

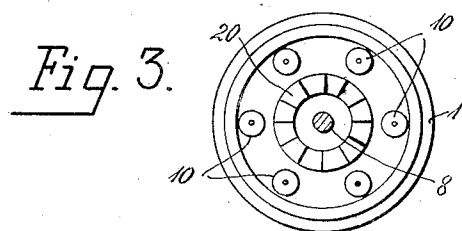
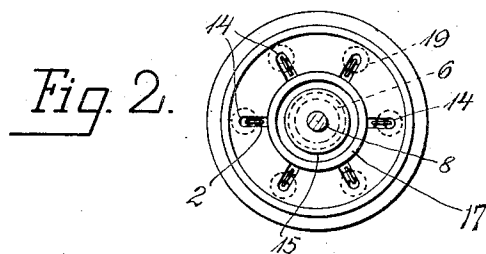
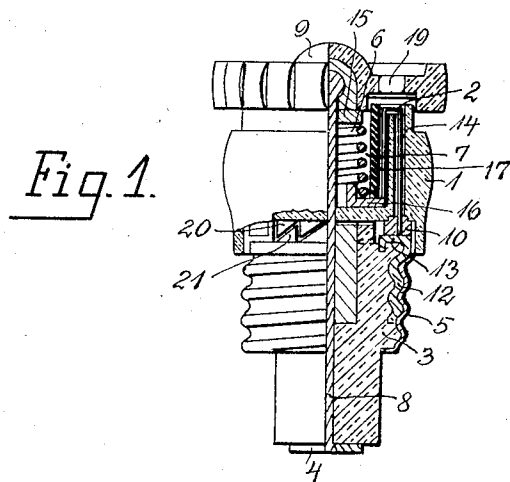
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S. J. KNUDSEN

ELECTRIC SAFETY FUSE

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Inventor:

Svend Johannes Knudsen

By *Louis Paine & Co.*
Attorney.

UNITED STATES PATENT OFFICE.

SVEND JOHANNES KNUDSEN, OF COPENHAGEN, DENMARK.

ELECTRIC SAFETY FUSE.

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(GRANTED UNDER THE PROVISIONS OF THE ACT OF MARCH 3, 1921, 41 STAT. L., 1313.)

To all whom it may concern:

Be it known that I, SVEND JOHANNES KNUDSEN, a subject of the King of Denmark, residing at 11 Langogade, Copenhagen, Denmark, have invented certain new and useful Improvements in Electric Safety Fuses (for which I have filed applications in Denmark, March 8, 1919; Sweden, November 17, 1919; England, December 6, 1919; Norway, January 8, 1920; and Germany, December 29, 1919), of which the following is a specification.

This invention relates to electric safety fuses.

According to this invention the fuse comprises a top member with fuse wires inserted in holes therein which are parallel with the axis of said member and a bottom member carrying the bottom contact and the contact sleeve of the fuse and being rotatably connected to the top member by means of an axial bolt rigidly connected to the bottom contact. The invention is characterized by the fact that the fuse wires extend from said holes over the top face of the top member down into a central cavity in the same to a disc seated therein and connected to all the fuse wires and to the bottom contact, the axial bolt or spindle being rigidly connected to a cover arranged over the top face of the top member and adapted to be turned together with the bottom member.

The invention will now be described more fully with reference to the accompanying drawings which represent one embodiment thereof. In these drawings:—

Figure 1 is a longitudinal section of the improved safety fuse.

Figure 2 is a plan of the same with the cover removed.

Figure 3 is a bottom view of the top member of the fuse.

The fuse consists of the top member 1 wherein all of the fuse wires 2 are inserted and fastened separately and the bottom member 3 connected rotatably to the top member and supporting the terminals of the fuse viz., the bottom contact 4 and a threaded contact-sleeve 5. The top and bottom members are held together axially under resilient pressure exerted by a helical spring 6 which is inserted in a central cavity 7 in

the top member and which acts on the bottom member to draw it towards the top member. The bottom member 3 is connected rotatably to the top member 1 by means of a central spindle 8 which passes through the latter and is firmly secured to the bottom member 3 as by being clinched thereto and the bottom contact 4 inserted therein and which is firmly connected, on the end of the top member farthest away from the bottom member, to a cover 9 for the top member. On the end of the top member which faces the bottom member there are inserted, in a circular row of holes, a number of metal plugs or studs 10 corresponding to the number of fuse wires; the said studs, as shown, projecting slightly beyond the bottom face of the top member and each being connected with the end of one of the fuse wires 2 of the safety fuse. On the end facing the top member, the bottom member 3 is provided with a contact member 12 having a terminal 13 which hooks over the said face of the bottom member and is sunk into the side of the bottom member, inside the contact-sleeve 5 and held in position by the latter. By soldering the contact-piece 12 and the contact-sleeve 5 together, any casual rotation of the latter relatively to the bottom member is prevented. The contact 13 rests against the end of one of the metal studs 10, the fuse wire of which is in circuit for the time being. By rotation of the top member relatively to the bottom member, the contact 13 may be caused to touch any one of the metal studs 10, and the contact-sleeve 5 may thus be connected to any one of the fuse wires. These wires are of inverted U-shape, as shown, and their outer branches extend each from one of the studs 10, up through a circular row of axially directed holes 14 in the top member, to the upper end of said member and then radially or laterally inward, their inner branches extending downwardly to one and the same disc 16 disposed on the bottom wall of the central cavity 7 in the top member, all of the fuse wires being connected to this disc. The disc 16 is connected electrically to the spindle 8 by means of the spring 6, the latter being compressed between the disc 16 and a nut 15 of conductive material firmly screwed on the spindle.

The helical spring 6 exerts an upwardly directed pressure on the nut 15, this pressure being transmitted by the spindle 8 to the bottom member 3 which is thereby
 5 forced against the bottom face of the top member 1 with a suitable degree of pressure. A lining 17 of mica or other suitable insulating material may be inserted in the cavity
 7 so as to insulate the fuse wires from the spring 6. The cover 9 encircles the upper
 10 edge of the top member 1 and is formed with a number of holes 19 which correspond to the number of fuse wires and are disposed immediately above these wires so that
 15 all of the fuse wires are visible. Otherwise the cover is fastened to the top end of the spindle 8 in any suitable manner, for instance by means of cement, litharge or the like.

20 The end of the top member which faces the bottom member is formed with a number of teeth 20 corresponding to the number of fuse wires, one side of these teeth being sloping and the other side vertical, and the
 25 teeth 20 engaging other teeth 21 on the correspondingly toothed top face of the bottom member 3. The teeth 20 and 21 are disposed in such a manner relatively to the holes 19 and the contact 13 on the bottom member
 30 that a proper position of one of the metal plugs 10 relative to the contact 13 is secured every time the teeth of the upper and lower member enter into engagement, after a rotary displacement (corresponding to
 35 the spacing of the teeth) of the upper member relative to the bottom member.

When a fuse wire is fused, or when for some other reason a fuse wire has to be replaced, the top member has to be turned
 40 about the spindle 8. The teeth 20 will then slide on the teeth 21, while the top member is slightly displaced in an axial direction. When a metal plug comes opposite the contact 13, the steep faces of the teeth 20 and
 45 21 will slip by each other, and the spring 6 will then force the top member down against the bottom member, and the last mentioned metal plug will thereby be caused to touch the contact 13.

50 The safety fuse may be constructed with any suitable number of fuse wires. The metal plugs 10 may be hollow or solid, and may be fastened to the top member in any suitable manner. Instead of a series of teeth
 55 20 on the upper member, a single tooth may of course be used which may be caused to engage any tooth space in a series of teeth 21 on the bottom member, or vice versa.

In order to ascertain which fuse wire is
 60 in circuit at a given moment, the holes 19 in the cover 9 may be so disposed that one of said holes comes directly above the contact 13, and this hole or its circumference may be provided with a special mark.

65 Having now particularly described and as-

certained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A multiple-fuse plug, comprising a top member provided with a central cavity and
 70 with an annular series of vertical fuse holes encircling the same and opening at their opposite ends through the corresponding end faces of said member; a series of contact
 75 studs on the inner end of said member at the inner ends of said holes; a disc in said cavity; a plurality of bent fuse-wires having their inner branches disposed in said cavity and connected at their free ends to said disc
 80 and their outer branches disposed in said holes and connected at their free ends to said studs, the central portions of said wires extending laterally across the outer end face
 85 of said member; a bottom member; a spindle passing axially through the top and bottom members to connect them together and to which said top and bottom members are
 90 rotatably and rigidly related, respectively; a contact sleeve on the bottom member having an extension to interchangeably engage
 95 said studs; and coacting sets of teeth on the confronting inner ends of said members having inclined faces for sliding engagement with each other during the rotation of the
 100 top member relative to the bottom member, said teeth being so disposed with relation to the contact studs that one stud will be held in correct contact position whenever the sets
 105 of teeth come into full engagement.

2. A multiple-fuse plug, comprising a top
 100 member provided with a central cavity and with an annular series of vertical fuse holes encircling the same and opening at their
 105 opposite ends through the corresponding end faces of said member; a series of contact studs on the inner end of said member at the inner ends of said holes; a disc in said
 110 cavity; a plurality of bent fuse-wires having their inner branches disposed in said cavity and connected at their free ends to said disc and their outer branches disposed
 115 in said holes and connected at their free ends to said studs, the central portions of said wires extending laterally across the outer end face of said member; a bottom
 120 member; a spindle passing axially through the top and bottom members to connect them together and to which said top and bottom members are rotatably and rigidly related,
 125 respectively; a cover for the top member rigidly secured to the outer end of said spindle, said cover and top member being rotatably related; a contact sleeve on the
 130 bottom member having an extension to interchangeably engage said studs; and coacting sets of teeth on the confronting inner ends of said members having inclined faces for sliding engagement with each other during the rotation of the top member relative
 135 to the bottom member, said teeth being so

disposed with relation to the contact studs that one stud will be held in correct contact position whenever the sets of teeth come into full engagement.

5 3. A multiple-fuse plug, comprising top and bottom members; a spindle connecting said top and bottom members and on which they are rotatably and rigidly mounted, respectively; a series of fuse wires carried by
10 the top member and electrically connected at one end with said spindle, each wire having a portion thereof extending laterally across the outer end face of the top member; a series of contact studs, one for each fuse
15 wire, disposed against the inner end face of the top member and to which the wires are connected at their other end; a contact element on the bottom member having a portion for interchangeable engagement with said studs; and a cover for the top member,
20 and to which that member is rotatably related, fixed to the upper end of the spindle so as to permanently occupy the same position with relation to the bottom member.
25 said cover having an opening in line with the stud-engaging portion of the contact element on the bottom member so as to expose the laterally-extending portion of the particular fuse wire which is electrically connected with said stud-engaging portion
30 through the corresponding contact stud at any given time.

35 4. A multiple-fuse plug, comprising top and bottom members; a spindle connecting said top and bottom members and on which they are rotatably and rigidly mounted, respectively; a series of fuse wires carried by

the top member and electrically connected at one end with said spindle, each wire having a portion thereof extending laterally across
40 the outer end face of the top member; a series of contact studs, one for each fuse wire, disposed against the inner end face of the top member and to which the wires are connected at their other end; a contact ele-
45 ment on the bottom member having a portion for interchangeable engagement with said studs; sets of coacting teeth on the confronting inner ends of the top and bottom members having inclined faces for sliding
50 engagement with each other during the rotation of the top member relative to the bottom member, said teeth being so disposed with relation to the contact studs that one stud will be held in correct contact position
55 whenever the sets of teeth come into full engagement; and a cover for the top member, and to which that member is rotatably related, fixed to the upper end of the spindle so as to permanently occupy the same position
60 with relation to the bottom member, said cover having an opening in line with the stud-engaging portion of the contact element on the bottom member so as to expose the laterally-extending portion of the particular fuse wire which is electrically connected with said stud-engaging portion
65 through the corresponding contact stud at any given time.

In testimony whereof I affix my signature. 70

SVEND JOHANNES KNUDSEN.

Witnesses:

CARL HEMMINGEN,
ULLA BANG.