

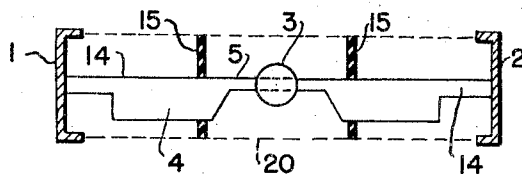
July 24, 1951

M. CREMER

2,561,464

TIME LAG FUSE

Filed Sept. 19, 1946



Inventor:
Michel Cremer
By
E. F. O'Kendall Atty

UNITED STATES PATENT OFFICE

2,561,464

TIME LAG FUSE

Michel Cremer, Seine, France, assignor to Societe Anonyme dite: Forges et Ateliers de Constructions Electriques de Jeumont, Paris, France, a corporation of France

Application September 19, 1946, Serial No. 698,075
In France October 5, 1945

3 Claims. (Cl. 200—123)

1

This invention relates to time lag fuses and particularly to delayed action fusible circuit cut outs of simplified construction and manufacture which will be uniform in operation.

An object of the invention is to provide a fusible circuit cut out which will eliminate to a large degree the variations now present in fusible circuit cut outs arising from the condition of the surfaces, variations in pressure, variations in the thermic and electrical contact between a fusible mass present on the fusible elements, etc., which all tends to make the circuit interruption less precise and non-uniform.

A further object of the invention is to simplify the manufacture of fusible circuit breakers, to reduce the loss of heat by thermic conductivity, to secure in an appropriate manner a certain thermic characteristic, to improve the uniformity of such characteristic and to improve the actual circuit breaking action.

A further object of the invention is to provide upon the fusible element an appropriate quantity of metal or alloy having a low fusion temperature in an approximately spherical form in order to reduce the cooling surface, and such metal being applied in a liquid state and then solidified upon the fusible element to secure good thermic contact. The form of the fusible element and the nature of the insulating material which surrounds it are arranged and chosen in order to reduce loss of heat by thermic conductivity and to increase the circuit breaking ability of the device.

With the above and other objects in view which will become apparent from the detailed description below, reference being had to the accompanying sheet of drawing, the single figure of which illustrates diagrammatically a preferred embodiment of the invention. The fusible element, as shown, has the terminal contacts 1 and 2 with a rod or ribbon 4 of a metal such as silver, for instance, extending therebetween. The rod or ribbon 4 is provided with at least one reduced section or hot portion such as 5 upon which a spherical mass 3 of a metal or alloy having a relatively low melting point is positioned. By an appropriate choice of the dimensions of the reduced portion 5 as well as of the spherical mass 3 and by providing a suitable and uniform thermic contact between these elements there is secured an appropriate and constant characteristic of operation which gives particularly a high ratio between the current I_1 which may be maintained for a second of time and the rated current I_n .

2

The fusible element is customarily mounted within a cover such as shown diagrammatically at 20. The interior thereof may be empty or filled with an insulating or refractory material such as sand or kieselguhr.

The formation of the mass 3, as shown, in the form of a sphere is advantageous in that it permits the use of an optimum volume of the metal or alloy with a minimum cooling surface which permits lowering the value of I_n . However, any other suitable form may be used which will satisfy the desired requirements.

In being the current blowing the fuse in one second and I_n being the rated current, the ratio I_1/I_n may be increased by modifying in an appropriate way the distribution of temperatures along the length of the fusible element and by reducing the transfer of heat to the terminal contacts 1 and 2. For this purpose reduced sections 14 may be provided at the sides of the reduced section 5. However the sections 14 have a cross-section preferably greater than that of the cross-section of the reduced portion 5.

Such an arrangement will permit not only modifying the thermic characteristic of the circuit cut outs in the desired direction but also reduces the quantity of metal used which is advantageous from the point of view of the breaking power. This last function may also be improved by providing transverse partitions 15 of insulating and refractory material located appropriately and in sufficient number to partition the interior of the fuse.

In certain cases it may be advantageous to provide upon the fusible element 4 a plurality of reduced sections instead of only one and to fix upon each reduced section one or several masses 3. Also it may be advantageous to provide within the same fuse a plurality of parallel fusible conductors and the arrangement of such multiple conductors may, if desired, be different.

It is obvious that the forms of manufacture described above are not limited and that various modifications are possible, all modifications being claimed as will come within the scope and spirit of the following claims.

I claim:

1. In a time lag fuse comprising an insulating container and two terminal contacts, at least one fusible element of the type carrying a low fusion additional mass, said fusible element being formed by a metallic conductor with at least one elongated portion of reduced cross section, adapted to reach in operation a higher temperature than all other portions, a substantially

3

spherical mass of low fusion metal surrounding with a good thermal contact the central part of the said elongated portion, the diameter of said spherical mass being smaller than the length of said elongated portion, and means for reducing the heat transfer from the ends of said fusible element to said terminal contacts.

2. A time lag fuse comprising an insulated container, two terminal contacts, at least one metallic fusible element, reduced cross-section end portions upon said fusible element connected to said contacts and adapted to reduce the thermal conductivity towards said contacts, at least one elongated portion of reduced cross section in the central part of said fusible element, adapted to reach in operation a higher temperature than all other portions and a substantially spherical mass of low fusion metal surrounding the center only of said elongated portion, the diameter of said spherical mass being substantially smaller than the length of said elongated portion, whereby practically no current is carried by said spherical mass.

3. A time lag fuse comprising an insulated container, two terminal contacts, at least one metallic fusible element, reduced cross section end portions upon said fusible element connected to said contacts and adapted to reduce the thermal conductivity towards said contacts, at least

4

one elongated portion of reduced cross section in the central part of said fusible element, adapted to reach in operation a higher temperature than all other portions, a substantially spherical mass of low fusion metal surrounding the center only of said elongated portion, the diameter of said spherical mass being substantially smaller than the length of said elongated portion, whereby practically no current is carried by said spherical mass, and a plurality of refractory insulating transverse partitions inside of said container.

MICHEL CREMER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
526,311	Harris	Sept. 18, 1894
1,473,284	Feldkamp	Nov. 6, 1923
1,934,244	Steinmayer	Nov. 7, 1933
2,181,825	Wood	Nov. 28, 1939

FOREIGN PATENTS

Number	Country	Date
499,999	Great Britain	Feb. 1, 1939
538 232	Great Britain	July 25, 1941