

[Continued from first page.]

is for convenience in future separating. The shot are next elevated to the top cylinder of a series, arranged on an incline. Two of these cylinders are represented in Fig. 4. They are conical in form and inclined, and are covered with perforated sheet brass. Each cylinder serves as a sieve for a particular size of shot, retaining that and allowing all smaller sizes to escape. The shot, as the cylinder revolves, traverse its entire length, and then the small ones run out into the next cylinder below, and thus the sifting goes on until each cylinder has picked out the particular class of shot to which it is adapted.

The sizes of shot are standard. The smallest is known as "dust," and then comes No. 12, which is 0.05 inch in diameter, 2,326 shot going to the ounce. The sizes then increase by one-hundredths of an inch to up to twenty-three hundredths, of which there are 24 shot to the ounce.

The shot being now assorted, polishing alone remains to be done. This is accomplished by placing the shot together with plumbago in the box, Fig. 2, which is rapidly rotated. This imparts the glossy black smoothness demanded by sportsmen. The shot are then weighed, bagged, and are ready for commerce.

Buck shot, which range in size from twenty-two to thirty-eight hundredths of an inch, are moulded. The moulds represented in Fig. 6 consist of a series of pivoted bars, the outer pair of which have handles. The upper edges of these bars are hollowed to form the moulds, so that when they are closed together, the opposite halves of each cavity unite, and it is only necessary to pour the lead into the apertures. The shot are thus at once moulded to the proper size, so that rumbering and polishing only are subsequently required.

#### A SWISS STEAM TRAMWAY CAR.

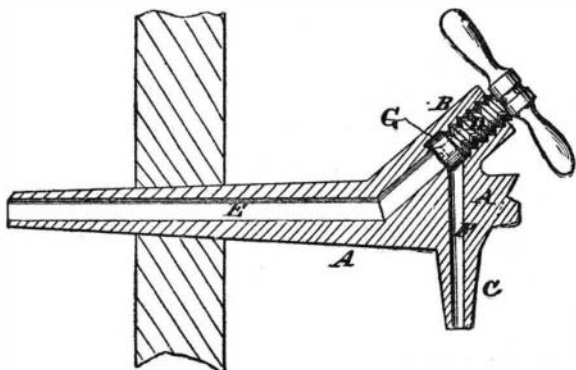
In the annexed engraving, from *La Nature*, is represented a steam car used on the route between Lausanne and Echelens, Switzerland. The length of the line is nearly nine miles. There are numerous curves; some having a radius as small as 62 feet. The speed at which the car travels is about 15 miles per hour, and the time of passage, including eight stoppages, 50 minutes. The steam engine and boiler is located in one end of the vehicle, similar to the Philadelphia street steam cars, and directly over the trucks. The heating surface of the boiler, according to the builder, M. Brunner, is 143 square feet, corresponding to a motive power of 25 horse. The consumption of fuel is 220 lbs. per trip. Coke is used in the towns, and soft coal during the journey. The tractile power is 1,650 lbs., and the car can be stopped by its brake within a distance of 20 feet.

The vehicle has two stories, with 24 seats in the lower one, and places for 32 people on the deck. Eight more passengers can be carried in the lower end compartment. No turn-tables are used, the car running in either direction. The total length is 41.2 feet; breadth 7.6 feet, height 13.7 feet. The weight, empty, is 11.5 tons; or, with a load of 64 persons, about 16 tons. There are many branch roads in this country where a car similar to the above might be used, and a great saving be effected in cost over the locomotive and ordinary cars now employed.

#### IMPROVED FAUCET.

This invention is designed to furnish a faucet so constructed as to prevent leakage, and enable the valve-packing to be readily renewed should it become worn.

In the engraving A represents the receiving tube, B the key seat, and C the discharge pipe. The passage, E, through the receiving tube near the outer end of the faucet, is inclined upward at an angle of 45°, so as to meet the lower end of the key, D. The passage, F, of the discharge pipe, C, passes down vertically entering the cavity of the key seat, B, at an angle of 45°, and just above the vent of

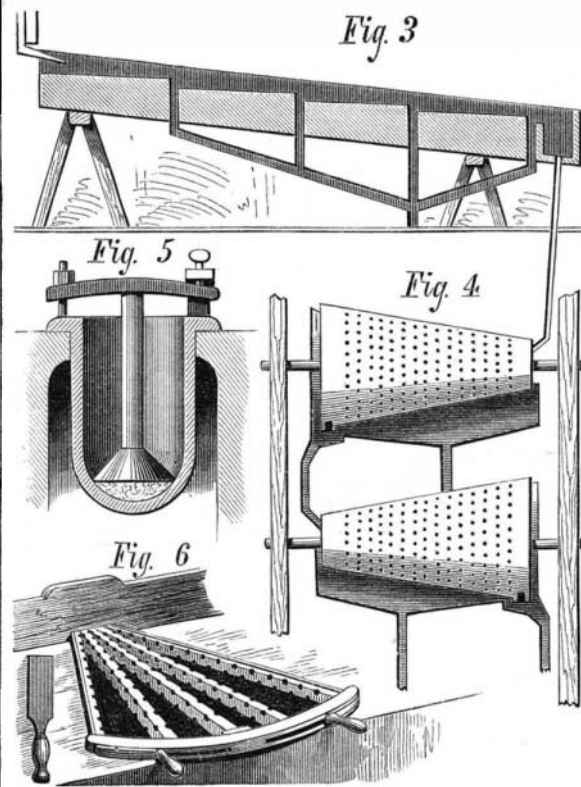


the passage, E. The key, D, screws into its seat, and has a rubber button or packing, G, secured detachably to its forward end by a small screw. The rubber button, G, is unaffected by the liquor, consequently it lasts almost as long as the metal parts of the faucet: but, should it become worn or frayed by use, it can readily be detached by removing the small screw, and replaced by a new one.

Patented through the Scientific American Patent Agency April 2, 1877, by Ralph Hathaway, of Memphis, Tenn.

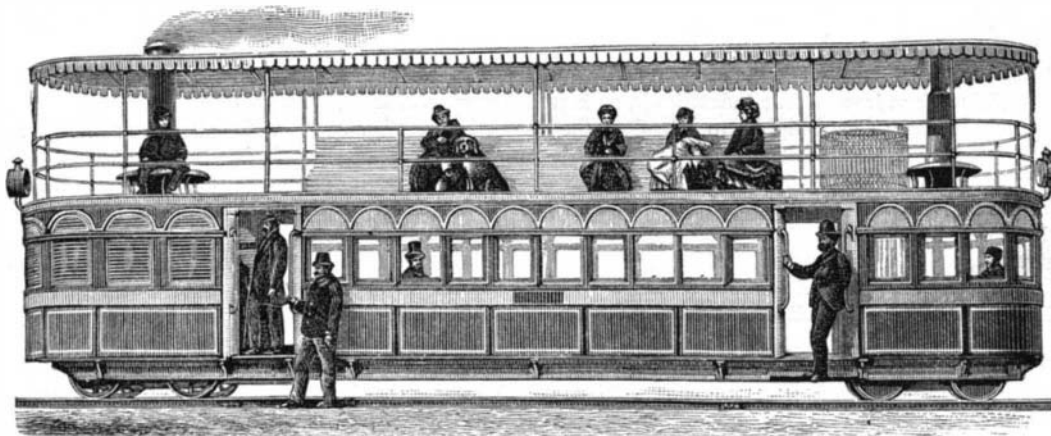
#### Esquimaux Implements.

In looking up objects of interest in my museum at South Kensington for the Westminster Aquarium, I have re-ar-



THE MANUFACTURE OF SHOT.

anged a very nice collection of Esquimaux implements. These were obtained from the Esquimaux at Kotzebue Sound, Behring's Straights (latitude 70°), Arctic Ocean, and presented to me by Commander Hill, R.N., June, 1865. These articles are as follows: A set of instruments used for producing fire. These consist of a bow made of walrus tusk, a round piece of stick like a large cedar pencil, and a piece of wood with cavities in it, corresponding with the



SWISS STEAM STREET CAR.

end of the stick. The stick being worked very quickly by means of the bow like a drill, smoke and then fire ultimately ensue. Neither Mr. Searle nor myself can produce the fire, but can make the top of the drill very hot. To the Esquimaux, who have no lucifer matches, this fire-stick must be of the greatest importance.

Tusks of the walrus are of the greatest value to the Esquimaux. We observe in the collection several articles made of this—namely, a netting-needle, the same as our own—three other needles—I cannot conjecture their use. They are about eight inches long, pointed at one end, blunt at the other, and a small hole bored through them about half way down. There is also another walrus ivory implement, used for plaiting or twisting lines. There are four hooks very unlike the hooks used by civilized nations. They are in the shape of a letter U, with a barb running down from the top of one side nearly across to the center. The hook is made of some very hard bent wood, but the barb is made of bone or ivory, and very sharp pointed. There are two kinds of baits, namely, a rough imitation of a fish, also in bone, which is evidently a spinning bait. Holes are drilled down the side, what the exact use of these is I am unable to determine. A very interesting specimen of a harpoon demands our attention. It consists of a heart-shaped termination. The edges of this weapon are very sharp, and are made of a portion of some shell. The material into which this shell is set is, I have ascertained by burning, to be some resinous gum, a native-made rope with two barbs of bone standing backwards is let into the hollow of this harpoon, and cemented fast by the gum. The strength evidently is trusted to the barb, the line and the shell are used for the lancing and penetrating purpose. The use of the flying lasso (or bolas as called in South America) is not unknown to the Esquimaux. It consists of strings made of the intestine of some animal; to the end of each string is attached a heart or pyramidal shaped bit of walrus tusk, about the size of a walnut; one has eight ends to it, the other nine. The bolas is thrown by hand. It is first of

all twirled two or three times round the head; and then is sent flying through the air like a large cobweb; it will lap round any object it meets with the greatest quickness; it is used by the Esquimaux for catching birds. I think the idea may be applied to catching such birds as partridges. It would require some skill and practice to use it properly, but therein it would cause some sport. At the ends of each bolas are attached a few birds' feathers. In order to avoid the terrible glare of the Arctic snow, we find the Esquimaux have invented snow spectacles. These consist of a piece of wood cut out in the shape of a spectacle; where the glass should be in ordinary spectacles we find two very fine slits. This apparatus I should think would be admirably adapted to drivers of railway engines, who have to encounter snow, wet, and hail, as the engine rushes through storms at express pace. The eye itself is entirely protected, while the eye gets a fair lookout through the slit in the wood. The ingenuity displayed by these hardy Esquimaux is very interesting and instructive.—*Frank Buckland, in "Land and Water."*

#### Proposed Utilization of a New York Reservoir as a Science Museum.

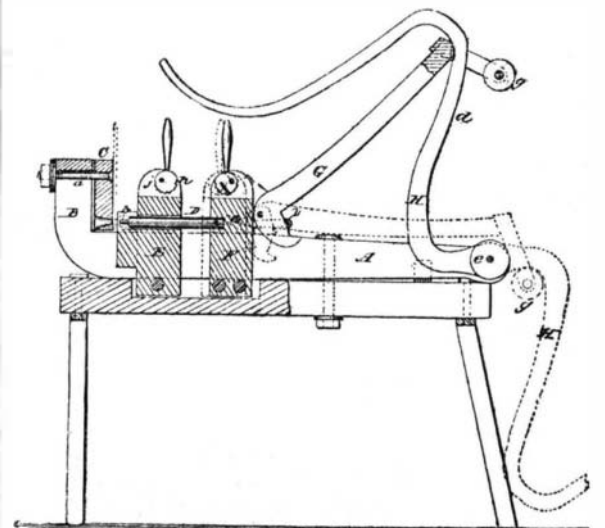
Messrs Vaux and Radford, architects of this city, have recently suggested the utilization of the ground on which the 42d street reservoir (which structure is no longer required for water distribution) stands as a site for a permanent museum of science. This is an old idea, which was quite fully elaborated by Professor C. F. Chandler and Mr. E. D. Lindsay some five years ago. It was then proposed to leave the reservoir as it is, removing only the inner dividing wall, the material in which could be used for building porches, etc. With the reservoir walls serving as those of the building, a glass and iron superstructure alone would be needed. Mr. Lindsay has prepared drawings of quite an imposing structure, which according to this plan would roof over nearly four acres of ground.

#### IMPROVED METAL PUNCHING MACHINE.

Mr. Adam Robertson, of Blanchardville, Wis., has patented through the Scientific American Patent Agency, May 22, 1877, the novel metal punching machine herewith illustrated.

B is a right-angled support for the dies, that is formed on the end of the bed, A. C is a die that is provided with several holes for punches, and is adjustably attached to the support, B, by a bolt, a. D is a follower that moves in a guide, E, attached to the bed, and F is a movable block that is attached to the end of the follower and slides in the slot in the bed.

The follower, D, carries a punch, b. G is a cam lever that is journaled in ears, c c, attached to the bed of the machine, and bears against the block, F. The lever, H, is curved in the form of an irregular volute from d to its fulcrum, e, and its outer end is bent into convenient form for a handle. A fork, f, is formed on the end of the lever, G, for supporting a friction roller, g, between which and the lever, G, the lever, H, passes. A loop, i, is attached to the block, F, and passes around the lever, G, for drawing the follower back and removing the punch from the metal. The fulcrum of the lever, H, being in the end of the bed, and that of the lever, G, being in the ears near the bed, brings the strain in nearly a straight line. The guide, E, and block, F, are provided with ears, h, to which fluted eccentrics, j j, are pivoted for clamping tire, for the purpose of upsetting it. It will be seen that as the lever, H, is brought into the position shown in the dotted lines in the drawing, the roller,



g, draws constantly nearer the fulcrum of the said lever, thereby increasing its advantage over the lever, G, which, by the form of its cam, works against the block, F, with a slightly-decreasing efficiency; but this loss is more than compensated by the advantage gained in the lever, H.