

RECENT IMPROVEMENTS IN ELECTRIC TRACTION.

A committee appointed to deal with the above subject reported to the Street Railway Association of the state of New York at last convention as follows:

We understand anything which tends to an increase of reliability or economy of operation of an electric railway to be an improvement, and it is with the intention of bringing before you in a brief manner the results of my experience and observation during the past year, upon these points, that this article has been written.

As you of course know, electric systems as first constructed were built on altogether too light a plan, and the increasing tendency year by year has been, and is, for heavier and more solid construction in every department, but particularly in the way of track station equipments. It has been well said that no new departure is ever perfect at the beginning, and no one realizes this more than he who has watched the development of electric traction during the last few years.

The storage battery has made but little progress during the past year and is not likely to cut much of a figure in electric traction until it is able to make better showing, financially, than it has in the past.

It may seem strange that the management of roads, even at present operated by horses, cannot see that a change of some kind must come soon owing to the great cry for rapid transit, and yet I know of roads at present being laid with flat center-bearing rails on stringers in streets being newly paved. I do not mention this as an improvement, but simply to show that what may be regarded as an improvement by some would be called simply a makeshift or temporary piece of work by others.

The general tendency of the times to consolidate all common interests under one management is showing its efforts in electric traction more now than ever, and scarcely a week passes that we do not hear of some syndicate obtaining control of some horse road, and the information usually ends with the statement that "it is intended to equip all the lines with electricity." From many points of view this is an improvement, and a marked one.

TRACK.

The improvement in track construction has been very great, and, although many expensive errors have been made, we ought, on the whole, to feel satisfied with the progress.

The early forms of track construction were too light and soon went to pieces, but during the past year heavier rails have been rolled and better joint plates made, so that it is possible to keep the road bed in perfect line and surface. This improvement has been a great help to the electric equipment and has reduced the cost of maintenance. As the cost of laying tracks is about the same, whether light or heavy, it is economy to put in only the best.

Now, on the question of what constitutes the best form of track there is considerable variance of opinion. My experience and observation has convinced me that the deep girder rail, about nine inches high, spiked directly to the ties, is the best form for paved streets, and, in dirt or Macadam streets, a six-inch girder rail laid in the same manner. In the country where the local authorities are willing, I would lay a tee rail spiked directly to the ties.

The weakest place in all forms of track construction is at the joint. Every manufacturer of rails, and many of the railroad companies, have tried to overcome this trouble. There are probably as many patents upon rail joints as upon car couplers, and most of them about as impracticable. Up to the present time there has been nothing brought out which surpasses a properly designed "fish plate."

While speaking of track construction it might be well to call attention to the bonding of rails for the return circuit. Many forms are used and some of them are still in operation. I believe that a copper-bond wire long enough to connect with the web of the rail on each of the fish plate to be the best plan, and then grounding the whole system at frequent intervals, and abandon the supplementary wire which it has been the custom to use with the common form of bonding.

ELECTRIC EQUIPMENT.

Probably the greatest advance in any particular line has been in the matter of armatures for motors and dynamos. I consider that the introduction of the "iron-clad" type will do more toward reducing the bill for repairs in that direction than any other one

thing that has been introduced during the year. The electric companies have all, I believe, now adopted this form as their standard, and all roads that have tried them will, I think, agree with me that for simplicity, ease of repair and ability to stand the hard usage they receive they stand at the head.

In the manner of controlling the motors most of the companies still use the time-honored rheostat, although I believe one company is endeavoring to introduce a new type of controller which they will doubtless be happy to explain at a later date.

Many roads acting under a misapprehension of the requirements, started off with motors too small for the work, and endless trouble has been the result. Some new classification should be adopted by electrical companies for designating the power of their motors, as the present "office classification" does not afford a proper understanding of its capacity, and the "horse power" term is but little better, depending on so many limiting conditions. A more satisfactory way would be to specify the number of pounds the motor can pull at different speeds, with the maximum current for which it is designed.

THE POWER STATION.

This may rightly be called the heart of an electric system. The trolley and feeder wires form the arteries, the rails and return wires the veins, and the cars the capillaries connecting them. The Biblical injunction to "guard thy heart with all diligence, for out of it are the issues of life," would certainly seem applicable to the station. The chief element to be considered should be reliability, and after that economy. Just what means shall be used to attain this end seems so far to be a disputed matter, as shown by the stations now in operation, which contain almost every conceivable device—good, bad and indifferent; all shapes, sizes and descriptions of engines, boilers and dynamos. Many designers of stations—if some of them can be said to have been designed at all—seem to have gone at their task utterly regardless of the future and oblivious to the experiences of the past. However, through it all I can say that a very marked improvement is observable lately. The designers of stations are learning wisdom from their past experiences and the makers of apparatus are more alive to the requirements of the system, and better material and workmanship can be had where required.

The recent introduction of large multipolar dynamos has brought about a change in station arrangements not heretofore obtainable, and in all large stations now being built counter-shafting is dispensed with entirely and the general tendency is toward reduction of parts, which in turn means simplicity. It is very probable that we have reached now a form of station that will be fairly permanent and the main point in the future will be the size of the units. For medium-sized stations engines with releasing valve gear bolted direct to a multipolar dynamo will be the best where the price of land is not excessive, and direct coupled engines and dynamos for larger stations. To my knowledge there have been no comparative tests made as to the economy of the various types of stations, although all reasoning would point to these latest types as being by far the most economical.

There has been heretofore too much taken for granted or assumed in electrical work, and the rapid growth of the business has called into it many who were totally unqualified for the positions which they have obtained. I attribute much of the unsatisfactory work in the past to this cause, but am happy to note that the great majority of these are passing into the background and their places are being filled with men of good judgment and mechanical resources.

TRUCKS.

The first car trucks employed in electrical work were of the pedestal form; that is the trucks were fastened to the car body and oscillated with the car. The motors, of course, had to be suspended from the car body, and the result was that the grinding of the gears was transmitted to the whole car, also the oscillation of the car body caused the motors to correspondingly rise and fall. This was very undesirable and it was soon found necessary to adopt the post form—in which the truck was complete in itself and the motors supported directly on the frame of the truck. The body was connected with the truck only by springs, thus being entirely free from the jolts and pounding of the truck.

In this form eight spiral springs were first used, the same as