

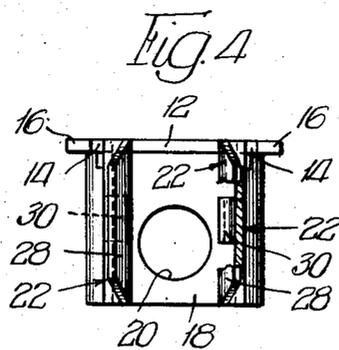
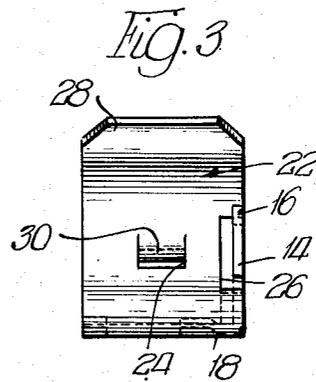
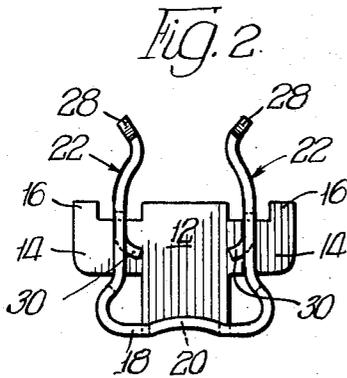
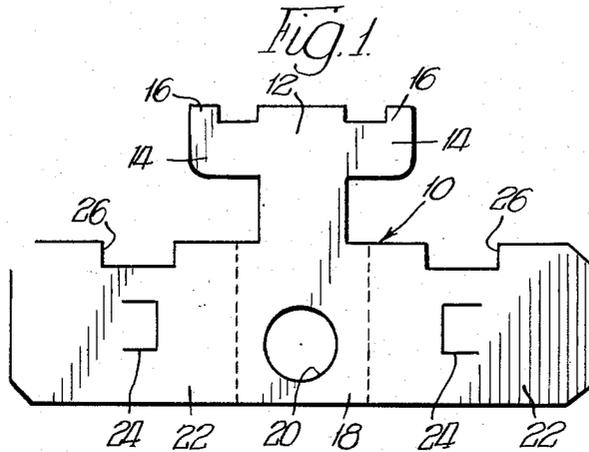
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FUSE CLIP

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## FUSE CLIP

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The present invention relates to improvements in clips adapted for the reception and retention of fuses of the cylindrical type.

Fuse clips of the general type referred to are well known and comprise a pair of resilient fingers adapted to grasp the sides of the cylindrical connector cap at one end of a fuse to effect electrical connection between one terminal of the fuse and one terminal of a power line. The fingers are normally divergently inclined at their outer ends to provide cam surfaces adapted to engage the connector cap to cam the fingers away from each other and accommodate entry of the cap into curved portions of the fingers defining therebetween a substantially cylindrical recess for the reception and retention of the cap. The curved portions of the fingers are normally spaced from the base portion of the clip and if care is not exercised, the fuse can be moved beyond the cylindrical recess defined by the fingers. Due to the fact that the fingers are relatively strong to provide firm retention of the fuse, the relaxation occurring as the fuse passes into the cylindrical recess is so sudden that application of pressure cannot be relieved in sufficient time to prevent forcing the cap beyond the cylindrical recess. As the cap is moved beyond the recess, the fingers are again flexed and frequently to such degree as to bend the fingers or destroy the resiliency thereof so that the fingers no longer grasp and provide pressure contact with the fuse cap.

To avoid the stated objectionable feature, several proposals have been made for the provision of stops to limit entry of the clip to the cylindrical recess. Many of the proposals contemplate the provision of a separate member or members to effect the stopping action, while other more practical proposals suggest the formation of stop members integrally with the fingers.

An object of the present invention is to provide an economical fuse clip having improved stop members formed integrally with the resilient fingers of the clip to prevent overstressing of the fingers due to over-insertion of the fuse.

Another factor contributing to bending or loss of resiliency of the fingers, is the lateral strain exerted thereon by improper insertion or removal of fuses. Due to the strong resilient urge of the fingers, persons not fully acquainted with fuses and fuse clips frequently attempt to insert or remove fuses by wiggling same to force the resilient fingers of the clip apart. Such wiggling exerts lateral strain on the fingers with resultant bending and loss of resiliency. Accordingly, it is

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desirable to limit the amount of lateral bending or stressing to which the fingers may be subjected. Several proposals, usually involving the use of separate stop members, have been made to provide limit stops for the purpose stated.

An object of the present invention is to provide an economical fuse clip having improved stop members, formed integrally with the clip, to limit lateral distortion of the fingers of the clip.

A further object of the invention is to provide an economical, compact fuse clip formed of a unitary piece of sheet metal and having stop means for limiting insertion of fuses into the clip and stop means for limiting lateral distortion of the fingers of the clip.

Other objects and advantages of the present invention will become apparent in the following detailed description of a preferred embodiment of the invention, wherein reference is made to the accompanying drawings, in which:

Figure 1 is a plan view of a unitary metal blank from which the fuse clip of the present invention is formed;

Figure 2 is an end elevation of the fuse clip formed from the blank of Figure 1;

Figure 3 is a side elevation of the formed fuse clip; and

Figure 4 is a plan view of the formed clip.

Referring now to the drawings, the blank is stamped from sheet metal of a high tensile strength having relatively high electrical conductivity. Preferably, the blank is formed from phosphorous bronze, which may have, for example, an electrical conductivity of approximately 25% and a tensile strength of approximately 80,000 pounds per square inch. The blank comprises a rectangular body portion 10, an extension 12 extending laterally from the body 10, a pair of wings extending laterally from the extension 12 intermediate the length of the extension and a tab 16 extending outwardly from each of the wings 14. As will be noted, the tabs 16 extend outwardly to substantially the same distance as does the lateral extension 12, so that the tabs and the outer end of the extension 12 define therebetween a slotted portion, the tabs 16 and the extension 12 each constituting an abutment.

The rectangular body portion 10 comprises a central portion 18, defined by the dotted lines in Figure 1, which will ultimately constitute the base portion of the fuse clip. An aperture or hole 20 is provided in the central portion 18 to facilitate mounting of the clip on a junction block or the like. Extending outwardly from the central

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portion 18 are a pair of side portions 22 each adapted to constitute ultimately one of the resilient fingers of the fuse clip. A U-shaped cut 24 is provided in each of the side portions 22 to define a portion of the metal blank adapted to be bent to form stops for limiting insertion of fuses between the fingers defined by the side portions 22. A slot or recess 26 is cut in the edge of each portion 22 from which the lateral extension 12 projects.

Referring to Figures 2 to 4, the fuse clip of the present invention is formed by bending the side portions 22 of the body portion 10 upwardly or outwardly approximately on the dotted lines shown in Figure 1, with respect to the central portion 18 to define upwardly extending oppositely disposed resilient fingers. Each finger is preferably formed to provide a central portion adapted for the reception of a fuse and divergent outer end portions 28 constituting cam surfaces for spreading the fingers apart upon insertion of a fuse in a direction normal to the base portion 18. The inner ends of the divergent portions 28 of the fingers 22 define a neck portion constituting one side of a substantially cylindrical recess defined by the fingers 22. The lower end of the substantially cylindrical recess is defined by stop members 30 which constitute portions of the fingers 22 bent inwardly from the material thereof along the U-shaped cuts 24 provided in each of the fingers. The stops 30 are adapted to limit insertion of fuses into the fuse clip to prevent excessive deflection of the resilient fingers 22 and to insure proper positioning of a fuse in the clip.

The lateral extension 12 is bent upwardly from the base portion 18 in the same direction as the fingers 22 and is disposed transversely of the fingers 22 so that the wing portions 14 thereof extend laterally beyond the fingers 22. After bending, the wings 14 are so disposed with respect to the fingers 22 that the portions of the wings between the extension 12 and the tab 16 are received within the slots 26 provided in each of the fingers 22. The slots 26 are of such extent that they terminate short of the upper end of the lateral extension 12 so that a portion of each finger is received within the slot defined between the lateral extension 12 and each tab 16. Accordingly, portions of each wing 14 are received within the plane of the fingers 22, and the tabs 16 and extension 12 constitute abutments adapted to be engaged by the portion of each of the fingers 22 extending into the respective slots in the extension to limit lateral deflection in both directions of the fingers 22. As will be noted, particularly from Figures 3 and 4, the lateral extension 12 and wings 14 are disposed within the edge plane of the fingers 22.

Due to its disposition with respect to the fingers 22, the lateral extension 12 provides an end abutment adapted to prevent axial shifting in one direction between the fuse and the fuse clip. In use, two clips would be mounted, by means of the aperture 20, on a junction block, in spaced relation, with the open end of each clip facing the open end of the other clip. The spacing between the clips, or the spacing between the lateral extension 12 of the clips, is such as to equal the length of the cylindrical fuse to be received by the clips. The fuse is inserted into the clips by positioning the end caps of the fuse within the divergent cam surfaces 28 of each clip and exerting a force on the fuse normal to the base portion 18 of each clip to force the fuse into each clip by

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spreading the fingers 22 apart until the fuse passes over the neck portion of the fingers and is moved downwardly into engagement with the insertion stops 30. The stops 30 prevent over-insertion of the fuse and serve to insure proper retention of the fuse by the clip and to prevent over-stressing of the resilient fingers of the clip. The abutment portions defined by the lateral extension 12 and the tabs 16 limit lateral deflection of the fingers 22 so that over-size fuses cannot be inserted into the clip, and fuses properly received, or adapted to be received, within the clip cannot be wiggled within the clip to such extent as to over-stress or bend the resilient fingers 22.

From the foregoing, it will be appreciated that the present invention provides a fuse clip formed from a unitary metal blank and having integral stop means for limiting and definitely defining the proper degree of insertion of fuses into the clip and other integral stop means for preventing over-stressing or distortion of the resilient fingers of the clip. Accordingly, the clip is insured of long and efficient use, since the resilient fingers thereof will retain the resilient strength necessary to effect a perfect electrical connection between a fuse connector cap and a power line terminal and so that the fingers will firmly retain the fuse in proper position.

The fuse clip of the present invention is readily formed in a convenient and economical manner in two steps, namely, a first stamping and forming operation wherein the blank shown in Figure 1 is stamped from sheet metal, the insertion stops 30 are bent upwardly from the plane of the body portion 10 and the fingers 22 are each provided with the configuration clearly shown in Figure 2, and a second forming operation wherein the resilient fingers 22 are bent upwardly from the base portion 18 of the body 10 and the lateral extension 12 is bent upwardly from the base portion 18 to be positioned within the slots 26 in the fingers 22. The steps of forming the fuse clip of the present invention are particularly adapted to modern mass production methods.

While we have described what we regard to be a preferred embodiment of our invention, it will be apparent that various changes, rearrangements and modifications may be made therein without departing from the scope of the invention, as defined by the appended claims.

We claim:

1. A fuse clip comprising a base portion, a pair of independent opposed fingers extending from said base portion, and an independent extension projecting from said base portion in the same direction as said fingers, said extension having abutment portions adapted to be engaged by substantially the midpoint of each of said fingers to limit lateral deflection of said fingers.

2. A fuse clip comprising a base portion, a pair of opposed fingers extending from said base portion, said fingers being formed between the ends thereof to define a generally cylindrical fuse receiving recess, and an extension projecting from said base portion in the same direction as said fingers, said extension being slotted adjacent the free end thereof transversely of said fingers for the reception of portions of each of said fingers adjacent said recess whereby said extension constitutes a stop limiting lateral deflection of said fingers.

3. A fuse clip comprising a unitary metallic blank formed to provide a base portion, a pair of

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independent opposed fingers extending from said base portion, and an independent extension projecting from said base portion in the same direction as said fingers and being disposed transversely of said fingers, each of said fingers being slotted intermediate the ends thereof for the reception of a portion of said extension and said extension being slotted for the reception of a portion of each of said fingers adjacent the midpoint of each of said fingers, whereby said extension constitutes a stop limiting lateral deflection of said fingers.

4. A fuse clip according to claim 3, in which said extension is disposed at one end of said base portion and said fingers and said extension are slotted whereby said extension lies in the edge plane of said fingers.

5. A fuse clip comprising a base portion, a pair of independent opposed fingers extending from said base portion, a stop member extending from each of said fingers intermediate their lengths, and an independent extension projecting from said base portion in the same direction as said fingers, said extension having abutment portions adjacent the free end thereof adapted to be engaged by an intermediate portion of each of said fingers to limit lateral deflection of said fingers.

6. A fuse clip comprising a unitary metallic blank formed to provide a base portion, a pair of independent opposed fingers extending from said base portions, a stop extending inwardly from each of said fingers, said fingers and said stops defining a recess adapted for the reception of a fuse and limiting insertion of a fuse into the clip, and an independent extension extending from said base portion in the same direction as said fingers and being disposed transversely of said fingers, said fingers and said extension having cooperating slotted portions adjacent said recess intermingling with one another, whereby said ex-

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tension constitutes a stop limiting lateral deflection of said fingers.

7. A fuse clip comprising a unitary metallic blank formed to present a base portion, a pair of fingers extending upwardly from said base portion, said fingers being oppositely formed to provide divergent inclined surfaces at their upper ends and a neck spaced from their upper ends, a fuse insertion stop stamped from the material of each of said fingers and directed inwardly to overlie said base portion and be spaced from said neck, an extension projecting upwardly from said base portion transversely of said fingers at one side thereof, a wing extending laterally from each side of said extension, and a tab extending upwardly from each of said wings, said tabs being each spaced from said extension to define a slot therebetween, said fingers being each slotted at the edge thereof adjacent said extension for the reception of the portion of the respective wing between said extension and said tab, a portion of each of said fingers adjacent the upper edge of the slot therein being received within the slot between the respective tab and said extension whereby said tabs and said extension define stops for limiting lateral deflection of said fingers and said extension when said wings are moved into the edge plane of said fingers.

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