

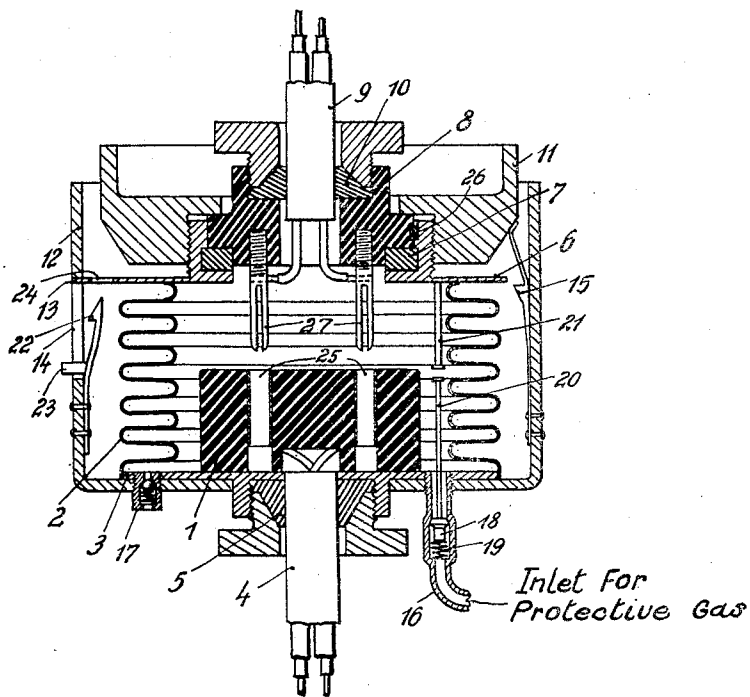
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E. VÖLKER ET AL

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CIRCUIT BREAKER

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Inventors:—
Emil Volker,
Kurt Kobligh;

By

John B. Brady
Attorney

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CIRCUIT BREAKER

Emil Völker, Berlin-Friedenau, and Kurt Kobligk,
Berlin - Wilmersdorf, Germany, assignors to
Deutsche Waffen- und Munitionsfabriken, Ak-
tiengesellschaft Hauptverwaltung, Berlin-
Charlottenburg, Germany

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This invention relates to an electric circuit breaker or switch for rooms in which combustible mixtures of air and gas vapours, dust or the like are present, for example, in mines, chemical factories, mills and the like.

It is the object of the invention to construct the circuit breaker in such a manner that any sparks which may possibly occur in the switching action cannot ignite the combustible mixture.

Another object of the invention is to provide circuit breakers of the kind referred to which are very simple, cheap and compact.

With these and further objects in view which will hereinafter appear, the invention consists not only of the structures herein pointed out and illustrated by the drawing but relates to further structures as hereinafter may be claimed.

The character of the invention, however, may be best understood by reference to one of its structural forms, as illustrated by the accompanying drawing showing an axial section of a plug and socket connection having the invention applied thereto.

Referring to the drawing, the plug socket 1 is surrounded by a flexible cover, for example, a corrugated tubular body 2 of resilient material, for instance, a metal bellows, secured to a base plate 3, through which the cable 4 is introduced by means of a packing 5. The tube 2 is provided with a top closure plate 6 which is formed with a flange having exterior thread and an interior collar for reception of a packing 7. The plug unit 8 is also fitted with a packing 10 to introduce the cable 9. By means of an interiorly threaded member 11 the plug unit 8 can be tightly pressed against the packing 7. The whole unit is surrounded by a protective casing 12. In order to position the plug contact pins 27 with respect to the contact sleeves 25 in the plug socket, a nose 13 of plate 6 is provided to be guided in a slot 14 of the casing. Moreover a key 26 may be provided between the plug unit 8 and the closure plate 6 to ensure correct relative position of the said parts. In order to prevent the plug from being inserted into the plug socket without the threaded member 11 being tightly screwed down, one or more spring actuated locking members 15 are provided, for example, at the wall of the protective casing 12 which locking members are pressed aside by screwing down the member 11, to such an extent that the cover plate 6 may pass and the plug unit be inserted into the plug socket. In order to lock the plug in this position, one or more similar locking members 22 may be provided which by engagement with slots 24' retain

the cover plate in its lower position and are adapted to be released by depressing their knobs 23, if the coupling is to be disconnected.

The portion of the device including casing 12, plate 6, tube 2 and the plug socket 1 comprises a current outlet connection adapted to receive plug units from various appliances. In the preferred form of our invention, therefore, socket 1 is secured to the base plate 3 and to the casing 12 as a fixed assembly, and the plug unit 8 together with the member 11 is removable and interchangeable with similar plug units and insertable in other socket assemblies similar to that shown. The plug unit is removed, after disconnection from socket 1 within the enclosure, by unscrewing member 11 which frees the plug unit 8, key 26 being movable therewith in a slot in the flange on plate 6.

Upon reinsertion of a plug unit 8, the key 26 is first aligned with its slot and the unit is then clamped against the packing 7 by screwing down member 11. Closure of the connections between pins 27 and sleeves 25 is prevented by stop 15 until member 11 has been sufficiently tightened to seal the mounting of the plug unit at packing 7 and displace the locking member 15. The plug unit 8 is then free to be depressed for connection of pins 27 in sleeves 25 within the air-tight enclosure afforded by the tube 2 and the otherwise sealed openings. The apparatus of our invention may be employed in the form thus described or may also be provided with means for introducing an inert preventive gas within the enclosure as hereinafter described, for greater safety.

It will be understood that by the said construction of the device, a perfectly closed space is formed within the cover 2 which does not permit any gas mixtures to enter. Of course, it might occur that a mixture is already present in the said space when the plug is inserted which might be ignited within the cover and possibly cause explosion of the device whereby further vapours in the surrounding atmosphere might be ignited. In order to prevent that, the space within the cover 2 may be connected to a supply duct 16 for compressed air or protective gas so as to feed fresh air or protective gas to this space and force the explosive mixture out through a blow-off valve 17. A valve 18 under action of a spring 19 may serve to shut off the supply duct 16 in the non-operative condition of the device and to admit air or protective gas only when the plug is inserted, by depression of an upwardly extending rod 20 on the valve 18 co-acting with a downwardly extending rod 21 on plate 6. Valve 18 55

also prevents release of the protective gas while interchanging plug units 8, during which time the opening in plate 6 is uncovered.

While we have herein shown and described certain preferred embodiments of our invention, we wish it to be understood that we do not confine ourselves to all the precise details herein set forth by way of illustration, as modification and variation may be made without departing from the spirit of the invention or exceeding the scope of the appended claims.

We claim:

1. A separable connector comprising, in combination, an electric plug unit, at least one contact part at said plug unit, a socket unit, at least one coating contact part at said socket unit, a corrugated tubular cover surrounding said socket unit and adapted to enclose the coating contact parts air-tightly, a threaded flange on said cover, an interiorly threaded member and a packing on said threaded flange for detachably and air-tightly connecting one of said units to the cover, means for fixedly securing said cover to the other of said units, and means connected with the last said means for preventing twisting of said tubular cover, said contact parts being engageable and disengageable within said cover, and said units being separable upon disconnection of said threaded flange and said threaded member.

2. A separable connector comprising, in combination, an electric plug unit, at least one contact part at said plug unit, a socket unit, at least one coating contact part at said socket unit, a corrugated tubular cover surrounding said socket unit and adapted to enclose the coating contact parts air-tightly, a threaded flange on said cover, an interiorly threaded member and a packing on said threaded flange for detachably and air-tightly connecting one of said units to the cover, means for fixedly securing said cover to the other of said units, means for preventing twisting of said tubular cover, and means for permitting insertion of the plug into the socket only after said cover has been tightly secured to said detachable unit.

3. A separable connector comprising, in combination, an electric plug unit, at least one contact part at said plug unit, a socket unit, at least one coating contact part at said socket unit, a corrugated tubular cover surrounding said socket unit and adapted to enclose the coating contact parts air-tightly, a threaded flange on said cover, an interiorly threaded member and a packing on said threaded flange for detachably and air-tightly connecting one of said units to the cover, means for fixedly securing said cover to the other of said units, means for preventing twisting of said tubular cover, means for permitting insertion of the plug into the socket only after said cover has been tightly secured to said detachable unit, and a releasable locking member for retaining said plug in said socket.

4. A separable connector comprising, in combination, an electric plug unit, at least one contact part of said plug unit, a socket unit, at least one coating contact part at said socket unit, a corrugated tubular cover surrounding said socket unit and adapted to enclose the coating contact parts air-tightly, a threaded flange on said cover,

an interiorly threaded member and a packing on said threaded flange for detachably and air-tightly connecting one of said units to the cover, means for fixedly securing said cover to the other of said units, means for preventing twisting of said tubular cover, means for permitting insertion of the plug into the socket only after said cover has been tightly secured to said detachable unit, a releasable locking member for retaining said plug in said socket, a pressure relief valve in said cover and means for supplying inert gas under pressure to the enclosure provided by said cover.

5. A separable connector comprising, in combination, an electric plug unit, at least one contact part at said plug unit, a socket unit, at least one coating contact part at said socket unit, a corrugated tubular cover surrounding said socket unit and adapted to enclose the coating contact parts air-tightly, a threaded flange on said cover, an interiorly threaded member and a packing on said threaded flange for detachably and air-tightly connecting one of said units to the cover, means for fixedly securing said cover to the other of said units, means for preventing twisting of said tubular cover, means for permitting insertion of the plug into the socket only after said cover has been tightly secured to said detachable unit, a releasable locking member for retaining said plug in said socket, a pressure relief valve in said cover, means for supplying inert gas under pressure to the enclosure provided by cover, a control valve in the last said means, and means for opening said control valve automatically when said plug is inserted into said socket.

6. In a separable plug and socket electrical connector, the combination of a socket member having terminals therein, a plug member having terminals for coating with the socket terminals, a non-porous resilient cover fixedly secured to one of said members in air-tight relation and having an opening therein opposite the terminals in the said member, the peripheral edge of said opening being engageable by the other of said members with the terminals thereof aligned for engagement with the coating terminals opposite said opening, means for detachably connecting the last said member and said cover in air tight relation with said coating terminals in disengagement, said resilient cover being flexed for engaging and disengaging said coating terminals within the air tight enclosure provided by said cover and said members, and stop means engaging said cover and controlled by the last said means for permitting flexing of said cover and engagement of said coating terminals only after said cover has been air tightly connected with the detachable member.

7. In a separable plug and socket electrical connector, the combination according to claim 6 with said means for detachably connecting member and cover in air-tight relation comprising a threaded flange on said cover, a packing in said flange, and a coating threaded member for pressing the said detachable member air tightly against said packing.

KURT KOBLIGK.
EMIL VÖLKER.