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THE DELAY IN THE PUBLICATION OF THE PATENT OFFICE GAZETTE AND OF COPIES OF PATENTS.

The *Patent Office Gazette*, as published during recent years, has fairly ranked as a model for the world. In its printing, illustrating, perfect and complete indexing and general character it has excelled both in typography and in clerical accuracy. When it is considered that each week the claims of some 500 patents had to be printed within its pages, with illustrations of very many of them, it will be seen that the work of doing this satisfactorily and up to date was no slight one. It is questionable if the government received better service from any of its contractors or employees than from those concerned in the publication of the *Gazette*. Incidental to its publication was the printing of half a million full copies of the patents of the week and the photolithographic reproduction of the drawings for them. The amount of the most difficult kind of supervision and proof reading involved in all this work was very great, and the expensive adequate plant for doing the mechanical work had to be supplemented by trained employees at high salaries. Recently, as our readers know, a change has taken place in the administration of the Patent Office, a new commissioner has been appointed, and for some reason the work of printing has been given to some other printer. Apparently this has been done without making proper arrangements for satisfactorily doing the work on time. Consequently, we find the production of the *Gazette*, the production of the copies of patents and drawings, all are delayed, and complaints about the matter are pouring into the Patent Office from all quarters. This is not creditable to the new administration of the Patent Office, and we hope a remedy will be applied quickly.

There is nothing to be said about the expediency of changing the printer, but there is a great deal to be said about the inexpediency of making the change before sure and adequate facilities had been provided for effectively keeping up the work.

AMERICAN ARMOR PLATE.

It was shown at the Indian Head proving grounds, July 11, that the United States apparently leads the world in the manufacture of the strongest armor plates. There were two plates tested, which were to be attacked by three projectiles each. The first test, besides determining whether the 250 tons of armor plate should be accepted, also determined whether the makers should receive \$30 a ton in addition to the contract price of \$575 a ton. The first plate tested was a 9 inch nickel steel plate weighing 10 tons. The plate was 6½ feet wide by 9½ feet long, and was made by the Carnegie-Frick Company. Three Holtzer projectiles weighing 250 pounds each were fired from an 8 inch rifle, the muzzle being 68 feet from the target. The results of the three tests were as follows:

1. Velocity 1,400 feet per second, penetrated plate and backing to a depth of 11.7 inches. 2. Velocity 1,688 feet, penetrated plate and 3 feet of oak backing; was lost in earth behind. 3. Velocity 1,536 feet, penetrated plate and backing to a depth of 14½ inches. No cracks were perceptible in the plate, which met all the requirements for acceptance without premium, as the second shot lost the makers the premium.

The second plate was made by the Bethlehem Company, and was also made of nickel steel. It was 8½ feet high by 12 feet 1 inch in length, and was 17 inches thick. The plate weighed 31½ tons. A 12 inch rifle was used at a distance of 319 feet, and threw Carpenter shells weighing 850 pounds. The result of the tests was as follows: 1. Velocity 1,322 feet per second, penetrated 16½ inches. 2. Velocity 1,495 feet, penetrated plate and 3 inches of backing. 3. Velocity 1,858 feet, plate penetrated as well as 86 inches of backing, the embankment, and disappeared beyond, either in the woods or the river. The plate secured the acceptance of the contract lot of 500 to 700 tons, but earned no premium. The projectiles acted admirably, and were hardly injured. Captain Ord Brown, of the English Ordnance, was surprised to find no cracks in the large barbettes plate. Commodore Sampson said: "The tests to-day demonstrate that the United States makes the best armor in the world, and makes it cheaper than other nations are able to produce it. We pay for the addition of nickel to the steel plate half a cent a pound, or \$11.20 a ton, while the French government pays \$140 for the addition of nickel to the steel plates."

PROTECTIVE DEVICES ON STREET RAILROADS.

The story of George Stephenson and his famous answer as to the effect which would be produced upon a cow getting in front of a locomotive, aptly voiced an objection to rapid transit which its promoters have always met. The danger to people and animals, either by running over or into them, and the frightening of horses, have been repeatedly brought forward as objections to the use of improved systems of rapid transit. Vested rights in highways have been cited over and over again in opposition to the crossing of the same by steam railroads. In England, famous for its maintenance of personal rights, grade crossings are

not admitted, and the integrity of the highway is religiously preserved.

In the United States prescriptive rights seem to have taken less hold upon the people. All sorts of trespasses upon public property are permitted. The subject of improvement of roads and city streets has no sooner been made an issue, macadamized roads no sooner begin to traverse country regions, than streets and roads alike are surrendered to rapid transit companies. All this is done, whether mistakenly or otherwise, with the virtual consent and in furtherance of the views and wishes of the majority. The minority seem to be the sufferers. It is in vested and prescriptive rights that the latter find their protection. With the loss of such rights the battle of the minority is lost.

The immense power of the electric trolley system in concentrating force at any desired point upon a line of many miles in length has brought about new conditions of city as well as country transit. A small motor underneath a car is the only mechanism required to develop a high mechanical horse power. An electric street car may run on a down grade with little or no absorption of energy, but it possesses the capability of converting a very large amount of electrical into mechanical energy. On an emergency it can absorb and utilize a surprisingly high horse power.

The consequence of this is shown in several ways. Grades virtually insurmountable by steam roads are climbed by the trolley car with almost undiminished speed. In an instant the motive power can be raised to its highest pitch, as the car passes from a level to a steep ascent. The other consequence appears in the carrying of great loads at undiminished speed. The crowding of passengers into the car increases its tractive power. The motor takes the requisite energy demanded by the increased strain without trouble.

The presence in crowded streets of abnormally heavy cars, moving at full speed, has had the natural consequences. A number of deaths and minor accidents have been chronicled. Within a few days several deaths have occurred in Brooklyn by the trolley cars. A steam railroad is provided with the most elaborate safety appliances. Gates protect grade crossings, the block system is used to prevent collisions, yet accidents constantly occur. The trolley cars, too heavy to admit of adequate control, run without protection through crowded streets. It would seem that invention should find in them a field for humanitarian work.

A car carrying perhaps eleven or twelve thousand pounds of humanity is driven at the regular running speed by the electric current. It can be almost instantly started. The same form of energy can be applied to stopping it. Electric and electro-magnetic brakes without number have been invented. It would seem as if some way of stopping such a car for an "emergency stop," within a few feet, might save many lives. The motorman may have but a fraction of a second in which to stop his car or to prevent it from striking a human being. A proper electric brake might enable him to work thus quickly. Electricity has the potentiality of doing this. In the system of series arrangement of cars, now little used, the motor itself could act as an efficient brake, by converting the mechanical energy of the moving car into the current form of electrical energy, which again helped to drive the other cars. This interesting feature is lost in the parallel connections of the usual system. The reversing of the present motor, however, is in the line of work suggested, and the motor then appears as a brake in itself. The subjective aspect of the case would call for some method of instantly doing this, without the delay incident to the movement of heavy switches.

Many appliances have been invented for preventing people from getting under the wheels. A successful guard or cowcatcher, which would be thoroughly operative and practical, which would not require too much room, and which would save life with some approach to certainty, seems to be a need. It might be so arranged as to be thrown into use only when required. The transit companies would certainly welcome any invention of this character which would be the thing needed. It seems as if it yet was not invented, in spite of the many patents taken out. If this is the correct view, the inventor of the successful appliance should reap a rich harvest. The field is still open. In the interests of human life it is to be hoped that it will not be long so.

It is satisfactory to learn that the gentlemen who have urged the New York botanical garden project are nearly now in a condition financially able to begin actual preliminary work near the Bronx River. At least the sum of \$215,000 has been received. There are several large subscriptions yet expected from wealthy citizens, and when these are received it is probable the general public will be asked to contribute. There will be no pains or expense spared to make the garden worthy of the State and of the nation. Kew Garden is the model which the far-seeing men who have undertaken the charge of this enterprise have in view, and there is every reason to believe that their efforts will be crowned with success.