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(54) **Business machine locking device.**

(57) Business machine locking device (1) which provides locking protection to an existing primary power control of the business machine (10), prevents removal of the business machine cover (2), and also prevents removal of an accessory power cord. The locking device (1) can be removed from the machine (10) only when it is in an unlocked position. This not only prevents the machine from being turned ON by the power switch, but also prevents jumpering of the power switch because the machine cover (2) is unremovable when the locking device (1) is in the locked position. Additionally, since the accessory power cord is locked onto the machine (10), the machine cannot be powered on by application of power to the accessory power receptacle.

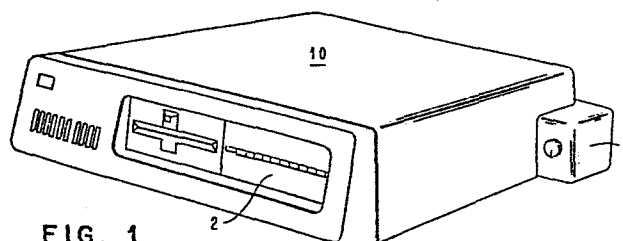


FIG. 1

BUSINESS MACHINE LOCKING DEVICE

This invention relates generally to locking devices for business machines and more particularly to a locking device to prevent access to the primary power switch of the machine as well as to prevent removal of both the machine covers and an accessory power cord from the machine.

In recent years, there has been an increased awareness and sensitivity to the potential for undesirable use of data stored in or accessible by data processing machines. In prior data processing systems in which the sensitive data was stored in a rather large and sophisticated host system and was accessed by "unintelligent" terminals, security measures were typically implemented by appropriate computer programming. Such programming would, for example, require that the user of data processing terminal equipment enter one or more previously assigned codes or passwords in order to gain access to the data stored and processed by the host system. A hierarchy of passwords or codes might be established to allow various levels of access to various sensitivity levels of data. As long as the data processing terminal equipment was unintelligent (meaning that it was incapable of storing or processing data by itself), it was of no consequence that the equipment could be turned on by persons not authorized to gain access to the data of the host system, since those persons, presumably, would not know the appropriate passwords or access codes to actually access the data.

With the advent of data processing equipment such as personal computers offering ever increasing amounts of data storage and processing capability at ever decreasing costs, the concerns for the security and protection of data stored and processed by data processing systems has been renewed. Personal computers having fixed disks ("hard file") storage devices are in common used today and are capable of storing large quantities of data and programs which are readily available to the user upon turning on the system.

Perhaps the most fundamental, obvious, and earliest recognized solution to the problem of accessibility of sensitive data stored in intelligent terminals, personal computers, or the like, was to provide the capability of locking the room in which the equipment is installed and provide keys to only those persons having authority to access the data. While this solution has worked where the equipment is, for example, a single personal computer in a one-person office, there are still numerous disadvantages to this approach. For example, this solution may be relatively expensive in that a door lock (and possibly even a door) may be required to be purchased and installed by someone other than the occupant of the office. For this type of security approach to be effective, the office must be locked at virtually all times that its regular occupant is not present, which precludes others delivering or picking up mail or other material that might normally go to and from the office in the normal course of the day. It might also, for example, restrict the times that other services can be performed, such as cleaning.

The above disadvantages relate to single occupant offices. If a large office area accommodates a number of persons, each associated with an individual computer, the security problem becomes even more complex in that it may be undesirable for some of the occupants in the room to have access to certain ones of the computers and the data therein or accessible by it, although it may not be undesirable for others to have access to all of this data. For these reasons, it was necessary to address the data security problem in a manner more directly related to the data processing equipment itself, rather than the general environment in which it is operated.

There are numerous examples in the prior art of locking techniques for machines, tools, and structures. For example, U. S. Patent 3,816,677 shows a locking device, attachable externally to an ordinary toggle switch, which allows the switch to be locked in an OFF position. U. S. Patent 3,622,720 shows a calculator keyboard cover interlock which

prevents the calculator switch from being turned on when the keyboard cover is closed. U. S. Patent 3,971,240 discloses a locking cover which can be mounted on a television set and arranged so that, in the locked position, some of the controls of the television set are unaccessible so that, for example, the channel selector cannot be accessed while the locking cover is in the locked position. Other examples of prior art relative to security of electrical apparatus include U. S. Patent 4,160,137 directed to a bracket which can be mounted on a circuit breaker to accommodate a padlock. The presence of the padlock prohibits the movement of the actuation handle of the circuit breaker into the ON position. U. S. Patent 4,414,829 teaches a locking device for an electric meter box that prevents unauthorized removal of the electric meter which prevents tampering with its readings.

None of these prior art techniques teaches a locking apparatus readily installable onto an office machine such as a personal computer in which the locking apparatus addresses a combination of security features wherein the locking apparatus added to the machine to provide locking protection of the existing power switch, also prevents removal of the machine covers and removal of a power cord while the system is in the locked OFF condition. The prevention of machine cover and accessory power cord removal adds an additional security aspect in that the power switch of the machine cannot be readily bypassed if the covers and accessory power cord cannot be removed.

In summary, therefore, it would be highly advantageous to achieve a low cost, easily installable business machine security apparatus which would prevent access to the existing machine power switch and lock the covers and an accessory power cord onto the machine with the installation of a single keylock.

Accordingly, an apparatus is provided in which a keylock is actuated to lock a box onto an electrical apparatus which box

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covers an existing on-off electrical switch thereof while also allowing or preventing removal of the external covers.

In a preferred embodiment of this invention, a bracket is attached to the apparatus to be physically and electrically locked. The bracket is attached using at least one of the existing cover screws or other fasteners of the apparatus and is attached in appropriate proximity to an existing on-off switch. A box assembly is then hinged onto this bracket. A drawer style cylinder lock is mounted in this box assembly and includes an angularly rotatable cam inside the box. The cam has a latch tooth thereon which positively engages the bracket on which the box assembly is hinged, thereby rendering it impossible to remove the box assembly while the lock is in the locked position with the key removed.

The bracket also includes an accessory power cord plug restraint to prevent removal of the plug of the accessory cord from the accessory power receptacle on the machine to prevent unauthorized powering of the machine through the accessory receptacle.

The following and other objects, features, extensions and advantages of the invention will be apparent from the following more particular description of preferred embodiments of the invention, as illustrated in the accompanying drawings.

Fig. 1 is a view of a business machine to which the locking device of this invention has been mounted.

Fig. 2 shows the location of the on-off power switch of the business machine of Fig. 1.

Fig. 3 shows a cutaway view of the housing as well as the cylinder lock and cam of the locking device of this invention.

Fig. 4 shows an assembly of all major components of the locking device of this invention including the bracket to which the housing sub-assembly shown in Fig. 3 is hinged.

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Fig. 5 shows a detailed view of a bracket for use in mounting the box sub-assembly of Fig. 3 to the business machine for locking the machine.

Fig. 6 shows a rear-view of the corner of the machine on which the locking device of the invention is mounted.

Fig. 7 is a side view of the business machine of fig.1 to which is mounted the bracket which supports the keylock housing.

Fig. 8 shows an assembly of all major components of the locking device when there is an accessory power cord plug.

Fig. 9 shows a detailed view of a bracket for use in mounting the box sub-assembly of fig. 3 when there is an accessory power cord plug.

Fig.10 shows a rear-view of a corner of the business machine of Fig. 1 on which the locking device of this invention is mounted, when there is an accessory power cord plug.

Referring now to Fig. 1, a perspective view of a business machine 10 is shown to which the locking device of this invention is mounted. The box sub-assembly 1 of this locking device is visible in Fig. 1 and its construction and cooperation with other components of the invention are described in detail below. The business machine of Fig. 1 can be any machine for which a need exists to add a locking device which covers a switch on the machine and secures the machine covers and an accessory power cord from unauthorized removal. For the purposes of illustration only, the business machine 10 in Fig. 1 may be, for example, the central processor and fixed disk drive apparatus for a personal computer. Reference 2 in Fig. 1 denotes the front cover of a non-removable disk drive (hard file) in this business machine which may, for example, store sensitive data for which security measures must be

undertaken to prevent unauthorized access at those times that the operator of the computer cannot personally provide security for the stored, sensitive information.

Fig. 2 shows the corner of the business machine 10 of Fig. 1 to which the locking device is to be mounted. In Fig. 2, an existing electrical switch assembly 3 is shown. Toggle lever 4 of switch assembly 3 is the existing electrical on-off switch of the business machine 10 which is used to apply and interrupt electrical power to machine 10.

Referring now to Figs. 3 and 4, the locking device of this invention comprises a box sub-assembly 1 shown in Fig. 3 as well as a bracket 11 shown in Fig. 4. The box sub-assembly 1 comprises a box 20 which may be fabricated by one of a plurality of processes including casting or stamping, bending and welding or riveting, the details of the fabrication of box 20 being irrelevant to the concept of this invention. Likewise, one of a plurality of materials may be chosen from which to fabricate box 20 depending on costs, fabrication processes, and degree of security desired, as will be understood to those skilled in the art. Into box 20 is mounted a cylinder lock 21, shown in Figs. 3 and 4 with a key 22 inserted therein. Those skilled in the art will appreciate that the degree of security associated with the cylinder lock 21 itself should be appropriately matched with the choice and thickness of material and type of construction for box 20.

At the end of the lock cylinder 21 interior to box 20, the lock cam 24 in this embodiment has two operative portions, a claw 25 and a latch 26. The claw 25 of cam 24 engages two surfaces of the on-off switch lever 4 of the business machine 10 such that angular movement of key 22 in lock 21 causes ON and OFF operation of the switch lever 4. Typically, in business machines such as the one described above, this ON and OFF movement of switch lever 4 alternately applies and interrupts electrical power to the business machine.

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Referring to Fig. 5, bracket 11 is shown which is typically constructed of a metal stamping. This bracket is mounted to the back side of business machine 10 by screws which go through holes 12 and 13 of bracket 11 into the business machine 10. Referring to Fig. 6, it will be noted that while hole 12 is visible, the box sub-assembly 1 covers hole 13 of the bracket. This fact will also be obvious with reference to Fig. 4. In the preferred embodiment of this invention, bracket 11 is constructed so that holes 12 and 13 are aligned with existing screw or bolt type fasteners already in place in the business machine 10. To install bracket 11, the two existing screws or bolts are removed from machine 10 and replaced through holes 12 and 13 such that the bracket is now interposed between the heads of these screws or similar fasteners and business machine 10. Preferably, as will be understood more fully hereinafter, the fastener going through hole 13 of bracket 11 is one of the fasteners which holds the covers of machine 10 onto the machine. It will also be noted, with reference to Fig. 7, that the tab 19 on bracket 11 is engageable with the inside of the covers of machine 10, during mounting of bracket 11 to machine 10, to prevent bracket 11 with sub-assembly 1 attached thereto in the locked position from being pried away from the side of machine 10.

Bracket 11 includes a pair of hinged fingers 15 and 16 which are shown on one side of bracket 11 in Figs. 4 and 5 and on the other side of bracket 11 in Fig. 3. These hinged fingers 15 and 16 protrude through openings 27 and 28 in the box sub-assembly 1 so that sub-assembly 1 is hinged onto bracket 11 when the locking device is mounted on machine 10, as shown in Fig. 6. A screw 29 (shown in Fig. 6) protrudes through a hole 30 in box 20 and threads into a tapped hole 17 in bracket 11 to secure the box sub-assembly 1 onto bracket 11 and the business machine 10, regardless of the position of the lock cam 24. It will be noted with reference to Fig. 4 that when the lock cam 24 is in the position shown in Fig. 4, the latch portion 26 of cam 24 engages a surface 18 on bracket 11 to positively prevent removal of box sub-assembly 1 from bracket

11 regardless of whether or not screw 29 is in place. Thus, the primary function of screw 29 is to prevent inadvertent movement of the box sub-assembly 1 relative to bracket 11 and business machine 10 when lock 21 and cam 24 are rotated clockwise to turn on the business machine 10 for normal operation.

Referring now to Figs. 8 and 9, bracket 11 can also include an accessory power cord plug restraint portion 31 thereof. Plug restraint portion 31 includes a slot 32 which engages the body of a power cord plug 33 as shown in Fig. 10. The engagement of slot 32 with the body of plug 33 prevents removal of plug 33 from machine 10. If plug 33 plugs into an accessory power receptacle (not shown) of machine 10 which has power applied to it at all times that power is applied to the remainder of the electrical or electronic apparatus of machine 10, then it might otherwise be possible, without the cord restraint portion 31 preventing removal of plug 33, to apply power to the machine via plug 33 rather than removing power from the machine through plug 33, as intended.

This invention, therefore, provides a security lock for a business machine, or the like, which is readily field installable by the machine user or owner with the requirement for minimal installation tools. In this embodiment a single screwdriver is the only installation tool required. The locking device of this invention provides locking protection to an existing primary power control, prevents removal of the machine covers, and prevents removal of an accessory power cord from the machine.

While the invention has been shown and described with reference to a particular embodiment thereof, it will be understood by those skilled in the art that the foregoing and other changes in form and details may be made therein without departing from the spirit and scope of the invention.

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CLAIMS

1. A business machine locking device characterized in that it comprises

keylock (1) means for preventing access to an electrical switch (4) on said machine;

means (19, 24) for retaining said keylock means and for preventing removal of a cover (2) of said machine when said keylock means is in a locked position; and

means (31) for preventing removal of a power cord (33) plugged into said machine.

2. The device according to Claim 1, wherein said means (19, 24) for retaining said keylock means (1) and for preventing removal of said cover (2) further comprises:

means for preventing access to at least one machine cover fastener.

3. The device according to Claim 1 or 2, wherein said means (19, 24) for retaining said keylock means (1) and for preventing removal of said cover (2) further comprises:

a bracket (11) fastened to said machine with one or more (12, 13) fasteners including said at least one machine cover fastener (13).

4. The device according to Claim 3, wherein said means for retaining said keylock means and for preventing removal of said cover further comprises:

a housing (20) in which said keylock means (1) is mounted, said housing covering said machine cover fastener (13) and being locked to said bracket (11) when said keylock means is in said locked position.

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5. The device according to Claim 4, wherein said housing (20) is constructed of a plastic material.
6. The device according to Claim 3, 4 or 5 wherein said bracket (11) further comprises an accessory power cord plug restraining portion (31) thereof, said plug restraining portion being engageable with a plug (33) on said accessory power cord.
7. The device according to Claim 6, wherein said plug restraining portion (31) of said bracket (11) further comprises a slot (32) which envelopes a portion of said plug (33) on said power cord when said bracket is fastened to said machine.
8. The device according to any one of claims 4 to 7 wherein said keylock means (1) comprises a lock cam (24) having a claw portion (25) engageable with the electrical switch (4) for actuation.
9. The device according to claim 8 wherein said lock cam (24) comprises a latch portion (26) engaging a portion of said bracket when said keylock means (1) is in locked position for preventing removal of said housing.
10. The device according to claim 9 wherein said bracket (11) comprises a tab (19) engageable with an inside surface of said cover (2).

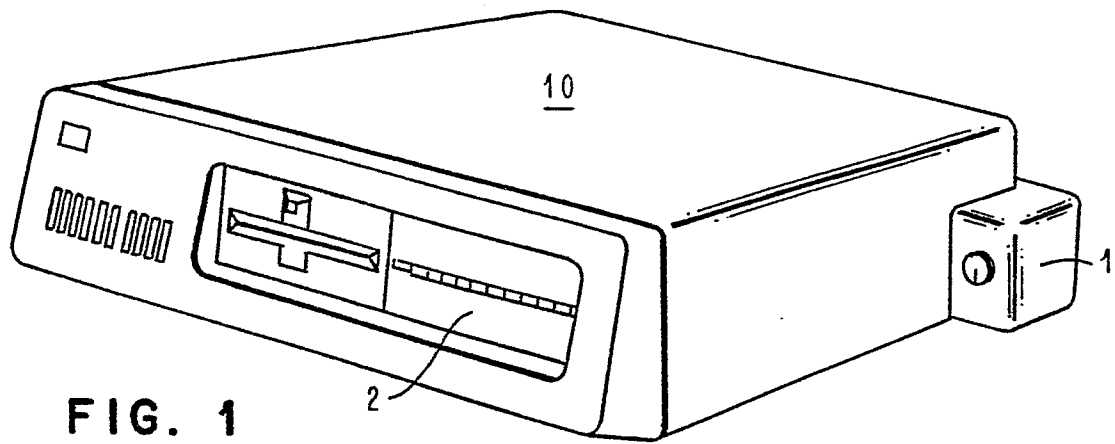


FIG. 1

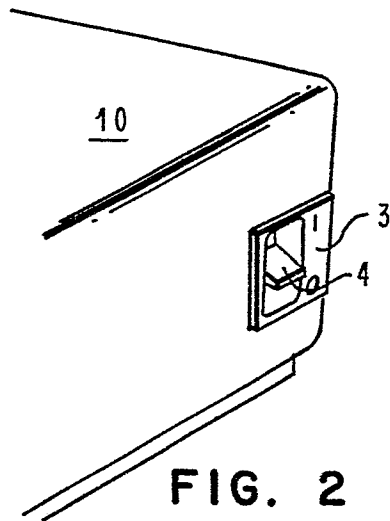


FIG. 2

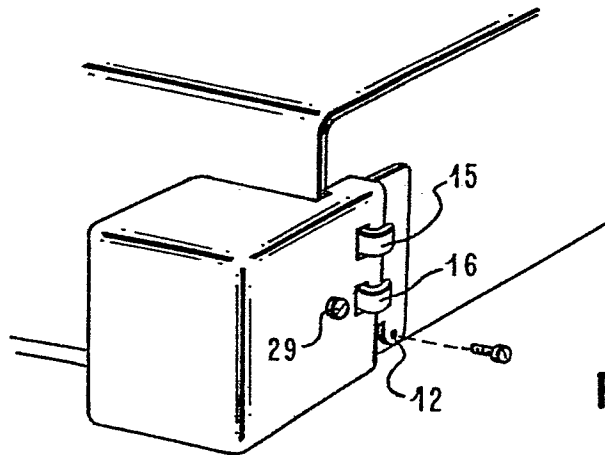


FIG. 6

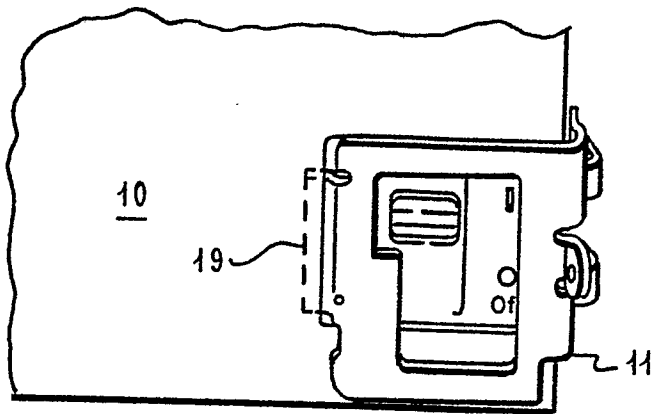


FIG. 7

FIG. 3

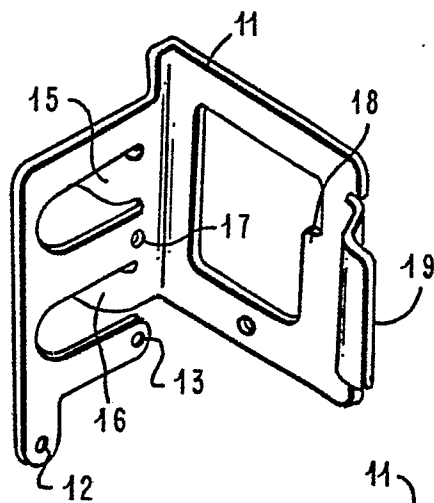
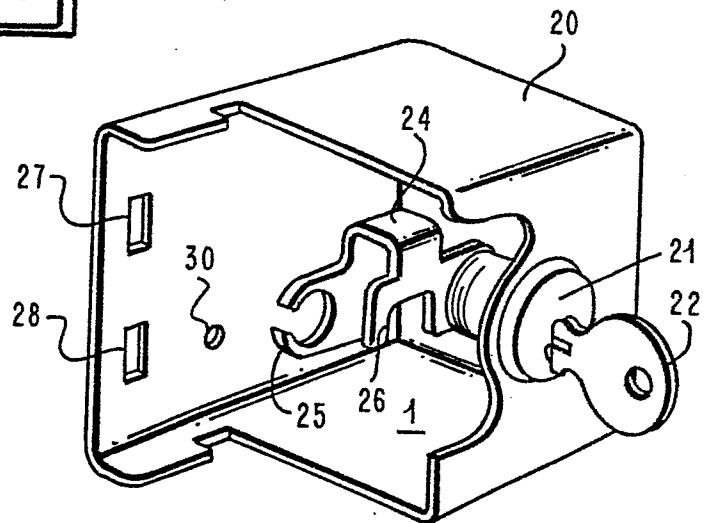


FIG. 5

FIG. 4

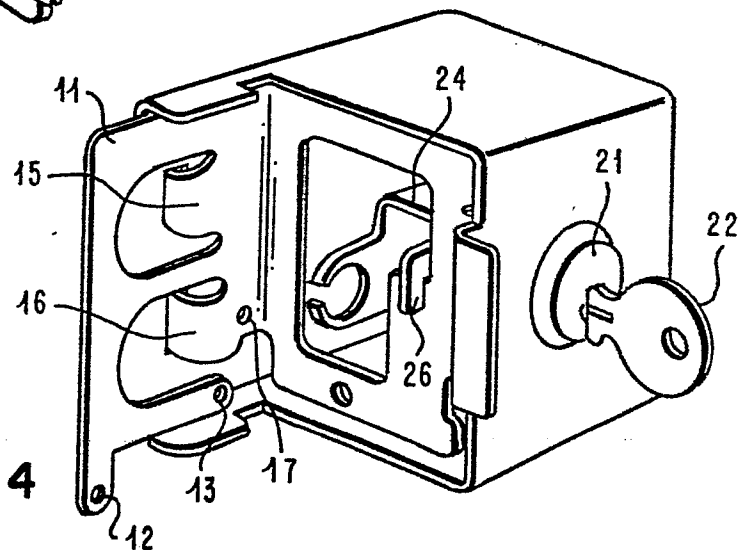


FIG. 9

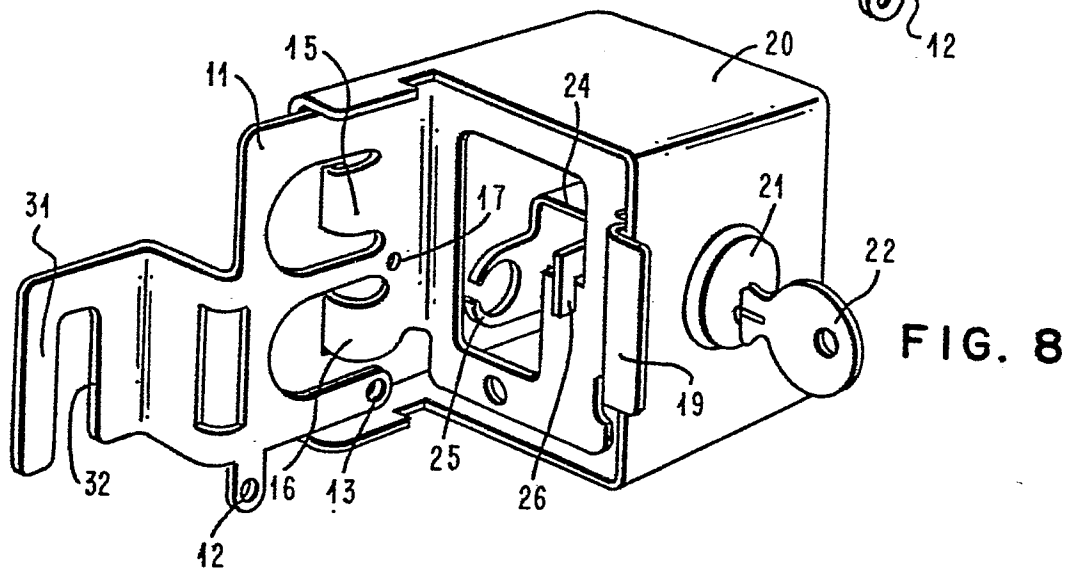
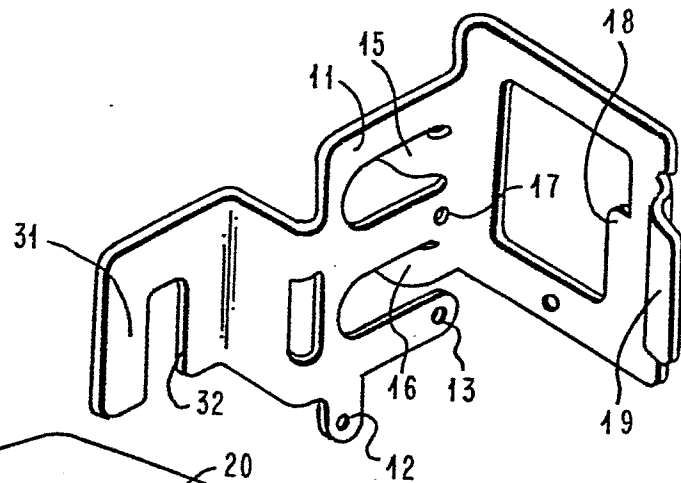


FIG. 8

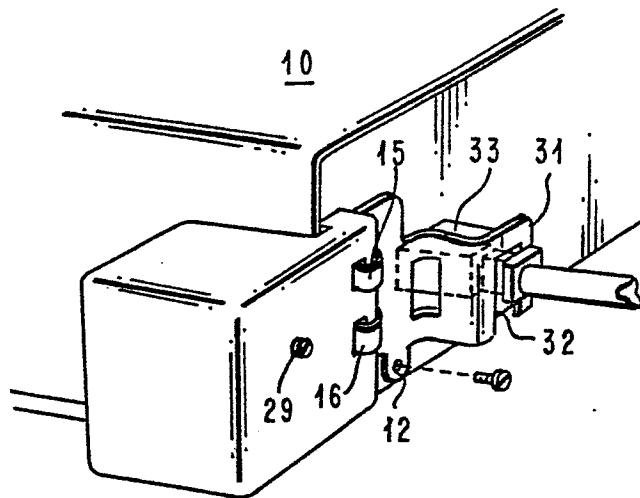


FIG. 10



EP 85103338.1

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
A	GB - A - 1 540 872 (HUGH FOWLER) * Fig. 1-4 * -----	1	E 05 B 65/00
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			E 05 B G 06 F
The present search report has been drawn up for all claims			
Place of search VIENNA		Date of completion of the search 04-06-1985	Examiner CZASTKA
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	