Feb. 2, 1926. 1,571,630

N. JAPOLSKY

HIGH TENSION CIRCUIT BREAKER

Filed April 20, 1925

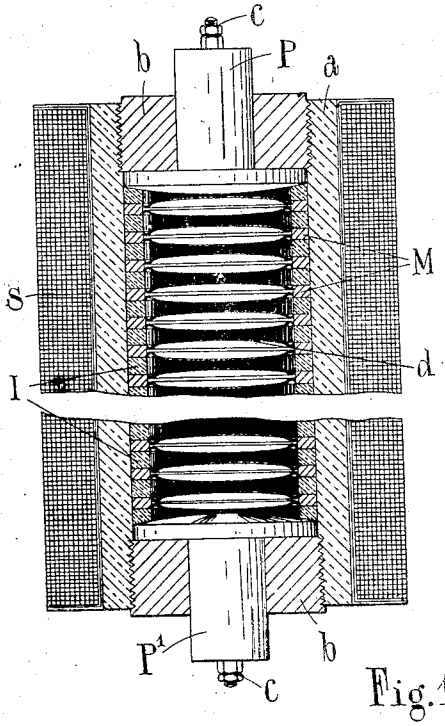


Fig.1

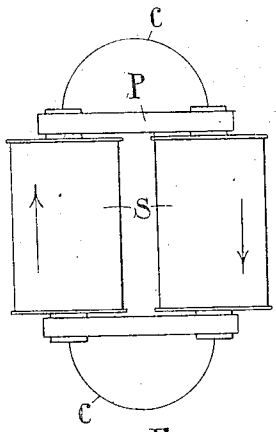


Fig.2

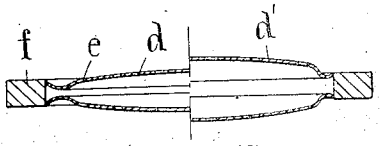


Fig.3

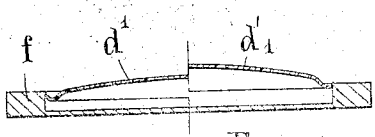


Fig.4

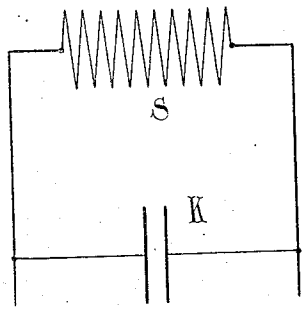


Fig.5

Inventor
N. Japolsky,
By Marks & Clark
Attys.

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UNITED STATES PATENT OFFICE.

NICOLAS JAPOLSKY, OF LONDON, ENGLAND.

HIGH-TENSION CIRCUIT BREAKER.

Application filed April 20, 1925. Serial No. 24,532.

To all whom it may concern:

Be it known that I, NICOLAS JAPOLSKY, a citizen of Russia, and residing at 68a, Lincoln's Inn Fields, London, W. C. 2, England, have invented a certain new and useful High-Tension Circuit Breaker, of which the following is a specification.

This invention relates to a system of high tension circuit breakers and consists essentially in fractioning the drop of potential by means of a number of surfaces of contact which are connected together when the circuit is closed and separated when the circuit is open. In this way, the insulating thickness which resists the total difference of potential is the sum of the insulating parts situated between the surfaces of contact and conversely the drop of potential between two surfaces of contact may be considered as the total difference of potential divided by the number of contact members.

For this purpose a certain number of capsules of suitable shape is placed in a tube of insulating material. These capsules are made of a metal which is an electrical conductor and are insulated from each other along their edges by insulating washers or rings. They may be deformed elastically under the effect of an external agent (magnetic field, fluid under pressure, etc.) which forces two adjacent capsules to come into contact with each other. The contacts being produced on all the surfaces of contact at the same time, the circuit remains closed as long as the external agent is in action. On the other hand, as soon as the external agent is removed, the capsules take up again their position of rest and the circuit is broken.

The following description by way of example and with reference to the accompanying drawing gives a clear idea of one manner in which the invention may be carried out.

Figure 1 illustrates in section a first form of construction of the circuit breaker which forms the subject of the invention.

Figure 2 illustrates in elevation a second form of construction.

Figures 3 and 4 are views to a larger scale of two types of capsules.

Figure 5 is a diagram showing the connection of a condenser in the circuit.

The high tension circuit breaker shown in Figure 1 is closed under the influence of a magnetic field. This circuit breaker comprises a tube a made of a dielectric material provided at both ends with covers b which are screwed therein and serve the purpose of gripping between two poles P and P^1 a certain number of capsules M which are separated from each other by rings I made of a dielectric material. The tube a is surrounded by one or more solenoids S.

The capsules employed may be of different types. In one type of construction shown, the capsule is formed by an iron ring f upon which are soldered, welded or simply tightly pressed on, along the upper and lower inner edges, two thin iron membranes d forming a complete whole from the electric and magnetic point of view. A certain number of small apertures e is provided upon the periphery of these membranes to equalize the pressures. The whole arrangement is covered on the outside and on the inside with a thin layer of copper or nickel in order to decrease the electrical resistance.

Due to the magnetic action of the two poles P and P^1 (Figure 1), the two membranes d of each capsule take up polarities of opposite signs and attract the membranes of the adjacent capsules so that all the membranes are elastically deformed so as to take up the position shown in Figure 3 on the right by small d'.

The second type of capsule shown in Figure 4 is practically the same, but instead of being formed by two flexible membranes, there is only one membrane d^1 identical with the membrane d. The lower surface of the capsule is entirely rigid. The membrane d, takes up the position d'_1 when under magnetic influence.

The capsules are calculated in such a way that the contacts are made by large surfaces very slightly domed so as to increase on the one hand the surface of contact, and on the other hand to avoid as much as possible the formation of sparks when the circuit is broken or contact made.

The whole of the switch may be employed directly in the line of high tension current and, in this case, the contact c of the poles P, are directly connected to the line.

In Figure 2 is shown the mounting of two units connected in parallel and in this case the poles are connected so as to form a complete magnetic circuit.

The contacts c are connected to each other and to the line. In these two cases

(arrangement shown in Figure 1 or the arrangement shown in Figure 2), the solenoids are provided with a fixed condenser K, as shown in Figure 5, in order to obtain instantaneously the demagnetization in the circuit.

Naturally the whole internal arrangement of the switch may be cooled by the circulation of air or oil; the solenoids placed in series may be employed in such a way that at the commencement the whole arrangement works together, and that afterwards, a single group of solenoids maintains the magnetic field.

As in the case of the capsule shown in Figure 3, the capsules are covered by electrolysis with a fine coat of copper or nickel in order to reduce the electric resistance.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. A high tension electric circuit breaker comprising in combination a number of capsules each of which consists of a ring of magnetic material and metal plates of electric conducting and magnetic material separated by said ring, distance pieces of dielectric material, terminals connected to the outers of the conducting surfaces, and electromagnetic means that enables deformation between plates of adjacent capsules whereby contact is established to close an electric circuit.

2. A high tension electric circuit breaker comprising in combination a number of capsules each of which consists of a ring of magnetic material and metal plates of electric conducting and magnetic material separated by said ring, distance pieces of dielectric material, a tube of insulating material within which the capsules and insulating rings are placed, pole pieces at each end of said tube, cover pieces adapted to be secured to the ends of the tube for gripping the said pole pieces and terminals on the pole pieces for completing the high tension circuit.

3. As a new article of manufacture, a capsule comprising a magnetic frame ring, a hollow elastic body therein formed of magnetic material deformable under magnetic influence for the purpose described.

In testimony whereof I have signed my name to this specification.

NICOLAS JAPOLSKY.