course would require the electrification of the road at both ends of the tunnel. I think the roads should begin in this way and after their experience had gone far enough they should extend the electrification as far as they can see their way clear, and perhaps it will be long before our lines are electrified for long enough distances to produce some real economy. We may within a short time if the railroad companies are left to themselves, and allowed to proceed in the economical way, see the New Haven lines electrified to Providence and perhaps all the way to New York. I think this would be better than requiring first the electrification of a lot of little stub ends. So, if the problem is left alone, it will take care of itself, and the revolution will be according to economic laws.

I have described to you the condition of things and the status of the question as it presented itself to us. The matter is still before the Legislature. I do not know what they will do. They may pass some compulsory legislation, but I sincerely hope that they will see that it is not in the real public interest to do so. I believe the majority of thoughtful and well informed people realize that it is not in the true interest of the public to place undue burdens upon the carriers, but that they should be allowed to work this problem out themselves.

A WELL EQUIPPED CLEARANCE CAR

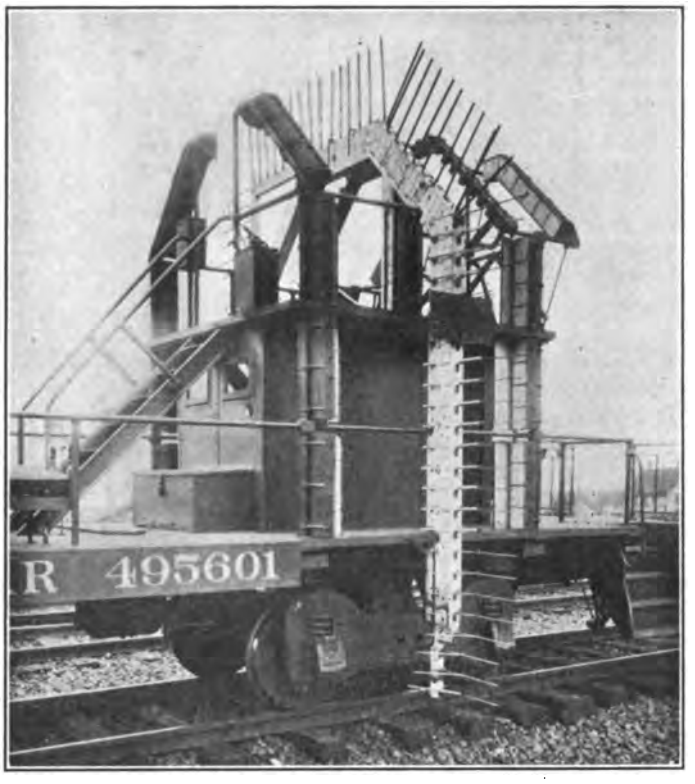
A new clearance car has just been placed in service on the Pennsylvania Railroad Lines East of Pittsburgh and Erie. This car was designed in the office of the Engineer of Maintenance of Way and built at the company's Altoona shops and is being run over every division as rapidly as possible in order to secure correct measurements of the distances from the track to projecting portions of station buildings, tunnels, bridges and other objects. It is also designed to indicate automatically while moving on curves the elevation of the rails and the degree of curvature.

The car, which is 54 feet 8¾ inches long over ail, and 30 feet between truck centers, is built entirely of steel, and is equipped with air brakes, steam fittings and electric lights. The main floor is 4 feet 5¼ inches above the top of the rail and at the front end of the car where the templets are located is a second floor at an elevation of 9 feet 8 inches above the top of the rail. Both floors are for use in taking measurements from the templets. The second floor is reached by steel stairways on each side of the main templet. All measurements are taken at the center of the car truck, from which clearances are computed. The main templet, which is erected directly over the center of the truck, has a width of 10 feet between elevations at 2 feet and 12 feet above top of rail, exclusive of the fingers or feelers attached to the sides. From an elevation of 12 feet above top of rail, the templet recedes towards the middle of the car at an angle of 45 degrees, reducing the width of the templet to 4 feet at the top, at an elevation of 15 feet above top of rail.

Immediately in front of the main templet is constructed an auxiliary templet, designed to measure overhead bridges, tunnels and other objects between elevations 17 feet and 20 feet above top of rail. This auxiliary templet has the same dimensions as that part of the main templet between elevations 12 feet and 15 feet. It is supported on a center shaft enclosed in an upright cylinder and is capable of being raised to a height of 18 feet by a crank and ratchet arrangement on the floor of the car. Enclosed in steel cylindrical boxes with translucent glass fronts facing the templets is a series of electric lights which extend from the floor of the car on each side thereof to a height of 15 feet above top of rail. The well diffused light thus obtained makes it possible to take measurements both day and night, as well as in dark tunnels.

The fingers or feelers attached to the sides and the top of the templets are two feet long and are spaced six inches apart. They are hinged to the templets and held in the different positions by friction. Attached to the feelers and the side of the templet are graduated scales which indicate automatically the distance from the rim of the templet to a side or overhead object. In addition, a small board equipped with a set of feelers spaced one inch apart has been provided to measure cornices of roofs of shelter sheds, or other irregular objects close to the track. This board is detachable and can be fastened to the side of the templet at any point desired. As the car passes over a curve, an attachment on the rear truck indicates the degree of curvature on a scale inside of a cabinet which has been erected in the middle of the car. In this cabinet is also an instrument consisting of a long pendulum suspended vertically which indicates automatically the elevation of one rail of the track over the other. The side of this cabinet facing the main templet has been provided with a plate glass window, which enables the operator of the car to read the degree of curvature, or the elevation of the rail at any time.

With all of the attachments working automatically, it is possible to take clearance measurements while the car is running



CLEARANCE CAR OF THE PENNSYLVANIA R. R.

at a speed of four miles per hour; this is necessary at times in order to keep out of the way of regular trains. Though two men can operate the new clearance car, one taking the readings of the scales and the other recording them, where clearances are close and irregular it requires the services of three men.

THE CASE FOR THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY in its appeal to the commonwealth for additional aid may be briefly and simply stated. It receives from every student a tuition fee of $250 a year; it expends $470 a year upon the education of each student. The school receives from the State of Massachusetts at the present time $25,000 a year toward the maintenance. It is the recipient also of interest upon certain endowment funds. But it would still show an annual deficit were it not for voluntary contributions from its alumni and friends. An agreed sum annually from the former has helped the school to tide over financial stringency in the last few years. This agreement is about to expire by limitation. Over and above all this, the school is confronted with the necessity of moving into larger and better quarters. Eight hundred students from Massachusetts alone are enrolled. Figured at the per capita loss mentioned above, the net cost of these students to the school is $176,000 per annum. The president and corporation of the institute feel that it is not asking too much of the commonwealth to contribute less than two-thirds of this amount yearly in consideration of the benefits accruing to its citizenship.