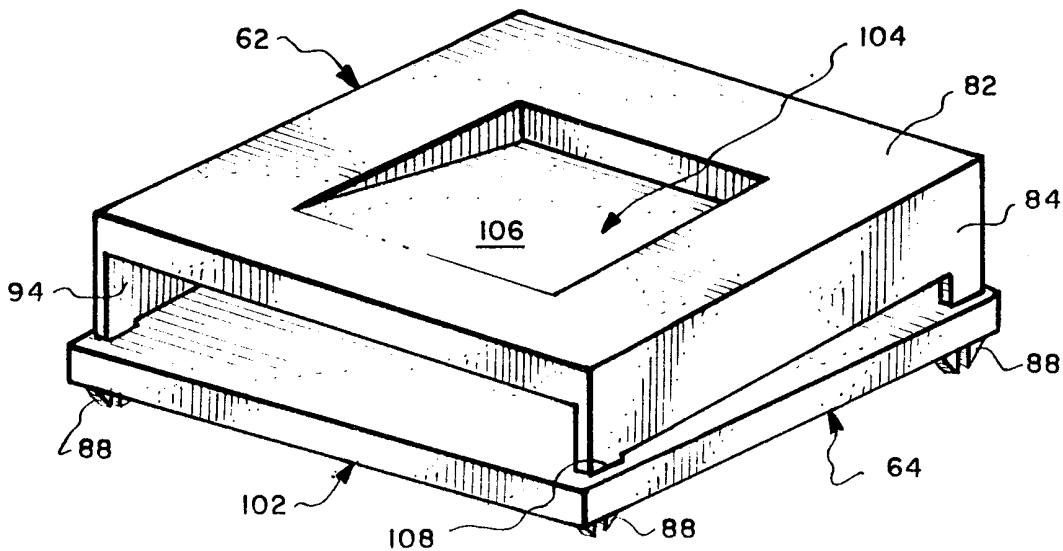


Fig. 7.

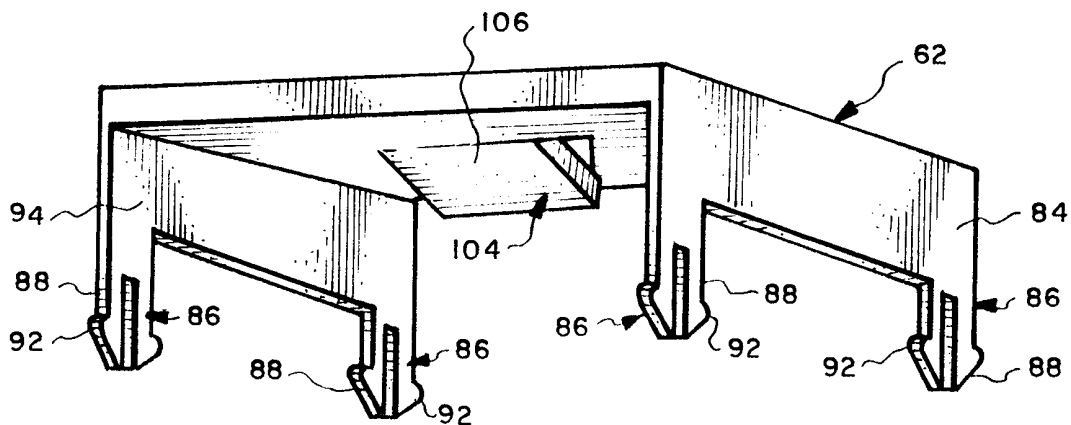


Fig. 8.

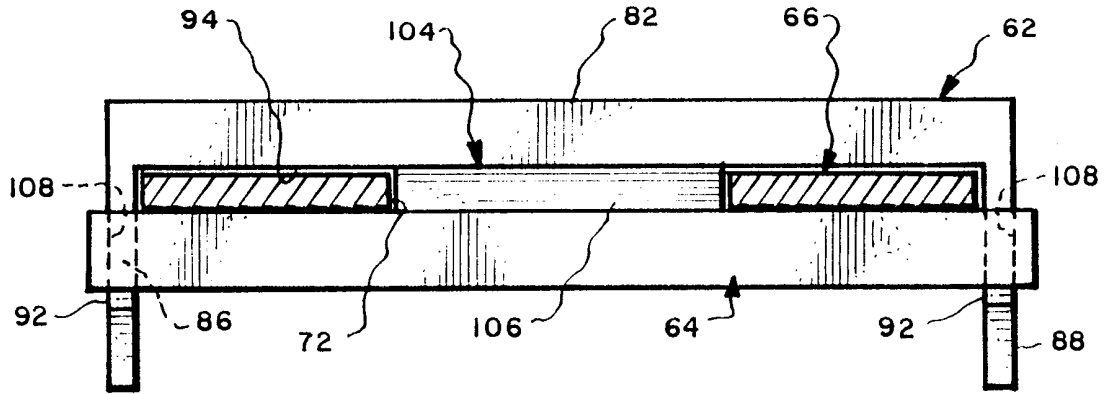


Fig. 9.

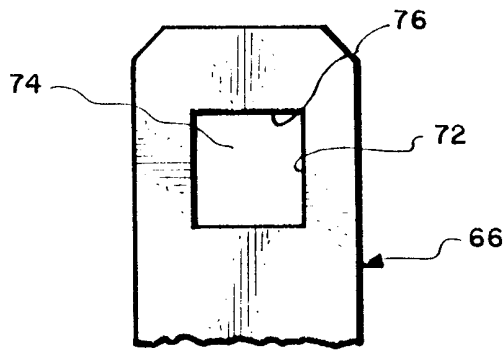


Fig. 10.

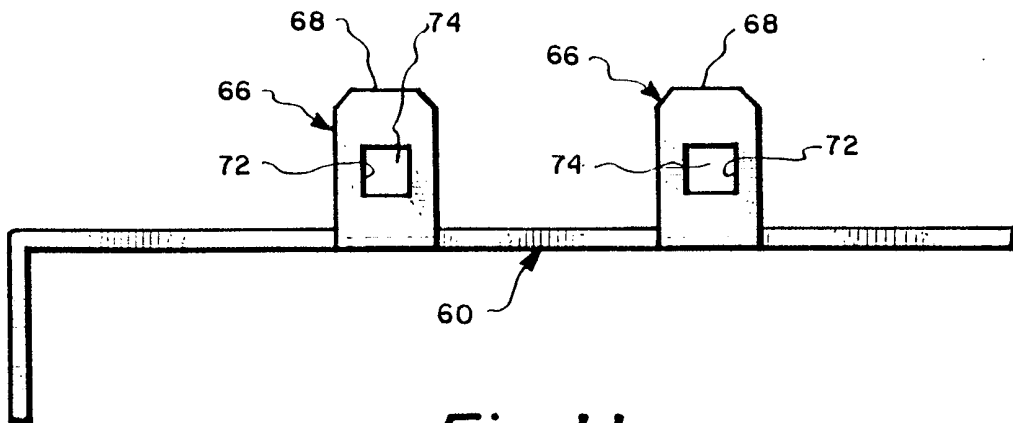


Fig. 11.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US98/14307

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :H05K 7/14

US CL :361/ 748, 759, 799; 248/223.31

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)

U.S. : 361/748, 752, 759, 796, 797, 799, 800, 801, 816, 818; 174/51; 24/456, 457; 248/223.31, 224.7,225.21; 211/41.17

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
NONE

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

U.S. PTO APS Search Terms: circuit board?, bracket, ground, latch

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X,P --- Y,P	US 5,754,404 A (BIERMANN et al.) 19 MAY, 1998, (19/05/98) col. 2, lines 36-67, and col. 3, lines 1-16	1, 2m 8-10, 13, 16 ----- 3-7 , 11-12, 14-15, and 17-19
Y	US 5,343,361 A (RUDY, Jr. et al) 30 August 1994, (30/08/94) column 6, lines 17-23.	3-5, 11-12, 14-15, and 17
Y	US 4,974,798 A (HARDING et al) 04 December, 1990, (04/12/90) column 3, lines 17-40	6, 7, and 18-19

Further documents are listed in the continuation of Box C. See patent family annex.

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Date of the actual completion of the international search

16 OCTOBER 1998

Date of mailing of the international search report

09 NOV 1998

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Facsimile No. (703) 305 7724

Authorized officer

JAYPRAKASH N GANDEHI

Telephone No. (703) 308-0524