

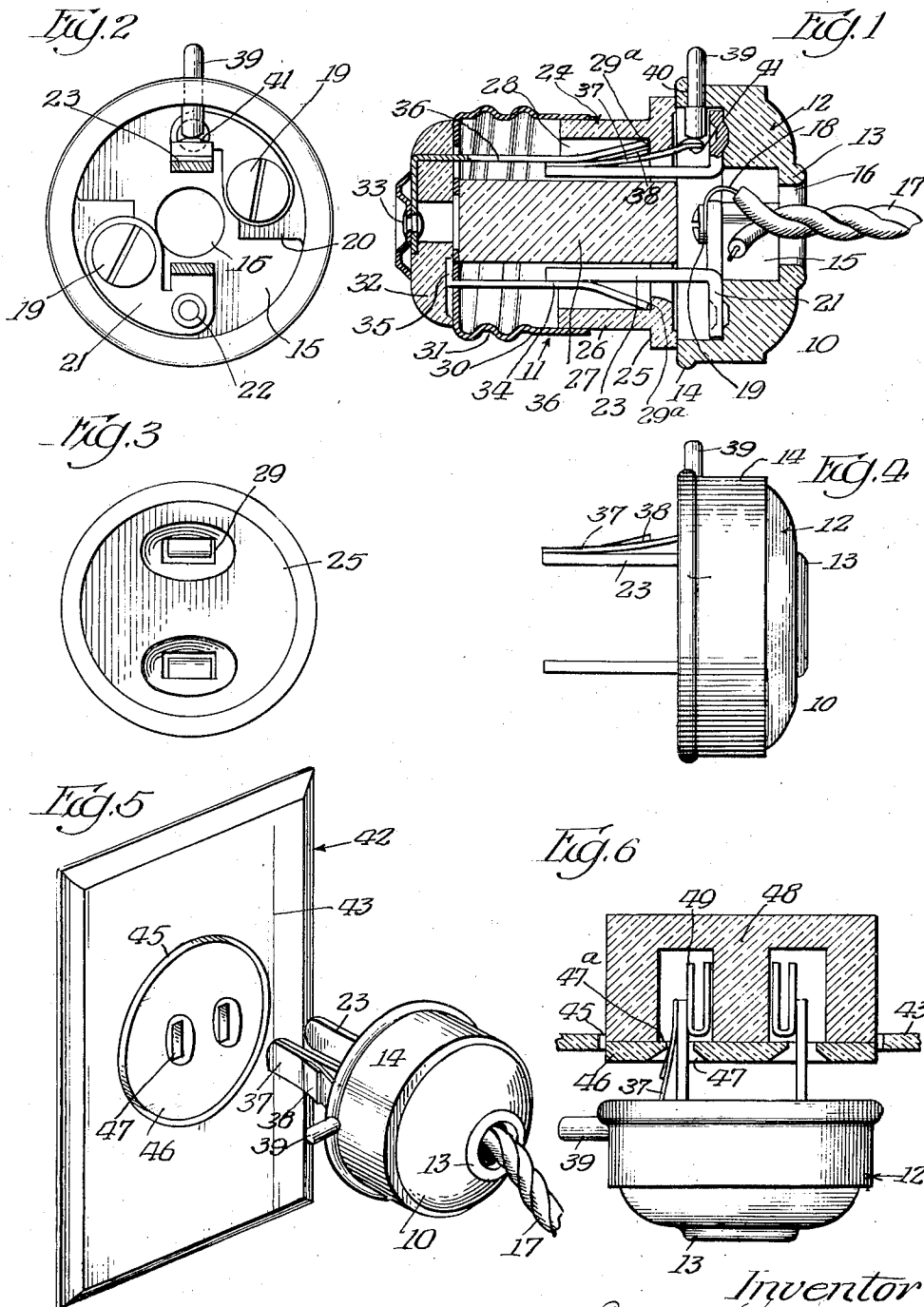
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LOCK EQUIPPED ATTACHMENT PLUG

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## UNITED STATES PATENT OFFICE

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LOCK-EQUIPPED ATTACHMENT PLUG

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The present invention relates generally to attachment plugs whereby the feed conductors leading to electrically operated devices such, for example, as vacuum cleaners, reading and floor lamps, irons and motor driven fans, may be brought into connected relation with the terminals of a supplemental plug member or a wall plug. More particularly the invention relates to that type of attachment plug which consists of a circular cap of insulation, having a central opening or aperture through which the feed conductors extend, a pair of binding screws for the conductors, and a pair of rigid contact elements which are associated with and extend outwardly in parallel relation from the binding screws and are adapted to be inserted through a pair of slots in the supplemental plug member or wall plug and jammed into frictional engagement with a pair of spring terminal strips that are housed within such plug member or wall plug.

In the use of attachment plugs of this character, the rigid contact elements are sometimes held by the spring terminal strips of the supplemental plug member or wall plug so tightly that the plug can only be withdrawn or disconnected from the supplemental plug member or wall plug with difficulty and the application of a comparatively great force. In such instances, the user, when desiring to disconnect or uncouple the attachment plug, usually pulls on the feed conductors with the result that great strain is placed upon the binding screws and the wires of the conductors are often broken or pulled away from the screws thereby rendering the plug inoperative. In some cases the spring terminal strips of the supplemental plug member or wall plug bear but lightly against the rigid contact elements of the plug. In such instances the plug is not locked or held fixedly in place and as a result is often accidentally pulled out of its operative position during use of the electrical device to which the feed conductors are connected.

One object of the invention is to provide an attachment plug of the character under consideration embodying a simple latch device which operates efficiently to lock the plug in connected relation with a supplemental plug member or a wall plug of the type that embodies a pair of spring terminal strips and has a pair of laterally spaced slots for the insertion of the rigid contact elements of the plug. This latch device, due to its construction, permits the attachment plug to be readily withdrawn from the coacting plug with which it is associated without the necessity of pulling on the feed conductors and serves to connect the plug rigidly in place so that it can not be inadvertently or accidentally uncoupled or disconnected during use of the electrical device to which the feed conductors are connected. In general, the latch device comprises a spring strip which has one end thereof anchored to the outer end of one of the rigid contact elements of the plug. The other end of this spring strip extends towards the cap and slightly outwardly of the said one contact element and is provided with a tooth which, when the plug is in its connected position, engages against and cooperates with the wall of the supplemental member or wall plug that has the laterally spaced slots to effect a positive locking connection. The distal end of the spring latch-strip, that is the end that has the locking tooth, is pressed inwardly against the contiguous contact element for unlatching purposes by means of a pin which extends radially with respect to the plug and is slidably mounted in the cap.

The invention consists in the several novel features hereinafter set forth and more particularly defined by the claims at the conclusion hereof.

In the drawing which accompanies and forms a part of this specification or disclosure and in which like numerals of reference denote corresponding parts throughout the several views:

Figure 1 is a longitudinal sectional view illustrating an attachment plug embodying the invention in connected relation with a supplemental plug member of the type that embodies an external screw thread and is adapted to be applied to an internally threaded socket;

Figure 2 is a transverse section taken on

the line 2—2 of Figure 1, disclosing the manner in which the pin for operating the spring latch-strip is slidably mounted in the cap of the plug;

5 Figure 3 is a front view of the supplemental plug member disclosed in Figure 1, showing the laterally spaced slots which are adapted to receive the rigid contact elements of the plug;

10 Figure 4 is a side elevational view of the improved plug;

Figure 5 is a perspective view showing the plug in connection with a wall plug; and

15 Figure 6 is a transverse sectional view of the wall plug, disclosing in detail the manner in which the latch device of the plug coacts with the wall that has the two laterally spaced slots to secure positively the two plugs in connected relation.

20 In Figures 1, 2, 3 and 4 of the drawing there is exhibited a two-piece plug consisting of an attachment plug 10 and a supplemental plug member 11. The present invention has particular utility in connection with a plug  
25 of this character and comprehends an improved form of latch device whereby the attachment plug may be positively locked to the supplemental plug member. The attachment plug 10 comprises a disk-like cap 12  
30 which is formed of insulating material and consists of an end wall 13 and an annular flange 14. The latter projects outwardly from one side of the end wall 13 and forms with the latter a substantially cylindrical compartment or chamber 15. The central  
35 portion of the end wall 13 has formed therein a circular opening or aperture 16 through which extend a pair of feed conductors 17 that lead to an electrically operated device, such, for example, as a vacuum cleaner, a  
40 lamp, or a motor driven fan. The feed conductors 17 include wires 18 and are anchored to the cap 12 by means of a pair of binding screws 19. The screws extend into a pair of  
45 lugs 20 which are disposed in the chamber 15 and are formed integrally with and of the same insulating material as the end wall 13 and the flange 14. The wires 18 of the feed  
50 conductors 17 are wrapped around the shanks of the binding screws and are clamped between a pair of sheet metal conductor plates 21 and the heads of the screws. The conductor plates 21 fit against the outer faces of the lugs 20 and are held in place by rivets or  
55 studs 22. Said studs and the binding screws 19 are arranged at opposite ends of the plates 21. In addition to the cap 12, the attachment plug 10 comprises a pair of contact elements 23. These elements are formed integrally  
60 with the ends of the plates 21 that have the studs 22 applied thereto. The elements 23 face one another and project outwardly from the chamber 15 in parallel relation. Due to their thickness the elements are of a substantially rigid character. The conductor plates

21, together with the binding screws 19, serve to connect electrically the contact elements 23 and the feed conductors 16.

The supplemental plug member 11 comprises a base 24 which consists of a circular end wall 25, a sleeve-like flange 26, and a core 27. These three last mentioned parts are formed integrally and are made of any suitable insulating material. The core 27 is positioned centrally with respect to the flange 26 and forms with the latter an annular space 28. The end wall 25 has formed therein a pair of rectangular slots 29. These slots are spaced apart laterally to correspond to the distance between the rigid contact elements 23 of the attachment plug 10. They communicate with the annular space 28 and are located inwardly of the flange 26 in order to form of the intervening parts of the end wall 25 a pair of shoulders 29<sup>a</sup>. A sheet metal shell 30 is secured to the flange 26 and embodies an external screw thread 31 whereby the plug member 11 may be screwed into connected relation with an internally threaded electrical socket. The shell 30 is held in place by a disk 32 of insulating material. This disk is secured to the core 28 by a screw 33 which serves as one of the electrical contact members of the supplemental plug member 11. A terminal strip 34 is positioned in the space 28 so that it is aligned with one of the slots 29. This strip is formed of spring metal and has one end thereof electrically connected as at 35 to the shell 30. The other end of the strip is bent outwardly and is arranged to abut against the outer part of the shoulder 29<sup>a</sup> which is associated with the contiguous slot 29. A second terminal strip 36 is positioned in the annular space 28 so that it is in alignment with the other of the two slots 29. This strip, like the terminal strip 34, is formed of spring metal and has one end thereof bent outwardly and arranged so as to abut against one of the shoulders 29<sup>a</sup>. The other end of the terminal strip 36 extends through the shell 30 so as not to contact therewith and is electrically connected to the contact screw 33. The attachment plug 10 is connected to the supplemental plug member 11 by inserting the contact elements 23 through the slots 29 and forcing them into engagement with the terminal strips 34, 36. When the plug is in its connected position, the two feed conductors 16 are electrically connected to the shell 30 and the contact screw 33 respectively.

The present invention as previously pointed out, comprehends a latch device for releasably locking the attachment plug 10 to the supplemental plug member 11. This device comprises a spring strip 37 which is positioned adjacent the outer face of one of the contact elements 23 and has one end thereof soldered or otherwise rigidly secured to the distal end of said contact element 23.

The free end of the strip 37 extends towards the cap 12 and projects into the chamber 15. It is bent slightly away from the contact element with which it is associated and embodies a tooth 38. This tooth is fixedly attached in any suitable manner to the outer face of the latch-strip and is adapted to be lodged behind one of the shoulders 29<sup>a</sup>, as shown in Figure 1, to lock together and in a positive manner the plug 10 and member 11.

When the contact elements 23 are inserted through the slots 29 of the end wall 25 and forced toward the terminal strips 34, 36, the tooth 38 of the latch-strip 37 engages said end wall 25 and is pressed inwardly thereby. As soon as the tooth clears the end wall 25 it is pressed outwardly by the strip 37 into engagement with the contiguous shoulder 29<sup>a</sup>. In this position of the tooth, the plug 10 is locked in place against withdrawal from the member 11. The free or distal end of the strip 37 is pressed inwardly by a pin 39 to disengage the tooth 38 from the coacting shoulder 29<sup>a</sup> for the purpose of unlocking the plug 10 and the member 11. This pin is formed of insulating material and is slidably mounted in an aperture 40 which is formed in the annular flange 14 of the cap 12. The inner end of the pin is connected by a stud 41 to the extreme inner end of the latch-strip 37. When the pin is pressed inwardly the latch-strip 37 is forced against the contact element 23 with which it is associated thereby causing the tooth 38 to be shifted out of engagement with the coacting shoulder 29<sup>a</sup>. The latch device herein disclosed may be manufactured at a comparatively low cost and exemplifies means of an improved character whereby the plug 10 and the supplemental plug member 11 may be releasably locked together. By means of this latch device, the attachment plug is positively locked to the member 11 and consequently can not be uncoupled or withdrawn accidentally during use of the electrical device to which the feed conductors 16 are connected. In addition to forming a positive lock the latch permits the attachment plug to be uncoupled without the necessity of pulling upon the conductors 16. A characteristic and an advantage of positioning the latch-strip 37 on the outer side of the contact element with which it is associated is that said latch strip bears against the adjacent terminal strip when the plug and member are in connected relation and consequently insures an efficient contact.

In Figures 5 and 6 of the drawing, the attachment plug 10 together with the improved latch device, is shown in connection with a wall plug 42. The latter comprises a rectangular plate 43 which is adapted to be secured to a wall or floor by a pair of screws 44. A circular opening 45 is formed in the central portion of the plate and has mounted

therein a disk-like member 46 which is comparable to the end wall 25 of the supplemental plug member 11 in that it is provided with a pair of laterally spaced rectangular slots 47. The portions of the inner face of the member 46 which are directly outwardly of the slots 47 form a pair of shoulders 47<sup>a</sup>. A block 48 of insulating material is secured to the back face of the plate by the screws 44 and embodies a pair of spring terminal strips 49. The latter are aligned with the slots 47 respectively and are connected to a pair of electrical supply conductors (not shown). The attachment plug 10 is applied to the wall plug 42 by inserting the contact elements 23 into the slots 47 and forcing them into engagement with the terminal strips 49. When the plug 10 is shifted so that the inner marginal part of the flange 14 substantially abuts against the plate 43, the tooth 38 of the locking device clears the disk-like member 46 and lodges against one of the shoulders 47<sup>a</sup> to effect the desired locking connection. The plug 10 is uncoupled from the plug 42 by pressing inwardly the pin 39 and disengaging the tooth 38 from the coacting shoulder.

From the foregoing description it is manifest that the plug 10 may be used either with a supplemental plug member or a wall plug and that the latch device in either instance operates to effect a positive interlock. The specific latch device herein disclosed consists of but three parts, namely, a spring strip, a tooth, and a pin, and as a result may be produced at a low cost. It may be applied readily to an attachment plug of the type that embodies a pair of rigid contact elements and operates in connection with a member having a slotted end wall.

The invention is not to be understood as restricted to the details set forth, since these may be modified within the scope of the appended claims, without departing from the spirit and scope of the invention.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent, is:

1. An attachment plug for use with a co-acting part embodying an end wall having a pair of laterally spaced slots formed therein, and a pair of spring terminal strips positioned in substantial alignment with the slots, said plug being separable from the aforesaid part and consisting of a cap having an open-ended chamber formed therein, a pair of binding screws in the chamber to which feed conductors are adapted to be secured, a pair of rigid contact elements electrically connected to the binding screws and projecting from the open end of the chamber in substantially parallel relation, said contact elements being adapted to be inserted through the slots of the end wall and forced adjacent the terminal strips, and a latch device for locking the plug to the part, com-

prising a spring strip having one end thereof fixedly attached to the outer end of one of the contact elements, the other end of the strip extending towards the chamber and away from said one contact element and being provided with a tooth which, when the plug and part are connected together, is forced by the strip into engagement with the end wall of the said part for locking purposes.

2. An attachment plug for use with a contacting part embodying an end wall having a pair of laterally spaced slots formed therein, and a pair of spring terminal strips positioned in substantial alignment with the slots, said plug being separable from the aforesaid part and consisting of a cap having an open-ended chamber formed therein, a pair of binding screws in the chamber, which feed conductors are adapted to be secured, a pair of rigid contact elements electrically connected to the binding screws and projecting from the open end of the chamber in substantially parallel relation, said contact elements being adapted to be inserted through the slots of the end wall and forced adjacent the terminal strips, and a latch device for locking the plug to the part, comprising a spring strip having one end thereof fixedly attached to the outer end of one of the contact elements, the other end of the strip extending towards the chamber and away from said one contact element and being provided with a tooth which, when the plug and part are connected together, is forced by the strip into engagement with the end wall of the said part for locking purposes, and a pin for shifting the free end of the latch-strip inwardly to effect disengagement of the tooth and end wall, said pin being slidably mounted in the cap and connected to said free end of the strip.

Signed at Chicago, Illinois, this 10th day of April, 1929.

JULIUS KEEPER.