

THE FIRELESS RAILWAY SYSTEM IN ENGLAND.

We publish herewith engravings of a new form of fireless car, the design of an engineer named Todd. It is a "dummy," or combined car and locomotive; it is styled the Harmless, and is constructed thus: There is a main lower frame 22 feet 6 inches long over the buffers, 7 feet wide over all, and 3 feet high from the rail to the top; and on this frame is placed the 14 feet body of an ordinary car. In the center of the frame are two receivers, each containing 30 cubic feet of water. Below the buffer beams are screw couplings and stop valves with perforated pipes running right through the receivers. The wheels are 24 inches diameter, placed 4 feet 6 inches between centers. Cylinders, 9 inches diameter and 8 inches stroke, surrounded with large jackets open to the water of the receivers. At each end of the car, outside the dash plate, is placed a brake handle, and on either side of this a regulator and reversing handle, all arranged as shown. These latter handles fit into spring sockets, so as to be changed from one end to the other, principally to prevent any one from behind moving the car. There are four sand boxes, with handles brought to the foot boards. There are two exhaust pipes, the end of each projecting slightly upwards from the edges of the curtains over the foot boards; and by a cock the waste steam is turned into whichever pipe happens for the time to be at the following end of the car. All the working motion is quite protected from dirt by light boxes which have hinged doors at the sides.

The inventor proposes to start the engine on its journey with an initial pressure of 200 lbs. to the inch; and the Engineer states that, owing to the jacketing of the cylinders, the loss by radiation will not exceed 5 lbs. pressure per hour, allowing the engine to run 40 miles on level lines at one charging of the boiler. This is rather a large idea of the capabilities of the system; and we hope that it may be realized.

Fig. 1 is a transverse section of the car, showing the boiler and steam dome, and the position of the engine; Fig. 2 is a longitudinal section of the same; and Fig. 3 is an exterior elevation, also showing the stationary boiler from which the apparatus is charged.

Lightning.

There are indications that we may anticipate severe electrical disturbances during the coming summer. The winter has been unusually long and severe. Abnormal weather has occurred over most parts of the globe. Reports of severe thunderstorms reach us from the Cape and the antipodes. Exceptional conditions of this kind abroad usually presage similar conditions in England. "Coming events cast their shadows before." But whether the coming summer be above or below the average, we are bound to call attention to the fearful apathy and gross carelessness evinced in not protecting buildings from atmospheric electrical discharges.

During two severe storms in England, in June, 1872, there were ten deaths and fifteen cases of injury to human beings; sixty houses struck, and fifteen burnt down; and twenty-three horses and cattle, and ninety-nine

sheep, killed. Those accidents that are not recorded are innumerable. In large towns damage to property is more frequent than destruction of human life; but in the open coun-

try, destruction of life is perhaps more frequent than destruction of property, unless we except trees, which are ruined in thousands every year, and unfortunately—from their size and growth—the finest suffer.

Lightning protection is therefore not only a necessity, but it is a source of satisfaction and comfort. It is difficult to comprehend the reasons why it is not more largely adopted. It is not its inutility—for the beneficial effect of lightning conductors among our buildings and our shipping is incontestable. It is not its expense—for a house can be protected for a less sum of money than is required to bed out a parterre. It is not its difficulty—for any skilled workman or energetic landlord can do it with ease.

Dr. Mann, the President of the Meteorological Society, has done good service in reading an exhaustive and able paper on the subject before the Society of Arts, and an admirable notice of it was given in the *London Times*. Dr. Mann has supplemented this notice with an excellent letter to the leading journal on the precautions to be taken, especially with the tall zinc tubes now so largely used for chimney tops. Mr. Preece had previously called attention, in the *Times*, to the danger of chimneys, lined as they are with soot, filled with ascending currents of heated air and smoke, and terminated in grates, acting as lightning conductors. If all such chimney pots be connected with the water pipes by galvanized iron ropes, and if all these pipes make good earth (that is to say, have a large metallic surface in contact with the earth), a house is as safe from lightning as a collier in a mine.

All lightning protectors should be constructed on proper scientific principles, and we have published in our columns many valuable papers on the subject. The great desiderata to be urged are the employment of perfectly continuous metallic ropes or rods, the use of good earths, and the termination of the conductors in the air in points. A great fact to be remembered is that joints, and earths, and points deteriorate, and lose their efficiency; they therefore require frequent examination and frequent renewal. Lightning conductors require annual inspection and a careful overhauling. It is needless to point out to telegraphists the necessity of a

good earths, for they all know that their circuits are unworkable without them; but it is lamentable to see the condition of the earths to the lightning protectors of the steeples of some of our cathedrals and churches. The splendid new spire of Llandaff cathedral is positively in a dangerous condition from this cause. Nine out of every ten churches are in the same condition. Earth wires are plunged into the interior of cisterns; they are leaded into stones; they are bedded in dry sand. One was carefully put into a glass bottle buried in the dry earth; another was coiled carefully into the interior of a wooden pail, in the basement floor of the house it was meant to protect. Every case of the inefficiency of lightning protectors that has been examined has been proved to be due to gross ignorance of the principles of electrical science.—*Telegraphic Journal*.

Fig. 1.

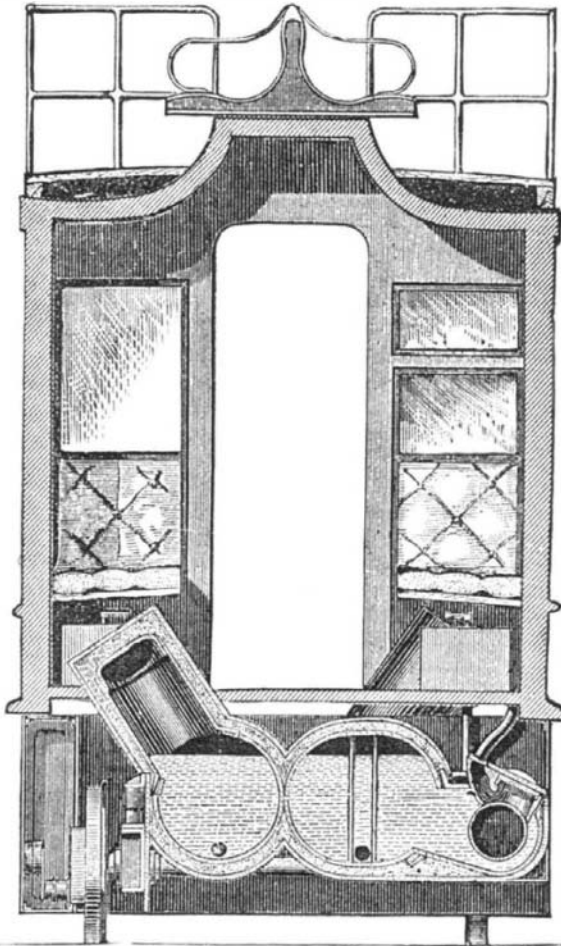


Fig. 2.

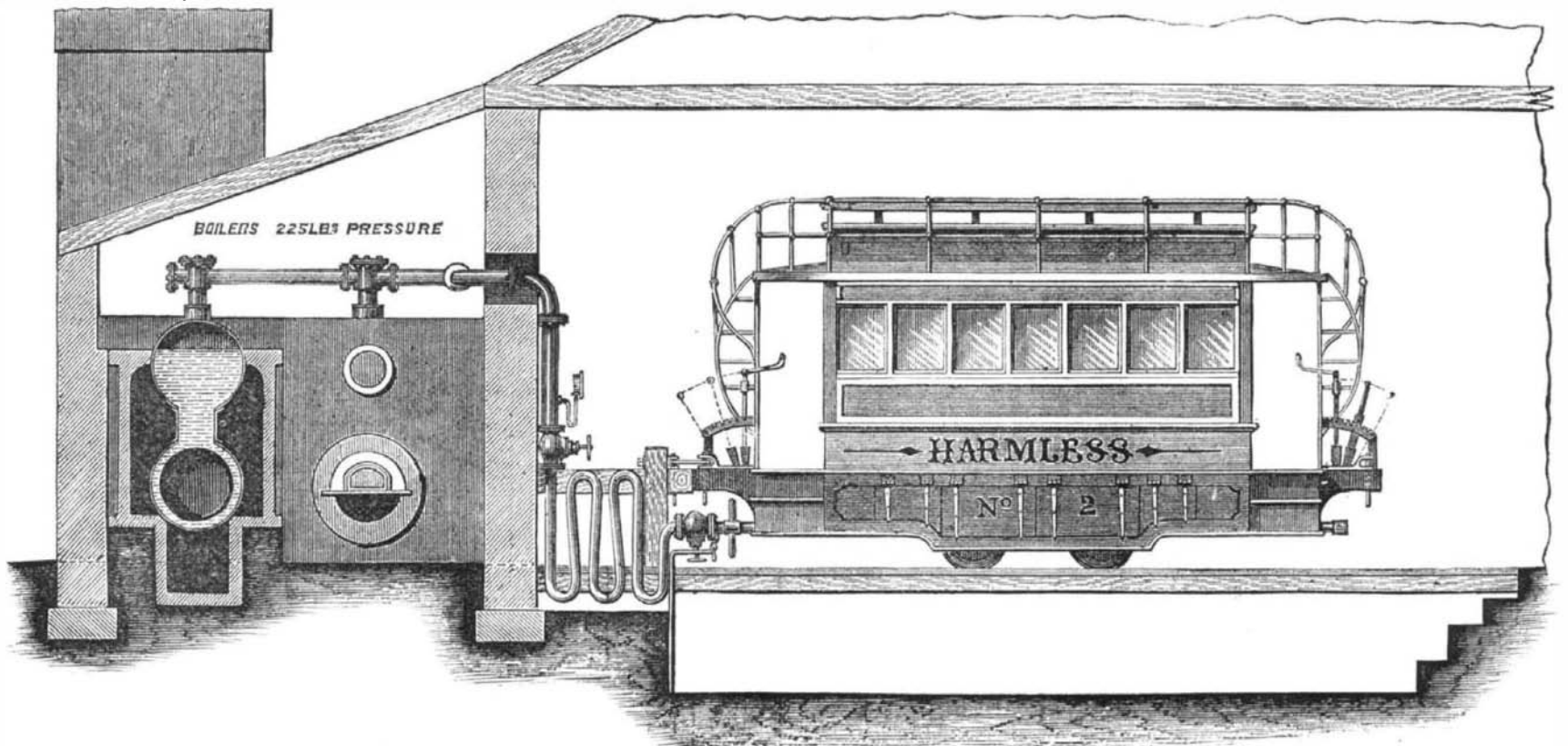
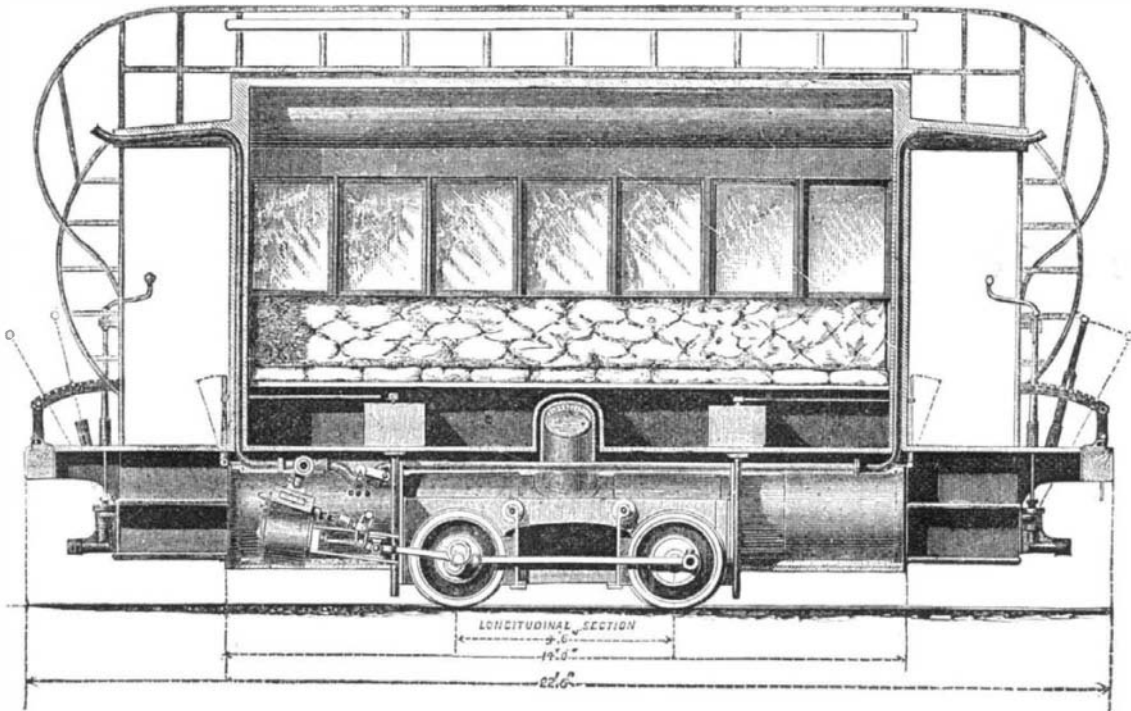


Fig. 3.—TODD'S FIRELESS STEAM CAR SYSTEM.