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ELECTRICAL RECEPTACLE WITH SAFETY SHUTTER

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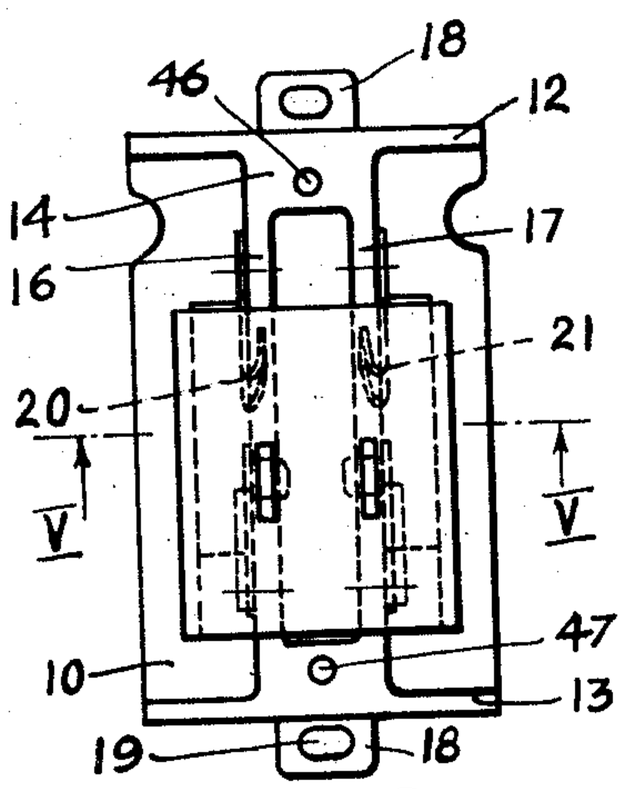

Fig. 1.

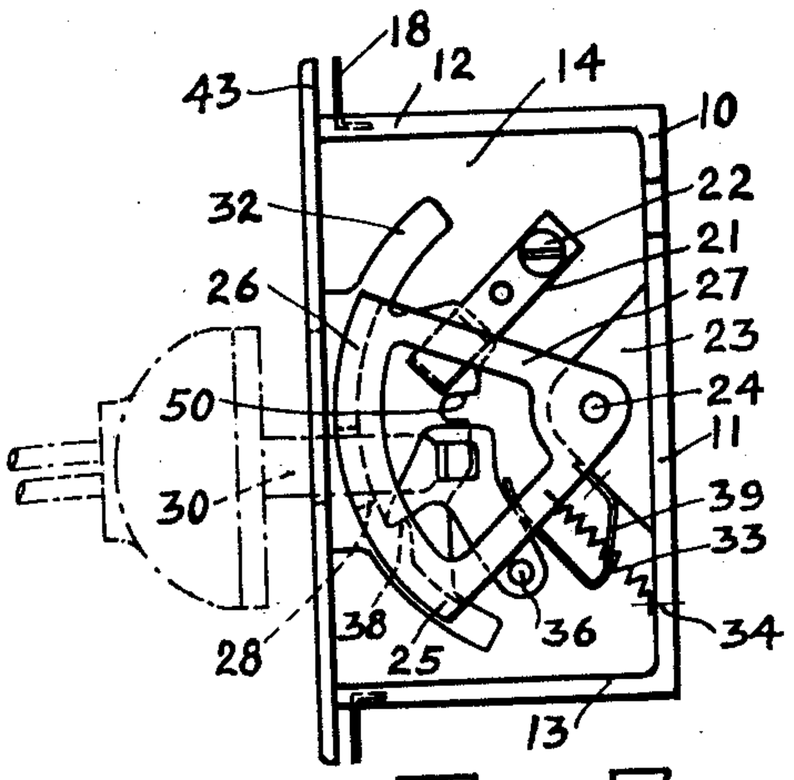

Fig. 3.

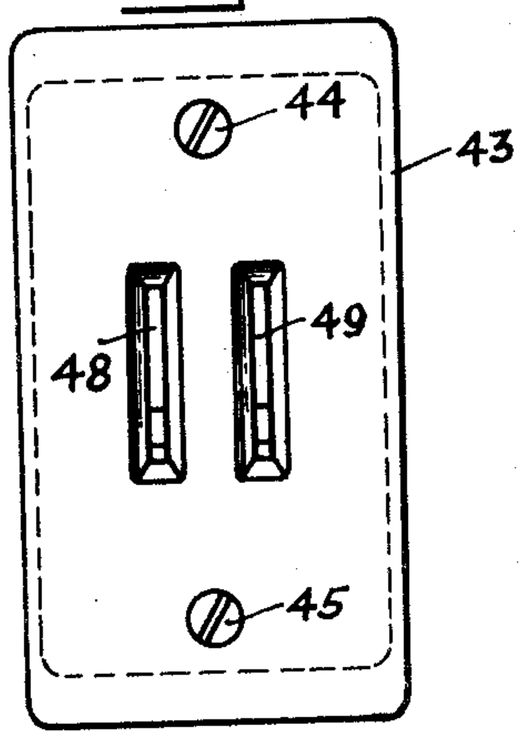

Fig. 2.

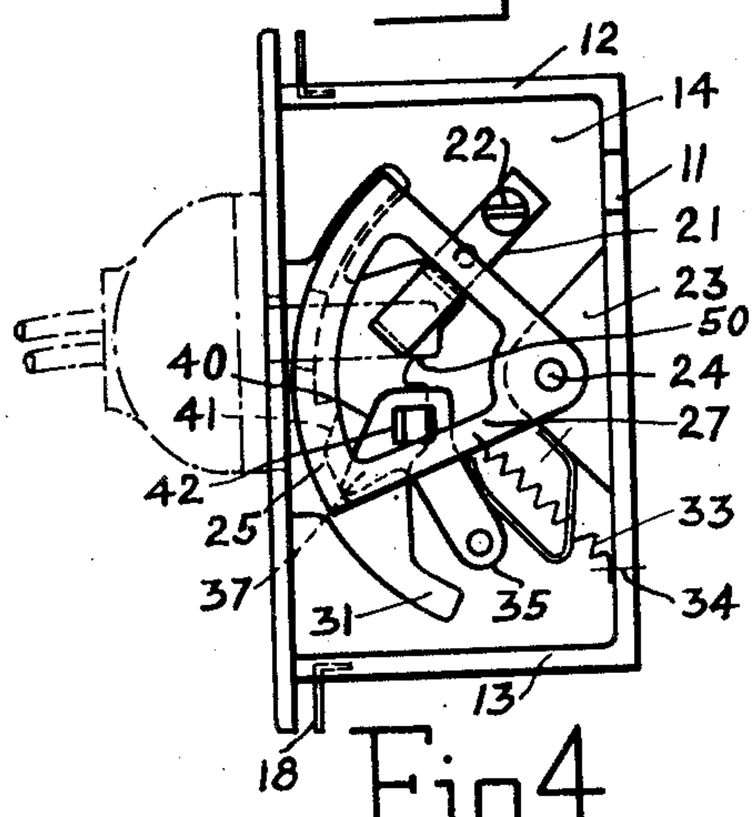

Fig. 4.

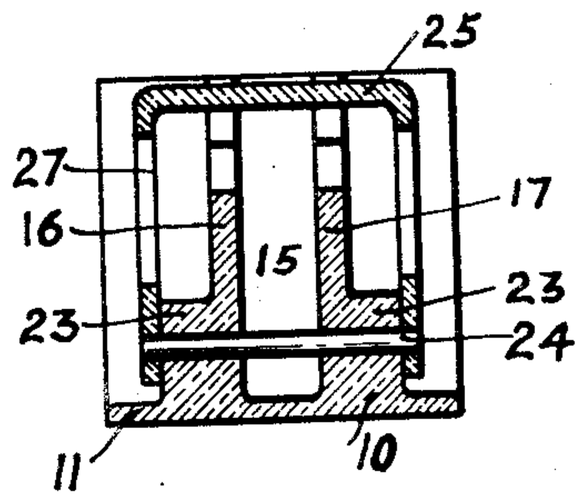

Fig. 5.

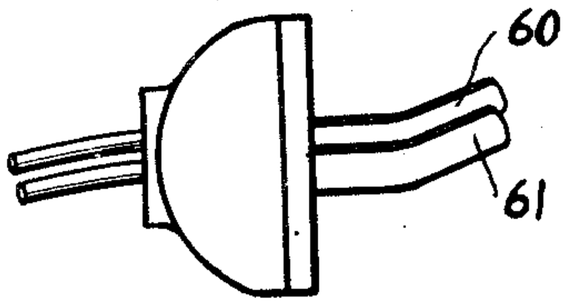

Fig. 6.

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ELECTRICAL RECEPTACLE WITH SAFETY SHUTTER

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4 Claims. (Cl. 173—330)

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Our invention relates to electric receptacles such as are installed in walls, baseboards, etc., and which serve as means whereby an electric appliance may be connected by a cord and plug to live wires and more particularly to what is known as a safety receptacle in which it is difficult or impossible to make accidental contact with the live parts of the receptacle.

The electric receptacle made according to our invention is adapted to receive any standard plug, or it may be constructed, if so desired, to receive any special plug. The arrangement is such that a shutter or barrier is positioned so that it is impossible to reach the live contacts until the two prongs of the plug are inserted into the prong slots and the shutter then moved so that the plug prongs may be slid further into the receptacle to contact engaging position. When the plug is withdrawn, the shutter member will return to barrier position and prevent engagement with the contacts by means of a foreign single piece of conducting material such as a wire or hairpin which may be inserted into the ordinary receptacle to engage a live contact, and which may cause grave results.

Our invention provides two locks for the shutter when in barrier position, which locks must be both released simultaneously to enable the shutter to be moved from the barrier position, which is such that it is impossible to move the prongs of a plug into engagement with the live contacts of the receptacle, to a position whereby the live contacts may be engaged by two prongs of a proper size and spacing, such as are found on standard insertable plugs.

It is one of the objects of our invention to provide a receptacle in which the live contacts cannot be engaged except by an object having two prongs of a determined size and spacing.

It is another object to provide a receptacle wherein contact with a current-carrying portion thereof can be made only by a two-step operation performed in a definite manner.

It is a further object to provide a receptacle having a barrier which may be released for movement only by the simultaneous action of two prongs of a desired plug.

It is still another object of our invention to provide a receptacle having a barrier which will return to a protecting position as soon as the prongs of the insertable prongs of the plug are withdrawn from the receptacle.

In the accompanying drawings, wherein we have shown for purposes of illustration only a

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certain presently preferred embodiment of our invention:

Figure 1 is a front view in elevation of a receptacle, but without the cover plate, embodying our invention;

Figure 2 is a front view in elevation showing the receptacle with the cover plate in position;

Figure 3 is a side view in elevation of the receptacle shown in Figure 1, with the cover plate in position, and showing in dotted lines a standard insertable plug with its two prongs in position to unlock the receptacle;

Figure 4 is a view generally similar to that shown in Figure 3, but showing the insertable plug in position with its two prongs engaging the live electric contacts of the receptacle;

Figure 5 is a view in cross section along the line V—V of Figure 1; and

Figure 6 shows a form of insertable plug which may be used with our receptacle.

Our receptacle is adapted to receive any standard plug having two connection prongs which may be inserted by pushing the prongs into apertures prepared for it in a barrier plate to release two locking dogs which engage the barrier or shield plate, whereupon the plug may be raised to move the barrier to a position where the prongs may be inserted further into the receptacle to engage the usual live electrical contacts therein. When the prongs are pulled out of the receptacle, the barrier plate is then moved by springs to a position where the locking dogs engage the barrier plate, in which position the apertures in the barrier position are out of alignment with the contacts. This makes it impossible for any one to engage the electrical contacts by means of an instrument having only a single prong-like member. Thus the ordinary nail or pin cannot be placed in contact engaging position, either accidentally or on purpose.

In the drawings, wherein similar parts in the several drawings are designated by like numerals, the numeral 10 designates the body of an electrical receptacle or plug-in socket formed from a suitable insulating material such as porcelain or plastic and by any usual method. The body has a base 11, upturned ends 12 and 13, and an upstanding land portion 14 having therein a well depressed portion 15 with sides 16 and 17. The well extends to the base 11. Centrally disposed at each end are the usual fastening ears or lugs 18, of metal secured to the body of insulating material, and having elongated slots 19, by means of which the receptacle may be attached to the usual outlet box.

Electrical contact elements **20** and **21** are secured to the sides **16** and **17** respectively, and on each contact an attachment screw **22** is mounted so that the contacts may be each attached to current carrying or live wires.

Mounted on raised lugs **23** disposed opposite one another and projecting from each of the side members **16** and **17** for arcuate movement around pivots **24** is a barrier plate or shutter **25** formed from an insulating material such as a suitable plastic or porcelain. The barrier or shutter consists of a cylindrical segment **26** from opposite sides of which segmented arms **27** extend to engage pivots **24**. The barrier has two aligned spaced apart slots **28** in the segment **26** into which the prongs **30** of an ordinary electrical plug may be passed. The barrier or shutter is so shaped and proportioned as to be received in lower recess **31** and upper recess **32** formed in each of the side walls **16** and **17** of well **15**. The barrier is biased toward the bottom of the slot or recess **31** by two springs **33**. The springs are attached to each arm **27**. The other ends of the springs are secured to pins **34** on the base **11**.

Two locking dogs **35** are mounted one on each of the side walls **16** and **17** for angular movement about the pivot pin **36**. Each of the dogs **35** has a detent or projection **37**, which engages with a shoulder or tooth **38** on each of the segments **26**. The detent and tooth form a latch to hold the barrier in the lower or locked position. The dogs are urged toward the segment **26** (to the left as seen in Figures 3 and 4) by flat springs **39**. A tongue portion **42** projects outwardly from each of the dogs **35** to be engaged by the prongs **30** of the plug as will be described. The upper end of detents **37** and the lower portion of the teeth **38** have sloped portions **40** and **41** respectively so that the barrier **25** when urged to locked position by the action of springs **33** after the withdrawal of plug prongs **30** will allow the teeth **38** to slide over the detents **37** until the detents engage the teeth, which occurs when the barrier is in locked position adjacent the bottom of the lower recess **31**.

A cover plate **43** is provided with two holes **44** and **45** through which screws may be passed into threaded holes **46** and **47** respectively disposed in the top surface of the land portion **14**, to secure the plate to the receptacle. In cover plate **43** are two slots **48** and **49**, which are of such length and breadth and so spaced as to accommodate the prongs **30** of an ordinary electrical plug, throughout the movements thereof when the plug is moved from the barrier position to the insertible position where the plug prongs may be slid into electrical union with the contact elements **20** and **21**.

When the barrier plate **25** is in the lower position or locked position, it is impossible for an object such as a nail to be pushed into the receptacle so as to engage the electrical contacts **20** and **21**. In this initial position of insertion the plug cannot make electrical connection directly with the contacts **20** and **21**. However, after the insertion of the two prongs of the plug part way into the receptacle the dogs **35** will be released from engagement with the teeth **38** by moving the prongs inwardly (to the right of Figure 3) until the prongs engage and then move the dogs **35** by pressing on the tongues **42**. The barrier or shutter **25** may then be moved upwardly from the barrier, locked, or closed position shown in Figure 3 to the unlocked or contact exposed position

shown in Figure 4, where the plug prongs **30** may be slid into electrical engagement with the contacts **20** and **21**. At the bottom of each of the contacts is a ledge **50** on which the ends of the prongs rest when in engagement with contacts **20** and **21**. This is to prevent any unplanned downward movement of the plug, which movement would tend to take place due to the pull of springs **33** should the engagement be loose. When the plug is withdrawn from the receptacle the barrier **25** is promptly moved to the lower or locked position (Figure 4) by the action of springs **33**, and held there by the latching means.

In Figure 6 we have shown an electrical plug which may be advantageously used with our invention. This plug has two metal prongs **60** and **61** which extend outwardly in a straight line for a short distance and are then slanted upwardly and may be arranged as to lie along the contacts **20** and **21**.

We have shown an exemplary and presently preferred embodiment of our invention, but it is to be understood that changes may be made in the structure within the scope of the following claims.

We claim:

1. In a plug-in socket structure having a contact element arranged to detachably receive a contact prong in electrical union, a shutter in the form of a radial segment of a cylinder hinged at the longitudinal axis for arcuate movement and having a slot for passage of a contact prong into the socket to an initial position of insertion out of line with the contact element, the shutter being movable in a limited arc relative to the contact element from the initial position of insertion to a position where the slot is in alignment with the contact element, and means for restoring the shutter to its initial position when the plug is withdrawn, and means for locking the shutter in its initial position.

2. In a plug-in socket structure having a contact element arranged to detachably receive a contact prong in electrical union, a shutter in the form of a radial segment of a cylinder hinged at the longitudinal axis for arcuate movement having a slot for passage of a contact prong into the socket to an initial position of insertion out of line with the contact element, the shutter being movable in a limited arc relative to the contact element from the initial position of insertion to a position where the slot is in alignment with the contact element, means for restoring the shutter to its initial position when the plug is withdrawn, teeth on the shutter, and locking dogs arranged to cooperate with the teeth for locking the shutter in its initial position, each dog having an outwardly projecting tongue engageable by the prongs whereby the locking dogs can be released by insertion of the prong.

3. In a plug-in socket structure having two contact elements arranged to detachably receive the two prongs of an electrical plug in electrical union, a shutter in the form of a radial segment of a cylinder and hinged to move in a limited arc, two prong receiving openings in the shutter, means for locking the shutter in closed position wherein the prongs when passed through the shutter openings are out of electrical union with the contacts, means operable by the insertion of the two prongs for releasing the locking means, and means urging the shutter to closed position, said shutter being arcuately movable from the closed position to a position where the prongs

may be moved into electrical union with the contacts.

4. In a plug-in socket structure having two contact elements arranged to detachably receive two prongs of an electrical plug in electrical union, a shutter in the form of a radial segment of a cylinder and hinged to move arcuately, two prong receiving openings in the shutter, means for locking the shutter in closed position wherein the prongs when passed through the shutter openings are out of electrical union with the contacts, means operable by the insertion of the two prongs for releasing the locking means, means urging the shutter to closed position, and projections on the contacts for preventing the downward movement of the plug when the prongs are in electrical union with the contact elements.

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