July 28, 1925.

1,547,407

V. BREEZE

MAGNETIC BLOW-OUT DEVICE

Filed July 12, 1921

2 Sheets-Sheet 1

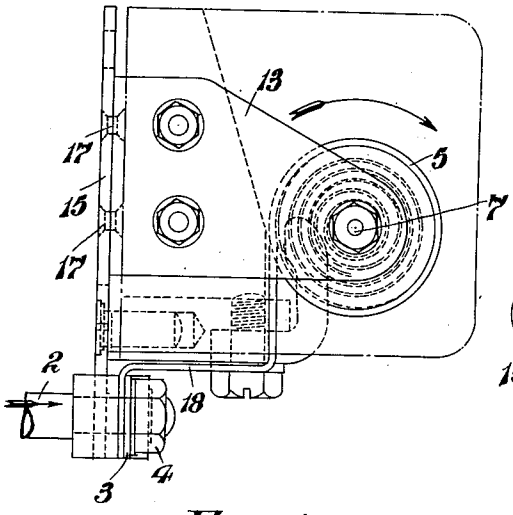


Fig.1.

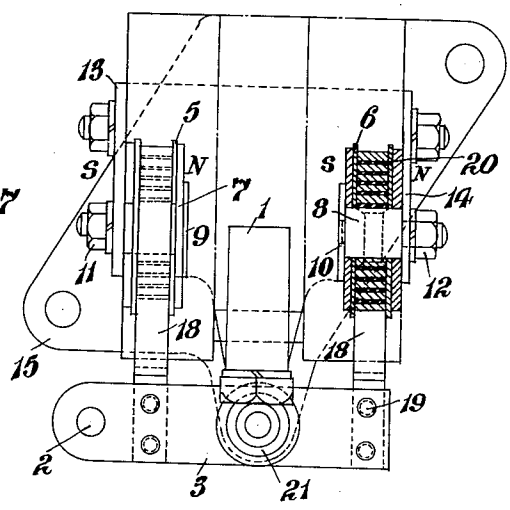


Fig.2.

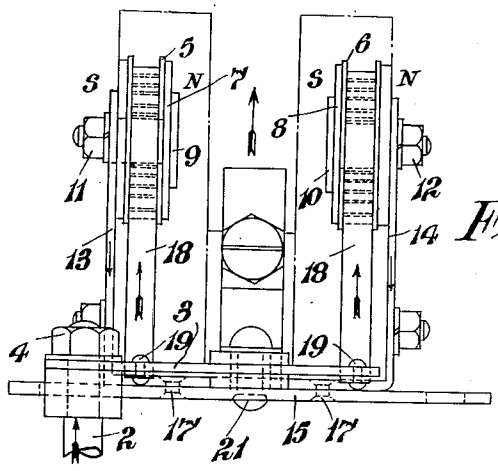


Fig.3.

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Fig. 4.

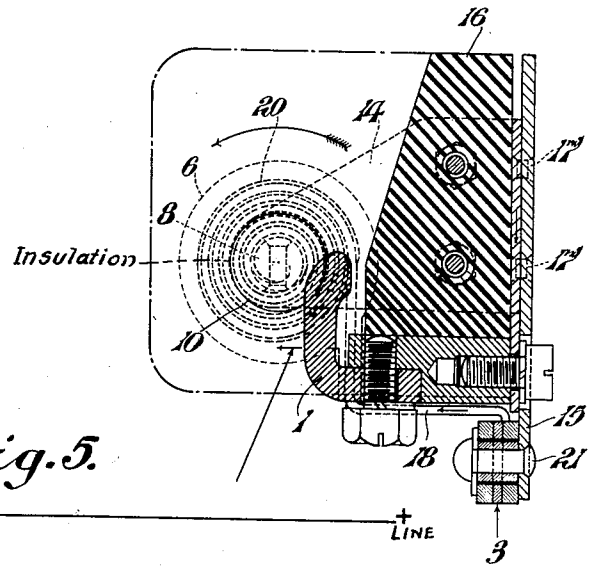
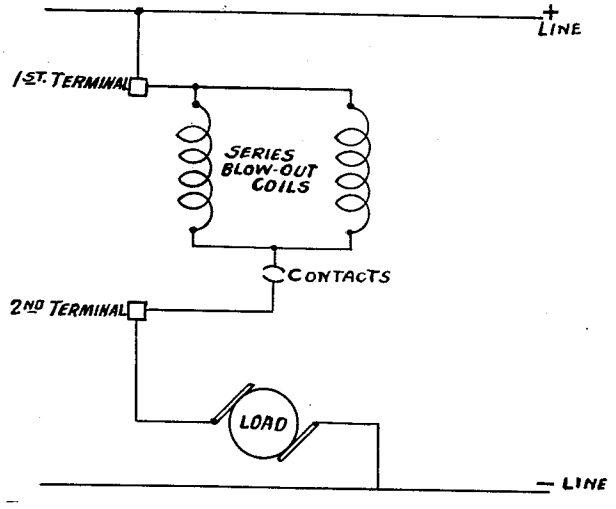


Fig. 5.



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UNITED STATES PATENT OFFICE.

VICTOR BREEZE, OF BRIGHTON, ENGLAND.

MAGNETIC BLOW-OUT DEVICE.

Application filed July 12, 1921. Serial No. 484,152.

To all whom it may concern:

Be it known that I, VICTOR BREEZE, a subject of the King of Great Britain, and resident of Brighton, in the county of Sussex, England, have invented certain new and useful Improvements in Magnetic Blow-Out Devices, of which the following is a specification.

This invention relates to magnetic blow-outs such as are used for the purpose of blowing out the arc formed when electrical contacts are separated, and the object of the invention is to provide a more efficient device of this character.

As is well known the blow out effect is obtained by causing a magnetic flux to pass across the gap occupied by the arc and this magnetic flux operates as the "blow out."

As at present constructed the blow out device comprises a coil wound upon a core of magnetic material having two wings or arms also of magnetic material extending one on each side of the arc gap.

With this arrangement although there is a considerable magnetic flux which passes across the arc gap there is great facility for leakage of the magnetic flux otherwise than through the arc gap, and it will be readily understood that as the blow out effect is dependent upon the magnetic flux this blow out effect will be enhanced considerably if this leakage can be prevented so that the whole of the flux passes across the air gap.

The present invention accomplishes this and comprises broadly a magnetic blow out consisting of one or more pairs of coaxial electro-magnets having magnetic poles of opposite polarity arranged respectively at opposite sides of the arc gap.

In the preferred form of the device the arms of a U-shaped member of magnetizable metal are arranged each side of the arc gap and on projections extending from these arms towards the arc gap are mounted electric coils wound to give opposite poles at the ends of the projections so that the magnetic flux will be in the same direction throughout the U-shaped member and across the arc gap, thereby enhancing the blow out effect and rendering the apparatus particularly advantageous for application to contacts of high tension apparatus.

The number and disposition of the magnets may be varied according to the nature of the contactors to which they are to be applied.

An embodiment of the invention is illustrated by the accompanying drawings wherein Figure 1 is a side elevation, Figure 2 a plan and Figure 3 a front elevation of a magnetic blow out device for an electric contact, and Figure 4 is a transverse sectional view of the device through the axis of the main contact. Figure 5 is a diagram placing the circuit in series from the mains through the blow-out coils in parallel.

In these drawings 1 is one member of the contact electrically connected to a lead 2 through the plate 3 and terminal nut 4, and 16 is a block of insulating material on which the contact 1 is mounted.

The electric coils are shown at 5 and 6 which are mounted on coaxially arranged rods 7 and 8 of magnetizable material in form of bolts having heads or coil retaining flanges 9 and 10 at their inner ends and nuts and washers 11 and 12 on a reduced portion of their outer ends. These reduced portions fit in holes provided in the legs 13 and 14 of a U-shaped member of magnetizable material, such as wrought iron of which the bend portion proper is connected to a base plate 15 by rivets 17.

The windings of the electric coils are in the present example made of strip conductors 18 electrically connected at one end to the piece 3 by rivets 19 and at the other end to the rods 7 and 8 the windings of the coil being separated by insulating material 20. These windings are wound round over each other on the rods 7 and 8 in a spiral the direction of which will produce opposite poles on opposite sides of the arc gap as shown by the letters N and S, the return current from the coil passing through the rods 7 and 8 and members 13 and 14. The contact 1 is electrically connected by a rivet 21 to the plate 15.

It will be readily understood from the above that the magnetic flux in the core of the electromagnet will be continuous across the arc gap between the rods 7 and 8 and through the U-legs 13 and 14 and their connecting base piece.

By the use of electro-magnet coils in accordance with this invention a magnetization curve can be obtained that approximates to a continuous straight line extending beyond the point of saturation at which a bend is usually indicated.

In some cases the supporting member or frame from which the cores of the coils ex-

tend may be of brass or other suitable non-magnetical material, although experience shows that the best results are obtained when magnetizable metals are used.

What I claim and desire to secure by Letters Patent is:—

1. A magnetic blow-out comprising a pair of coaxial electro-magnets having poles of opposite polarity arranged at opposite sides of an arcing gap between two circuit opening and closing contacts having terminals for connecting them to the leads of the main circuit, the electric coils of the magnets being connected together in parallel to each other and permanently in series with the main circuit.

2. A magnetic blow-out comprising a pair of coaxial electro-magnets having poles of opposite polarity arranged at opposite sides of an arcing gap between two circuit opening and closing contacts having terminals for connecting them to the leads of the main circuit, an electro-magnetic core supporting device of non-magnetic metal, the electric coils of the magnets being connected together in parallel to each other and permanently in series with the main circuit and the cores of the electro-magnets supported coaxially at their outer ends by the supporting devices of non-magnetic metal.

3. A magnetic blow-out comprising a pair of coaxial electro-magnets having poles of opposite polarity arranged at opposite sides of an arcing gap between two circuit opening and closing contacts having terminals for connecting them to the leads of the main circuit, a U-shaped electromagnetic coil core supporting frame of magnetizable metal, the electric coils of the magnets being connected together in parallel to each other and permanently in series with the main circuit and the electro-magnetic coil cores supported coaxially at their outer ends by the U-shaped frame of magnetizable metal.

4. A magnetic blow-out comprising a pair of coaxial electro-magnets having poles of opposite polarity arranged at opposite sides of an arcing gap between two circuit opening and closing contacts having terminals for connecting them to the leads of the main circuit, a U-shaped electromagnetic coil core supporting frame of sheet metal, the electric coils of the magnets being connected together in parallel to each other and permanently in series with the main circuit and the electromagnetic coil cores supported coaxially at their outer ends by the U-shaped frame of sheet metal.

5. A magnetic blow out comprising a pair of coaxial electro-magnets having disc shaped coils consisting of a flat strip of metal wound into a spiral with insulating material between the windings, and having poles of opposite polarity arranged at opposite sides of an arcing gap formed between two circuit opening and closing contacts having terminals for connecting them to the leads of the main circuit, the flat strips of metal forming the coils being connected together electrically in parallel to each other and in series permanently with the main circuit.

6. A magnetic blow out comprising a pair of coaxial electro-magnets having disc shaped coils consisting of a flat strip of metal wound into a spiral with insulating material between the windings, and having poles of opposite polarity arranged at opposite sides of an arcing gap formed between two circuit opening and closing contacts having terminals for connecting them to the leads of the main circuit, a U-shaped electromagnetic core supporting frame of sheet metal, the flat strip of metal forming the coils being connected together electrically in parallel to each other and in series permanently with the main circuit and the coil cores supported coaxially at their outer ends by the U-shaped frame.

7. A magnetic blow-out comprising a pair of coaxial electro-magnets having poles of opposite polarity arranged at opposite sides of an arcing gap between two circuit opening and closing contacts having terminals for connecting them to the leads of the main circuit, the electric coils of the magnets being closed circuits connected together in parallel and so as to receive current from the mains.

8. A magnetic blow out comprising a pair of coaxial electro-magnets having coils consisting of a flat strip of metal wound with insulating material between the windings and having poles of opposite polarity arranged at opposite sides of an arcing gap formed between two circuit opening and closing contacts having terminals for connecting them to the leads of the main circuit, the flat strips of metal forming the coils being electrically connected at one end to one terminal and at the other to the metallic cores of the coils, the metallic cores being electrically connected to the contact receiving current from the terminal.

In witness whereof I affix my signature.

VICTOR BREEZE.

Witnesses:
M. E. NELL,
S. MARSH.