WALKING ON THE CEILING HEAD DOWN.

A performance of considerable scientific interest has been produced in this and other cities which is presented in the illustrations accompanying this article.* In order to procure a perfectly smooth surface to walk on, a board twenty-four and one-half feet long is suspended from the ceiling, and near one end of this is a trapeze. The lower surface of the board is painted, and is smooth and polished. The performer, who is known as Aimee, the human fly, is equipped with pneumatic attachments to the soles of her shoes. Sitting in the trapeze with her face to the audience, she draws herself upward by the arms and raises her feet until they press against the board. They adhere by atmospheric pressure. She leaves the trapeze, and hangs head downward, as shown. Taking very short steps, not over eight inches in length, she gradually walks the length of the board backward. She then slowly turns round, taking very short steps while turning, and eventually returns, still walking backward. This closes the performance.

To provide against accident a net is stretched under the board. The performer has frequently fallen, but so far no serious accident has happened. There is a certain art in managing the fall, as, if the shock were received directly by the spinal column, it might be very severe.

The attachment to the shoe is in general terms an India rubber sucker with cup-shaped adhering surface. It is a disk 4½ inches in diameter and ⅝ inch thick. To its center a stud is attached, which is perforated near the end. This stud enters a socket fastened to the sole of the shoe. The socket is also perforated transversely. A pin is passed through the apertures, securing the hold between socket and disk. The socket is under the instep and is attached to the shank of the shoe sole.

A wire loop that extends forward under the toe of the shoe is pivoted on two studs which are secured on each end of the transverse central diameter of the disk. This loop is normally held away from the disk and pressing against the shoe sole by a spring. One end of the loop projects back toward and over the rear edge of the disk. A short piece of string is secured to the India rubber and passes through a hole in the extension or rearwardly projecting arm of the loop. The disk when pressed against a smooth surface is held fast by the pressure of the atmosphere. If now the loop is pressed toward the surface to which it adheres, the string will be drawn tight and will pull the edge of the India rubber away from the board. Air will rush in, and the adhesion will cease. As each new step is taken, one disk is made to adhere by pressure, and the other is detached by the action just described.

The power of the disk to sustain the weight of a performer may be easily calculated.

Each sucker is 4½ inches in diameter, and contains therefore 16 square inches of surface. The full atmospheric pressure for the area would amount to 240 pounds. The stud and socket attachment provides a central bearing, so that the full advantage of this and of the disk is obtained, and a fairly perfect vacuum procured. As the performer only weighs about 125 pounds, there is about 115 pounds to spare with a perfect vacuum.

Electrified Wax.

Some curious electrical phenomena were lately observed (according to a writer in the *Chemische Zeitung*) in a stearin and ceresin manufactory in Italy. One evening four vats of white ceresin (which is a paraffin got from ozokerit), containing about 500 kg. each, were being stirred to cool. When the point of solidification was nearly reached, the electric light of the place accidentally went out; and, to the surprise and alarm of the rather ignorant workmen, the mass of ceresin was observed to give pale sparks on the slightest motion. If the hand was brought near, loud sparks nearly two inches long were obtained. The phenomenon lasted over half an hour.

AN ELECTRIC TRAP.

Our illustration shows a novel application of the idea of execution by electricity, by means of which it is designed to put a speedy end to rodents and all manner of noxious crawling and flying creatures. This electric trap forms the subject of an American patent recently issued to Mr. F. Scherer, a resident of Paris, France. Any suitable lure or bait is located within the cage, behind a grid composed of metal rods or

AN ELECTRIC TRAP.

wires, arranged side by side to form the positive and negative wires of the circuit. When the rat or other foredoomed victim, seeking the bait, comes in contact with the wires of the grid, the circuit is thereby closed. Of course, the current must be strong enough to produce a fatal shock, or the invention would not succeed as an electric trap.

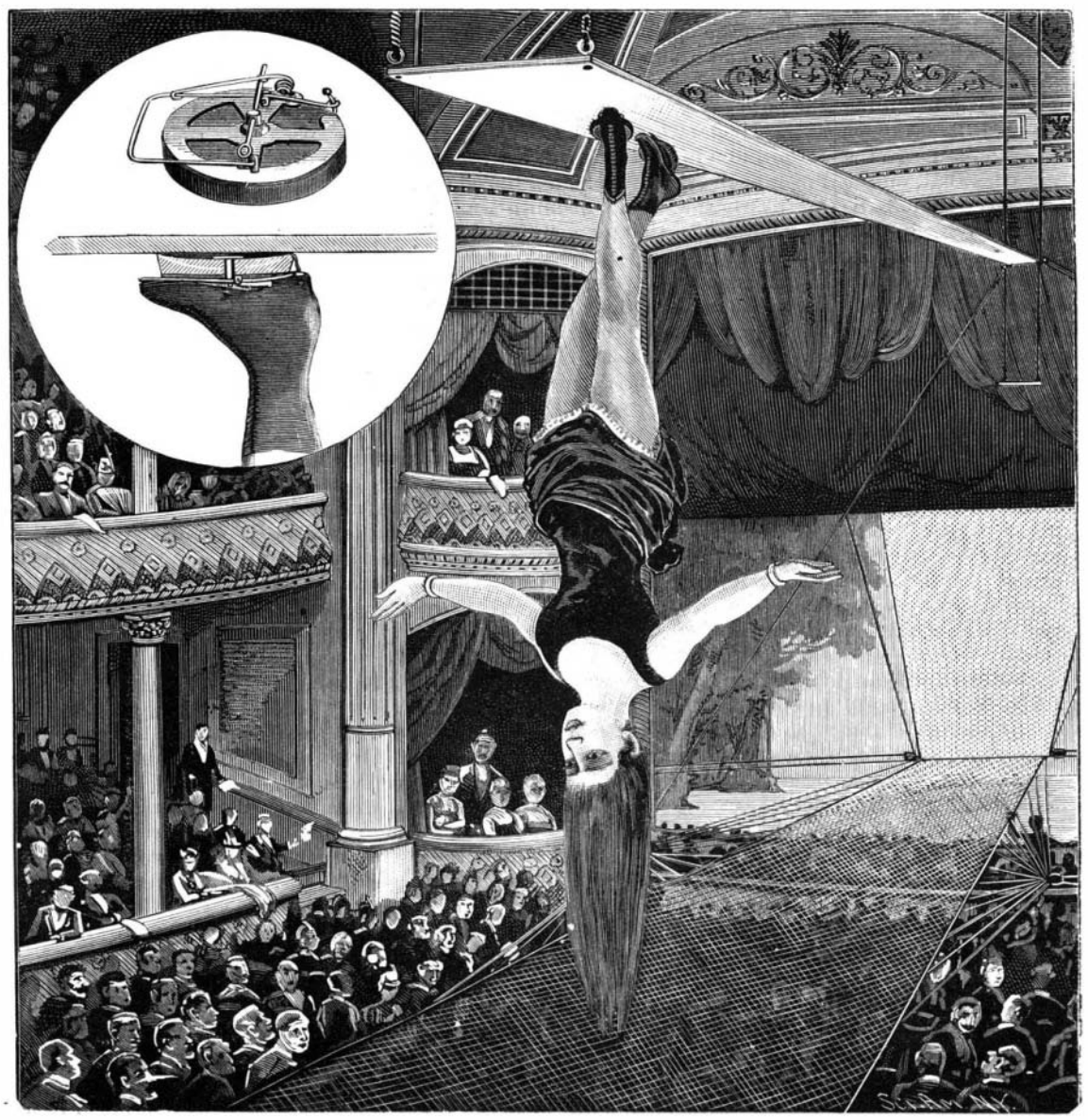
Steel Railway Ties.

The most startling piece of railroad legislation yet proposed the nation owes to that new State, Dakota. Representative Gifford, of Dakota, lately introduced in Congress a bill providing that all railroad companies shall in future substitute a homogeneous steel cross tie instead of wood, under a penalty of $1.50 for every wooden tie used five years after the passage of the act. The bill authorizes the president to appoint three persons to investigate patented metal cross ties to determine upon three of the best ties to be used. "The cost of the steel tie shall not exceed $1.50 each, and they must be so constructed as to keep the track in line and prevent the rails from spreading." The bill appropriates $75,000 for the expenses of the commissioners. We do not know of any homogeneous steel cross tie offered in this country at $1.50, but if one that can be used is made at that price by any of Mr. Gifford's constituents, they had better advertise it. They will probably be able to sell it without the help of the government. Even with the help of the government they will have a hard time getting it introduced in the place of all wooden ties within five years, unless the government undertakes to pay the cost. At a very moderate estimate these ties would cost in place as much as the entire gross earnings of the railroads of the United States for 1888, say $951,000,000. There is still another difficulty in the case. Steel ties for all the railroads of the country would take about 25,000,000 tons of steel. In the latest edition of Mr. Swank's "Directory of Iron and Steel Works," the annual capacity of the Bessemer and open-hearth furnaces of the United States is estimated at 6,800,000 tons. So if Mr. Gifford's bill passes, we shall be bothered to get steel for other uses. But perhaps it will not pass.—*Railroad Gazette.*

Fibrous Roots.

At the recent meeting of the American Association of Nurserymen, New York, Mr. Thomas Meehan said that it had been fifty years since he wrote his first article for a horticultural paper, and it seemed to him, although horticulture had made rapid advances in all of those years, that it had not progressed as far on the scientific side as it ought to have done. As a practical example of some scientific truths, upon which good practice is based, he instanced the fact that fibrous roots live only a year. They do their work and then die. Where there are a hundred small roots now about a young tree, there will be in a few years only a few large ones radiating from it, like railroads on a map. These big roots alone have the strength to send out fibers, and the root is of no value to the tree until new white fibers are growing. Therefore, it may be that a mass of fibrous roots in a tree for transplanting is injurious. They are weak, they have no vital power to put out rootlets, and they may keep the soil from contact with the big roots, which, therefore, do not find the proper medium in which to throw out feeding roots.

Another fact which observation teaches is that roots die in exact proportion to the amount of tops that are cut off. If a tree is pollarded, nine-tenths of the roots may die and then invite a fungus which spreads to the living roots. It is said that the branches which sprout from these pollards grow strongly because the roots are stronger below them, but in fact they grow from the food stored up in the trunk, just as shoots three or four feet long often grow out of logs which lie by the wayside. Generally, pollarded trees die after this operation has been frequently performed. Look, for example, at an Osage orange hedge. If one of the trees at the end is allowed to grow it will make a trunk as big as a man's body in twenty years, while the hedge plants of the same age, their vital power being weakened by constant cutting, are no larger than a man's wrist. Of course all pruning is not to be condemned, although it does weaken the vital power of the plant. We prune for other purposes than to make long-lived trees.



* In the performance in question, the performer ascends to the top of the audience hall and walks on the ceiling head down, like a fly. The effect is very startling, and the ease with which it is apparently done is marvelous.

IN the Post Office appropriation bill lately passed by the Senate is a provision by which mails are to be sorted on board steamers, so that deliveries will be hastened on arrival of vessels. The arrangement is to be in conjunction with the governments, the United States paying its portion of the costs.