Nov. 19, 1929. E. C. BLEM 1,735,845

AUTOMATIC SWITCH

Filed Dec. 20, 1926

Fig 1.

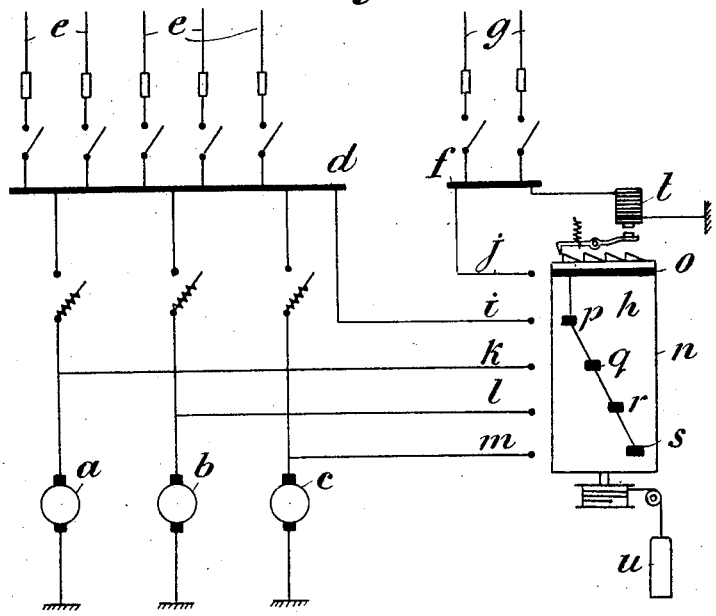
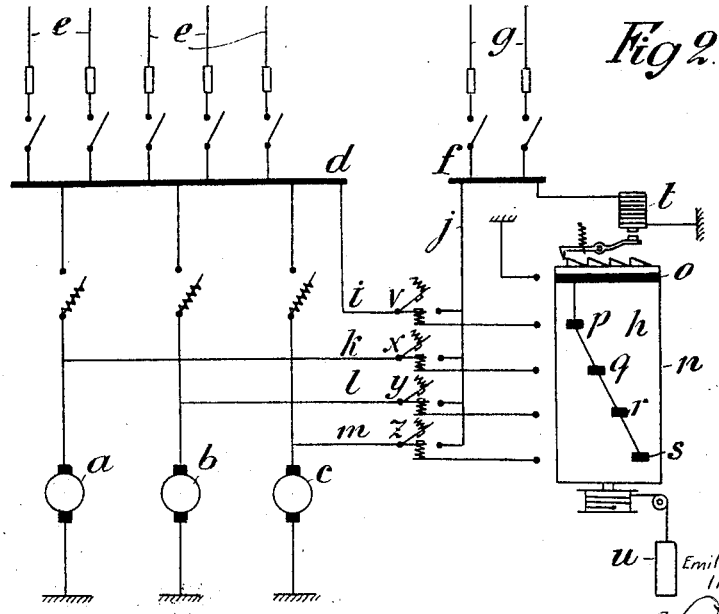


Fig 2.



Emil Christian Blem
INVENTOR
By Otto Munk
his ATTY.

Patented Nov. 19, 1929 1,735,845

UNITED STATES PATENT OFFICE

EMIL CHRISTIAN BLEM, OF HELLERUP, NEAR COPENHAGEN, DENMARK

AUTOMATIC SWITCH

Application filed December 20, 1926, Serial No. 155,890, and in Denmark March 15, 1926.

In electric plants, where several dynamos are running parallel to each other with or without the use of a storage battery, it may occasionally happen that every one of the sources of current are switched off from the bus bars of the distributing board.

This may be caused, for instance, by an overload of such magnitude occurring that the automatic switches or the fuses, as the case may be, of the total number of sources of current go, or by one of the dynamos or their driving engines breaking down or being caused to stop operation under such conditions that not only the dynamo concerned is switched off, but simultaneously all the other sources of current are switched off on account of the overload of these caused thereby.

In cases of this nature the total number of circuits connected to the bus bars of the distributing board will be without current, and very serious difficulties may be produced thereby, more especially in ships where the steering gear is operated and the lanterns are lighted by means of electricity.

After an occurrence as the above described one or more of the dynamos will, as a rule, continue working in proper working order under normal voltage and thus be capable of supplying a few of the more indispensable or essential consumers with electricity.

Accordingly it will be possible essentially to reduce the risk of discontinuing the supply of current to these important consumers by employing an arrangement which will cause consumers of this nature to be automatically connected to one of the sources still in working order when their supply is discontinued in the above described manner or otherwise.

In plants where the dynamos are not working parallel, but each supplies an individual group of consumers, it is also important that the consumers of the above described nature can be transferred to another source under full voltage, in case of a break-down or stoppage of one of the dynamos.

This invention relates to an arrangement which makes it possible to obtain the above mentioned desired effect, and according to the invention the arrangement or device comprises a contact mechanism operated by an independent auxiliary power which normally is prevented from operating by means of an electromagnetic non-voltage relay. This relay is under the influence of the electric tension on the said important circuits, so that the contact mechanism, when the said tension disappears, will be caused to operate and successively connect the more important circuits to the several sources of current in the system, whereby the contact mechanism again stops working and is secured and kept at rest by the said electromagnetic non-voltage relay when a connection has been effected to one of the sources under tension.

In the drawing

Fig. 1 shows a diagram of one construction of the arrangement, in which the working current flows through the contact mechanism, and

Fig. 2 shows a diagram of another construction of the arrangement, in which the contact mechanism or apparatus controls electrically controlled switches for the working current.

Referring now to the drawing the plant illustrated in Fig. 1 comprises three dynamos *a*, *b*, *c*, working parallel with each other. The dynamos supply current to the bus bar of a distributing system (*d*) from which lines *e* lead to the consumers in the usual manner. For the sake of clearness the system is shown as a single-pole system; it may, however, just as well be a bipolar or multipolar system.

The especially important consumers *g* whose supply must be maintained as long as at all possible are connected to a separate set of bus bars *f*. The current supply to this set of bus bars is either direct or indirect through the contact apparatus *h*. According to Fig. 1 the connection is direct through the contacts of the contact apparatus which comprise a set of fixed contacts *j*, *i*, *k*, *l*, *m*, cooperating with contacts, *o*, *p*, *q*, *r*, *s* mounted on a rotatable contact drum *n*. The latter contacts, which are all interconnected, are arranged in such a manner that the contact *o*, cooperating with the fixed contact *j* con-

nected to the bus bars *f*, extends over the whole of the circumference of the drum, and thus the connection *o*—*j* is constantly maintained. The other contacts *p*, *q*, *r*, and *s* extend only over a certain portion of the circumference of the drum; the said contacts cooperate with the fixed contacts *i*, *k*, *l* and *m* which are connected to the main bus bars *d* and each of the dynamos *a*, *b* and *c* respectively.

An electromagnet *t* magnetized from the bus bars *f* has its armature shaped as a pawl which engages the ratchet wheel arranged on the drum *n*; the said electromagnet prevents rotating of the drum and secures the drum in one of its contact positions as long as the bus bars *f* are under tension, but will release the drum when this is no longer the case; a weight *u* or the like will then cause the drum to rotate until the electromagnet *t* again is supplied with current in another of the contact positions by being connected to a dynamo under tension, after which the drum will be secured in this position from the influence of the weight or the like.

With normal working conditions of the system the contact drum is secured in such a position that contacts *o*—*j* and *p*—*i* are closed, thus maintaining connection between the sets of bus bars *d* and *f*. If the bus bars *d*, however, for some reason or other lose their tension or voltage the contact apparatus will begin to rotate and successively connect the bus bars *f* to each of the dynamos *a*, *b* and *c*. So soon as a connection has been established with a dynamo under voltage the contact apparatus will be kept in the corresponding position, and thus the supply of current to the consumers *g* will be re-established.

In case the working current to the consumers *g* is too strong for passing direct over the contacts of the contact apparatus the arrangement illustrated in Fig. 2 may be employed, in which the contact apparatus is used only for controlling an auxiliary current for electrically operated switches *v*, *x*, *y* and *z*, these switches being placed in connecting lines between the bus bars *f* and the main bus bars *d* and each of the dynamos *a*, *b* and *c* respectively.

It should be understood that the arrangement or device shown and described above may, without departing from the principles of the invention, be carried into effect in a number of other ways than that here described and shown. Instead of the described mechanism for operating the contact apparatus it is possible, for instance, to use any other driving mechanism which is independent of the working condition of the system, in which case the electromagnet *t* preferably controls or is replaced by a non-voltage relay of suitable nature for controlling the said driving mechanism.

I claim:

A current supply system, comprising a circuit including a plurality of generators arranged in parallel and supplying bus bars for general consumers and additional bus bars for special consumers, a contact drum to carry the current from the general bus bars to the special bus bars, or the current from any one generator to the special bus bars, means normally tending to rotate the drum, and a no-voltage trip cooperating with the drum to hold it against rotation and comprising a magnet in the circuit with the bus bars for the special consumers, said magnet being energized by the normal voltage on the special bus bars, whereby a reduction in the line voltage caused by the failure of one or more of the generators to function will de-energize the magnet and permit the drum to rotate until a closed circuit between one of the generators and the special bus bar will supply sufficient current for the special consumers and for operating the magnet to stop further rotation of the drum.

In testimony whereof I affix my signature.

EMIL CHRISTIAN BLEM.