

C. GILLIETT.
FUSE CONTROL FOR MULTIPHASE CIRCUITS.
APPLICATION FILED APR. 5, 1918.

1,309,027.

Patented July 8, 1919.
2 SHEETS—SHEET 1.

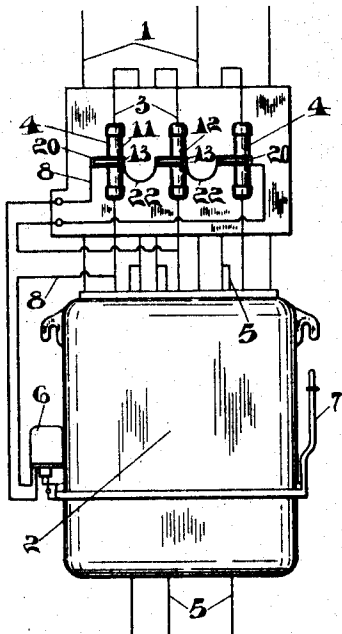


Fig. 1.

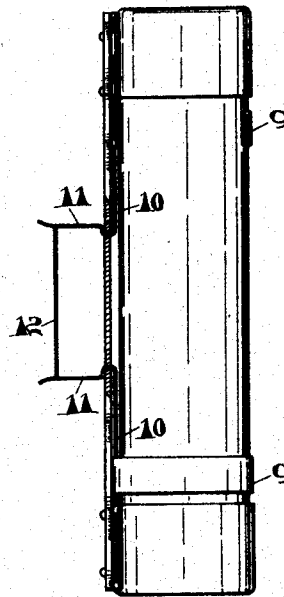


Fig. 2.

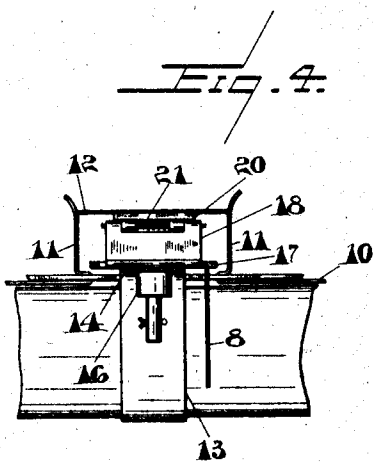


Fig. 4.

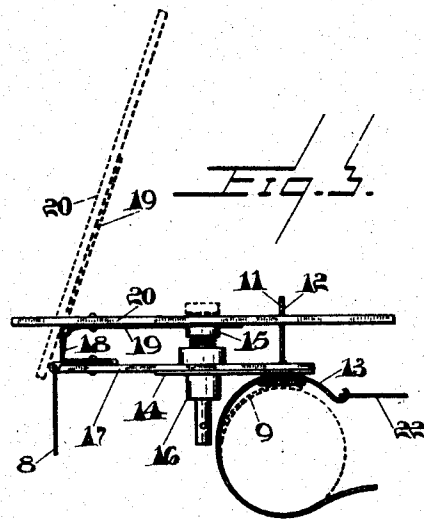


Fig. 3.

INVENTOR

C. Gilliett.

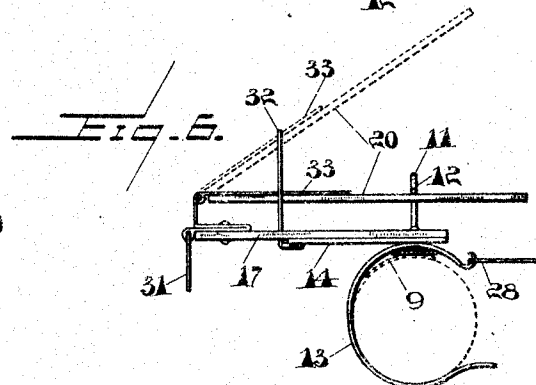
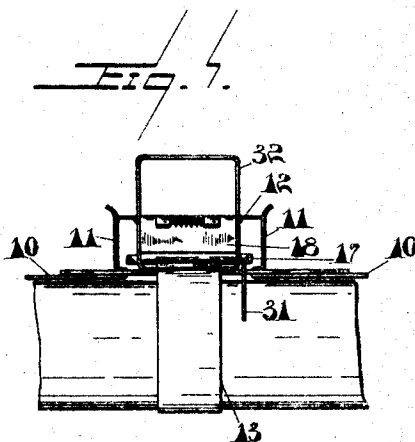
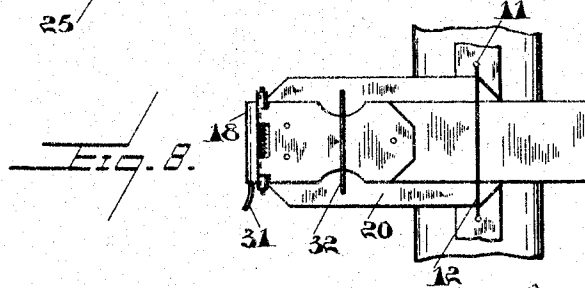
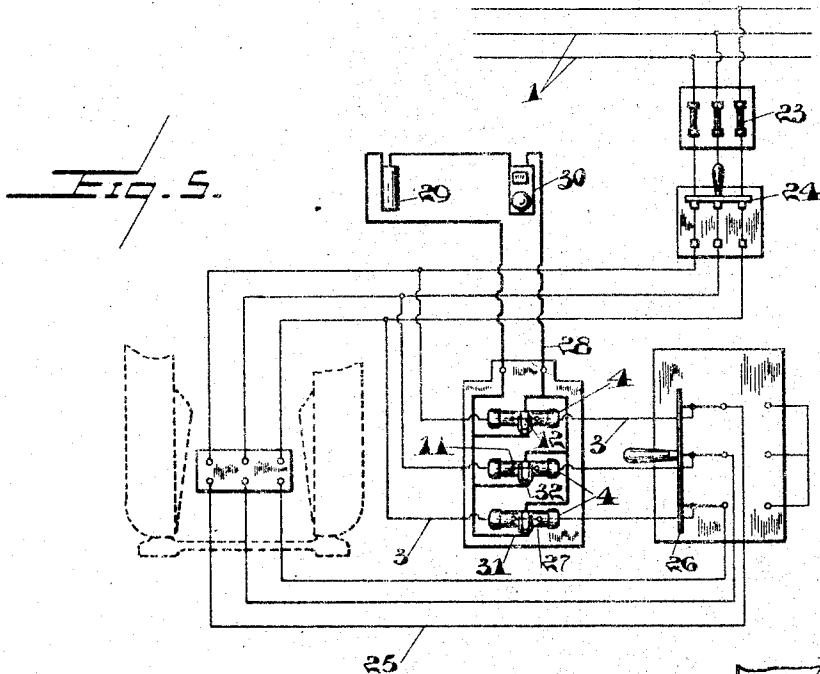
BY J. Edward Maybee.
ATTY.

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2 SHEETS--SHEET 2.



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UNITED STATES PATENT OFFICE.

CHARLES GILLIETT, OF TORONTO, ONTARIO, CANADA.

FUSE CONTROL FOR MULTIPHASE-CIRCUITS.

1,309,027.

Specification of Letters Patent.

Patented July 8, 1919.

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To all whom it may concern:

Be it known that I, CHARLES GILLIETT, of the city of Toronto, in the county of York, Province of Ontario, Dominion of Canada, have invented certain new and useful Improvements in Fuse Controls for Multiphase-Circuits, of which the following is a specification.

In operating electrical apparatus with multiphase current, it is usual to locate a protective fuse in each wire leading to the apparatus. Unless, however, all the fuses blow, the apparatus may continue to run on less than the full number of phases, resulting frequently in serious damage to the apparatus.

It is the object of my present invention to devise a fuse control which will either give immediate warning to an operator of the blowing of any one or more fuses, or else cause the operation of means for completely opening the circuit or circuits to the apparatus aforesaid.

I attain my object by means of the constructions hereinafter more specifically described and illustrated in the accompanying drawings in which—

Figure 1 is a diagrammatical view showing my invention as used in connection with a starter for a three wire three phase alternating current motor;

Fig. 2 a side elevation of a fuse with my auxiliary fuse connected therewith;

Fig. 3 an end elevation of my mechanical circuit-controlling device;

Fig. 4 an end elevation of the same showing also part of the main fuse to which it is connected;

Fig. 5 a diagrammatical view showing my invention as arranged to close the circuit of alarm apparatus;

Fig. 6 a view similar to Fig. 3 showing a modified form of controlling device used in the arrangement shown in Fig. 5;

Fig. 7 a view similar to Fig. 4 of this modified form; and

Fig. 8 a plan view of the parts shown in Fig. 6.

In the drawings like numerals of reference indicate corresponding parts in the different figures.

Referring particularly to Fig. 1, 1 are the line leads of a three wire, three phase electric circuit. These are connected with a compensation motor starter 2 of any ordinary type. 3 are the wires in which are

located the main or running fuses 4. 5 are the wires running to the motor, and 6 the electro-magnet of the no-voltage release commonly employed with such starters, the arrangement being the usual one that the breaking of the circuit of this electro-magnet or the failure of the potential therein will deenergize the magnet and trip the retaining devices of the starter handle 7, which will then fly to its normal position with the motor cut out.

The wires 8 form the circuit of the no-voltage release magnet 6, which wires are connected in the ordinary way with the starter wiring. For my purposes I extend the circuit to include a mechanical circuit controlling device for each wire of the multiphase circuit adapted to be conditioned for action by the blowing of an auxiliary fuse arranged in connection with each fuse of each wire of the multiphase circuit.

The arrangement of the auxiliary fuses controlling said mechanical circuit controlling device is preferably as shown more particularly in Figs. 2, 3 and 4 of the drawings. Spring clips 9 are adapted to be sprung about the shell of a fuse. With these spring clips are connected the metal connections 10, which are in electrical engagement with the end contacts of the fuse. Metallic arms 11 extend out from these connections and a fuse wire 12 of small capacity is stretched between them.

The mechanical circuit controlling device is preferably constructed as follows: A spring clip 13 of metal is adapted to be sprung over the cartridge shell as shown. To this clip is secured a metal plate 14 carrying a contact member 15. This is preferably a spring actuated plunger movable in a sleeve 16 in electrical contact with the plate 14. To the plate 14 is secured a strip 17 of non-conducting material carrying at its end the metal hinge 18, which provides a hinge connection between a metal plate 19 and the non-conducting strip 17. To this metal plate 19 is secured a strip 20 of non-conducting material. The hinge is of the spring type as shown in Fig. 8, the spring tending normally to throw the strip 20 into the position shown in dotted lines in Fig. 3. The strip is normally held down so that the contacts of the device are in engagement by the fuse wire 12, which overlies the strip as shown in Figs. 3 and 4. The result of this arrangement is that the instant one of

the main or running fuses blows, the corresponding fuse wire 12 will also blow, as it is in parallel with this fuse. The spring hinge at once throws up the strip 17 and the contacts of the device are disengaged.

It will be noted that the wires 8 are connected to the hinge 18 of one of the mechanical circuit controlling devices, and the spring clip of the third therefrom, and that the three devices are connected in series by means of the wires 22. Consequently, the blowing of any one of the running fuses will break the circuit, including the no-voltage release magnet, which permits the starter to move to the non-running position, effectually cutting out the motor and preventing it running on less than three phases. Any damage which might result to the motor from such operation is thus prevented.

In Figs. 5, 6, 7 and 8 I show a modification in which the mechanical circuit-controlling devices close an electric circuit instead of breaking it, thus making my invention applicable to circuits not provided with starters having no-voltage release attachment. In Fig. 5 the line leads are shown as having line fuses 23 and a line switch 24 arranged therein before they reach the motor. The wires 25, completing the circuit of the motor, have the motor switch 26 arranged therein and the running fuses 27. The mechanical circuit controlling devices are each clipped on the running fuses in the same way as hereinbefore described, but the spring clips 13 are each connected with one wire 28 of the circuit including a battery 29 and a bell or other alarm device 30. The other wire 31 of the circuit being connected with all the hinges 18. The contacts 15 and 19 are omitted, and I substitute therefor a wire bail 32 connected with a metal plate 14 and straddling the non-conducting strip 17. On top of the strip 17 and in electrical contact with the hinge is a metal plate 33, which is adapted to engage the bail as shown in Fig. 6 when the strip 17 is released by the fusing of the fuse wire 12. The blowing of any one of the running fuses will thus cause the operation of one of the mechanical circuit controlling devices and thus close the circuit of the alarm device, which will immediately give warning to the attendant, who can then throw out the switch until the conditions are remedied which have caused the blowing of the fuse and a new fuse has been inserted.

What I claim as my invention is:—

1. The combination with a multiphase electric circuit provided with a principal fuse in each wire of the circuit; and a con-

trolling switch in said circuit provided with a no-voltage release; of a shunt circuit including an electro-magnetic control for the no-voltage release; an auxiliary fuse in parallel with each principal fuse; a mechanical circuit-breaking device in connection with each auxiliary fuse normally tending to break said shunt circuit, each of said auxiliary fuses being adapted normally to restrain the operation of its corresponding mechanical circuit-breaking device and to release it for operation when blown.

2. The combination with a multiphase electric circuit provided with an inclosed principal fuse in each wire of the circuit of an auxiliary open link fuse in parallel with each principal fuse and removably supported thereon, and a mechanical circuit-controlling device in connection with each auxiliary fuse comprising a spring actuated rocking arm adapted to make or break an electric circuit, said arm being normally restrained from action by the fuse wire of its corresponding fuse.

3. The combination with a multiphase electric circuit provided with a principal fuse in each wire of the circuit; and a controlling switch in said circuit provided with a no-voltage release; of a shunt circuit including an electro-magnetic control for the no-voltage release; an auxiliary fuse in parallel with each principal fuse; a mechanical circuit-breaking device in connection with each auxiliary fuse including a spring actuated rocking arm normally tending to break said shunt circuit, said arm being normally held in position to close the circuit by the fuse wire of its corresponding fuse.

4. The combination with an electric safety cartridge fuse provided with an internal fusible member and the usual end contacts, of an auxiliary removable fuse support clipped on the shell of the fuse in electrical connection with said end contacts and provided with arms extending out from the shell of the fuse, and a fusible member stretched between said arms.

5. The combination with an electric safety cartridge fuse provided with an internal fusible member and the usual end contacts, of spring clips adapted to be sprung over the fuse; metallic connections carried by the clips and engaging the aforesaid end contacts; metallic arms extending out from said connections; and a fusible member stretched between said arms.

Signed at Toronto, Canada, this 19th day of March, 1918.

CHARLES GILLIETT.