L. KOVACS.

SAFETY FUSE.

APPLICATION FILED OCT. 30, 1911.

1,049,370.

Patented Jan. 7, 1913.

2 SHEETS—SHEET 1.

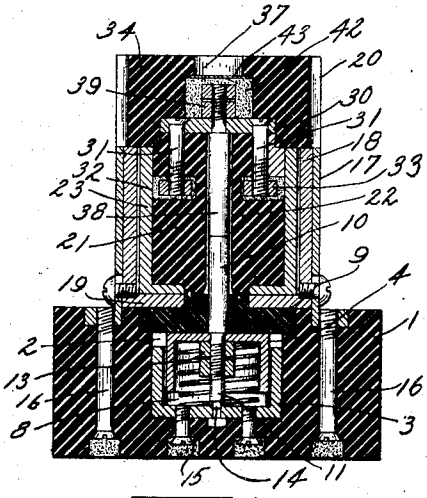

Fig. 1

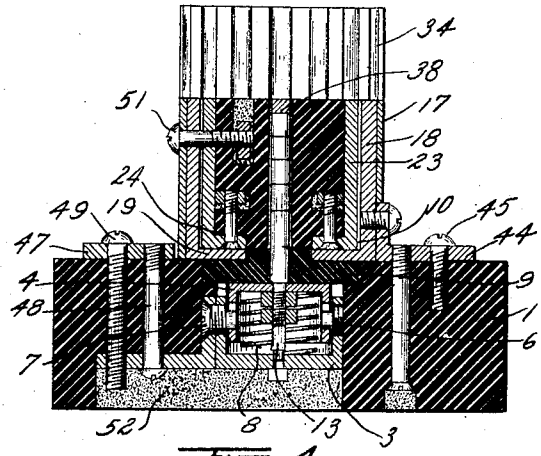

Fig. 4.

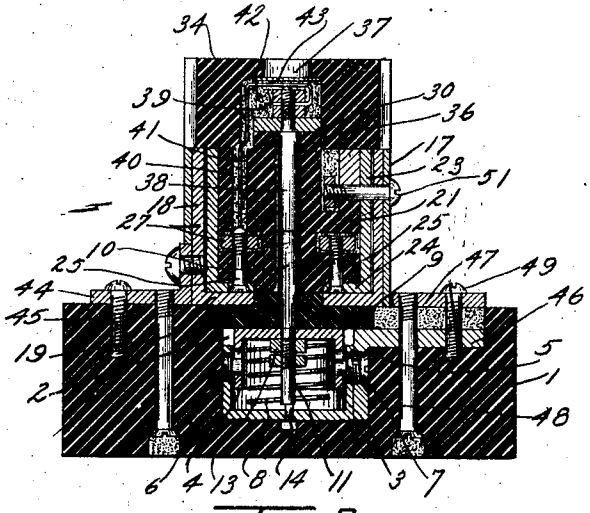

Fig. 2.

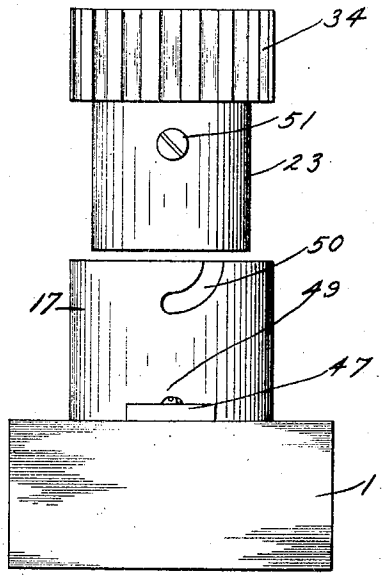

Fig. 3.

WITNESSES:

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ATTORNEY

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2 SHEETS—SHEET 2.

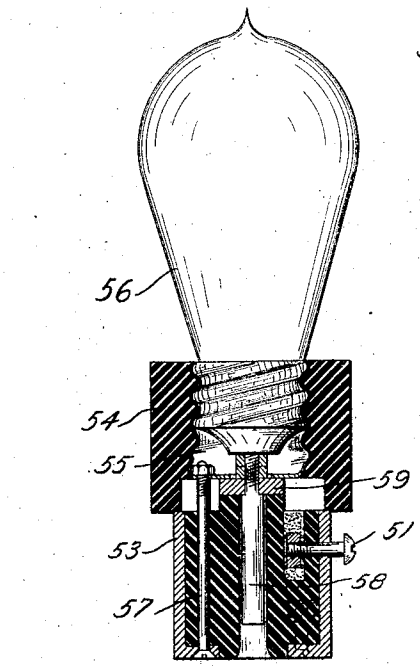

Fig. 14.

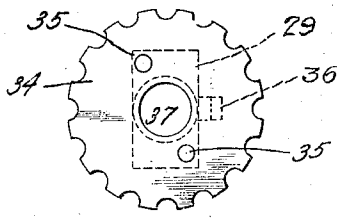

Fig. 5.

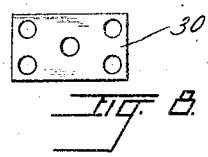

Fig. 8.

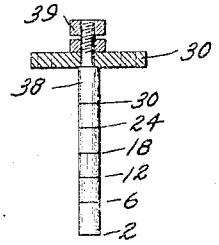

Fig. 9.

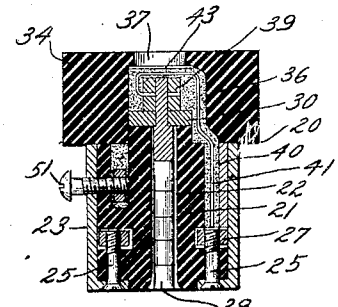

Fig. 6.

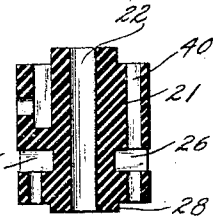

Fig. 10.

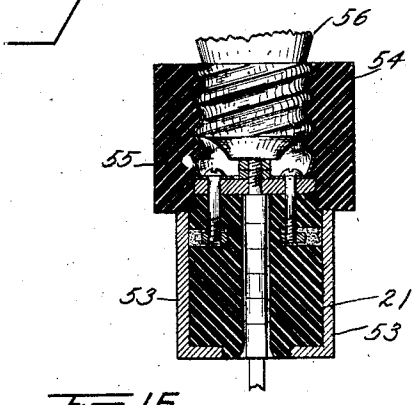

Fig. 15.

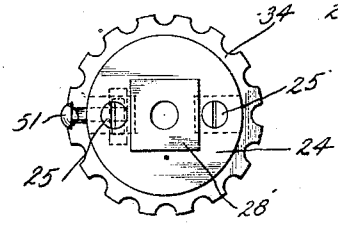

Fig. 7.

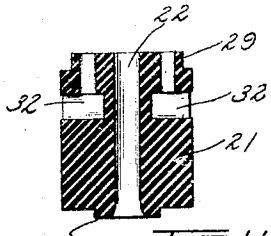

Fig. 11.

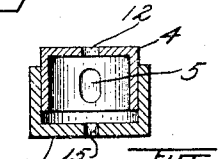

Fig. 12.

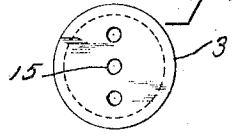

Fig. 13.

WITNESSES:

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UNITED STATES PATENT OFFICE.

LOUIS KOVACS, OF CHICAGO, ILLINOIS.

SAFETY-FUSE.

1,049,370. Specification of Letters Patent. Patented Jan. 7, 1913.

Application filed October 30, 1911. Serial No. 657,498.

To all whom it may concern:

Be it known that I, LOUIS KOVACS, a subject of the Emperor of Austria-Hungary, and residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Safety-Fuses, of which the following is a complete specification.

The main objects of this invention are to provide an improved safety fuse for electric currents; to provide a safety fuse adapted to be used for a given current strength and which is so constructed as to render it impossible to send a higher current strength through it than that for which it is rated; to provide a safety fuse adapted for use with a wire of certain current rating and so constructed that the parts of a safety fuse designed for a higher current rating cannot be connected with its parts; and to provide a safety fuse adapted to be economical in its operation.

In the drawings: Figure 1 is a central longitudinal section of a safety fuse embodied in this invention. Fig. 2 is a longitudinal section of the safety fuse taken at right angles to the section shown in Fig. 1. Fig. 3 is a side elevation of the safety fuse with the safety plug detached from the safety block. Fig. 4 is a modified form of the safety fuse. Fig. 5 is a top plan view of the safety plug. Fig. 6 is a central, longitudinal section of the plug. Fig. 7 is a bottom plan view of the plug. Fig. 8 is a plan view of the binding plate for the safety plug contact. Fig. 9 is a side elevation of the safety plug contact with its binding plate in section. Fig. 10 is a central longitudinal section of the insulating body for the safety plug. Fig. 11 is a longitudinal section of the insulating body taken at right angles to the view shown in Fig. 10. Fig. 12 is a central section of the contact support for the safety block contact. Fig. 13 is a bottom plan view of the same. Fig. 14 is a longitudinal section of a light plug adapted for use with the safety block. Fig. 15 is a view similar to Fig. 14 but taken at right angles thereto.

Referring first to Figs. 1 and 2, the safety block has a base 1 which is preferably constructed of marble or slate and has a cavity or recess 2 in its upper face in which is mounted the safety block contact support comprising a lower cup 3 which fits closely in the recess 2 and an upper cup 4 which is inverted in the lower cup. Said cups are preferably formed of brass or copper and the upper cup is provided with slots 5 in its sides into which project guide screws 6 and 7 carried in the walls of the cup 3. A coiled spring 8 is carried in said cups and is adapted to normally hold the cup 4 at the upper limit of its movement. Covering said recess 2 and countersunk in the top of the base plate 1 is a plate 9 of ebonite or fiber. The safety block contact 10, of copper, extends through the plate 9 and projects above the same. Said contact is provided with a reduced portion 11 which extends through an aperture 12 in the top of the cup 4 and the shoulder formed by said reduced portion rests on the top of the cup 4. The reduced portion 11 is provided with screw threads on which are engaged binding nuts 13 which bear against the inner side of the cup 4 and hold the contact firmly in place. The extreme lower end 14 of the contact projects into an aperture 15 in the bottom of the cup 3 which acts to guide and brace the contact in its vertical movement. Secured on the top of the base 1 by means of screws 16 is an outer shell 17 of fiber within which and fitting closely thereto is an inner copper shell or socket 18 which is provided at its bottom with an internal flange 19 which rests on the top of the base 1 and overlaps the edges of the plate 9. The safety plug 20 is adapted to fit within the socket thus formed and comprises a central insulating body 21 of porcelain which has an axial bore 22 therethrough. A brass or copper sleeve 23 incloses the body 21 and is provided with an inturned flange 24 which overlaps the bottom of the body 21 and screws 25 extend through said flange and project into cavities 26 in the sides of the body in which are nuts 27 to which said screws are secured. The flange 24 and the flange 19 extend inwardly the same distance and a projection 28 on the bottom of the body 21 projects into the aperture in the flange 24 and rests on a like projection on the plate 9 which extends into the aperture in the flange 19. The upper end of the body 21 has an angular portion 29 on which is seated a fastening plate 30 which is secured to the body 21 by means of screws 31 which extend through the plate and into the cavities 32 in the body 21 and engage nuts 33 in the cavities. A cap 34 of porcelain seats over

the plate 30 and the upper end of the body 21 and rests on the tops of the sleeves 17, 18, and 23, and is secured to the plate 30 by means of screws passing through apertures 35 in the cap and into the plate. The cap has a recess 36 in its outer side in which the plate 30 is carried, and which opens upwardly through the top of the cap through an aperture 37. The safety plug contact 38 is secured to the plate 30 by means of nuts 39 and projects into the bore 22 of the body 21. The body 21 has a passage 40 which extends upwardly from one of the cavities 26 and opens into the recess 36 in the cap, and a fuse 41 of a given current strength is carried in the passage 40 and is connected at one end to the screw 25 and at its other to the upper end of the contact 38 by means of the nuts 39. The passage 40 and the recess 36 are then filled with asbestos filling 42, and the recess is closed by a layer of mica 43. Secured to one side of the sleeve 18 and to the base 1 is a brass binding plate 44 which has a binding screw 45 to connect the line wire. A copper or brass conductor 46 is secured to the cup 3 by means of the screw 7 and extends laterally from the top of the cup in a recess in the base 1. The recess above the lateral portion of the conductor is filled with a suitable filling, and a binding plate 47 is secured over the filling by means of a bolt 48. A binding screw 49 is carried in the plate 47. For the purpose of securing the safety plug to the safety block the sleeves 17 and 18 are provided with a curved notch 50 in which a screw 51 carried on the plug engages when the plug is in place.

In the construction shown in Fig. 4 the safety block 1 opens at its bottom for the insertion and removal of the contact supporting caps 3 and 4, and the opening is then sealed with a filling 52.

In Figs. 14 and 15 are illustrated a lamp plug 53, in which the cap 54 has a socket 55 to receive a lamp bulb 56. The negative terminal of the lamp is provided by a bolt 57 extending from the lamp socket through the body 21 and flange 24 of the sleeve 23. The positive terminal is provided by a contact 58 which is carried in a plate 59 of ebonite or fiber.

The current enters at the binding post 45 and thence passes, successively, through plate 44, shell 18, flange 19, screw 25, and fuse 41, from which it is adapted to enter the lamp at the positive pole. Leaving the lamp at the negative pole, the current passes, successively, through safety plug contact 38, safety block contact 10, cup 4, cup 3, screw 7, plate 46, and binding post 49, it being understood that the negative line wire is connected to post 49. This path of the current can be most clearly traced in Fig. 2 of the drawings. The current must necessarily pass from plug 38 to plug 10, which are both made of copper and which are held in frictional contact with each other by the action of the helical spring, which is found within the telescoping cups 3 and 4. If said plugs 38 and 10 do not touch, there will be a break in the circuit and the current will not bridge the gap, and it is the essential object of this invention so to construct said plugs and associated parts that the plugs will be in electrical connection only when plugs of the proper size are being used.

As is well known in the art, for every size and grade of wire there is a maximum amperage which that wire can carry, and fuses which are adapted to melt when the amperage reaches or exceeds the maximum, are placed in the circuit in order that the circuit may be broken before the wire itself becomes too hot. In many instances, however, employees who install or maintain electrical apparatus, for various reasons frequently use safety plugs which will not break the circuit at the same amperage as the fuse which is being used, and this often results in causing fires or accidents to the main wire or the electrical apparatus because the safety devices do not blow out at the proper time.

It is the essential object of this invention to provide a construction in which the plugs for a given amperage cannot be connected with a block designed for a different amperage and thus make it impossible to combine together a safety plug and a block which are not mated for each other. It being obvious from what has been stated above that the current must pass through plugs 38 and 10, it follows that anything which prevents a proper connection between said plugs will make a break in the circuit between posts 45 and 49. In order that this connection may be maintained when shell 23 is placed within the socket 18, the sum of the lengths of plugs 38 and 10 must be exactly enough to span the distance between the members 30 and 4. If, for example, the plug 10 be too short, the circuit will be incomplete because the current cannot bridge the gap between plugs 10 and 38; but, on the other hand, if the plug 10 be too long, it will prevent assembling the device and will not permit the cartridge containing the fuse to be seated within the shell secured to the base 1. The plugs 38 and 10, therefore, are made of certain definite lengths, one of the plugs increasing in length according to the number of amperes within the rating of the wire forming the circuit, and the other plug decreasing in length according to the number of amperes. For example, if the maximum number of amperes to be permitted is 20, the plug 38 may be relatively long, extending to the mark 2, Fig. 9, and in such case, the plug 10 will be relatively short. If the wire

rating be 60 amperes, the plug 38 will extend from the member 30 only to the line 6, Fig. 9, and the length of the plug 10 will be correspondingly increased. For a current of say 300 amperes, the plug 38 will be very short, extending only to line 30, Fig. 9, and the plug 10 will be very long. The plugs are not designed to blow out or melt since they are made heavy or thick enough to carry practically any current, but they either prevent assembling the shell 23 within the shell 18 or cause a break in the circuit unless the respective plugs carried upon the cartridge and upon the base are each of the right length to complete the circuit. The carelessness of employees is thus guarded against, because the respective plugs 38 and 10 are placed within the cartridge or fuse plug and the base at the factory and cannot readily be removed or inserted at the job, and the workman who is instructed to arrange the circuit for any maximum amperage, absolutely must use a cartridge and a base containing the plugs of the length designed to meet and touch each other for that amperage. If the workman does not so do, the electrical connection will not be established.

The members 10 and 38 have herein been referred to as plugs and in the drawings they are shown as being substantially cylindrical in shape. It should be understood, however, that the term "plug" as used in the claims, is not to be limited to a conductor of any particular size, shape, or material but that the essential feature of the invention consists in providing the cartridge and the base with co-acting parts which will establish electrical connection only when the part or plug on one member is of the right length to engage the part or plug on the other, after the cartridge and base have been assembled. If the current attains a higher amperage than that which the line wire is designed to carry, the safety fuse 41 will blow out, breaking the circuit and making it necessary to remove the cartridge or member within which the fuse 41 and the plug 38 are carried and to substitute another which must be obtained from the factory. Each cartridge, of course, will contain both a fuse 41 adapted to blow out at a given amperage, and a plug 38, the length of which is proportionate to the amperage at which the fuse will blow out. Since the plugs will be inserted at the factory where the workmen are less likely to make a mistake and under practically no temptation deliberately to err, the cartridges as they leave the factory will be equipped with plugs 38 of the proper length, considering the rated amperage of the wire in connection with which any particular cartridge and base is to be used. The workman on the job, therefore, who is installing or repairing must use a cartridge and a base, each of which has a plug of the proper size to accord with the wire ratings and cannot, merely to save himself inconvenience and extra labor or delay, substitute a cartridge or a base adapted for a wire of a different rating.

I claim as my invention:

1. In a device of the character described, the combination of a base, a cartridge adapted to be secured thereto and comprising an insulating member, said base and said block being provided with registering recesses, a conducting plug fixed in one of said members and adapted to engage a conducting plug retained in the other of said members, resilient means to keep said plugs in engagement, and a fuse, the length of each of said plugs being proportional to the amperage at which said fuse is adapted to blow out.

2. In a device of the character described, the combination of a base, a pair of telescoping cups therein, resilient means interposed between said cups, a cartridge adapted to be secured to said base, said base and said cartridge being provided with registering recesses, and co-acting conductors retained within said recesses, one of said conductors being connected to and movable with one of said telescoping cups.

3. In a device of the character described, the combination of a base, an insulator block adapted to be secured thereto, said block and said base being provided with registering recesses, abutting plugs retained in said recesses, one of said plugs being fixed to its support, the other of said plugs being movable, and a yielding means engaging said movable plug and adapted to force same into contact with said fixed plug, the length of each of said plugs being proportionate to the amperage in connection with which the device is intended to be used.

4. In a device of the character described, the combination of a base, a pair of telescoping cups therein, resilient means interposed between said cups, an insulating member above said cups, said insulating member being perforated, a conducting member passing through said perforation and being movable therewithin, said conducting member being secured to one of said cups, a cartridge adapted to be secured to said base, said base and said cartridge being provided with registering recesses, and co-acting conductors within said recesses.

5. In a device of the character described, the combination of a base, a cartridge adapted to be secured thereto, said base and said cartridge being provided with registering recesses, an insulator adapted to seal one of said recesses, said insulator being perforated, abutting plugs retained in said recesses, one of said plugs being adapted to pass through the perforation in said insula-

tor, the other of said plugs being fixed, and resilient means within the recess which is sealed by said insulator, said resilient means being adapted to force the plug passing through said insulator into contact with the other of said plugs, the length of each of said plugs being proportionate to the amperage in connection with which the device is intended to be used.

6. In a device of the character described, the combination of a base, a cartridge adapted to be secured thereto, an insulator interposed between said base and said cartridge, a pair of contacting plugs retained by said base and said cartridge, one of said plugs being movable and the other being fixed, resilient means, and means projecting through said insulator adapted to receive the force of said resilient means and keep said movable and said fixed plugs pressed into engagement with each other.

7. In a device of the character described, the combination of a base, an insulating member adapted to be secured thereto, a cartridge also secured to said base, a pair of contacting plugs, one of which is retained by said insulator, said plug being movable, the other of said plugs being fixed, and resilient means coöperating with said movable plug thereby to press said plugs into engagement with each other.

In testimony whereof I have hereunto subscribed my name in the presence of two witnesses.

LOUIS KOVACS.

Witnesses:
JOSEF. SCHLENKER,
ROBT. LOTZ.

Copies of this patent may be obtained for five cents each, by addressi. the "Commissioner of Patents, Washington, D. C."