

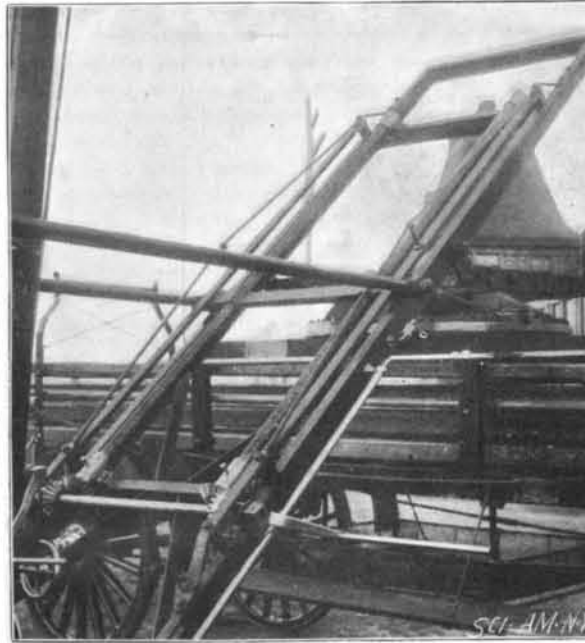
Rapid Firing at Home and Abroad.

An English officer on Indian service, who recently spent his holiday in the Alps with the special object of reporting on the comparative efficiency of French and Italian batteries with regard to English, had no hesitation in deciding, says the Admiralty and Horse Guards Gazette, that in rapidity of fire and general smartness our men and mountain guns were ahead of both countries. There were some points of special excellence about both corps, and with regard to the Italians one fact may be noted. The men were trained and accustomed to carry the component parts of the gun themselves; but in accuracy of fire as well as rapidity, and with regard to the general smartness of the men themselves, he would have had no doubt in putting our own mountain batteries into competition with either French or Italian. But the high standard of merit attained with regard to accuracy relates exclusively to stationary objects, and it is felt that the results attained at the ranges might be easily falsified on the field of battle against moving objects, and especially against the rapid movements of cavalry. At the present moment there is no place in India where firing at moving objects can be practiced, and even in England it is only quite recently that the simple moving target on a pair of rails has been established at Okehampton. Even there the target is never moved at anything approaching the rate at which cavalry would charge, and, moreover, the object fired at moves across the horizon instead of toward the guns themselves, as would be the case with cavalry in real war.

THE HORTON FIRE LADDER APPARATUS.

The accompanying illustrations represent a fire ladder apparatus designed to combine the advantages of the ordinary hand ladder truck, a main extension ladder useful at high buildings, and a substantial water tower, the entire apparatus being of much less weight than has been heretofore deemed feasible. It is claimed that the truck and an 85 foot ladder built on this plan will not weigh over 7,000 pounds, as against a weight of over 12,000 pounds for the same extension in the ladders hitherto most approved. In the improved ladder, also, the steering wheel may be dispensed with, as the distance between the hind and fore wheels is only about 14 feet. The improvement is the invention of William J. Horton, of Halifax, N. S., Canada, and is being introduced by the Horton Fire Ladder Company (Limited), of that city, patents having been obtained thereon in the United States, Canada, Great Britain, France and Germany. The ladder platform is connected to the main frame of the truck by a rocking yoke swiveled to swing horizontally, enabling the platform with its raised or partly raised ladder to be turned

one-quarter around and then tilted to the ground on one side, the ground end of the tilted platform being then adjusted by side levers, as is also the lateral adjustment of the upper portion of the main ladder. By this means a solid foundation is obtained and the weight is taken off the truck, which then forms an anchor. The mechanism for raising and bracing the ladder comprises principally a pair of screws having nuts which are coupled by connecting rods to opposite sides of the pivoted ladder, as shown in one of the views, the ladder-raising screws being fitted in front thrust bearings held to the platform

**THE HORTON FIRE LADDER ELEVATING MECHANISM.**

sides and in rear metal plate bearings which form the back end of the ladder platform, large gear wheels engaging pinions fixed on the screws, and the gear wheels being rotated by a crank turned by the firemen on the rear step of the platform. The drum, wire rope and pulley mechanism, for extending the upper or fly ladder, is also operated from the platform, the upper ladder being extended as desired and safely held, or again lowered after use, by operating the drum. Sockets in the side bars of the ladder sections carry bracket forks in which the hose may be placed to assist or relieve firemen on the ladder, enabling them to direct the stream to the best advantage, and the hose may be raised as the ladder is raised to any required height. It is claimed that this ladder can be raised by four men in less time than other ladders can be raised by eight or ten men.

Method of Coating Paper with Emulsions.

A correspondent in Photography describes the following plan of coating paper with emulsions: The coating of paper with emulsion in a liquid state is attended with such difficulties as unequal expansion of the paper, and the too rapid solidification of the emulsion into lumps or waves. The following method (due to White) coats the paper with the cold and solidified emulsion, and then produces an even coating by application of a very gentle heat, just sufficient to melt the emulsion. The apparatus required is very simple: it consists of a zinc or tin reservoir of hot water, in section of quadrant shape. Two openings at the top allow of hot water being poured in. The back, sides, and bottom of the reservoir should be covered with felt. It is not necessary to keep a light burning underneath, for when once filled with hot water the apparatus suffices to prepare 300 to 400 feet of paper. To the upper part of the back of this apparatus is fixed a perfectly horizontal board, about 2 feet wide and 8 feet to 10 feet long, and to the lower end of the reservoir a similar board is attached. The lower board is used for applying the cold emulsion to the paper, and the upper board for smoothing and solidifying the same. The paper to be coated is generally 22 inches broad, and in lengths of 8 feet to 10 feet (these are convenient dimensions). Proceed now as follows: Lay one piece of paper on the lower board, take the emulsion, either in lumps or pressed through canvas, and by means of a stiff bristle brush (one about 8 inches broad, similar to the tool used by bookbinders) work the mess as a paper hanger does his paste. By skillful working of the brush a coating quite flat and free from lumps can be given. Now take one end and steadily and regularly (though fairly quickly) draw it over the central reservoir containing the hot water. The slightest contact with the warmed surface is sufficient to make the emulsion flow, and it naturally solidifies, the more quickly the less heat is employed. When it has reached the other board it is allowed to remain lying until the next piece is coated with emulsion. It can then be hung in a drying chamber to dry. It is important to note that just sufficient heat should be applied as will melt the emulsion. Delay or too long contact of the paper with

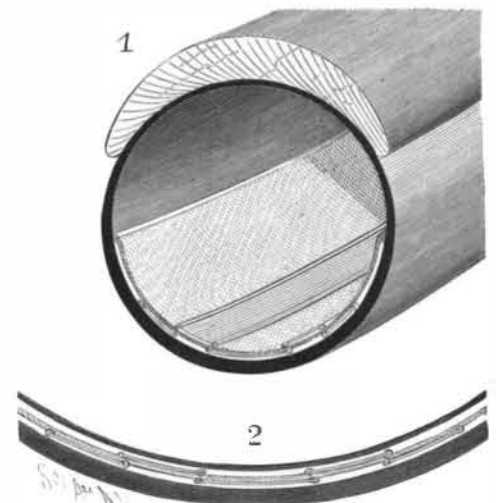
the hot zinc removes the solution partly from the paper, and causes undulating marks, such as are seen in badly prepared albumen papers.

Recent Discoveries in Palestine.

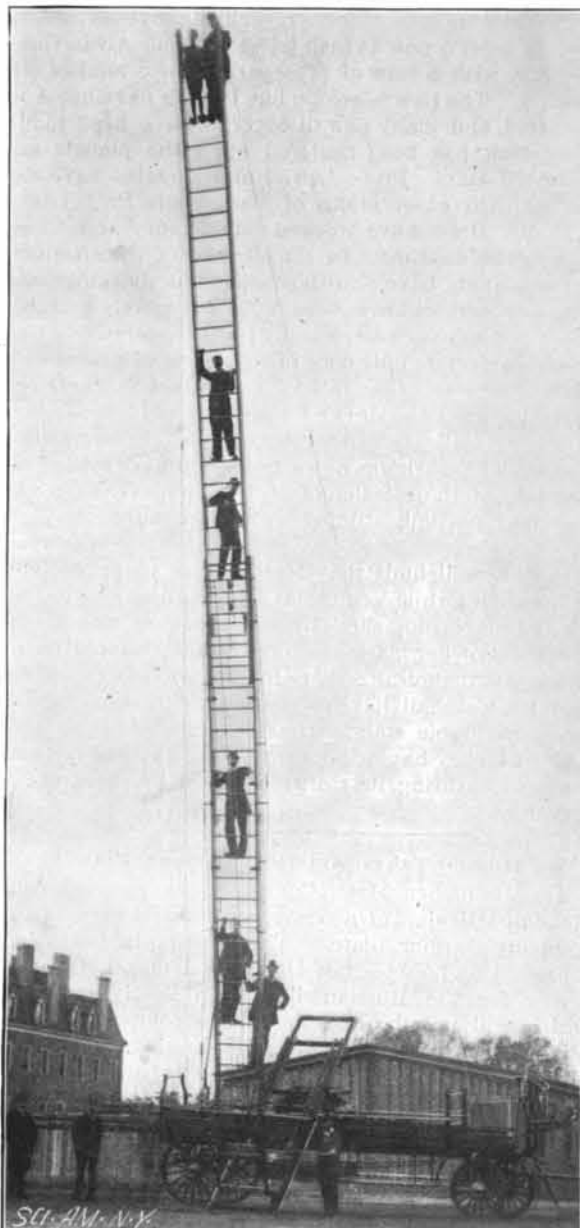
The Quarterly Statement of the Palestine Exploration Fund, in noticing some recent discoveries by the society's officers, says: "Dr. Bliss' excavations in the Tyropæon Valley have brought to light a very remarkable stone stairway, forming part of a road leading down from the city past the Pool of Siloam. This stairway is 24 feet broad, and on its eastern side is a parapet, apparently constructed to prevent passengers falling over the scarp which exists there. The steps are thirty-four in number, so far as discovered. They are about 7 inches in height, and are arranged in a system of wide and narrow treads alternately, the wide treads measuring between 4 feet and 5 feet in breadth, and the narrow ones about 1½ feet. The stones composing these stairs are well jointed and finely polished by footwear. It is impossible not to be reminded by this important discovery of the statement in Nehemiah iii, 15, that Shallun repaired the gate of the fountain, the wall of the Pool of Siloam, by the King's Garden. 'and unto the stairs that go down from the city of David.' It is not suggested that these newly discovered stairs are identical with those mentioned by Nehemiah, but possibly they may be on the same site. Also another paved roadway leading down from the city has been discovered near the top of the hill, a little east of David's Tomb, and apparently continuous with the long street which runs through the city from the Damascus Gate and traverses the present Jewish quarter. In its width, in its curb on either side, in the size and appearance of its slabs, and in its inclination, this street resembles the one found in the Tyropæon Valley. Students of Jerusalem topography have long been of opinion that such a roadway existed in this situation. 'The main thoroughfares of a city are apt to remain in the same spot from age to age, and it has always been thought probable that the great central street of the Holy City was continued further south than the present wall. Of quite special interest is the rock tomb near the Tombs of the Kings described by Mr. Dickie. It is the only rock tomb with a vertical shaft which has yet been discovered in South Palestine."

A NOVEL PNEUMATIC TIRE.

The illustration represents a tire having a novel form of protective shield, designed for application to a single or double tire, without in any manner detracting from its resiliency. Fig. 1 shows a section of a tire on which the improvement is applied, and Fig. 2 a portion of an outer and an inner tire and an enlarged section through the shield. A patent has been issued for this invention to Joseph F. Dolles, of Chester, Ill. The shield is placed next the inner face of the outer tire at its tread portion, and between this tire and the tread section of the inner tire when used with an inner tire, and consists practically of a diaphragm of canvas to which are attached a number of endless bands of very light spring steel. The bands are placed along the inner as well as the outer face of the body of the diaphragm, there being preferably a central wide band and two narrower bands near the side edges, the sides of the inner bands extending over upon the body portion of the

**DOLLES' BICYCLE TIRE.**

outer bands. Each of the bands has a rib along its sides, the ribs being bent over on the slightly convex outer faces of the bands, and the bands are so overlapped as to make it difficult for any sharp object piercing the outer tire to pass between the inner and outer bands where they connect. The diaphragm or shield is made air tight when used with a single tube tire, and may be secured to the sides of the outer tube in any approved manner, or the canvas may be woven in to form an integral portion of the outer tube. The improvement is designed to add but little to the weight of the tire and not to stiffen it or in any way mar its appearance.

**THE HORTON FIRE LADDER EXTENDED VERTICALLY.**