FLOOD ROCK BLOWN UP.

Last Saturday morning, October 10, at 11 o'clock and 16 minutes, the 150 tons of dynamite and rack-a-rock stored in the excavation under Flood Rock, Hell Gate, N. Y., were exploded. The volume of water that rose in the air seemed to most fittingly terminate, by its vast proportions, the most stupendous piece of engineering, of its kind, the world has yet seen. The volume rose in irregular masses, seemingly as if many gigantic fountains, each playing independently, were at work beneath the surface; it measured at least 1,400 feet in length, 800 feet in width, and 200 feet in height. There was one heavy report, followed by a lighter one from the northern end of the work; along each of the shores but one severe shock was felt; there was no series of vibrations.

The engraving, Fig. 1, represents Flood Rock immediately before the explosion; Fig. 2 is immediately after; Figs. 3 and 4 show the water rising, and in the former may be seen the derrick just toppling over; in Fig. 5 the water is about at its height. Figs. 1, 2, and 5 are on precisely the same scale, and taking the total length of Flood Rock (Fig. 1) as 300 feet, our readers have an accurate scale by which to measure the water. The volume of water shown in Fig. 5 is at least 1,100 feet in length. An examination of the rock shows it to be shattered, proving that the explosion was successful.

We are indebted to Messrs. F. C. Beach, President; Geo. H. Ripley, Frank G. Dubois, Wm. Darrow, Jr., members of the Society of Amateur Photographers of this city, for the excellent instantaneous photographs of the explosion, from which our engravings were made.

JUMBO'S death has been chronicled in obituary notices in the London newspapers longer than is usually accorded to men of science and statesmen.

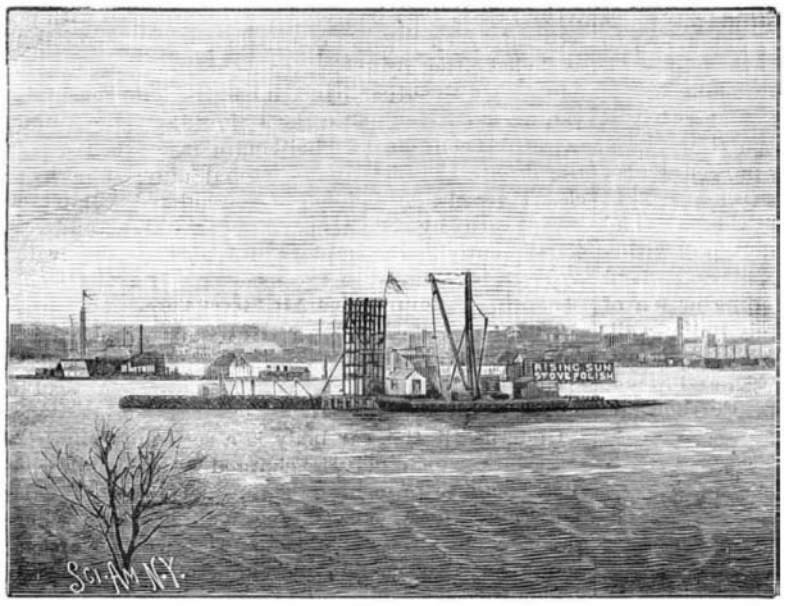


Fig. 1.—JUST BEFORE THE EXPLOSION.

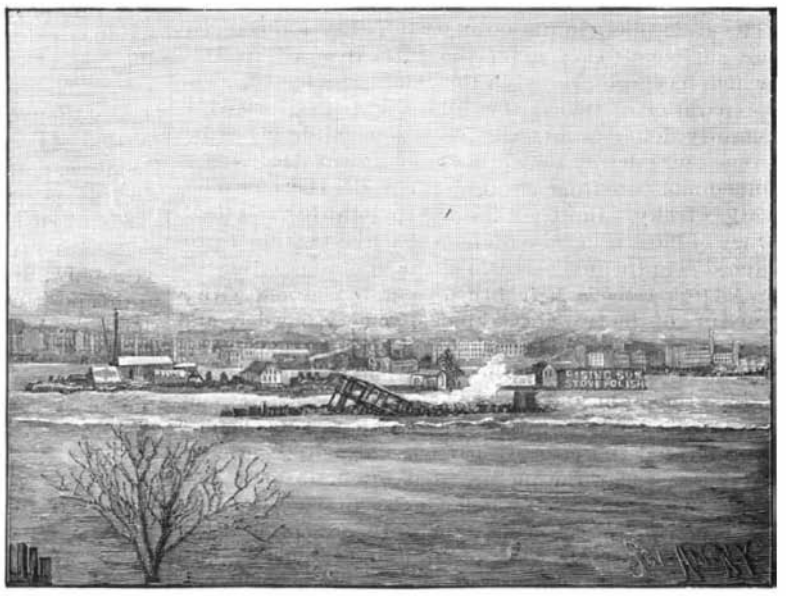


Fig. 2.—JUST AFTER THE EXPLOSION.

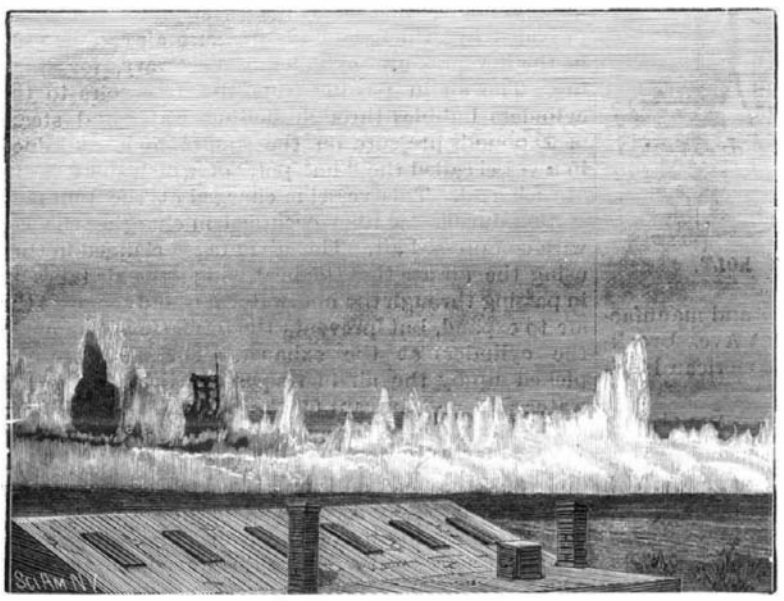


Fig. 3.—THE WATER RISING.

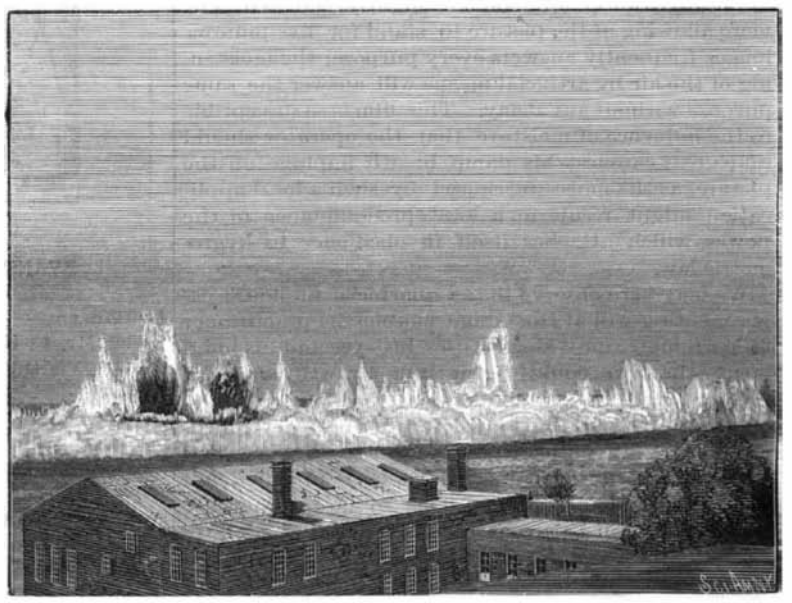


Fig. 4.—THE WATER NEARLY AT ITS HEIGHT.

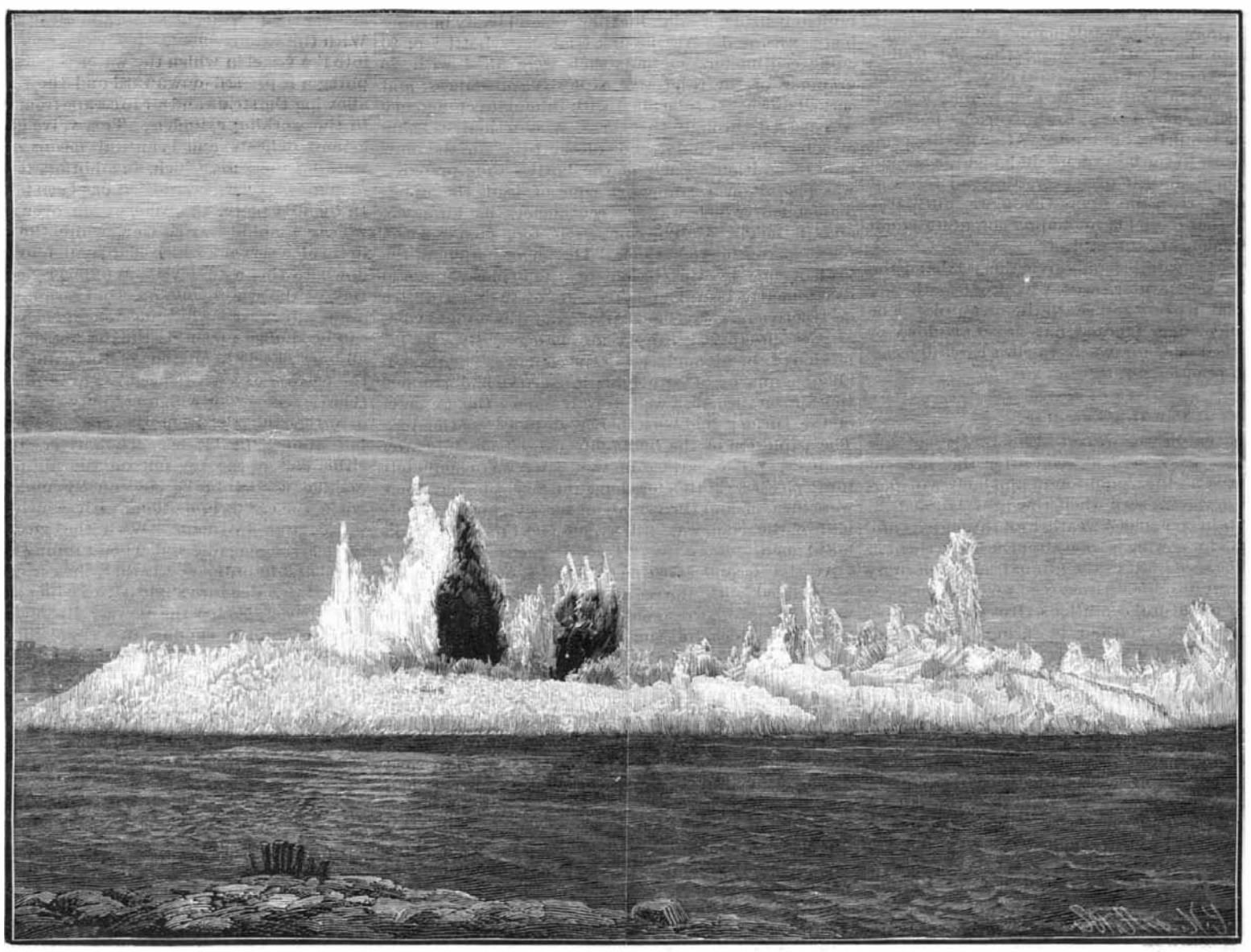


Fig. 5.—FLOOD ROCK EXPLOSION—THE WATER AT ITS HEIGHT.

Photo-Mezzotint Engraving.

Upon a polished steel plate, spread a thin coating of:

Saturated solution of bichromate of ammonia	5 drachms.
Honey	3 "
Albumen	3 "
Water	1½ pints.

Let this be dried by gentle heat, and when thoroughly dry, expose to light under a transparency. Now remove the plate to a place in which the air is moist. The atmosphere in an ordinary room contains moisture sufficient to act upon the surface of the picture which has been printed in the manner indicated. The preparation of which the formula is given above is slightly deliquescent, and very soon after it has become quite dry by the application of heat it attracts so much moisture from the atmosphere as to become more or less tacky. But the exposure to light has the tendency of hardening the film; so that the tackiness produced is in the inverse ratio of the luminous action.

A large camel's hair brush is now charged with a mixture of the two finest kinds of emery powder, and applied with a circular kind of whisking motion all over the surface. As those portions of the plate on which the light did not act are the first to become tacky, the emery powder will first adhere to them, and we find that the coarsest particles attach themselves to those parts of the picture that are in deepest shadow. The exposure to light ought to be such that every portion of the surface—with the exception of the extreme high lights—becomes in a condition to "take" the powder. If the image be slow in becoming developed under this pulverulent treatment, then the moisture in the atmosphere should be slightly increased. The mere allowing of the picture to stand for five minutes longer frequently answers every purpose; the moistening of the air by artificial means will answer the same purpose without any delay. This film is so susceptible to the influence of moisture that the operator should take great care lest his damp breath impinge on the picture, as the moisture caused by such a local application might result in a local predominance of the power which attaches itself in obedience to hygrometric law.

We may here observe that a quarter of an hour's experimenting will at this stage enable the practitioner to learn more—provided he uses his eyes and his judgment—than we could teach him by writing at far greater length than would here be expedient.

Assuming, then, that the picture has been developed, a polished plate of metal, softer than that upon which the picture is formed, must have been procured and laid down upon the other, face to face. They are passed between a pair of rollers screwed so well together as to insure the setting off on to, or indentation of, the emery powder image into the polished plate of metal. This latter plate is now precisely similar to the one produced by the mezzotint engraver.

An impression having been obtained by an ordinary copper plate process, the manipulator (whom we must now designate the "artist," seeing that art feeling and knowledge must be brought into play), having the proof and the plate both before him, applies a small burnisher with a curved point to the various portions of the picture requiring lightening. After having completed this work to the best of his judgment, a second proof is obtained, and, if necessary, a second series of the alterations are made upon the plate, until it is finally found that it yields an impression quite equal to the requirements of the subject.

This being the case, it only remains to hand the plate over to the printer, who will produce the impressions equal in every respect to the first proof. The method we have here pointed out is no shadowy or mere theoretical one, for we have most carefully carried it out in practice.—*Lith. and Printer.*

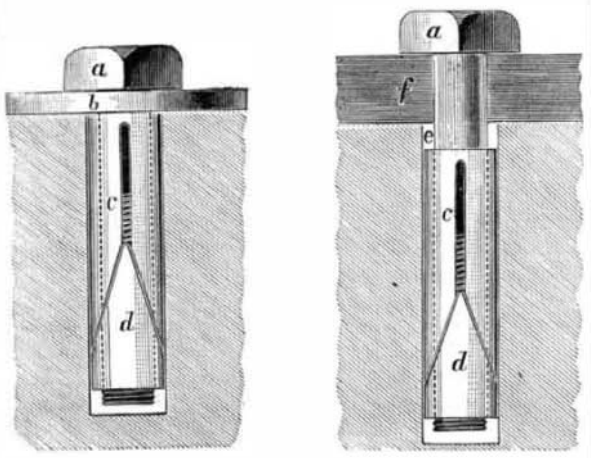
Fall Grass Seeding.

A. W. Cheever, in the *Rural New-Yorker*, advises farmers to sow grass seed as soon after the heat of summer is past as the condition of the land will permit. Don't sow grass seed when the heat is greatest. Grass delights in cool, moist weather all through its life. Nature's time for sowing is soon after the seeds ripen in summer. The seeds fall to the ground, and wait only for rain to start into life. Grass seed sown in spring is placed under unnatural conditions. Hot weather is before it, and if it gets a start in the spring, it will try to produce seed the first year. This practice affects grass plants as it affects heifers to have calves at an early age. Grass sown in spring and cut for hay in July has been killed outright by the operation. The hot sun dried the surface, and the root growth being shallow and scanty, the plants were killed. Nothing is gained by spring seeding, except the labor in replowing after grain is harvested. Grass sown alone this fall, on well tilled and well enriched land, should produce a full crop of hay next July. Fall sown grass has the advantage over spring sown in this, that the annual weeds which may come up with it will soon be killed by frost and be out of the way of the grass, while in spring the chances are usually more favorable to the weeds than to the grass, as the weeds are starting at their natural season, while the grass is not.

IMPROVED EXPANSION BOLT.

The greatest use of the bolt herewith shown is in places where it is not practicable or desirable to bore through the material to which the fastenings are to be made. With this bolt any piece of work can be drawn down and tightened; the manner in which this is done is shown in the cuts. The bolt is put in the hole with the collar, *b*, between the base of the jaw piece, *c*, and the head to tighten against; an ordinary washer may be used for this, as it is only to get the fitting in place, and the same washer will do for any number of bolts. The shape of the piece, *c*, and the nut, *d*, are clearly shown. By turning the bolt the wedge-shaped portion of the nut, *d*, is brought between the jaws of the piece, *c*, the latter being thus firmly pressed against the side of the hole.

The piece, *c*, will be spread out to fit the hole, and then with any convenient tool may be driven in with a light blow, leaving a space, *e*; the piece, *c*, will be held in this position in the hole by the spreading action of the nut. A plate, *f*, may be held securely to the wall. This expansion bolt has been used extensively in fastening objects to stone, iron, brick work, and wood, and has given the utmost satisfaction. Further particulars can be had from the patentee and manufacturer, Mr. F. H. Evans, of 124 to 136 Kent Ave., Brooklyn, N. Y.; the bolt can be seen at the American Institute Fair.



EVANS' IMPROVED EXPANSION BOLT.

A New Explosive.

A new explosive, known as hellhoffite, which has been invented by Hellhoff and Gruson, has been subjected to comparative trials at St. Petersburg, together with nitro-glycerine and ordinary gunpowder. It is described in the London *Times* as a solution of a nitrated organic combination—naphthaline, phenol, benzine, etc.—in fuming nitric acid.

In preparing the hellhoffite tried in the experiments, binitro-benzine, a solid, inexplosive, and badly burning body, was used. At the first trial glass bottles of 20 cubic centimeters contents each were filled with 20 grammes of the respective explosive substances, and corked down. A tube filled with fulminate of mercury was passed through the corks, a slow match being attached to the outer end of the tube for the purpose of ignition. Each of the bottles thus prepared was placed on a truncated cone of lead, the upper diameter of which was 3·5 centimeters, its lower 4·5, and its height 6. The cone itself stood on a cast iron plate 2·5 centimeters thick. The deformation of the leaden cone by the action of the explosives could consequently be taken as measure of their respective destructive power. The explosion of the gunpowder, as was anticipated, caused no changes. By the explosion of the nitro-glycerine the cone was compressed about a quarter of its height; its surface had assumed the appearance of a well worn hammer; the diameter of the surface had been increased to 5·5 centimeters The explosion of the hellhoffite caused much greater changes. The surface of the cone was completely torn; pieces 5 centimeters long and 2 centimeters thick were torn off and thrown about for several paces; only half of the cone was still a compact but entirely defaced mass.

At the second experiment, bottles of 25 grammes each, filled with the various explosive substances, were let into corresponding cavities bored into the face of fir blocks of similar dimensions. In exploding the gunpowder, the block was torn into four pieces as if split with a hatchet, the several pieces were thrown about for 18, 12, 11, and 10 paces. In exploding the nitro-glycerine, the block was split into several pieces. The upper portion of the block, as far as the bottle was let into it, was torn off perpendicularly in the direction of the fiber in such a manner that a smooth cut was formed. The explosion of the hellhoffite likewise tore the portion of the block surrounding the bottle perpendicularly in the direction of the fiber, and splintered the remainder of the block into a large number of thin fibers. The following experiments were also made with hellhoffite alone: A slow match was passed through the tube in the cork, which was without fulminate of mercury, as far as the surface of the hellhoffite in the glass bottle; no explosion followed on igniting the slow match. A quantity of hellhoffite poured into a bowl could not be exploded by a lighted match. Finally a few drops of hellhoffite were poured on an anvil, and exposed to heavy blows with a hammer, and no explosion followed. The hellhoffite consequently possesses the following advantages: (1) In igniting it with fulminate of mercury, it acts more powerfully than nitro-glycerine; (2) it may be stored and transported with perfect safety as regards concussion, as it cannot be exploded either by a blow or a shock, nor by an open flame. On the other hand, it has the following disadvantages: (1) Hellhoffite is a liquid; (2) the fuming nitric acid contained in hellhoffite is of such a volatile nature that it can be stored only in perfectly closed vessels; (3) hellhoffite is rendered completely inexplosive by being mixed with water, and can consequently not be employed for works under water.

Compressed Air Street Cars.

The line of the London Street Tramways Company from Holloway to King's Cross is about to be worked exclusively by compressed air machinery instead of horses, as hitherto.

Underneath the car body is a series of cylindrical reservoirs, which may be charged with enough compressed air to propel it a distance of 10 or 12 miles. The car is four wheeled, one pair of these wheels alone being used for driving; and, to save the expense and inconvenience of turn tables, the car may be driven from both ends. To the driving wheels are attached a pair of high and low pressure ordinary working cylinders, each of 8 inches stroke. Means are provided by which the high pressure air can be used in the low pressure cylinder, if necessary, for starting. The air in passing from the reservoirs to the cylinders bubbles through boiling water and steam of 60 pounds pressure on the square inch, contained in a vessel called the "hot pot," of which there is one at each end. This vessel is charged at the pumping station during the time occupied in charging the car with compressed air. The advantages claimed in thus using the air are that the heat which the air takes up in passing through the hot water not only causes the air to expand, but prevents the formation of snow in the cylinders at the exhaust. The moisture also picked up by the air in its passage through the hot water acts as a lubricant for the side valves and pistons.

The working pressure in the high pressure cylinder can be varied at will; it is usually from 120 pounds down to 50 pounds on the square inch, the variation being regulated by a valve of peculiar construction, consisting essentially of a piston, which, by means of a hand wheel and screw, can be forced into or raised from a vessel in which water and air are contained. The bottom of this vessel is made of an India rubber diaphragm, which is connected to a valve opening against the pressure of steam and air in the "hot pot." With this arrangement, when the piston is forced down into the vessel in which the water is contained, the diaphragm is pressed downward and the valve is opened, allowing the steam and air to escape from the "hot pot" to the working cylinders. This valve gives the driver a most delicate and beautiful means of varying the working pressure, which, in addition, it automatically regulates. Every precaution has been taken for safety. In the first place, the car can run over nobody. The wheels are hidden from view behind the capacious cylindrical reservoirs which flank all four sides, almost down to the road level. Whatever may get in the way of the car in motion would simply be shunted aside, albeit somewhat unceremoniously. But the car can be pulled up short; the brakes can be applied to all four wheels in any one of three different ways. In the case of excessive speed, as over 10 miles an hour, there is a governor which not only cuts off all steam, or rather the air, from the engines working the car, but applies the brakes. The driver, too, can, from either end of the car, put on the air pressure brake, and has a foot brake continually under his control when the car is in motion, with which ordinary passenger stops are made. With the most powerful of these arrangements, and when running at its greatest speed and in ordinary weather, the car can be brought to rest in a distance slightly exceeding its own length. The driver also has the power, by reversing the engines, of rapidly coming to a standstill. The car as constructed carries 38 passengers, and weighs about 6½ tons unloaded. The tramway is regarded as one of the most difficult for the purpose, on account of its varied gradients and a sharp curve in its course, not to mention the fact that the thoroughfare is one of the busiest in London.—*Railway and Tramway Express.*

Another Lightning Photo.

Mr. A. W. Manning, of Edena, Mo., sends a photograph of a "streak of lightning," which exhibits the waviness shown in our recent illustration; but there is only one sinuous line. The upper end of the streak, however, exhibits several faintly defined branches, as if the discharge had resulted from the coalition of several tributaries.