Oct. 23, 1928.

1,688,697

F. FISCHER ET AL

ELECTRICAL CIRCUIT CLOSER

Filed June 21, 1926

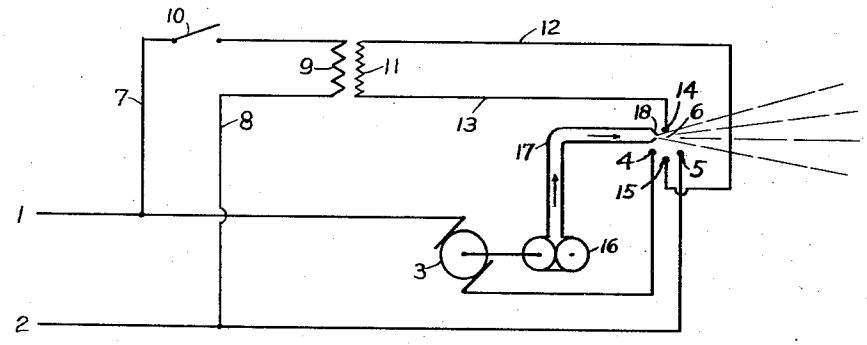


Fig. I

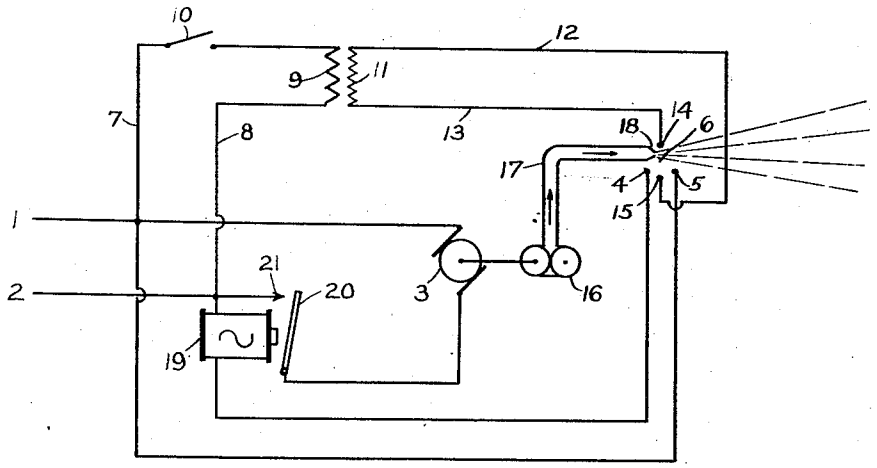


Fig. II

WITNESSES:

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Patented Oct. 23, 1928. 1,688,697

UNITED STATES PATENT OFFICE.

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ELECTRICAL CIRCUIT CLOSER.

Application filed June 21, 1926. Serial No. 117,393.

Our invention relates to a circuit-closer actuated by an electric spark, wherein two or more circuits, normally open through a common air-gap, are closed when a spark jumps the gap and thereby breaks down the gap-resistance to all of the circuits otherwise open at that point.

One of the objects of our invention is to prevent the energizing of a given circuit unless a spark is obtained across the air-gap. This is particularly desirable in an oil-burner safety control-circuit in which the burner is prevented from operating unless the required ignition spark is obtained.

Another object is to dispense with mechanical moving parts in hot locations.

Another object is to obtain automatic and remote electrical control without the use of moving parts.

Still other objects will hereinafter appear.

The nature and scope of this invention are more fully explained in the following description taken in connection with the accompanying drawings forming part of this specification, in which:

Figure I is a diagram of our circuit-closer as applied to an oil burner control circuit.

Figure II is a diagram of our circuit-closer adapted to an oil burner control circuit similar to Figure I, but having a low voltage relay-circuit, instead of the main motor-circuit, energized across the air-gap.

Similar numerals refer to similar parts in both figures.

In Figure I, 1 and 2 are alternating current power leads, 3 is a motor, 4 and 5 are electrodes separated by air-gap 6. 7 and 8 are wires connecting the transformer primary coil 9 in parallel across leads 1 and 2 when switch 10 is closed.

The transformer secondary coil 11 is connected by means of wires 12 and 13 to electrodes 14 and 15 which are also separated by air-gap 6.

The air and oil pump 16 is driven by motor 3 and discharges a combustible mixture of oil and air through conduit 17 and nozzle 18 into the fire-box of a furnace.

In Fig. II, relay coil 19 is connected in series between lead 2 and electrode 4; and motor 3 is bridged across leads 1 and 2 when relay armature 20 contacts with contact point 21—otherwise the circuit of Figure II is the same as Figure I.

The operation of our circuit-closer is as follows:

The power current is always presumed to be on lines 1 and 2 (see Figure I).

When the control switch 10 is closed, the primary transformer coil 9 is energized. This energizes the high-tension secondary coil 11 and causes a spark to jump across air-gap 6 between electrodes 14 and 15.

The above spark, in breaking down the resistance of air-gap 6, permits the relatively low voltage current to pass between electrodes 4 and 5, thereby energizing motor 3.

The pump 16 which is driven by motor 3, discharges a combustible mixture through nozzle 18 in proximity to air gap 6, so that the mixture is ignited when a spark jumps across the air-gap.

The maintenance of the spark is necessary to the continuous operation of the burner, and the burner obviously will not run if the spark circuit should be open, short-circuited, or otherwise rendered ineffective.

The opening of control-switch 10 de-energizes the transformer coils 9 and 11, stopping the spark and thereby rendering gap 6 non-conductive to the motor circuit. This stops pump 16 and the burner remains inactive until switch 10 is again closed and the cycle repeated.

The operation of the circuit outlined in Figure II is similar to the above except that the spark across gap 6 energizes the relay coil 19 which in turn closes the motor-circuit through the contact of armature 20 with contactor 21. Failure of the spark opens the relay circuit and thereby prevents operation of the motor.

Explosions with oil burners often occur through the belated ignition of accumulated oil or combustible mixtures in the fire-box. With our device no oil can enter the fire-box without passing the spark which ignites it as it enters; and consequently there can be no accumulation of combustibles to explode.

Various modifications and changes may be made without departing from the spirit and scope of our invention, and we do not confine our invention to its use with oil burners but desire that only such limitations shall be placed thereon as are imposed by the prior art or are specifically set forth in the appended claims.

We claim:

1. An electrical circuit-closer, consisting

of a high-voltage controlling circuit having a spark gap and a relatively low voltage controlled circuit having an air-gap intercepting the spark-gap, the air-gap being rendered relatively conductive in the controlled circuit when energized by a spark produced at the spark gap by the high-voltage controlling circuit, and a switch in the controlling circuit.

2. In an electrical circuit-closer, a high-voltage controlling-circuit having a pair of spaced electrodes forming a spark-gap between them, a relatively low-voltage controlled-circuit also having a pair of electrodes spaced on opposite sides of the gap, the gap being rendered conductive to the low-voltage controlled circuit when the spark-gap is energized by the high-voltage controlling circuit.

3. In an oil burner control circuit, a fuel-supply motor, a burner nozzle, a high voltage circuit having a spark gap adjacent to the nozzle for igniting the burner, a motor controlling circuit having a pair of electrodes separated by the spark gap, the electrodes being insulated from each other by the gap when the spark is absent but in electrical communication when the spark is present.

4. In a burner ignition device, a high-voltage circuit having a spark gap for producing an ignition spark, a controlled circuit, and means responsive to the presence of an ignition spark for energizing the controlled circuit when an ignition spark is produced and substantially deenergizing the controlled circuit when said ignition spark is absent.

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