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ELECTRICAL OUTLET SPLASH PROTECTOR

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STATEMENT OF GOVERNMENT INTEREST

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BACKGROUND OF THE INVENTION

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(1) Field of the Invention

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This invention generally relates to an apparatus which integrates safety shields into electrical outlets. More particularly, the invention relates to a safety shield for an electrical outlet such that the safety shield will entirely block the power and ground openings of an outlet to prevent the entrance of a liquid splash from entering the outlet. This will minimize susceptibility of the outlet to corrosion caused by the liquid and the possibility of electrical contacts in the outlet shorting out.

1 (2) Description of the Prior Art

2 Older electrical receptacles are designed such that they
3 have either a single or double outlet location for receipt of
4 an electrical plug. Two slots in the outlet are rectangular
5 to match the shape of the electrical plug prongs and the face
6 of the outlet is slightly tapered to guide an electric plug
7 into the slots of the outlet. Once a plug is inserted into
8 the outlet, the plug prongs contact with positive and negative
9 electrical current lines which provide electrical power to the
10 item which is connected to the outlet. These outlets are not
11 connected to a grounding wire and therefore any short circuit
12 in the system could result in power being transmitted through
13 an individual using the electrical outlet.

14 Newer receptacle outlets are connected to a third wire
15 which is the grounding wire. These outlets are designed with
16 a third hole in their face plate which is connected to the
17 grounding connection. This provides a grounding path through
18 the electrical system in lieu of through an individual using
19 the system, should a short circuit be present in the system.
20 The grounding connection of a plug is circular in shape (in
21 lieu of rectangular) and is located below, and centrally
22 between the rectangular positive and negative prongs for an
23 electrical plug.

1 In either style electrical outlet, it is possible for
2 water or other liquids to be accidentally splashed into the
3 slots or holes in the outlet. This situation can be costly in
4 that it can cause the metallic components of the outlet to
5 corrode or it could cause the electrical parts to short out
6 causing a fire or personal injury.

7 A safety device is inherently built into water proof
8 spring loaded or screw on receptacle safety covers which were
9 developed for outside use. Such safety features are not
10 normally included in many environments, such as a laboratory,
11 since there is no need for them to be waterproof and they cost
12 more. The spring loaded covers are inconvenient to hold out
13 of the way when inserting an electrical plug into an outlet
14 and the screw on caps would most likely be left unscrewed and
15 provide no protection. The safety apparatus described by this
16 invention can instead be easily utilized and will normally be
17 transparent to an observer.

18 The following patents, for example, disclose receptacle
19 covers, but do not disclose a water proof receptacle cover for
20 completely blocking the power and ground openings of an outlet
21 which is easy to use and includes a simple spring biased
22 safety shield.

1 U.S. Patent No. 3,173,731 to Anderson; and
2 U.S. Patent No. 3,990,758 to Petterson
3 Specifically, the patent to Anderson discloses an
4 electrical outlet covering having two pivotal members that are
5 pivotally positioned over a three prong electrical outlet.
6 The purpose of the outlet covering in Anderson is to prevent
7 insertion of a non-grounded plug into the electrical outlet.
8 Accordingly, each pivotal member has a portion which covers
9 only a part of the grounding pin opening and portion which
10 covers only a part of a prong slot opening. Covering of the
11 prong slot openings and grounding pin opening is only to the
12 extent necessary to prevent insertion of an ungrounded plug.
13 The pivoting member is pivotally attached between the two
14 pivotable arms. The pivoting members swing from a closed
15 position in which the grounding pin opening and the prong
16 slots are partially covered to an open position in which the
17 grounding pin opening and prong slots are completely
18 uncovered. Anderson teaches the use of a "spring member" to
19 provide biasing between the pivotable arms and the spring
20 member is independent of a pivot point between the two arms.
21 Helical compression springs and helical torsion springs are
22 specifically disclosed.

1 The patent to Petterson discloses a flat spring to bias
2 prong slot covers inside an electrical outlet.

3 It should be understood that the present invention would
4 in fact enhance the functionality of the above patents by
5 providing complete coverage of both the prong openings and the
6 grounding pin opening in an electrical outlet, thereby
7 achieving total closure of the outlet. The outlet would,
8 therefore, be sealed against the intrusion of liquid or
9 harmful substances which could corrode and/or damage the
10 interior of the electrical outlet. The present invention
11 would also be more reliable and compact because it uses a flat
12 spring rather than a helical spring.

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SUMMARY OF THE INVENTION

15 Therefore it is an object of this invention to provide an
16 apparatus which integrates safety shields into an electrical
17 outlet such that they will prevent water or other liquids from
18 splashing into the prong openings or grounding pin opening of
19 an electrical outlet.

20 Another object of this invention is to provide a splash
21 protector for an electrical outlet which completely covers the
22 prong openings and grounding pin opening of the electrical
23 outlet.

1 Still another object of this invention is to provide a
2 splash protector for an electrical outlet which has the
3 additional feature that the shield portions of the safety
4 shield are automatically cammed out of the way when a plug
5 with a standard grounding pin is inserted into the grounding
6 aperture of the outlet.

7 A still further object of the invention is to provide an
8 override pin which may be used in place of the grounding pin
9 of a plug to cam the safety shield away from the prong
10 openings and the grounding pin opening of an electrical
11 outlet.

12 Yet another object of this invention is to provide a
13 splash protector for an electrical outlet which is simple to
14 manufacture and easy to use.

15 In accordance with one aspect of this invention, there is
16 provided a splash protector in combination with an electrical
17 outlet. The splash protector includes a shield member having
18 a first shield portion and a second shield portion opposite to
19 the first shield portion. A spring member is provided in
20 connection with the first and second shield portions. An
21 outlet cover includes an outer face with a pair of rectangular
22 slot openings and a grounding pin opening formed therein, and
23 an inner face having a recessed area with an outer perimeter

1 of the recessed area encompassing at least the pair of
2 rectangular slot openings and grounding pin opening, but less
3 than an outer dimension of the outlet cover. A spring-
4 supporting post is formed on the inner face of the outlet
5 cover and projecting therefrom such that the spring member
6 fits within facing inner sides of the first and second shield
7 portions so that the first and second shields completely block
8 external access to the rectangular slot openings and grounding
9 pin opening of the outlet cover. Upon selectively actuating
10 the spring, the shield portions are moved away from the
11 rectangular slot openings and grounding pin opening.

12

13 BRIEF DESCRIPTION OF THE DRAWINGS

14 The appended claims particularly point out and distinctly
15 claim the subject matter of this invention. The various
16 objects, advantages and novel features of this invention will
17 be more fully apparent from a reading of the following
18 detailed description in conjunction with the accompanying
19 drawings in which like reference numerals refer to like parts,
20 and in which:

21 FIG. 1A is a side view of a conventional electrical plug
22 with a grounding pin;

1 FIG. 1B is an end view of FIG. 1A;
2 FIG. 1C is another end view of FIG. 1A;
3 FIG. 2A is a front view of a single electrical outlet
4 safety shield according to a first preferred embodiment of the
5 present invention;
6 FIG. 2B is an end view of FIG. 2A;
7 FIG. 3A is a front view of spring for use with the outlet
8 safety shield of FIGS. 2A and 2B;
9 FIG. 3B is a side view of the spring shown in FIG. 3A;
10 FIG. 4 is a view of a combined safety shield and spring
11 in an electrical outlet;
12 FIG. 5 is a view of the combined safety shield and spring
13 in an electrical outlet with a three-prong plug inserted into
14 the electrical outlet;
15 FIG. 6A is a side view of an override pin according to a
16 second preferred embodiment of the present invention;
17 FIG. 6B is an end view of an override pin of FIG. 6A;
18 FIG. 7 is a front view of an electrical receptacle with
19 an electrical plug installed in the lower outlet.

1 DESCRIPTION OF THE PREFERRED EMBODIMENT

2 In general, the present invention is directed to an
3 electrical outlet splash protector, generally shown in FIGS. 4
4 and 5 as it is attached to an electrical outlet. Details
5 thereof will be set forth in the following.

6 Turning first to FIGS. 1A, 1B, and 1C, explanation will
7 be briefly provided of a conventional three-prong plug 10. In
8 a known three-prong plug 10, there are at least three elements
9 which are used in connection with a conventional outlet and
10 with the splash protector of the present invention.

11 Specifically, the three-prong plug 10 includes a positive
12 prong 12 and a negative prong 14 which correspond to the
13 positive and negative slotted openings in a conventional
14 outlet 18 (see FIG. 7), such that insertion of the plug 10
15 into a corresponding outlet will complete a circuit.

16 Additionally, many of the newer known plugs 10 include a
17 grounding pin 16 centered below the positive and negative
18 prongs 12, 14 on a face of the plug 10. It should be noted
19 that the grounding pin 16 is longer than or protrudes
20 longitudinally beyond the length of the positive and negative
21 prongs 12, 14, as seen most clearly in FIG. 1A. The invention
22 advantageously utilizes the length of grounding pin 16 in a
23 manner to be described more fully hereinbelow.

1 FIG. 2A is a front view and FIG. 2B is an end view taken
2 along line 2B-2B of FIG. 2A and showing one half of a safety
3 shield 20 according to a preferred embodiment of the present
4 invention. It should be understood that the safety shield 20
5 includes a pair of shield portions 20a and 20b. Shield
6 portion 20a is a mirror image of shield portion 20b. Each
7 shield portion 20a or 20b of the safety shield 20 includes an
8 inner face 22 and an outer face 24 opposite the inner face 22.
9 Upon assembly, the inner faces 22 of the shield portions 20a,
10 20b are selectively separated and joined for the purpose of
11 exposing and shielding the openings of the electrical outlet
12 18 (see FIG. 7), respectively.

13 Each of the inner faces 22 of the shield portions 20a,
14 20b include a lower flat surface 26 having a tapered groove 28
15 formed therein and an upper flat surface 30 at an opposite end
16 of the shield portion from the lower flat surface 26. The
17 lower flat surface 26 is angularly offset from the upper flat
18 surface 30 of the shield portion 20a, 20b. An inset surface
19 32 is set in from but formed parallel to the upper flat
20 surface 30 of the shield portion 20a, 20b. Within the inset
21 surface 32, there is formed a circular cutout area 34, the
22 cutout area terminating at a transition to the lower flat
23 surface 26 of the shield portion 20a, 20b. In further

1 understanding of the lower flat surface 26, the tapered groove
2 28 is formed such that the groove 28 initiates at a top
3 surface 27, and tapers to a termination at a bottom surface
4 29. At no location of the tapered groove 28 is there a cutout
5 or opening formed which would affect the continuity of the
6 bottom surface 29. Thus, upon joining of the lower flat
7 surfaces 26 together, a flush mating is achieved therebetween.

8 The outer face 24 of each shield portion 20a, 20b is such
9 that the surface is substantially parallel to each of the
10 lower face 26 and the recessed surface 32, while the upper
11 flat surface 30 is backed by an angled surface 36 on the outer
12 face 24 of the shield portions 20a, 20b. Optionally, Angled
13 surface 36 can be provided with a partial cut out to allow
14 prongs 12 and 14 to move shield portions 20a and 20b. It
15 should be noted, however, that the shape of the outer surface
16 24 can be varied to suit particular manufacturing, consumer,
17 or industry needs.

18 Each of the shield portions 20a, 20b of the safety shield
19 20 is made of plastic or any dielectric material in its
20 preferred embodiment.

21 Turning now to FIGS. 3A and 3B, there is shown a front
22 view and an end view, respectively, of a spring 40 for use
23 with the safety shield 20 of the preferred embodiment. The

1 spring 40 includes a substantially circular base portion 42
2 terminating in a pair of radial arms 44. The spring 40 is
3 normally biased outward such that the radial arms 44 are
4 spaced apart, and a force against the radial arms 44 will
5 compress the radial arms 44 together, to a point where they
6 are in surface contact with each other. The central axis of
7 the spring 40 is centered in the substantially circular base
8 portion 42.

9 Upon assembly of the safety shield 20 with the spring 40,
10 the circular portion 42 of the spring 40 is fit within the
11 cutout area 34 of the shield portions 20a, 20b and one of each
12 of the radial arms 44 of the spring 40 are fit within a
13 corresponding inset surface 32 of the shield portions 20a and
14 20b. This assembly results in a flush surface between an
15 inner face of the radial arms 44 and the upper flat surface 30
16 of the shield portions 20a, 20b.

17 FIG. 4 is a rear view illustrating a safety shield 20
18 installed in an electrical outlet 50 of the present invention
19 and FIG. 5 is a rear view showing the safety shield 20
20 installed in the electrical outlet 50 with the plug 10
21 inserted therein. More specifically, the electrical outlet 50
22 includes a plastic piece having an outer dimension shown at 52
23 and an inner recessed portion 54. It should be noted that the

1 inner recessed portion 54 is in fact facing to the interior of
2 the outlet 50 and the shape thereof is not seen from an
3 exterior of the outlet structure as viewed by a user inserting
4 a plug 10 into the outlet 50. Accordingly, top surface 27 of
5 shield portions 20a and 20b face the user, and bottom surfaces
6 29 are visible in this view. The inner recessed portion 54 is
7 of a size to encompass positive 56 and negative 58 cutout
8 slots of the outlet 50 as well as a cutout grounding hole 60
9 of the outlet. The inner recessed portion 54 of the outlet 50
10 also includes a support post 62 projecting therefrom. The
11 support post 62 is located to receive the axial portion of the
12 circular base portion 42 of the spring member 40 therearound.

13 It is anticipated that an inner circumferential surface of
14 the circular base portion 42 will be friction fit with an
15 outer circumferential surface of the support post 62.

16 However, support post 62 can also be formed with a head for
17 retaining spring member 40. The combined safety shield 20 and
18 spring 40 are fit within the inner recessed portion 54 of the
19 outlet 50 so that the support post 62 of the outlet 50 is
20 axially fit within the circular portion of the spring 40.

21 In FIG. 4, the normal bias of the spring 40 maintains the
22 shield portions 20a, 20b spaced apart from each other so that
23 a portion (the upper ends) of the shield portions 20a, 20b are

1 completely covering the slotted prong openings 58, 60 of the
2 outlet 50. Additionally, the normal biasing outward of the
3 upper ends of the shield portions 20a, 20b causes the joining
4 of the lower flat surface 26 of the shield portions 20a, 20b
5 in a flush manner. The tapered groove 28 of the lower flat
6 surface 26 thus has its edges aligned so that the cutout
7 grounding hole 60 of the outlet 50 is completely covered from
8 an interior of the outlet 50.

9 In FIG. 5, insertion of the conventional plug 10 causes
10 the grounding pin 16 to slide into the tapered grooves 28 of
11 the shield portions 20a, 20b thereby gradually separating the
12 lower flat surfaces 26 of the shield portions 20a, 20b away
13 from each other. Because the grounding pin 16 is longer than
14 either of the positive prong 12 or the negative prong 14, the
15 grounding pin 16 will lead the insertion of the plug 10 into
16 the outlet, thereby enabling the camming of the lower flat
17 surfaces 26 of the shield portions 20a, 20b away from each
18 other. The tapered grooves 28 of the lower flat surfaces 26
19 permit an easy sliding of the grounding pin 16 thereagainst,
20 and eventually separates the lower flat surfaces 26 of the
21 shield portions 20a, 20b away from each other. Upon
22 separation of the lower flat surfaces 26 of the shield
23 portions 20a, 20b, the radial arms 44 of the normally biased

1 spring 40 are compressed together by the action of the shield
2 portions 20a, 20b until the upper flat surfaces 30 of the
3 shield portions 20a, 20b are flush against each other. Upon
4 complete compression of the radial arms 44 of the spring 40,
5 the slotted prong openings 56, 58 of the outlet 50 are
6 exposed, allowing for insertion of the positive and negative
7 prongs 12, 14 into the corresponding outlet openings 56, 58,
8 respectively. The plug 10 may be fully inserted so that there
9 are no exposed prongs 12, 14 or grounding pin 16.

10 Referring now to FIGS. 6A and 6B, if the plug 10 to be
11 inserted into the outlet 50 has no grounding pin 16, then it
12 will be necessary to insert an override pin 70 into the
13 grounding hole 60 and thus against the tapered groove 28 of
14 the shield portions 20a, 20b. The override pin 70, similar to
15 the grounding pin 16, cams the shield portions 20a, 20b so
16 that insertion of an ungrounded plug can be effected. This
17 insertion of the override pin 70 should only be performed just
18 prior to installing a plug without a grounding pin 16. Under
19 these conditions, it will be necessary to manually remove
20 override pin 70 when the ungrounded plug is removed in order
21 to return the outlet to its safety configuration.

22 In detail, the override pin 70 includes an elongated
23 shaft portion 72 and a head 74 at one end of the elongated

1 shaft portion 72. The diameter and length of the shaft 72 of
2 the override pin 70 is similar to the diameter and length of
3 the grounding pin 16 of the electrical plug 10. In addition,
4 override pin 70 has an enlarged head member 74 which will
5 prevent the shaft 72 from completely entering the grounding
6 hole 60 of the outlet 50 when it is inserted therein. The
7 head portion 74 also provides an area which can be grasped to
8 remove the override pin 70 from the outlet 50. However, it
9 should be noted that the thickness of the head portion 74 is
10 thin enough to prevent any interference with insertion of a
11 plug having no grounding pin 16. Generally, the override pin
12 70 will be formed as a one-piece construction and out of a
13 non-conductive material to avoid shock or injury to the user.
14 However, the override pin 70 may be formed, as necessary, of
15 a two-piece construction or with rubber coating or the like on
16 the head portion 74 for safety purposes.

17 The fully assembled electrical outlet with a splash
18 protector and having an electrical plug inserted in the lower
19 outlet thereof is shown in FIG. 7. The outward appearance of
20 outlet 50 is almost identical to standard receptacles which
21 are presently widely known. The only outwardly physical
22 difference between the appearance of the safety outlet 50 a
23 standard receptacle is that the rectangular slots 56, 58 and

1 grounding hole 60 will be completely blocked by shield
2 portions 20a, 20b and the joined edges of the tapered groove
3 portion 28 will be visible through the grounding hole 60 in
4 the outlet 50. The plastic outlet 50 will be riveted to a
5 back plastic piece in the same manner as is presently common
6 practice. In addition, the terminal connections and
7 foundation mounts will be unchanged from the existing, well
8 known configuration. As a result of this similarity, the
9 safety receptacle 50 will be interchangeable for replacement
10 of receptacles which are already installed or suitable for new
11 installation into existing configuration electrical boxes and
12 be able to utilize existing face plates.

13 In summary, a preferred embodiment of the present
14 invention illustrates shield portions 20a, 20b confined just
15 behind the front face of an electrical outlet 50. These
16 shield portions 20a, 20b are positioned by the single spring
17 40 which places them so that they completely block access
18 through the rectangular prong slots 56, 58 and circular
19 grounding hole 60 of the outlet 50. However, when the
20 grounding pin 16 of a standard plug 10 is inserted in the
21 outlet's grounding hole 60, it automatically cams the shield
22 portions 20a, 20b out of the way so that the rectangular slots
23 56, 58 in the outlet 50 are opened for insertion of the

1 rectangular prongs 12, 14 of a standard electrical plug 10.
2 If the plug 10 does not have a grounding pin 16, then the
3 override pin 70 is provided to cam the shield portions 20a,
4 20b out of the way.

5 The present invention is inexpensive and may be
6 incorporated into the basic configuration of a standard
7 electrical outlet such that the safety shield mechanically
8 prevents the splashing of water or other liquids into the
9 rectangular slots. The safety shield therefore prevents the
10 potential for shorting of electrical power or the corrosion of
11 internal components of an outlet.

12 When the subject matter of the present invention is
13 incorporated into the design of an electrical outlet, it will
14 result in a splash protection receptacle which is
15 interchangeable with conventional receptacles and completely
16 compatible with existing electrical boxes, face plates,
17 foundation and wiring.

18 The subject matter of the present invention can be mass
19 produced without a significant increase in cost over a
20 standard electrical outlet configuration.

21 The configuration shown provides the basic concept only,
22 and may be modified as necessary as to the size and shape of
23 the components described.

1 By the present invention, a safety shield for an
2 electrical outlet is provided in a more efficient manner than
3 previously achieved in the art.

4 This invention has been disclosed in terms of certain
5 embodiments. It will be apparent that many modifications can
6 be made to the disclosed apparatus without departing from the
7 invention. Therefore, it is the intent
8 to cover all such variations and modifications as come within
9 the true spirit and scope of this invention.

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3 ELECTRICAL OUTLET SPLASH PROTECTOR

4 ABSTRACT OF THE DISCLOSURE

5 A splash protector in combination with an electrical
6 outlet includes a shield member having a first shield portion
7 and a second shield portion opposite to the first shield
8 portion. A spring member is provided in connection with the
9 first and second shield portions. An outlet cover includes an
10 outer face with a pair of rectangular slot openings and a
11 grounding pin opening formed therein, and an inner face having
12 a recessed area with an outer perimeter of the recessed area
13 encompassing at least the pair of rectangular slot openings
14 and grounding pin opening, but less than an outer dimension of
15 the outlet cover. A spring-supporting post is formed on the
16 inner face of the outlet cover and projecting therefrom such
17 that the spring member fits within facing inner sides of the
18 first and second shield portions so that the first and second
19 shields completely block external access to the rectangular
20 slot openings and grounding pin opening of the outlet cover.
21 Upon selectively actuating the spring, the shield portions are
22 moved away from the rectangular slot openings and grounding
23 pin opening.

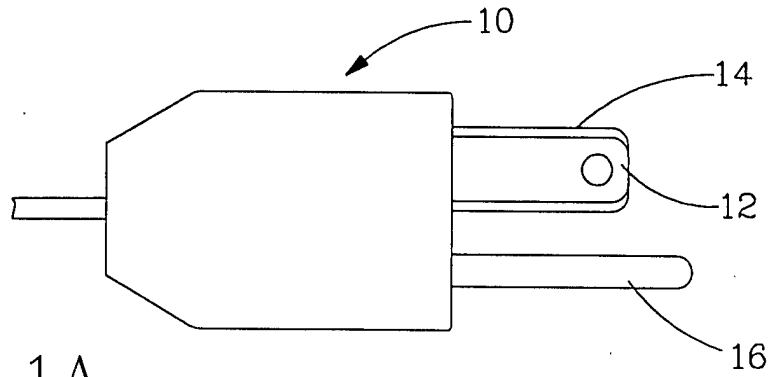


FIG. 1A
(PRIOR ART)

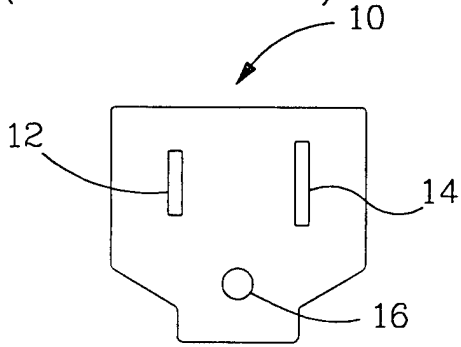


FIG. 1B
(PRIOR ART)

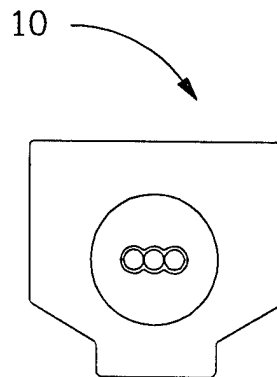


FIG. 1C
(PRIOR ART)

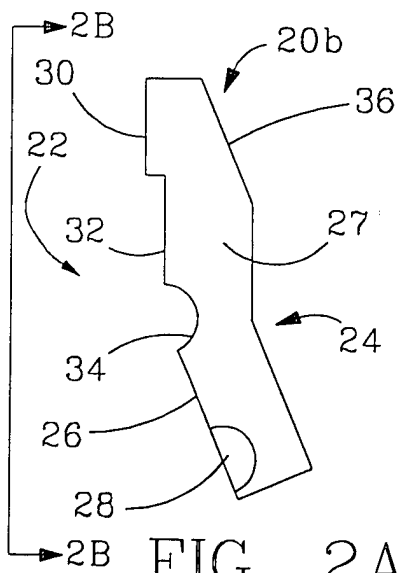


FIG. 2A

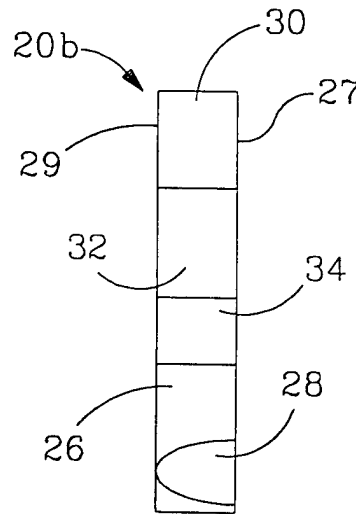


FIG. 2B

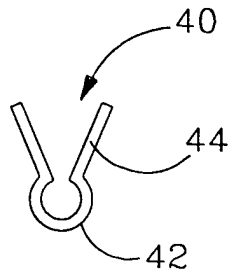


FIG. 3A

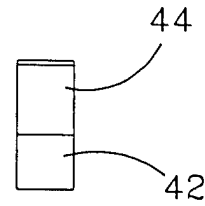


FIG. 3B

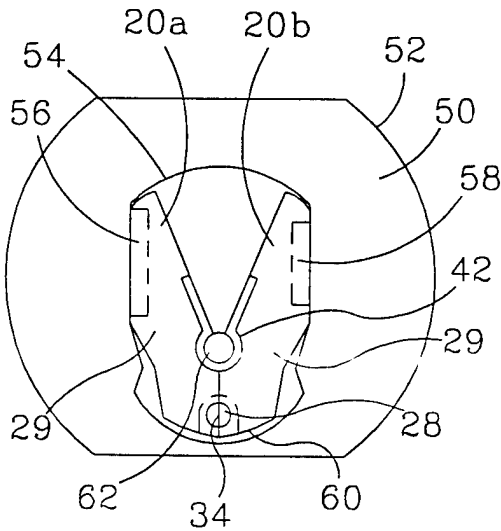


FIG. 4

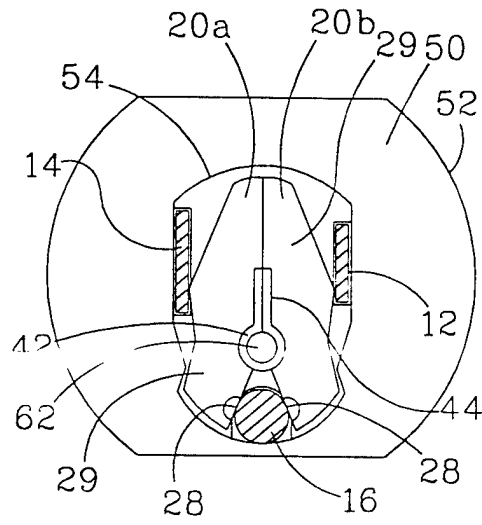


FIG. 5

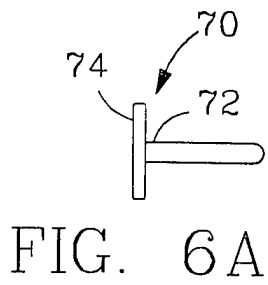


FIG. 6A

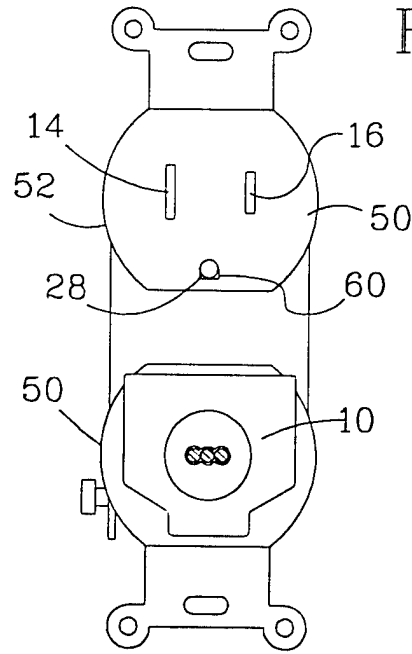


FIG. 7

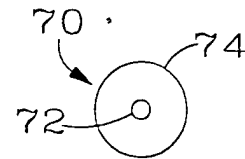


FIG. 6B