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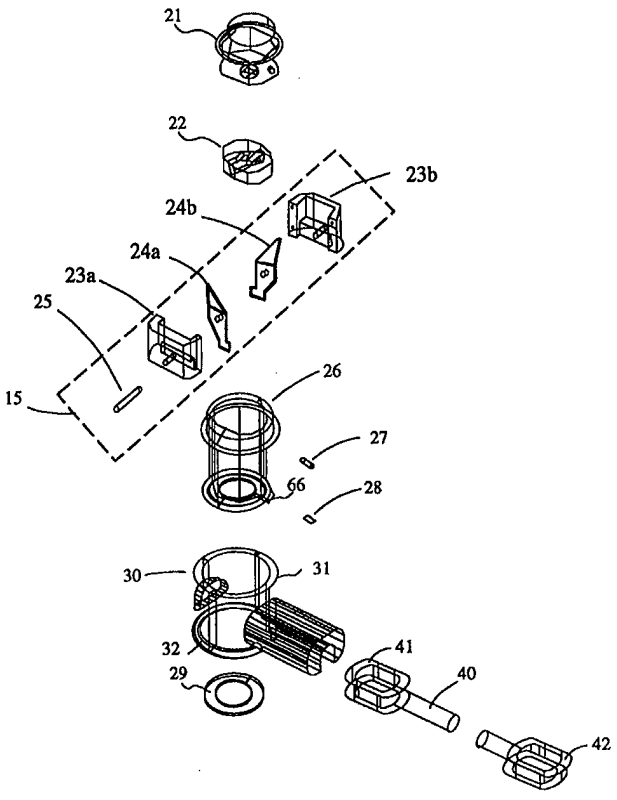
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(54) Title: LOCK WITH REMOVABLE CABLE ADAPTER

(57) Abstract

A security device for securing a first object having an aperture to a second object by means of a cable (40). The device comprises a self contained locking unit (10) for securing the device to the first object and a cable adapter (30) having a top, a bottom and a cable housing (62). The cable housing (62) receives a connector (41) attached to an end of the cable (40) after the cable (40) is attached to the second object. The cable adapter (30) receives the locking unit (10) which will extend out of both said top and bottom of the cable adapter (30). The locking unit (10) prevents the connector (41) of the cable (40) from being removed from the cable adapter (30) when the locking unit (10) is received by the cable adapter (30). The connector (41) can be removed from the cable adapter (30) when the locking unit (10) is not being received by the cable adapter (30).



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LOCK WITH REMOVABLE CABLE ADAPTER

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention generally relates to a locking mechanism and a removable cable adapter and more specifically relates to a locking mechanism and a removable cable adapter for use in securing business equipment such as printers, scanners and portable computers and other portable objects in a location.

Description of the Related Art

Manufacturers of portable computers, such as lap top computers, and other portable objects, such as printers, scanners, copiers and modems, are providing a standardized and dedicated locking aperture within the body of the portable computer or other equipment. The locking aperture is so located that the equipment may still be operated when secured in a location by a locking apparatus. Where such a locking aperture is not provided in the equipment, a locking aperture structure that can be permanently connected to such equipment is available on the market.

Many different locking apparatuses have been developed to secure the equipment at a location using a locking aperture. Product have been developed for locking down equipment, using a locking aperture on or attached to the equipment, where a cable is permanently attached to the locking apparatus. Examples of such securing devices can be found in United States Patents 4,938,040, 5,327,752, 5,493,878 and 5502,989. A locking apparatus having a permanently attached cable may experience problems where it is desired to have the cable used not only for locking down the object having

the locking aperture but also to lock down other equipment such as printers by the same cable.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a cable adapter and a locking apparatus that coact to secure one end of a cable to an object using the locking aperture in or connected to the object.

Briefly the invention comprises a key operated lock structure that moves a pair of arms between open and closed positions as a key inserted into the lock is rotated between open and closed positions. A cable adapter allows one end of the lock structure to pass through the cable adapter such that when the lock structure is inserted through a locking aperture in a given object and then locked, the cable adapter cannot thereafter be removed from the lock structure until the locking structure is unlocked and removed from the object. The cable adapter includes a compartment for receiving one end of a cable which is locked in place when the lock structure is inserted through the cable adapter.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be described with respect to the particular embodiments thereof and references will be made to the drawings, in which:

FIGURE 1 is a plain view of a lock structure;

FIGURE 2 is a cross section view illustrating the assembly of the various components of a scissor lock structure;

FIGURE 3 is an exploded wire drawing view of a lock structure and a cable adapter of the invention;

FIGURE 4 is a front view of the lock component of the scissor locking unit;

FIGURE 5 is an isometric view of the cam component of the scissor locking unit;

FIGURE 6 is an isometric view of one half of the clamp component of the scissor locking unit;

FIGURE 7 is an isometric view of the sleeve component of the scissor locking unit;

FIGURES 8A and 8B is a front and side view respectively of a scissor arm of the scissor locking unit;

FIGURE 9 is an isometric view of the cable adapter of the invention;

FIGURE 10 illustrates the relationship of the scissor arms to the cam when the scissor locking unit is unlocked;

FIGURE 11 illustrates the relationship of the scissor arms to the cam when the scissor locking unit is locked;

FIGURE 12 illustrates a first way of connecting a cable to a structure; and

FIGURE 13 illustrates a second way of connecting a cable to a structure.

DETAILED DESCRIPTION OF THE INVENTION

A locking unit 10 of Figure 1 and a cable adaptor 30 of Figure 9 comprise the two major elements of the invention. Locking unit 10 is described herein as a scissor locking unit 10 within the specification however other mechanical locking structures can be used to control a pair of engagement ends 55a and 55b such as those described in the United States Patents referenced above.

Figure 1 shows an assembled scissor locking unit 10 of the invention. At the top of the scissor locking unit 10 a key operated lock 21 is provided for operating scissor arms 24a and 24b. Referring to Figures 3, 4 and 7, lock 21 is securely mounted in sleeve 26 by pin 27 being force-fitted through hole 65 in sleeve 26 into mounting slit 64. Engagement end 55a

of scissor arm 24a and engagement end 55b of scissor arm 24b extend from the bottom of sleeve 26. Seal 29 is provided to form a non-abrasive surface that will be in contact with the portable computer or portable object.

Figure 3 is a wire diagram showing an exploded view of scissor locking unit 10, a cable adapter 30 and a cable 40. As shown in Figures 3 and 4, lock 21 is a standard commercially available key lock except that the shaft 50 of lock 21 has been machined preferably into a square shaft 50. Shaft 50 will rotate as an inserted key (not shown) into lock 21 is rotated.

As shown in Figures 3, 5 and 7, a cam 22 is provided having a square shaft receiving compartment 51 and translation slot 52 therein. Shaft 50 of lock 21 is inserted into the shaft receiving compartment 51 of cam 22 such that cam 22 will rotate as shaft 50 is rotated. Cam 22 is designed to rotate within sleeve 26. Shaft 50 and shaft receiving compartment 51 are not limited to a square structure but may take the form of any interlocking structure such as a rectangle, a triangle, a hexagon, etc.

Figure 3 shows a scissor pivot assembly 15 formed from clamps 23a and 23b, scissor arms 24a and 24b and pivot pin 25. Figures 3 and 6 show clamp 23b to include bar 61 with pivot hole 62 therein. Clamp 23a is made identical to clamp 23b such that when the clamps 23a and 23b face each other as shown in Figure 3 the two clamps will mate with each other to form a scissor housing into which scissor arms 24a and 24b are mounted by means of pivot pin 25.

Figures 8A and 8B shows scissor arm 24a to include a translation portion 53a and a bottom portion 54a which terminates in engagement end 55a. The translation portion 53a has a truncated right triangle

shape which is bent away from the vertical bottom portion 54a. Scissor arm 24b is made identical to scissor arm 24a such that when the scissor arms 24a and 24b face each other as shown in Figure 3, the two translation portions 53a and 53b will extend away from each other, thereby allowing freedom of movement for the scissor arms 24a and 24b about pivot pin 25 in the scissor pivot assembly 15. The translation portions 53a and 53b extend into opposite sides of translation slot 52 in cam 22. As cam 22 is rotated, the structure of the scissor arms will translate the rotatory motion of the cam 22 into linear motion of the engagement end 55a and 55b of bottom portion 54a and 54b of scissor arms 24a and 24b respectively.

Referring to Figures 3 and 7, a seal 29, made of rubber or plastic, is attached to the bottom of sleeve 26 for providing a non abrasive bottom surface for the scissor locking unit 10. Seal 29 is securely mounted in sleeve 26 by adhesive or by a force fitting.

Referring to Figures 2, 3, 7 and 9, key pin 28 is force fitted into blind hole 66 in sleeve 26 to provide a means for keying and holding scissor locking unit 10 within cable adaptor 30. Cable adapter 30 has a key slot 31 through which key pin 28 passes to gain access to locking groove 32 in sleeve 30. Locking groove 32 has an internal stop (not shown). In practice, scissor locking unit 10 is first oriented by key pin 28 to key slit 31 in cable adaptor 30 and then scissor locking unit 10 is moved down through key slot 31 into cable adapter 30 and positioned such that key pin 28 is aligned with locking groove 32 in cable adaptor 30. Scissor locking unit 10 is then rotated in either direction such that key pin 28 is engaged at he stop in locking groove 32 thereby securing scissor locking unit 10 within cable adapter 30 and for preventing scissor

locking unit from being rotated a full 360 degrees within cable adapter 30. When scissor locking unit 10 is so inserted into cable adaptor 30, key operated lock 21 will extend from the top of cable adaptor 30 and the bottom surface of seal 29 and engagement end 55a of scissor arm 24a and engagement end 55b of scissor arm 24b will extend from the bottom of cable adapter 30.

Figures 3 and 9 show the cable adapter 30 having a ring portion 61 which has an inner diameter greater than the outer diameter of the lower portion 68 of sleeve 26. A cable 40 is shown having both ends of cable 40 terminated with eye connector 41 and 42. The cable alternatively may have the end to be received by cable adapter 30, referred to as the adaptor end of the cable, terminated in another form such as an enlarged sleeve or a ball structure. The size of the eye in eye connector 40 is large enough to allow the connector, whether it take the form on an enlarged sleeve, ball or another eye connector, at the adapter end of cable 40 to pass through that eye connector's eye.

Cable adaptor 30 has a connection housing 62 designed to receive and hold the connector at the adapter end of the cable. The cable adapter 30 will hereinafter be discussed for use having an eye connector at the adapter end of the cable.

Cable adapter 30 has an eye connector housing 62 which is large enough to house eye connector 41 or 42 of cable 40. An insertion hole 63 in ring 61 and an insertion slot 69 in eye connector housing 62 are provided to ease the insertion of an eye connector into the eye connector housing 62.

Figure 2 illustrates the relative positions of the various components of the scissor locking unit 10. Sleeve 26, cam 22 and seal 29 have been sectioned along line A-A and clamp 23a has been omitted to expose other

components in the scissor locking unit 10. Lock 21 is shown inserted into sleeve 26 with shaft 50 being housed in receiving compartment 51 of cam 22. Clamp 23b is shown inside sleeve 26 and supporting scissor arms 24a and 24b upon pivot pin 25. Translation portion 53a and 53b of scissor arms 24a and 24b respectively are shown as extending into translation slot 52 of cam 22.

Figure 10 illustrates cam 22 and the scissor arms 24a and 24b in the unlocked position. In the unlocked position the translation slot 52 will cause the ends of the translation portions 53a and 53b to be aligned over each other such that the engagement ends 55a and 55b of bottom portions 54a and 54b respectively will also overlap. When in the open position the engagement ends 53a and 53b can be inserted into the adapter hole in the portable computer or other portable objects.

Figure 11 illustrates cam 22 and the scissor arms 24a and 24b in the locked position. In the locked position the translation slot 52 will cause the ends of the translation portions 53a and 53b to not be aligned over each other and spaced apart from each other such that the engagement ends 55a and 55b of bottom portions 54a and 54b respectively will be linearly moved apart. When in the closed position the engagement ends 53a and 53b can not be removed out of the adapter hole in the portable computer or other portable objects. Further the engagement ends and the scissor arms may be so designed that when in the closed position the engagement ends 55a and 55b come into contact with the sides of the adapter hole and/or the inside of the housing having the adapter hole.

In that the cable 40 is not permanently attached to the cable adapter 30, the cable may first be secured to a structure.

Figure 12 illustrates such a connection by passing eye connector 41 of the cable 40 first through a holding bracket 72 on structure 70 and then through eye connector 42 of cable 40. Eye connector 41 of cable 40 may then be inserted in eye connector housing 62 in cable adapter 30.

Figure 13 illustrates another such connection passing eye connector 41 of the cable 40 first through structure 70 and then through eye connector 42 of cable 40. Eye connector 41 of cable 40 may then be inserted in eye connector housing 62 in cable adapter 30.

In used, the cable is attached to a structure and then the adaptor end of the cable is pass through holding brackets, such as the holding bracket 72 of Figure 12, attached to various other objects, if any, that are to be locked down. The adapter end of the cable is then placed into connector housing 62. A locking unit 10, in an unlocked mode, is then inserted into cable adaptor 30, as previously described, thereby securing the adaptor end of the cable in the cable housing 62 of the cable adapter 30. The engagement end 55a and 55b are inserted through the locking aperture in an object, the key for the lock is then used to cause the engagement ends 55a and 55b to engage the object thereby effectively securing the cable to the object.

While the invention has been particularly shown and described with references to the preferred embodiments thereof, it will be understood by those skilled in the art that changes in form and detail may be made therein without departing from the spirit and scope of the invention. Given the above disclosure of general concepts and specific embodiments, the scope of the protection sought is defined by the following.

CLAIMS

What is claimed is:

1. A security device for securing a first object having an aperture to a second object by means of a cable, said device comprising:

a self contained locking unit for securing said device to said first object; and

a cable adapter having a top, a bottom and a cable housing, said cable housing receiving a connector attached to an end of said cable, said cable being attached to said second object, said cable adaptor receiving said locking unit, said locking unit extending from both said top and bottom of said cable adapter for preventing said connector of said cable from being removed from said cable adapter whenever said locking unit is received by said cable adapter and for permitting said connector to be removed from said cable adapter when said locking unit is not being received by said cable adaptor.

2. The security device of Claim 1 wherein:

said locking unit has a first portion and a second portion where said first portion has a first diameter and said second portion has a first length and a second diameter where said second diameter is smaller than said first diameter; and

said cable adapter has a ring shaped portion wherein the inner diameter of said ring shaped portion is greater than said second diameter and less than the first diameter such that said cable adapter can receive said second portion of said locking unit and said cable adapter is captured between said top portion of said locking unit and said first object when said locking unit secures said device to said first object.

3. The security device of Claim 1 wherein said locking unit comprises:

a moveable engagement means that is in a first position when said locking unit is unlocked and in a second position when said locking unit is locked, said engagement means engaging an object through said aperture when said engagement means passes through said aperture of said object and said locking unit is locked.

4. The security device of Claim 2 wherein said locking unit comprises:

a moveable engagement means that is in a first position when said locking unit is unlocked and in a second position when said locking unit is locked, said engagement means engaging an object through said aperture when said engagement means passes through said aperture of said object and said locking unit is locked.

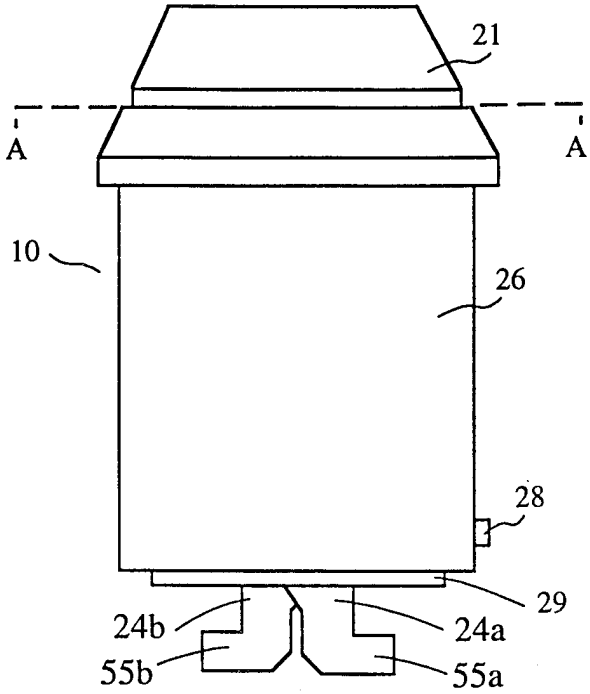


FIGURE 1

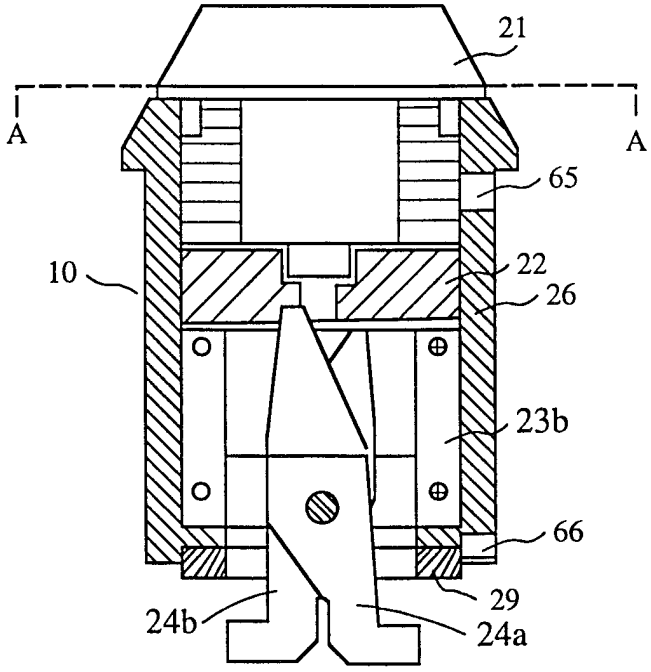


FIGURE 2

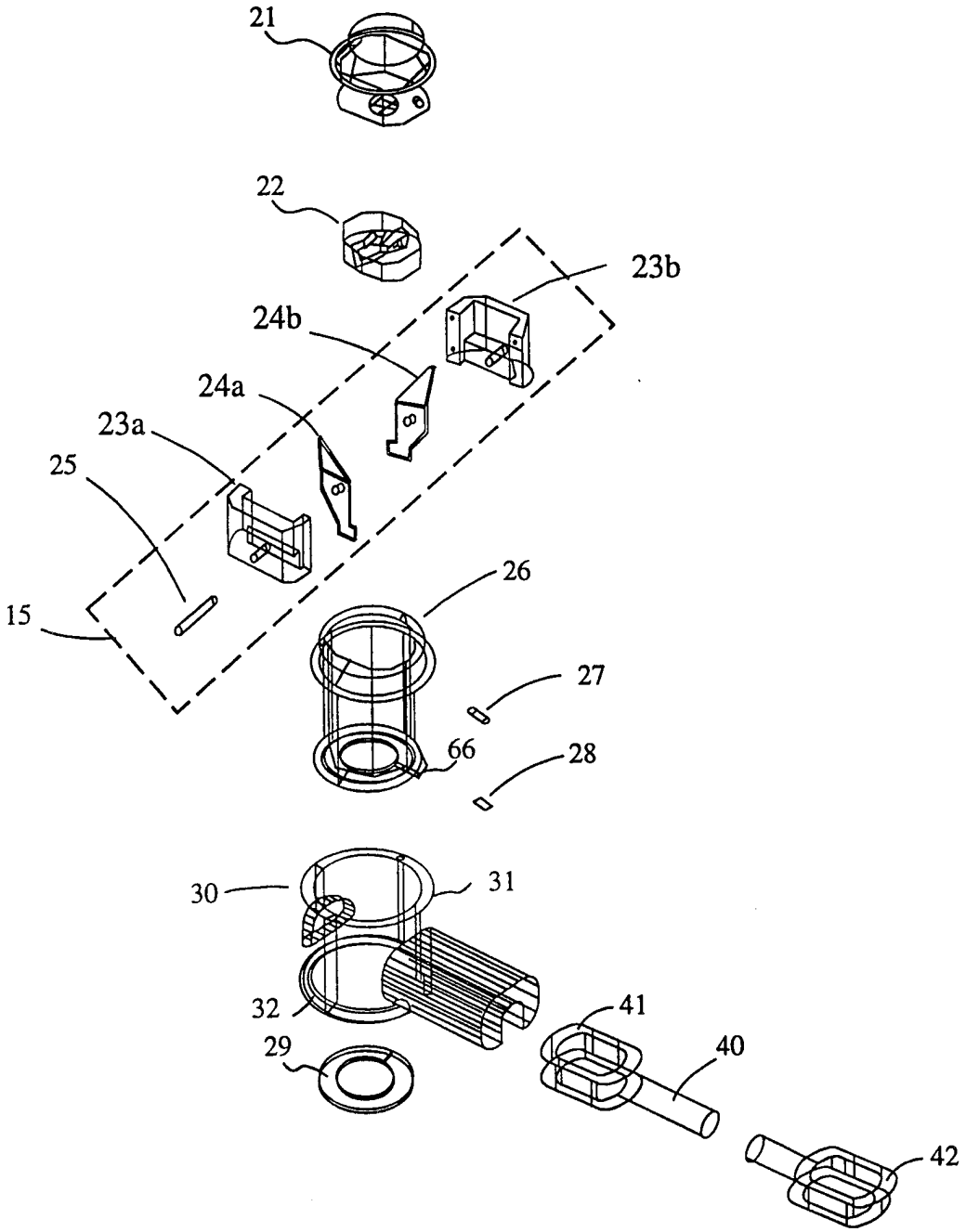


FIGURE 3

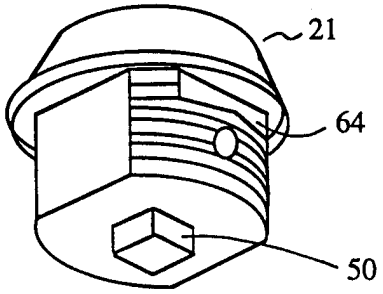


FIGURE 4

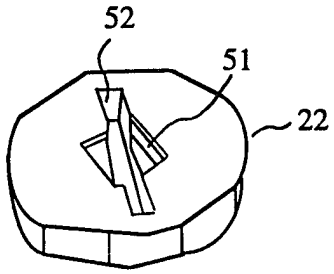


FIGURE 5

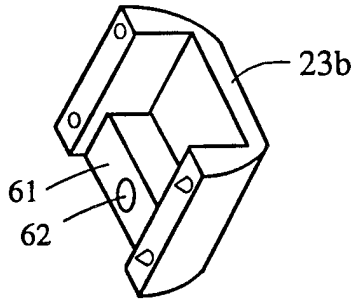


FIGURE 6

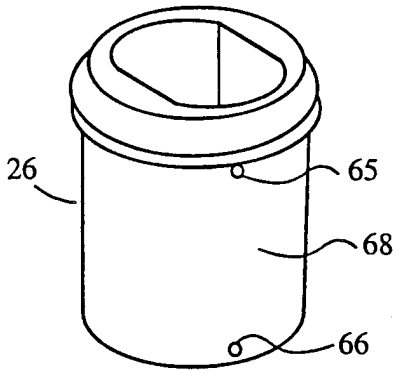


FIGURE 7

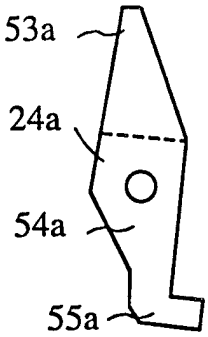


FIGURE 8A

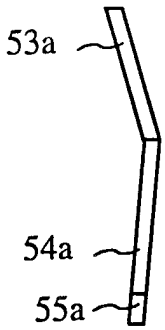


FIGURE 8B

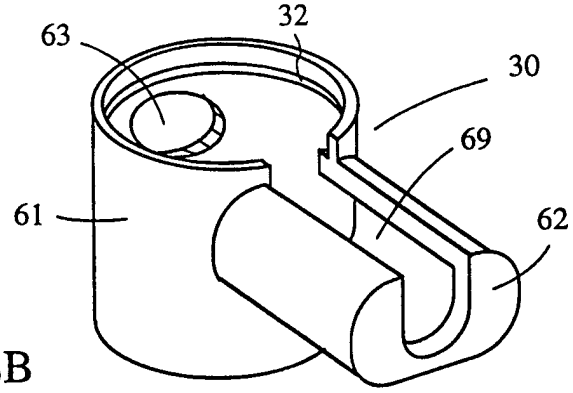


FIGURE 9

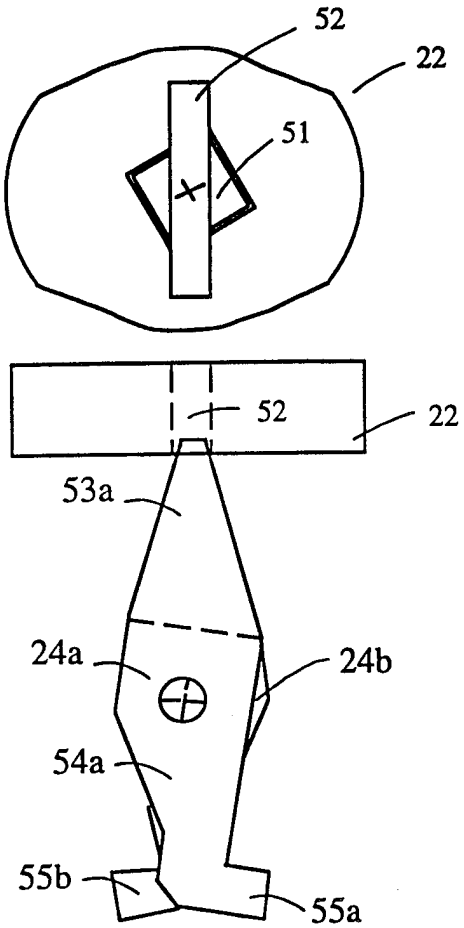


FIGURE 10

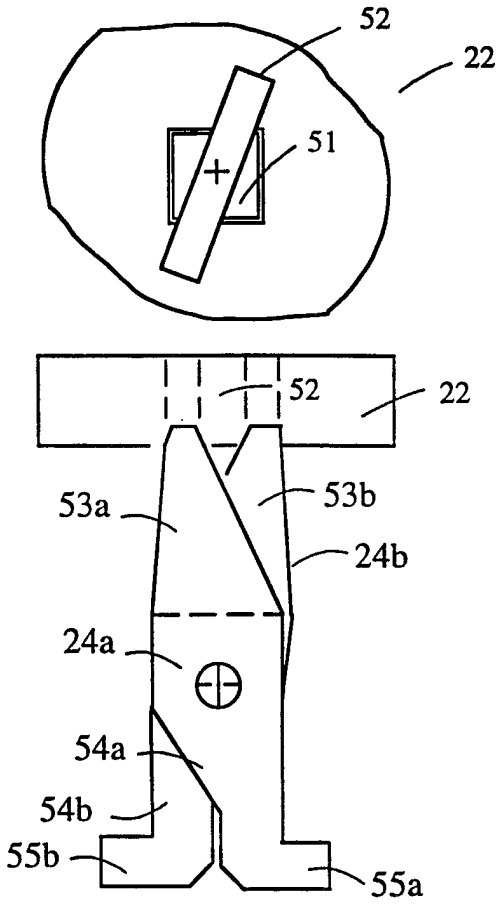


FIGURE 11

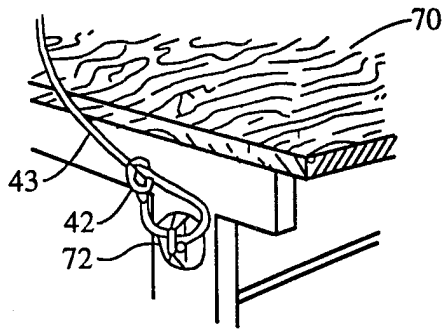


FIGURE 12

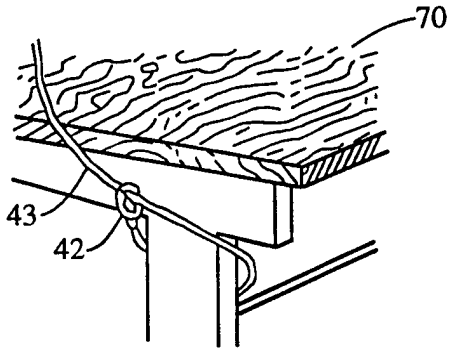


FIGURE 13

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US98/04442

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :E05B 73/00
US CL :70/18,49,58; 248/553
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. : 70/18,30,49,58,dig.57; 248/551-553

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 practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3,101,695 A (HONEYMAN, JR.) 27 August 1963 (27/08/63), see figure 2.	1,2
X --- Y	US 3,859,826 A (SINGER et al) 14 January 1975 (14/01/75), see figure 4.	1,3 --- 1-4
Y	US 5,351,507 A (DERMAN) 04 October 1994 (04/10/94), see figure 6.	1-4

☐ 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	Date of mailing of the international search report
10 JULY 1998	28 JUL 1998
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