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SCIENTIFIC AMERICAN SUPPLEMENT

No. 588,

For the Week Ending April 9, 1887.

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CAR LIGHTING BY ELECTRICITY.

The regular Boston "special," on the Boston and Albany Railroad, was, last week, lighted by electricity and heated by steam—an arrangement which adds much to the comfort of passengers and removes altogether the danger from fire, always imminent in trains lighted and heated in the old way. The use of incandescence lighting on railway trains is not novel, nor is steam for heating. The Pennsylvania and other railroads long ago used this system of lighting on some of their special trains, and steam has been used for heating cars and other conveyances for years. But, up to the present time, no system of electrically lighting trains has proved satisfactory from a practical standpoint, and if that now adopted on the Boston "special" fulfills its promise, a really important advance will have been made in applied science.

In the system in use, electrical accumulators, commonly called "storage" batteries, are placed under the cars, and these having previously been charged from a dynamo-electric machine, while the train was lying in the depot, give out electrical energy as required. In this particular case, there are sixty cells to each car, and these, it is said, are good for the round trip between Boston and New York, thus necessitating the maintenance of only one electrical station.

In every car there are twenty incandescence lamps, each of sixteen candle power, this being equal in intensity to a five foot gas burner. As these lights glow in a vacuum without combustion, there is no danger of their setting anything afire in case of accident. Indeed, the entrance of oxygen through the breaking of a globe puts an instant end to the life of the lamp.

It is not at all likely that, even should the system now in use on the Boston "special" realize all that is promised for it, it would come to be generally adopted on the railway. It is too expensive. But, if it succeed in this instance, it will, no doubt, be used on many, if not all, similar trains, to wit, special trains on which an extra rate is charged for speedy and comfortable travel.

It should not, however, be forgotten by those who are interested in this subject that other and equally important experiments are now making, looking to the electrical lighting of trains by various and, it is said, cheaper means than that afforded by the movable accumulator. In one of these a small electrical generator is placed under each car, and this, being coupled up with the car axles, continually charges an accumulator, the same performing the two important offices of steadying the lights and furnishing the required energy to keep them aglow when the train stops. In another and still more economical system, a dynamo-electric machine is affixed to the locomotive and driven by a small auxiliary engine, connected by wire with the incandescence lamps in the cars. Then we have the system, now under active experimentation, of making small dynamos, affixed to the axles of each car, supply electrical energy directly to the lamps. This is, undoubtedly, the least costly and troublesome, and, consequently, the most promising system of all, provided, of course, that it can be made to work with certainty. At the first look, the fact that the lights go out whenever the train stops would seem to make the system impracticable. Careful examination, however, gives this defect a less serious aspect. Special trains—and the system is not adapted for any others—stop rarely, and only at principal stations, which are always well lighted, and the promoters of this system say that the reflection of the strong light from the station is quite sufficient for the illumination of the train during the few moments of stoppage. Where the large voltaic arc electric lights are used at the railway stations, as they are at many points on the New York Central, for instance, this assertion is certainly borne out by the fact.

Looking at the various systems of electrically lighting trains which are here enumerated, we should say that that which is most certain in its working is likely to be the most popular, regardless of relative expense. If this can only be said of the system which is now being used on the Boston "special," then the fact that the electrical batteries must be taken out and put back again once a day is of little importance. But if one of these other systems which require no such multiplicity of manipulation should prove to be quite as reliable, the question would resolve itself into one of dollars and cents, and the choice between them would then be clearly in favor of the latter.

HEATING OF RAILWAY CARS BY STEAM.

An interesting practical article upon "Improved Methods of Heating Railway Trains" will be found in this week's SUPPLEMENT, by Mr. E. Powell Karr, C.E. The writer has reasoned *a posteriori*, *i. e.*, from the record of facts, as shown by the experiments with the Martin system upon the Milwaukee and St. Paul and other roads, rather than from a theory of cause as to what the effect ought to be; and the conclusions reached are, therefore, valuable and available as to the best course to be pursued in designing steam heating apparatus for railway trains.

The ordinary formulas in use for determining the velocity of flow and quantity of discharge of steam are too empirical, and lead generally to results which are absurd in the light of current practice.

The fundamental principle announced in the paper, that the velocity of flow is due to the rapidity of condensation and to no other cause, wonderfully simplifies the entire problem. The late esteemed mechanician, Robert Briggs, seems to have been fully conscious of this principle, but made no use of it in his valuable discussion of the question.

The unmodified formulas of Wiesbach and others refer more particularly to the flow of air and saturated steam, but for dry steam, such as that taken from the dome, the resistances to be overcome, although considerable, are greatly modified and lessened. The paper calls attention indirectly to our lack of knowledge upon the subject of the loss of heat by the impact of cold air upon the surface of a moving object, and the solution of the question offers a wide field of original research to the physicist and the engineer. Its solution is of the widest practical value.

The important practical features of the paper are the tabulated results, the precautions which must be taken to insure success, and the neutral ground pointed out between excessive pressure, with reduction of weight of piping, on the one hand and the minimum of pressure, with excess of weight of piping, on the other.

The condensation called for by the calculations so closely approximates the recorded amount of condensation under circumstances so similar that the result is an invaluable confirmative aid to future investigations.

Lucky Buyers of Inventions.

The life dream of a Lowell lady has been that the number 272,751 was to be her lucky number. Some years ago she invested a small amount of money in letters patent bearing the favorite number 272,751. She claims the purchase was made to assist the inventor, who lost his health in the late war, rather than for her own speculation, notwithstanding her belief in the number. After years of patient waiting she has been assured by some of the best judges in the State that she had chosen a lucky number, as it appears to-day that the goods which this patent covers are of considerable value. A Pennsylvania manufacturer tells a story of the inventor of a multiple of rolls or trucks used under the bottom of railroad cars between the truck frame and the body of the car. The inventor became pressed for funds and desired a loan of $100, assigning his patent as security. Out of sympathy, the manufacturer gave him the money, never expecting, as he says, to ever get a dime of it back, and threw the patent papers aside in his safe, where they lay undisturbed for ten years. One day a lawyer of his acquaintance called at his office and inquired if he ever bought a patent on friction rolls for a railroad car. After reflecting a moment, he told him that about ten years before he had loaned an inventor some money on a car patent, but he didn't ever expect to hear from it again. The lawyer told him that this patent was being used on almost every car now being built, and a large revenue could be collected. Terms were soon negotiated for collecting evidence of infringement; so that the loaning of $100 to help out the distressed inventor brought him more money than all his other business.—*Boston Journal.*

The money paid for patents which have remained dormant in the hands of the inventor for a long time after their issue is in the aggregate very large. Incidents similar to those related above come to our knowledge very often, where parties have received quite handsome sums for their patents after several years' waiting, when all hope of realizing anything from them had departed.

Upon referring to our file of Patent Office reports we find the patent referred to as the lucky number 272,751 was for a window blind support, a small invention, but seemingly a good contrivance, the merit of which had undoubtedly more to do with the woman's success than her dream.—ED.

Hindoo's Mode of Reaping and Cleaning Grain.

The *Milling World* tells its readers how the Hindoo reaps with an iron blade, six inches long, an inch wide, and curved like a sickle, costing him four cents. He squats on his heels, cuts a handful, lays it down, and without rising off his heels waddles forward and cuts another. In twelve days he cuts an acre, and receives five cents a day, boarding himself. When he wants to thrash his grain, he drives a stake in the ground, spreads his grain around it, ties a rope to his bull's horns and then to the stake, and drives them around and around till the straw is tramped very fine into what they call "bhoosa." This is fed to the cattle after the wheat is separated. Englishmen have introduced thrashing machines, but the Hindoos will have none of them. They think their cattle would not eat the straw because it breaks it instead of tramping it flat. They clean their wheat by holding it up in the wind in a scoop made of reeds, or, if the wind is not blowing, two Hindoos make wind by waving a blanket, while a third dribbles the grain from the scoop.