

the branch exchange. In giving this limited service, the telephone company charges considerably lessened rental, although securing for the subscriber a more efficient service by not allowing the unnecessary blocking of his down-town trunk wires. This difference in expense together with the difference in price between public and branch exchange lines is almost, if not quite, sufficient to pay the salary of the telephone operator even though you have only a small number of lines, and this naturally increases with the greater extent of the system.

The success of the system can best be indicated by the statement that of all the branch exchanges put in operation in the city of Chicago, only one has ever been taken out through dissatisfaction with the system, and in this case it was only a short time before the telephone company was requested to immediately replace, the firm finding that the inconvenience and loss of time were greatly increased when the exchange was closed.

The growth of the private branch exchange system must soon extend along the lines of the individual roads; in fact, at present the Pennsylvania Railroad Company has in operation a very complete system which gives them direct connection over wires entirely controlled by them between all division headquarters on their road east of Pittsburgh. Through the courtesy of that company I am permitted to exhibit a diagram of this system. They have branch exchanges at all division headquarters and have leased from the Long Distance company necessary wires to complete connections with these points. Other large eastern lines, I understand, are now contemplating the adoption of this same scheme.

With the growth of the private exchange idea, these exchanges will rapidly multiply in large cities and the necessity for means of intercommunication between them without going through the public exchange will become imperative; in fact, in the city of Chicago, at present, where branch exchanges are being operated by the Chicago & Northern Pacific, Chicago, Rock Island & Pacific, Chicago, Milwaukee & St. Paul, Chicago & Eastern Illinois, Illinois Central, Chicago & Northwestern and Chicago, Burlington & Quincy Railroad companies this necessity is very noticeable, and the local telephone company is considering the question of trunking the different exchanges together. With this accomplished, it is but a step to the connection of the branch exchanges in one city with those in another over wires controlled by the railroad companies. How this can best be done can only be decided by trial, and I believe we will have to meet this particular issue at a very early date.

When we consider the rapid growth of the telephone system, it seems a question of only a short time before the telegraph will be largely superseded by the telephone. It has been shown in actual practice in commercial service that messages of 30 words can be read and intelligently transmitted in a quarter of a minute, or 120 words per minute, which is about 3,600 better per hour than the average by Morse, using the Phillips code and the typewriter. The above record is taken from a guaranteed service where the toll service is daily performed on this basis.

The question of the telephone not being able to compete with the telegraph on account of the lack of records was happily answered, you will recollect, by Superintendent Selden in a paper read before this association at the 1894 meeting, and this feeling, I believe, is rapidly passing away.

The despatching of trains by telephone has been tried with perfect success in several instances in this country. This is the most exacting of service, and the fact that it is a success speaks volumes for its efficiency.

It is a well known fact that large corporations are slow in adopting radical changes, but the improvements in telephone apparatus are so marked and the benefits derived from its use so evident, that they are being forced to recognize its merit and consequently are rapidly advancing the movement.

One-half a square inch of piston area per horse power is a common rating for steam engines.

If the girth seams of a tubular boiler leak and chipping and caulking do not stop it, be sure there are no cracks in the plate, or that defective rivets are not the cause of it. If the boiler is sound, the trouble may be caused by unequal contraction of the plates due to the introduction of comparatively cool feed water into the bottom of the boiler. If the location of the feed pipe is changed the leakage may cease without further attention. The water should be discharged into the body of the water already in the boiler, and not on the bottom sheets.

ELECTRIC LIGHT INSPECTION.

The divisional inspector of electric light, Mr. Wm. Johnson, of Belleville, was here several days last week, during which time he has inspected all the electric light meters and also has been looking into the voltage or pressure carried by the company. It will be remembered that the Government fitted up apparatus in the post office building, but to suit the convenience of the Light, Heat and Power Co., the inspection is now done at the premises on William street. Mr. Johnson was not stinted in his praise of the test board and other appliances supplied by the ingenuity of Mr. H. E. Reesor, who, Mr. Johnson says, in the fitting up of these, has shown his ability as an electrical engineer. It has proved fortunate for the users of electric light meters that they have been brought under Government inspection, if they are everywhere as they are here. It must be understood that the company here accepted the meters from the manufacturers as correct and had their guarantee that they were; but, when tested by the Government standards, the majority of them have been found to be too fast, or, in other words, against the consumers. One meter only was found too slow and it was sixteen per cent. that way, while many of them were from seven to nineteen per cent. fast. All the meters in town have now been adjusted or regulated in the inspector's presence and have been sealed by him. The inspector explained to us that the Electric Light Inspection Act requires each company to state to all its customers the rate of voltage at which it will supply the electricity; the company here proposes to do this at a voltage of 104, but the inspector found that the company was furnishing it at from 109 to 112 volts and informed the company that it was liable to a penalty for increasing or diminishing the voltage beyond or under three per cent. of 104 volts. The reason for this provision of the law is that if the voltage is greater than the amount specified it destroys the lamps, or if less than it should be the light is diminished. A number of our citizens visited the Light, Heat and Power Company's office while the inspector was here, and had explained to them the interior of that mystical looking object an electric light meter, also how the meters were tested, and the meaning of some of the technical terms used by the electric light fraternity. Canadian Post, Lindsay, Ont.

The inspection by the Government of all the electric light meters in town was concluded this morning, nearly one hundred and fifty having had the red seal attached to them. The Government regulations give the electric light companies until the first of next June to have all their meters tested, after which it will be unlawful for them to use any other. A penalty of \$25 is to be inflicted after that date on any company or person who uses a meter which has not been inspected and stamped.

The Peterborough Light and Power Co. has done a popular thing in having its meters tested at once, and in this way again has given evidence of how well it keeps its finger on the public pulse, and have met the universal clamor for inspected meters.

The inspector, Mr. Wm. Johnston, informs the REVIEW that of the hundred and fifty meters tested, about a dozen were incorrect, six were 5 p. c., a couple 8 p. c., and two 12 p. c. too fast, or in favor of the company, while one, where the customer uses ten lights, had not registered but a small percentage of the energy, owing to part of the gearing having got wrong, the customer's bill for last quarter having been only \$1.80. These cases, however, prove the value of the inspection. By a strange "irony of fate" the two meters that were twelve per cent. too quick were in the residences of two of the officers of the company.

Mr. Johnston also says that the work of inspection, which it was first intended should be done at the gas inspector's office in the Custom House, was accomplished much more quickly at the offices of the Light and Power Company where through the ingenuity of Mr. Fisk, the company's clever electrician, facilities were provided.--The Daily Review, Peterborough, Ont.

If the guides on an engine are made separate from the frame, they may be taken off and planed when they need it, but if they are cast with the frame this cannot be done.

For lubricating pump rods, a very good mixture is made from tallow, cylinder oil and plumbago; and if the water is warm, it is better to add a little beeswax. This, mixed with the fibers of the rod packing, will greatly improve the ease of running and will keep the rod in good condition; and, in fact, this and good waste may be used to replace expensive packing if the waste is properly laid up.