

surface and where such contacts are used to break currents, they should have auxiliary carbon contacts, between which the final break and consequent arc occur.

In the controller of which I have spoken, copper discs are used and set loosely on their spindles, so that they rotate during operation and constantly present new surfaces to the contact pieces. A judicious use of emery cloth will keep these in order for a long time. Knife contacts, however, are very bad. I remember, one time when I was called in to investigate an elevator accident. The controller was a cheap solenoid affair with a double lever arrangement. The car rope turned a shipper sheave, which moved a lever and threw in the main switch, which in turn connected the solenoid and started the motor, the solenoid gradually cutting out the resistance. The switch blades happened to get bent and passed their clips, making a poor contact. The arcing set up fused the blades solidly to their clips and the operator could not pull hard enough on shipper rope to release them.

The car came on down to the bottom, and as soon as the ropes slacked, the mechanical slacked cable device was brought into play. This merely threw a clutch into gear with a pinion, meshing with a rack on the same old lever, and as the switch blades still refused to let go the gear was stripped of its teeth, the lever bent and the controller board smashed. The main line fuses blew out at this point and saved the rest of the wreck.

There were two bad features in that elevator; knife contacts and a mechanical slack cable device. The remedy prescribed was a new and better controller. Great care should be used to keep wires from becoming crossed or grounded, as almost any combination of circuits can be obtained by grounding wires, and it is impossible to foretell the result.

I know of one case where an armature grounded and a sudden flash occurred clear across the commutator. The startled attendant grabbed a fire bucket and threw its contents on the motor. It put out the fire, but it pretty effectually put the motor out of business and cost a new armature.

Another thing, if you disconnect the field terminals, be sure to get them back right. If you get the series field in opposition the motor will surely run away. Even a loose connection in the field circuits may cause trouble.

It is well to remember, too, that the car is over balanced for the sake of economy, and if you jack the brake off while making some repairs, and at the same time, have the main switch open, the car had better be at the top of the shaft; otherwise it will soon get there and it might not stop at the roof.

A great many accidents in which people have been hurt