

July 1, 1969

L. W. BRENDLEN, JR

3,453,586

EXTRACTOR-LOCK MECHANISM

Filed Sept. 12, 1967

Sheet 1 of 2

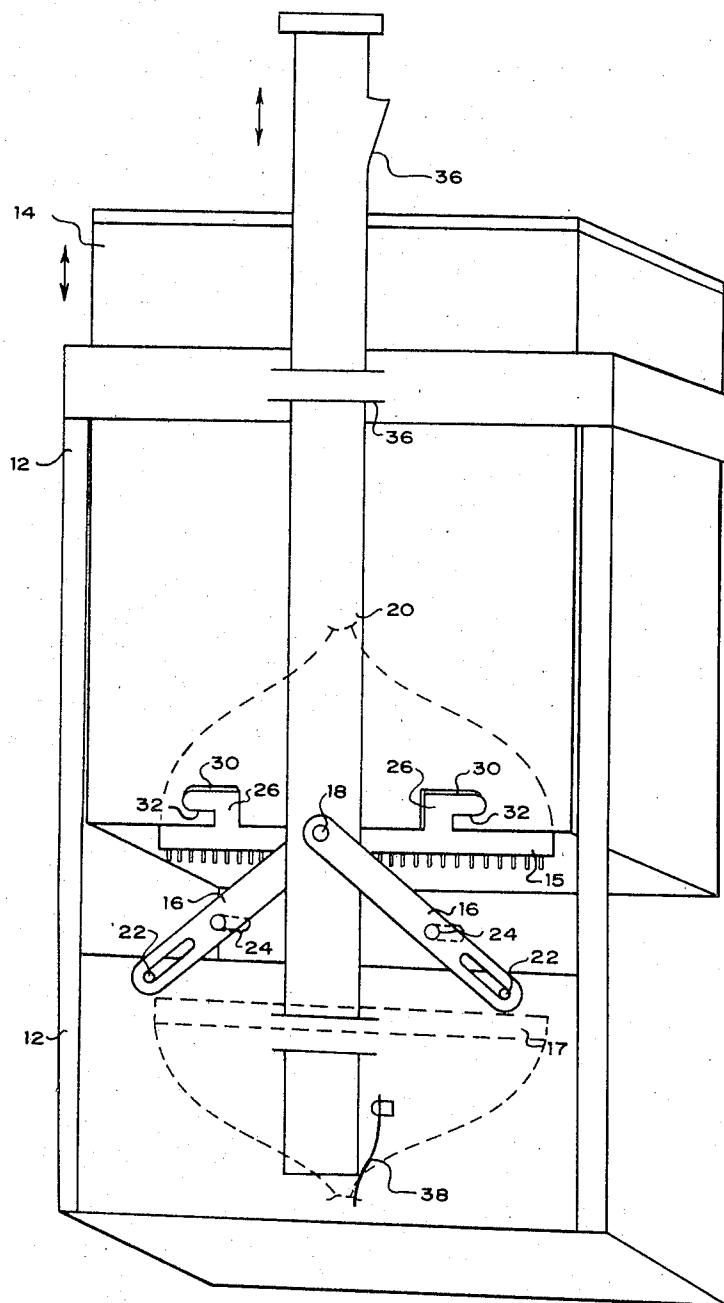


Figure 1

INVENTOR
LAWRENCE W. BRENDLEN, JR
BY *Roland D. Griffin*
ATTORNEY

July 1, 1969

L. W. BRENDLEN, JR
EXTRACTOR-LOCK MECHANISM

3,453,586

Filed Sept. 12, 1967

Sheet 2 of 2

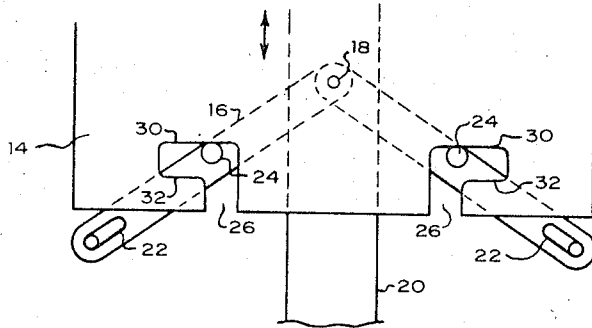


Figure 2

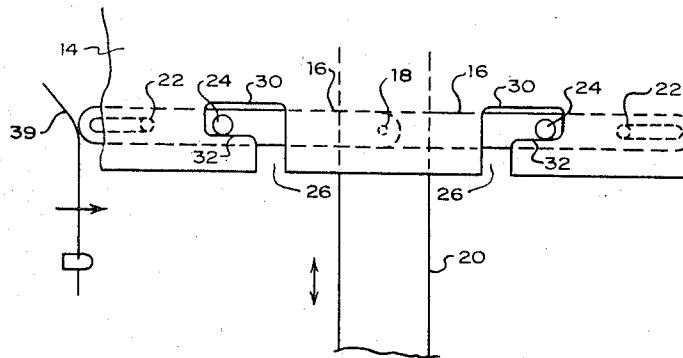


Figure 3

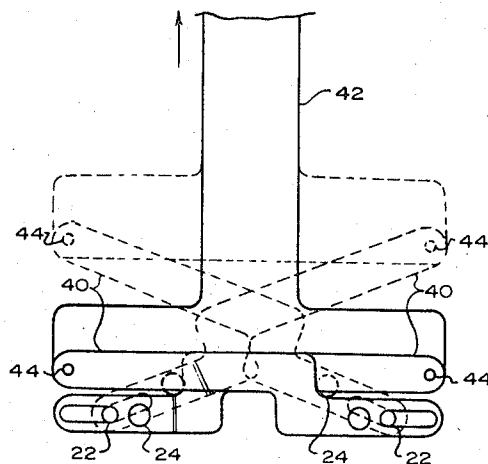


Figure 4

INVENTOR
LAWRENCE W. BRENDLEN, JR.

BY *Roland O. Griffin*
ATTORNEY

1

3,453,586

EXTRACTOR-LOCK MECHANISM

Lawrence W. Brendlen, Jr., Sunnyvale, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif., a corporation of California

Filed Sept. 12, 1967, Ser. No. 667,300

Int. Cl. H01r 13/62, 13/54

U.S. Cl. 339-45

10 Claims

ABSTRACT OF THE DISCLOSURE

A mechanism converts the linear motion of a handle link to rotary motion of a pair of rotary links to extract, insert, and retain a plug-in component in the main frame of a primary unit. A raised portion on each of these rotary links engages a catch on the base of the plug-in component, thereby moving the component in correct alignment with the main frame.

BACKGROUND AND SUMMARY OF THE INVENTION

This invention relates to a mechanism for extraction, insertion, and retention of a plug-in component in the main frame of a primary unit.

At the rear of a plug-in component there is typically at least one male connector which must be mated with a matching female connector in the main frame. In engaging and removing the plug-in unit there is often a great deal of friction between these connectors which must be overcome. Also, the prong contacts of the male connector must move straight in and out of their corresponding receptacle in the female connector to avoid bending or jamming.

In accordance with the illustrated embodiment of this invention, the main frame of a primary unit is provided with a linearly movable handle link connected to a pair of rotary links. These rotary links are individually attached to the main frame so they will rotate with the linear motion of the handle link. A raised portion of each of these rotary links is positioned to engage an associated catch on the base of the plug-in component and thereby imparts motion to the component. Since driving occurs at two points on the base of the plug-in component, correct alignment is provided for the connection of the prong contacts and their associated receptacles. By changing the rotary link length and the location of their raised portions, the plug-in component may be inserted with different mechanical advantages. By offsetting the link handle such that a latch portion thereof engages a catch when the plug-in component is fully inserted, the component may be locked in place at the rear of the main frame with its connector plug and the associated receptacle fully engaged. Alternatively, the plug-in component can be locked in the main frame by allowing the rotary links to rotate beyond a position forming an angle of ninety degrees with the handle link.

DESCRIPTION OF THE DRAWING

FIGURE 1 is a simplified drawing showing a bottom perspective view of an extractor lock mechanism according to the preferred embodiment of this invention.

FIGURE 2 is a drawing illustrating the extraction and insertion operating modes of the mechanism of FIGURE 1.

FIGURE 3 is a drawing illustrating the insertion and locking operating modes of the mechanism of FIGURE 1.

FIGURE 4 is a simplified drawing illustrating another

2

arrangement of rotary links that may be used with the mechanism of FIGURE 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to FIGURE 1, there is shown a primary unit main frame 12 and a plug-in component 14 which are to be electrically connected by male and female connectors 15 and 17. Two rotary links 16 are each attached at one end by a pin joint 18 to handle link 20. This handle link is constrained to slide in and out of main frame 12. The remaining end of each rotary link 16 is hinged to main frame 12 by sliding pin joints 22. A raised portion 24 is positioned along each rotary link 16 to engage a corresponding catch 26 in the base of the plug-in component chassis. Each catch comprises a generally L-shaped slot.

In the insertion operating mode, plug-in component 14 is inserted manually in main frame 12 until raised portions 24 of rotary links 16 hit the long surface 30 of L-shaped catches 26, as shown in FIGURE 2. This occurs approximately when the prong contacts of plug-in connector 15 have reached their associated receptacles in female connector 17. The handle link 20 is then pushed toward the back of the main frame thereby shifting the rotary links along their lengths in the sliding pin joints 22 and applying a force through raised portions 24 to the short surfaces 32 of L-shaped catches 26. This force is much greater than that applied to handle link 20 because of the mechanical advantage achieved according to the ratio of the length of each rotary link 16 to the distance between its raised portion 24 and the associated sliding pin joint 22. This mechanical advantage helps overcome the friction in engaging male and female connectors 15 and 17.

At the completion of the insertion mode, plug-in component 14 is firmly located against the back of main frame 12 and is electrically connected thereto by connectors 15 and 17. The rotary links 16 are parallel to one another, as shown in FIGURE 3, and are held in place by the raised portions 24 of rotary links 16, which are constrained by handle link 20. Spring 38, mounted on main frame 12, offsets handle link 20 so that latch 36 will be engaged by the main frame 12 to hold component 14 in place.

As an alternate means for holding the plug-in component 14 in place, spring 39 is mounted on main frame 12 to supply a force to the rotary links 16 as shown in FIGURE 3. This constrains rotary links 16 and, hence, the plug-in component when the rotary links are rotated to a position making an angle of at least ninety degrees with handle link 20.

In the extraction mode, plug-in component 14 is removed from main frame 12 by first releasing latch 36, so handle link 20 can be pulled out from the main frame. As the handle link 20 is pulled out the position of raised portions 24 shifts to the long surface 30 of L-shaped catches 26 as shown in FIGURE 2. Further pulling out of handle link 20 applies a force to plug-in unit 14 therefore removing plug-in unit 14 from main frame 12 and detaching connectors 15 and 17.

Referring now to FIGURE 4, there is shown an alternative arrangement of rotary links 40 and handle link 42 allowing for consolidation of the mechanism for operation with smaller plug-in units without sacrificing the mechanical advantage associated with longer rotary links. Rotary links 40 are crossed and attached at distinct points on handle link 42 by pins 44. The rotary links 40 are offset so they will cross without blocking each other as the links rotate into the position shown in broken lines.

What is claimed is:

1. An extractor-lock mechanism for a plug-in component, said mechanism comprising:

a primary unit having a main frame for receiving the plug-in component;

a handle link movably supported on the main frame; a pair of rotary links, each having a raised portion and being hinged at one end to the main frame and at the other end to the handle link; and

a plug-in component having a base with a pair of catches for receiving the raised portions of the rotary links.

2. An extractor-lock mechanism as in claim 1 including means for locking the plug-in component into the main frame of the primary unit.

3. An extractor-lock mechanism as in claim 2 wherein said locking means includes a latch for engaging the main frame to hold the handle link in a substantially fixed position.

4. An extractor-lock mechanism as in claim 2 wherein said locking means includes apparatus for constraining said links when they rotate to a position making an angle of at least ninety degrees with the handle link.

5. An extractor-lock mechanism as in claim 2 wherein said catches comprise substantially L-shaped slots in the plug-in component.

6. An extractor-lock mechanism as in claim 5 wherein both of said rotary links are hinged to the handle link at a single point.

7. An extractor-lock mechanism as in claim 5 wherein said rotary links are crossed and attached at distinct

points on the handle link, said rotary links being offset to allow them to cross as the links rotate.

8. An extractor-lock mechanism as in claim 1 wherein said catches comprise oppositely facing substantially L-shaped slots in the plug-in component.

9. An extractor-lock mechanism as in claim 8 wherein said rotary links are crossed, each of said rotary links being slidably hinged at said one end to the main frame of the primary unit and being hinged at said other end to said handle link.

10. An extractor-lock mechanism as in claim 9 wherein: the main frame of said primary unit includes means for guiding the movement of said handle link; and said mechanism includes means for locking the plug-in component into the main frame of the primary unit.

References Cited

UNITED STATES PATENTS

2,735,077	2/1956	Jessee et al.	
2,894,763	7/1959	Karnath et al.	---- 339—45 XR
3,122,603	2/1964	Atkinson.	
3,181,906	5/1965	De Rose et al.	

FOREIGN PATENTS

687,866	2/1940	Germany.
---------	--------	----------

MARVIN A. CHAMPION, *Primary Examiner*.

PATRICK A. CLIFFORD, *Assistant Examiner*.

U.S. Cl. X.R.

29—206; 339—75, 91