

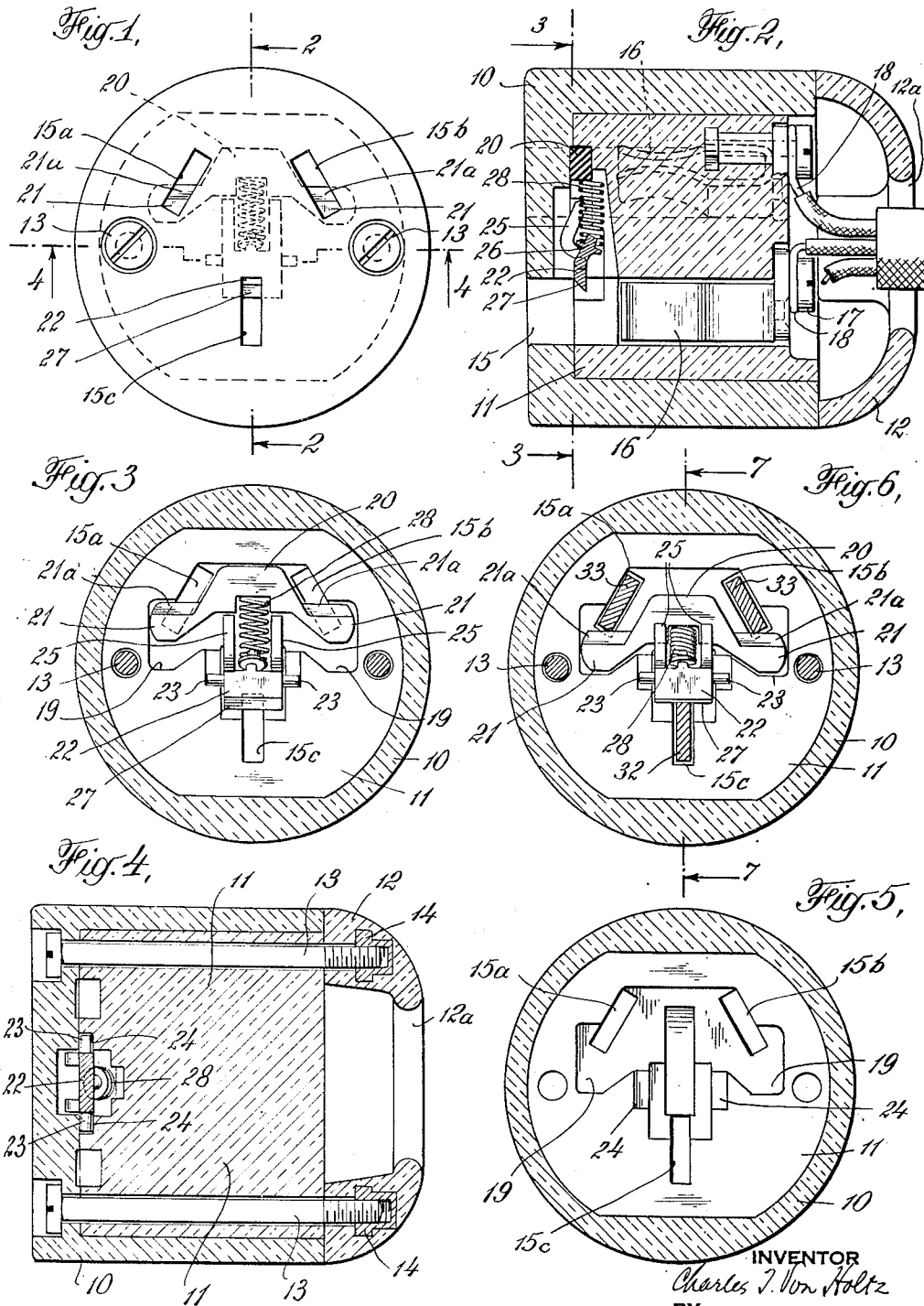
May 22, 1951

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SAFETY RECEPTACLE

2,553,837

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2 Sheets-Sheet 1



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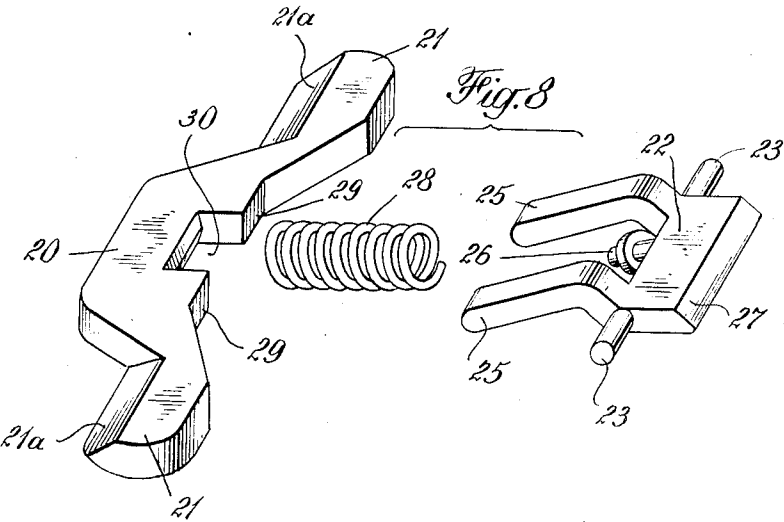
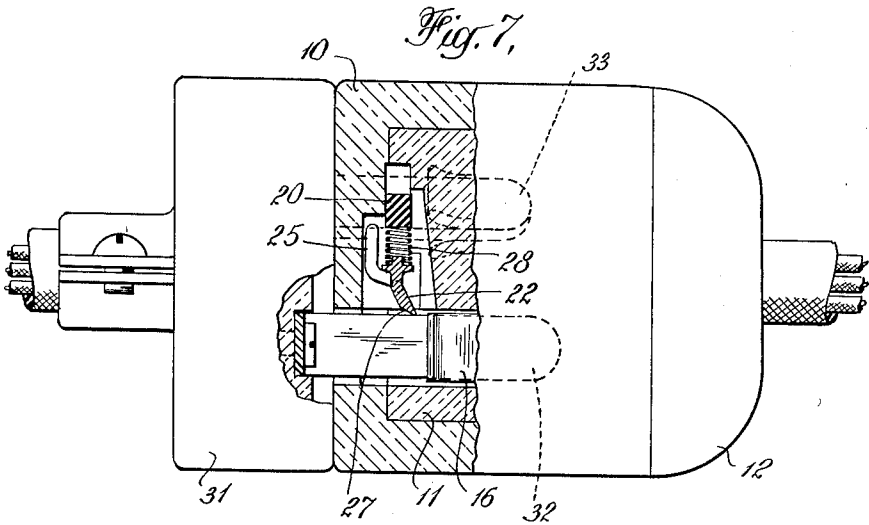
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## UNITED STATES PATENT OFFICE

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## SAFETY RECEPTACLE

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This invention relates to electrical receptacles, which include terminals concealed within the body of the receptacle and engageable by the prongs of a plug inserted into passages in the body to make a connection between conductors connected, respectively, to the terminals and the prongs. More particularly, the invention is concerned with a novel safety receptacle for use in a three wire system, in which one wire is a ground connection, the new receptacle including three terminals and means normally blocking the passages to the two live terminals and movable to open the passages only upon the insertion of the ground prong of a plug into the passage leading to the ground terminal. The new receptacle, accordingly, prevents accidental engagement of the ground prong of a plug with a live terminal of the receptacle.

The new receptacle may be employed with a standard type of plug and the plug prongs may be inserted into the passages of the receptacle by a single rectilinear movement to make a connection. The safety means of the receptacle consist of a few simple parts, which can be readily produced, and assembling the receptacle is a simple operation.

For a better understanding of the invention, reference may be had to the accompanying drawing, in which

Fig. 1 is a view in end elevation of one form of receptacle embodying the invention;

Fig. 2 is a sectional view on the line 2-2 of Fig. 1;

Fig. 3 is a sectional view on the line 3-3 of Fig. 2;

Fig. 4 is a sectional view on the line 4-4 of Fig. 1;

Fig. 5 is a view similar to Fig. 3 but with parts removed;

Fig. 6 is a view similar to Fig. 3 but showing the safety means acted on by the prongs of a plug;

Fig. 7 is a view in side elevation, with parts broken away, of the receptacle with a plug in place with its prongs inserted into the receptacle passages; and

Fig. 8 is an exploded perspective view on an enlarged scale of the parts of the safety means of the receptacle.

The receptacle in the form shown comprises a body made up of casing 10 of a suitable insulating plastic material and of cylindrical cup form and a block 11 of similar material filling the interior of the casing. A cover 12 of plastic insulating material or of metal with a lining

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of such material is mounted at the open end of the casing and the casing and cover are held together by bolts 13, which pass through openings in the end of the casing and the block and are threaded into metallic cups 14 embedded in the wall of the cover. The end of the casing and the block are formed with aligned passages 15 and, within each passage and inside the block, there is a terminal 16, which includes a pair of spring blades and has a screw 17, by which a wire 18 inserted through an opening 12a in the cover may be connected to the terminal. Two of the passages 15a, 15b, lying at one side of the axis of the casing and convergent toward a diameter of the casing, lead to terminals to be connected to live conductors. The third passage 15c lies on the other side of the casing axis on the diameter referred to and leads to the terminal to be connected to the ground wire of the system.

The inner face of the end of the casing and the opposed end of block 11 are formed to provide a chamber 19, which connects the passages 15. Within the chamber is mounted a plate 20, which lies with its plane transverse to the passages and is formed with ends 21, which, in the normal position of the plate, extend into the passages 15a, 15b. The edges of the end portions 21 are formed with sloping surfaces 21a exposed through the passages, when the plate is in normal position, so that when the prongs of a plug being inserted into the passages strike the surfaces, the plate can be moved edgewise to unblock the passages.

A second plate 22 is mounted in the chamber and one edge of the plate normally projects into passage 15c. The plate is provided with a pair of trunnions 23 at its opposite sides, which are receivable in grooves 24 in the side walls of the chamber, and the plate also has a pair of spaced legs 25, which extend away from the plane of the plate and then are bent back so that their ends lie approximately in that plane. Plate 22 is also provided with a stud 26, which lies between the legs and extends in the same direction, and it has a cam surface 27 along its edge opposite to that from which legs 25 extend.

The plates 20 and 22 are urged apart by a coil spring 28 and, in the normal position of the plates, plate 20 is held against an end wall of the chamber with its ends 21 blocking passages 15a, 15b and plate 22 is held with its trunnions engaging the ends of grooves 24 and one face lying against the forward wall of the cham-

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ber with an edge of the plate projecting into passage 15c. In this position of the parts, the ends of legs 25 lie in the plane of and close to flat surfaces 29 on plate 20 on opposite sides of a recess 30 in the plate, in which one end of the spring is seated.

The plug 31 used with the receptacle has a ground connection prong 32, which is somewhat longer than the prongs 33, which are to make contact with the live terminals. In the normal use of the plug and receptacle, the ground prong 32, upon insertion into passage 15c, engages the cam surface 27 on plate 22, before prongs 33 have reached plate 20. A slight further inward movement of the prongs results in prong 32 first swinging plate 22 on its trunnions, until the ends of its legs 25 are offset from the plane of plate 20, and plate 22 is then moved toward plate 20 in such position. Further inward movement of the prongs causes prongs 33 to strike the inclined surfaces 21a on plate 20 and this plate is then moved edgewise, so that its ends 21 no longer block passages 15a, 15b. The inward movement of the prongs is then continued, until the prongs enter the terminals 16. When the plug is removed, spring 28 causes plate 20 to be restored to its initial position in which its ends 21 close passages 15a, 15b and, at the same time, plate 22 is moved back edgewise to its original position and is also swung on its trunnions, so that the ends of its legs 25 lie in opposition to surfaces 29 on plate 20.

If, by accident, the ground prong 32 of the plug is inserted into one of the passages 15a, 15b leading to a live terminal, inward movement of the prong will be arrested upon engagement of the prong with an inclined surface 21a at one end of plate 20. Pressure applied to the plate by the prong cannot shift the plate edgewise to open the passage, because such movement of the plate is prevented by its engagement with the ends of the legs 25 on plate 22. The same action occurs regardless of whether the ground prong is inserted into passage 15a or 15b leading to a live terminal, and the result is that, in the new receptacle, it is not possible to connect the ground conductor of the plug with a live terminal of the receptacle.

#### I claim:

1. An electrical receptacle for use in a three wire system, which comprises a body having three passages leading inwardly from one end, terminals mounted within the body in alignment with the passages, a chamber within the body connecting the passages, a plate mounted within the chamber for edgewise sliding movement and having end portions normally projecting into and blocking two of the passages, a second plate mounted in the chamber for both swinging and sliding movement and normally projecting into and blocking the third passage, the second plate having a portion projecting toward and normally lying in the path of movement of the first plate, and a spring urging the plates apart and toward their normal positions, the second plate being rotatable and slidable by force applied to it through the third passage to swing it, until said portion thereof is out of the path of movement of the first plate, and to move it to unblock its passage.

2. An electrical receptacle for use in a three wire system, which comprises a body having three passages leading inwardly from one end, terminals mounted within the body in alignment with the passages, a chamber within the body

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connecting the passages, a plate mounted within the chamber with its plane transverse to the passages and having portions normally projecting into and blocking two of the passages, the plate being slidable edgewise, a second plate mounted in the chamber with its plane transverse to the passages and normally projecting into and blocking the third passage, the second plate being slidable edgewise and also rotatable about an axis in its plane and having a portion projecting toward and normally lying in the path of movement of the first plate, and a spring urging the plates apart toward their normal positions, the second plate being rotatable and slidable by force applied to it through the third passage to swing it, until said portion thereof is out of the path of movement of the first plate, and to move it to unblock its passage.

3. An electrical receptacle for use in a three wire system, which comprises a body having three passages leading inwardly from one end, terminals mounted within the body in alignment with the passages, a chamber within the body connecting the passages, a plate mounted within the chamber for edgewise sliding movement and having portions normally projecting into and blocking two of the passages, said portions having cam surfaces exposed within the passages, a second plate within the chamber normally projecting into and blocking the third passage and having trunnions, on which the plate may be swung and moved edgewise, the second plate having a pair of legs projecting toward and normally lying in the path of movement of the first plate, and a spring urging the plates apart and toward their normal positions, the second plate being rotatable and slidable on its trunnions by force applied to it through the third passage to swing it, until its legs are out of the path of movement of the first plate, and to move it to unblock its passage, the first plate being movable to unblock the remaining passages by force applied to its cam surfaces after swinging of the second plate.

4. An electrical receptacle for use in a three wire system, which comprises a body having three passages leading inwardly from one end, terminals mounted within the body in alignment with the passages, a chamber within the body connecting the passages, a plate mounted within the chamber for edgewise sliding movement and having portions normally projecting into and blocking two of the passages, said portions having cam surfaces exposed within the passages, a second plate within the chamber normally projecting into and blocking the third passage and having a cam surface exposed within the third passage, the second plate having trunnions on which the plate may be swung and moved edgewise, the second plate also having a pair of legs also projecting toward and normally lying in the path of movement of the first plate, and a spring urging the plates apart to their normal positions, the second plate being initially rotatable on its trunnions, until its legs are out of the path of movement of the first plate, and then movable edgewise on its trunnions toward the first plate to unblock its passage by force applied to its cam surface through the third passage, the first plate being movable toward the second plate to unblock the remaining passages by force applied to the cam surfaces of the first plate, after swinging of the second plate.

5. An electrical receptacle for use in a three wire system which comprises a body having three

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passages leading inwardly from one end, terminals mounted within the body in alignment with the passages, a chamber within the body connecting the passages, a plate mounted within the chamber for edgewise sliding movement and having opposite end portions normally projecting into and blocking two of the passages, a second plate mounted in the chamber for both swinging and sliding movement and normally projecting into and blocking the third passage, the second plate having a pair of legs projecting toward and normally lying opposite the central portion of the first plate and in the path of movement thereof, and a spring acting on the first plate at its midpoint and on the second plate between its legs to urge the plates apart and toward their normal positions, the second plate being rotatable by force applied to it through the third passage to swing it, until its legs are out of the path of movement of the first plate.

6. An electrical receptacle for use in a three wire system, which comprises a body having three passages leading inwardly from one end, terminals mounted within the body in alignment with the passages, a chamber within the body connecting the passages and having opposed walls formed with a pair of grooves, a plate mounted within the chamber for edgewise sliding move-

ment and having portions normally projecting into and blocking two of the passages, a second plate mounted in the chamber and having trunnions within said grooves, the second plate being rotatable and slidable edgewise on its trunnions and normally projecting into and blocking the third passage, the second plate having a pair of legs projecting toward and normally lying in the path of movement of the first plate, and a spring acting on the plates and urging them apart and toward their normal positions, said spring tending to swing the second plate on its trunnions to the limit of its rotatable movement in one direction and the plate being rotatable against the spring by force applied to it through the third passage to swing it, until its legs are out of the path of movement of the first plate.

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