

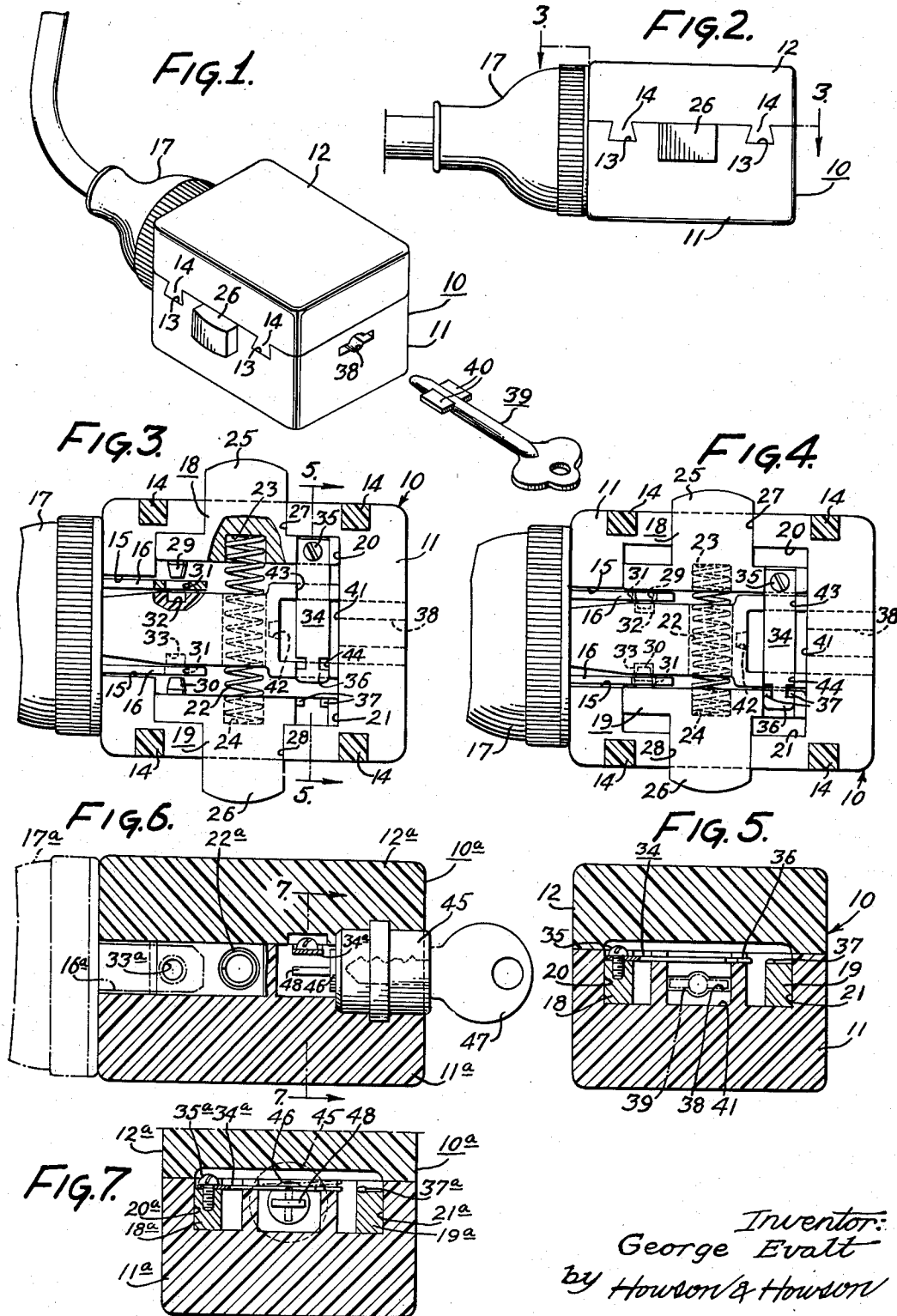
Jan. 31, 1956

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2,733,416

LOCKING DEVICE FOR USE WITH ELECTRICAL PLUGS

Filed April 5, 1955



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1

2,733,416

LOCKING DEVICE FOR USE WITH ELECTRICAL PLUGS

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Application April 5, 1955, Serial No. 499,275

8 Claims. (Cl. 339-37)

This invention relates to locking devices for use with electrical plugs to prevent unauthorized use of electrical appliances.

With the wide and increasing use of power tools, there is an increasing need for such locking devices, especially in homes where children may be injured by power tools. The locking devices heretofore proposed for this purpose have not been satisfactory and have not been commercially acceptable for one reason or another, usually because they are of complex structure and are costly to manufacture and, therefore, must be sold at a high price. When it is considered that an owner of power tools requires a locking device for each tool, and many persons now own various power tools, it may be appreciated that the cost of the locking device is a significant factor. A need has existed for a simple and inexpensive locking device, in which cost is minimized without sacrificing effectiveness to prevent children from plugging in power tools in the home.

The principal object of the present invention is to provide a simple, inexpensive and commercially practical locking device to meet this need.

Another object of the invention is to provide a locking device which can be made practically entirely of plastic material, white metal, or any other desired material.

A further object of the invention is to provide a locking device which is easy to use and yet provides adequate protection against the unauthorized use of electrical appliances such as power tools.

Other objects and features of the invention will be apparent from the detailed description to follow.

In the accompanying drawing:

Fig. 1 is a perspective view of one embodiment of the locking device provided by this invention, showing an electrical plug in association with the device;

Fig. 2 is a side elevational view of the device and associated plug;

Fig. 3 is a sectional plan view taken along line 3-3 of Fig. 2 showing the device in the unlocked condition;

Fig. 4 is a view similar to Fig. 3 showing the device in the locked condition;

Fig. 5 is a transverse sectional view taken along line 5-5 of Fig. 3;

Fig. 6 is a sectional view of a modified form of the device, taken along a central vertical plane longitudinally of the device; and

Fig. 7 is a cross-sectional view of the same device taken along the transverse vertical plane indicated by line 7-7 of Fig. 6.

Referring more particularly to the drawing, as shown in Fig. 1, the locking device 10 preferably comprises a rectangular casing comprising a main part 11 and a cover 12. While these parts may be formed of any suitable material, they are preferably formed of plastic material. Any suitable arrangement may be employed to effect secure attachment of the cover 12 to the main casing part 11. For example, the main part 11 may be provided with dove-tail recesses 13, and the cover 12 may be pro-

2

vided with projections 14 which are forced into the recesses.

Figs. 3 and 4 are effectively plan views with the cover 12 removed. As may be seen in these figures, the casing has openings 15 to receive the prongs 16 of a conventional electrical plug 17. The most common electrical plug has two prongs and, therefore, the casing 10 is shown with two openings to receive the prongs of such a plug. However, the device may be adapted for use with plugs having any number of prongs, e. g. plugs having three prongs.

The device provided by the invention effects locking of an electrical plug by locking engagement of at least one of the plug prongs through the aperture which is present in each of the prongs. In the embodiments illustrated, which are adapted for use with plugs having two prongs, locking is effected through the apertures of both prongs, and therefore two locking members are provided as hereinafter described. However, the invention contemplates the provision of one or more locking members to effect locking through one or more of the prongs of an electrical plug.

As shown in Figs. 3 and 4, a pair of opposed locking members 18 and 19 are arranged within the casing 10 for translational movement from outer positions to inner positions to effect locking action. The main part 11 of the casing has opposed recesses 20 and 21 to slidably support the locking members 18 and 19 which are shaped as shown. These members are urged to their outer positions, as shown in Fig. 3, by a helical spring 22, the end portions of which are seated in recesses 23 and 24, of the locking members. Manual elements 25 and 26, in the form of button-like projections, are provided on the locking members 18 and 19 and they extend through openings 27 and 28 in the opposed sides of the casing.

The locking action is effected by means of pins 29 and 30 provided respectively on the locking members 18 and 19. As may be clearly seen in Fig. 3, these pins are in opposed relation to one another and they are aligned with the apertures 31 of the inserted plug prongs 16. When the locking members 18 and 19 are moved to the inner positions, as shown in Fig. 4, the pins 29 and 30 are projected through the prong apertures 31. Recesses 32 and 33 serve to receive the end portions of the pins 29 and 30 so as to protect them against shearing in the event that a pulling force is exerted on the plug 17. The movement of the locking members to their inner locking positions is effected simply by exerting a squeezing force with two fingers on the manual elements 25 and 26.

The locking members 18 and 19 are locked in their inner positions by key-releasable detent means. As shown in Figs. 3 and 4, a spring detent finger 34 has one end secured to the locking member 18 at 35 as by riveting or by means of a screw. The said end is seated in a shallow recess of member 18 to prevent turning of the finger 34 which extends transversely between the two locking members. The other end 36 of finger 34 is shaped for engagement behind stationary detent elements 37 formed integrally with the casing. As best shown in Fig. 1, the adjacent end of the casing has an opening 38 to receive a key 39 having opposed projections 40 thereon. The inner portion of the casing adjacent the opening 38 is constructed to provide a space 41 through which the key projects, and the raised central section of the casing has a recess 42 to receive the end of the key and to serve as a bearing support when the key is turned. This section of the casing also has recesses 43 and 44 to serve as retaining guides for the detent finger 34.

When the locking members 18 and 19 are moved to their inner locking positions, the spring finger 34 is deflated sufficiently so that the portion 36 rides over the detent projections 37 and falls behind them. The plug

3

17 is then securely locked, as shown in Fig. 4. When it is desired to unlock the device to release the plug, the key 39 is inserted through the opening 38 and is then turned. Turning of the key causes one of its projections 40 to engage the spring finger 34 and deflect it to unlocking position, whereupon spring 22 moves the locking members 18 and 19 to their outer positions shown in Fig. 3.

As previously mentioned the device may be adapted to engage only one of the plug prongs. In such case, locking member 19 could be eliminated and one end of spring 22 would engage a part of the casing. Detents 37 would then be provided on the casing.

From the foregoing description, it will be seen that the device provided by this invention is extremely simple in construction and is easy to assemble. The device comprises a minimum of individual parts ideally suited for mass production. All of these parts can readily be formed of plastic material with the exception of the spring, the detent finger and the engaging pins, which may be simple metal parts.

Furthermore, in the form of the device shown in Figs. 1 to 5, the simple key 39 serves for unlocking and no key barrel is needed. Such device is adequate for most purposes, such as the protection of small children against injury by power tools.

Figs. 6 and 7 show a modified form of the device which is identical with the first described embodiment but is provided with a lock barrel 45 of conventional form having a rotatable cylinder 46 which is turned by key 47. The barrel 46 carries an element 48 which serves to deflect the spring detent finger 34a. Apart from this modification, this embodiment is the same as that previously described, and the parts are designated by similar reference numerals with the suffix *a*. This modified form of the device may be employed where it is desired to provide positive insurance against unlocking of the device by older persons who might tamper with the device.

While the device is shown at a portable unit, it could be built into a stationary structure, such as a wall socket. Thus, the device could be provided in place of one of the usual receptacles of a multi-receptacle wall unit. In such case, the casing 10 would be built into the wall unit or would be adapted to be inserted therein.

Although exemplary embodiments have been illustrated and described for the purpose of disclosure, it will be understood that the invention is not limited thereto but contemplates such further embodiments as may be provided within the scope of the invention.

I claim:

1. A locking device for use with an electrical plug having prongs, comprising a casing having openings to receive the prongs, locking means within said casing movable translationally from an outer position to an inner position to lockingly engage one of the inserted prongs, spring means for normally retaining said locking means in the outer position, manual means for moving said locking means to the inner position, and key-releasable detent means for holding said locking means in the inner position.

2. A locking device for use with an electrical plug having prongs, comprising a casing having openings to receive the prongs, a locking member within said casing movable translationally from an outer position to an inner position to lockingly engage one of the inserted prongs, spring means for normally retaining said locking member in the outer position, a manual element on said locking member extending externally of said casing for moving said locking member to the inner position, and key-releasable detent means for holding said locking member in the inner position.

3. A locking device for use with an electrical plug having prongs, comprising a casing having openings to receive the prongs, a locking member within said casing movable translationally from an outer position to an inner position to lockingly engage one of the inserted prongs,

4

spring means for normally retaining said locking member in the outer position, a manual element on said locking member extending externally of said casing for moving said locking member to the inner position, and a key-releasable spring detent element for holding said locking member in the inner position.

4. A locking device for use with an electrical plug having a plurality of apertured prongs, comprising a casing having openings to receive the prongs, a plurality of locking members within said casing each having a pin thereon to enter the aperture of one of the prongs, said members being movable translationally from outer positions to inner positions to effect entry of the pins on said members into the apertures of the prongs, spring means for normally retaining said members in their outer positions, a manual element on each of said members extending externally of said casing for moving each member to its inner position, and key-releasable detent means for holding said members in their inner positions.

5. A locking device for use with an electrical plug having a pair of apertured prongs, comprising a casing having openings to receive the prongs, a pair of opposed locking members within said casing each having a pin thereon to enter the aperture of one of the prongs, said members being movable translationally from outer positions to inner positions to effect entry of the pins on said members into the apertures of the prongs, spring means for normally retaining said members in their outer positions, a manual element on each of said members extending externally of said casing for moving each member to its inner position, and key-releasable detent means for holding said members in their inner positions.

6. A locking device for use with an electrical plug having a pair of apertured prongs, comprising a casing having openings to receive the prongs, a pair of opposed locking members within said casing each having a pin thereon to enter the aperture of one of the prongs, said members being movable translationally from outer positions to inner positions to effect entry of the pins on said members into the apertures of the prongs, spring means for normally retaining said members in their outer positions, a manual element on each of said members extending externally of said casing for moving each member to its inner position, and a key-releasable spring detent finger secured to one of said members and engageable with the other member for holding said members in their inner positions.

7. A locking device for use with an electrical plug having a pair of apertured prongs, a rectangular casing having openings at one end to receive the prongs and having key receptacle means at the other end, a pair of opposed locking members within said casing adjacent the opposed sides thereof, inwardly-extending pins on said members aligned with the apertures of the inserted prongs, said members being movable translationally from outer positions to inner positions to effect entry of said pins into said apertures, spring means arranged between said members to normally force them apart and to retain them in their outer positions, a manual element on each of said members extending through the adjacent side of said casing for moving each member to its inner position, and key-releasable detent means adjacent said other end of said casing for holding said members in their inner positions.

8. A locking device for use with an electrical plug having a pair of apertured prongs, a rectangular casing having openings at one end to receive the prongs and having key receptacle means at the other end, a pair of opposed locking members within said casing adjacent the opposed sides thereof, inwardly-extending pins on said members aligned with the apertures of the inserted prongs, said members being movable translationally from outer positions to inner positions to effect entry of said pins into said apertures, spring means arranged between said members to normally force them apart and to retain

5

2,738,416

them in their outer positions, a manual element on each of said members extending through the adjacent side of said casing for moving each member to its inner position, and a key-releasable spring detent finger secured to one of said members and engageable with the other member 5 for holding said members in their inner positions.

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6

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