

frictional resistance to be overcome is very small.

It will be apparent that our invention comprises features belonging to both the above described constructions which have previously been employed, and the combination enables us to achieve a result which is unattainable by either of them.

In all cases to which our invention is applied, we employ a pair of flat surfaces with a freely movable roller contacting with both. But the manner of attaching the roller to one of the levers may be varied in a number of ways. For example trunnions on the ends of the rollers may be free to move in retaining grooves in the lever. Preferably the construction first described is carried out by attaching a cylindrical piece to one side of the lever connected to the switch mechanism, and forming in such piece a transverse groove the base of which provides the flat surface on which the roller

can run. The roller is held in position by a small pin passing through it and the sides of the groove. The said cylindrical piece is also capable of rotational or angular adjustment to enable the flat surface to be brought readily into correct relationship with that on the other lever.

Instead of flat surfaces, curved surfaces may be used on one or both levers. For example, a useful arrangement for some purposes comprises a flat step or shoulder on one of the levers, a fixed cylindrical peg on the other, and a roller arranged to operate between them, the roller contacting with the outer cylindrical surface of the peg. Any suitable provision, such as those above described, is used for holding the roller in position.

Whilst primarily intended for the trip mechanisms of circuit breakers it may be applied to other kindred mechanisms.

Dated this 30th day of April, 1924.

MARKS & CLERK.

COMPLETE SPECIFICATION.

Improvements relating to Trip or Release Mechanisms for Electric Circuit Breakers and like Apparatus.

We, GEORGE ELLISON and THOMAS BROWN, British subjects, both of Well-head Lane Works, Perry Barr, in the City of Birmingham, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to trip or release mechanisms for electric circuit breakers and the like, and has for its object to provide an improved anti-friction device between the interengaging elements of such mechanisms. In one form of mechanism a pair of catch levers are used, one connected to the movable member of the switch, and the other arranged in conjunction with a releasing device, such as the plunger of an overload or no-voltage coil. The interengagement of the two catch levers, whereby the switch is held in action, is sometimes effected through the medium of a flat step or shoulder on one lever which engages a corresponding part on the other lever. When one of the levers is actuated for the release of the other a relative sliding movement occurs between the said interengaging parts. Due to the pressure between those parts a certain amount of frictional resistance is set up; In small apparatus the pressure

is comparatively small and the frictional resistance to movement is also small, so that no special provision for minimising the resistance is necessary. But in larger apparatus the frictional resistance between interengaging parts as above described is sufficient to interfere with the proper action of the mechanism, and in consequence it has long been the practice to provide on one of the parts a roller which is carried on a pivot pin and is engaged by a step or shoulder on the other part. In still larger apparatus it is found that the reduction of frictional resistance which is possible by means of a roller carried on a pivot pin is not sufficient, owing largely to the sliding friction between the roller and its pin, and in consequence much difficulty has been encountered in constructing mechanism which is capable of withstanding heavy pressure and which is also capable of being released by a small effort.

The object of the present invention is to still further reduce frictional resistance to motion and to effect the desired result in the simplest possible manner.

The invention comprises the employment of a flat or curved step, shoulder or other fixed surface on each of the levers, and the provision of a roller which cooperates with both surfaces and is free to roll relatively to each.