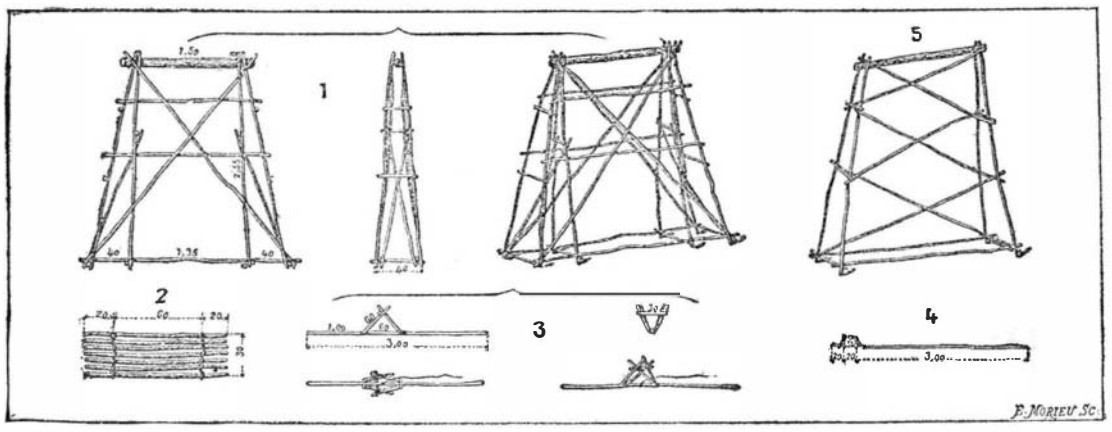
AN IMPROVISED PORTABLE FOOT BRIDGE.

The adoption of smokeless powder, which is now by so good a right occupying the attention of all who are interested in matters pertaining to the army, is going to favor the formation, in the infantry, of the detached groups recommended by General Lowal. These groups are called upon to give powerful aid to bodies of reconnoitering cavalry in a service that has become very difficult in the face of an enemy whose presence is shown only by the firing of projectiles, the sound itself giving no exact indication as to the point occupied.

It is necessary to give every facility to the men charged with this mission, in order that they may triumph over the obstacles in their way; and, as regards this, the foot bridge devised by Captain Cavarrot, who is in charge of the school of bridges of the third regiment of engineers, seems destined to render genuine services. Doubtless it will not permit of crossing large watercourses, but a stream 6 feet deep and 12 or 18 feet wide will arrest the marching of troops if the usual bridges have been destroyed, or if a passage at a spot at a distance from them becomes necessary, for the art of swimming is not widely known among us and all times are not favorable to cold baths.



Figs. 1 to 5.—DETAILS OF PORTABLE FOOT BRIDGE.

This bridge possesses the following advantages: The elements of it are found everywhere, and the improvements and accessories are simple—pruning knives, or pocket knives even, a few small nails or iron wire, or string even. It may be prepared, too, far away from the crossing selected, and be brought in pieces by men, without fatigue, to the edge of the watercourse, and be placed in position without any noise, in a very short time. It will prove very valuable in cases where preparations are being made for a surprise. All the other improvised means of crossing a stream are accompanied with more or less noise in their construction. The infantry officers who, in 1888, followed the course of instruction at the School of Campaign Operations at Arras, appreciated the merit of this invention, and special instruction was given in certain corps of the army during last year.

The construction and erection are very simple, and it suffices to have performed these operations but once in order to know them sufficiently well.

The elements of the bridge are: (1) Eight-legged trestles (Fig. 1) made of poles of a diameter of about an inch, connected with each other and with the top by small iron nails, one at each crossing. The top is formed of a round piece of wood two and a half inches in diameter and five feet in length. A height of 11½ feet may be given to the trestle, as the bridge does not have to rise over two feet above the level of the water. (2) A flooring consisting of three poles of a maximum length of 11 feet for the longest spans (from 10 to 10¼ feet), with a mean diameter of 2½ inches and a spacing of 16 inches apart; and of hurdles (Fig. 2) 12 inches in width by 3 feet in length, made of 7 poles 1 inch in diameter, connected by two withes spaced 20 inches apart. The hurdles are nailed to the string pieces or are fastened to them with wire. A trestle 10¼ feet in height weighs 58 pounds; a span of 10 feet weighs, for the three string pieces, 62¾ pounds, for the five hurdles, 42 pounds, or, all told, 162 pounds for a single element of the bridge. Seven men can easily carry the elements of a span and one trestle. The parts can, therefore, be made at quite a distance from the point chosen for crossing, and any noise of a nature to attract the enemy's attention be thus avoided. A ten-foot span with trestles ten feet in height supports the weight of ten armed and equipped men. Now, normally, there can be but five or six men upon a span at a time, seeing the spacing of the hurdles.

The trestle has very great stability on account of its form and of the dimensions of the head piece with respect to the base; and the stability is further increased by the bracing of the string pieces. The trestles offer little resistance to the current. They may, moreover, be weighted with stones attached firmly to the lower cross pieces.

The species of wood to be preferred for making the trestles and the hurdles are oak, hornbeam, ash, birch, hazel, elm, chestnut and willow. To these may be added, as proper for making the withes, the Virginia creeper, the tamarind and the osier.

The tools are pruning knives, pocket knives, hammers and a fret saw; and the accessories are string and wire.

In the experiment made October 15, 1888, on the Scarpe, with a width of stream of 34 feet, and a depth varying from 5 to 7 feet, it took 35 minutes to prepare the bridge, exclusive of the time necessary to cut the wood, the work being done by three non-commissioned officers and thirty-one men. It took 41 minutes to erect the bridge, counting from the arrival of the first man upon the bank of the Scarpe. In reality, the operation lasted 32 minutes. A preliminary sounding is, of course, necessary. The infantry crosses the bridge in Indian file, with a fast gait, but without skipping. Each man on stepping upon the bridge must avoid using the same foot as the one who precedes him.

In addition to the materials mentioned above, boards, laths and rafters may be used. Finally, by employing wood of a diameter of from 1 to 1½ inches in the middle, four-legged trestles may be made (Fig. 5).—*La Nature.*

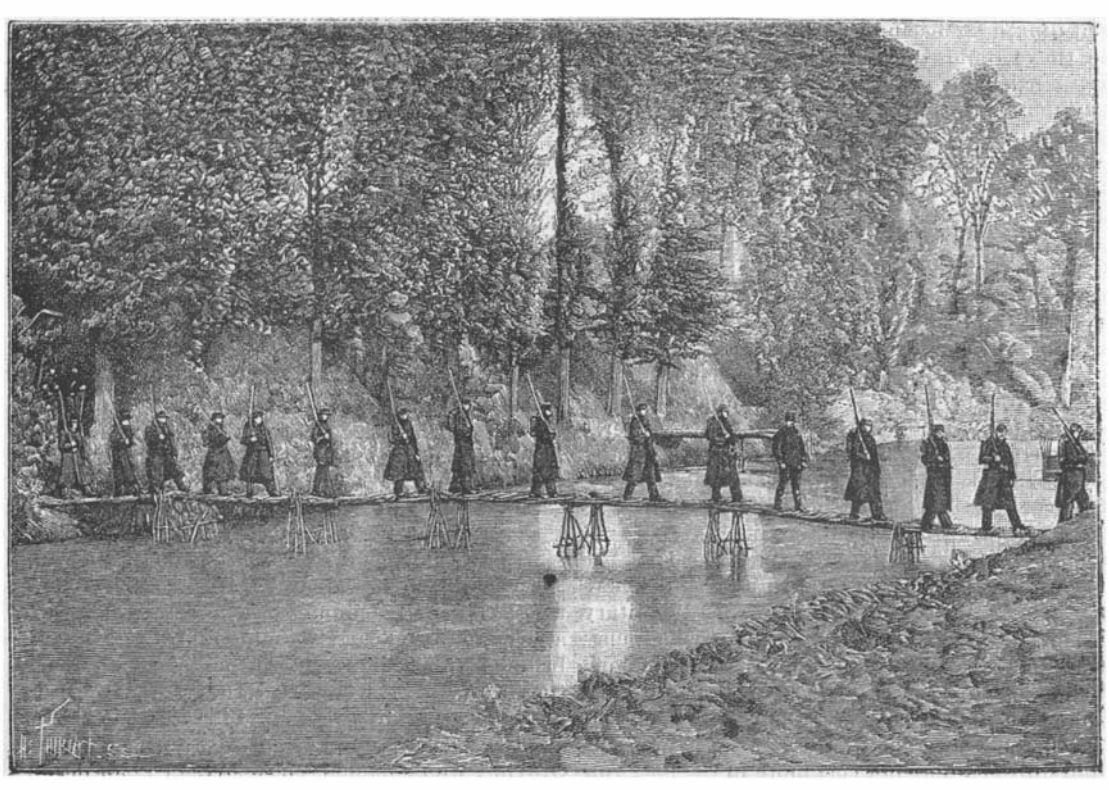


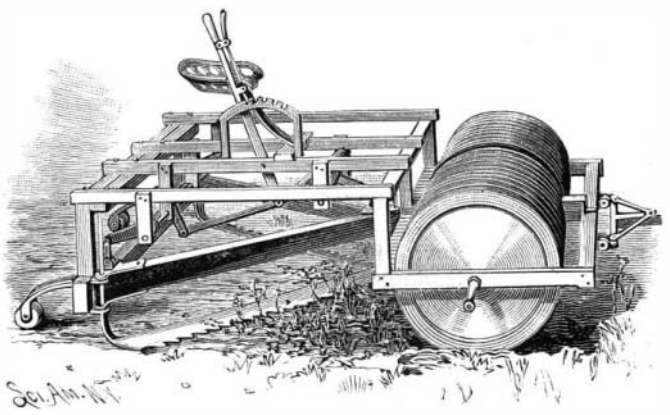
Fig. 6.—PORTABLE FOOT BRIDGE.

Singular Electric Effect.

A peculiar and instructive accident recently occurred in the city of Lynn, Mass. The electric lighting station caught fire, and the wires carrying the current from the powerful dynamos were burnt off, thus breaking the circuit and cutting off the current. Relieved of the work of producing the current, the 700 horse power engine became unmanageable, and started off at such a rate of speed that the large fly wheel was broken into fragments by the centrifugal force, and flew in all directions, causing much damage to the building. This occurrence is an excellent illustration of the principle of the transformation of energy, as the power produced by the engine, instead of being transformed into electrical energy, was, on account of the breaking of the circuit, suddenly changed into the centrifugal force which caused the wreck of the fly wheel. It also shows plainly, the *Popular Science News* avers, that it really costs something to produce electricity, and that it is not an unlimited and costless source of power, as many suppose.

A LEVELER FOR USE ON MEADOW LANDS, ETC.

The illustration represents a machine designed, when drawn over the ground, to effectually remove hummocks, level the earth, and cut off or draw up growing brush. It has been patented by Mr. Peter M. Thompson, of Anaconda, Montana. In the forward part of the frame, journaled in its side beams and an intermediate longitudinal beam, is an axle on which a drum is loosely mounted. The axle projects beyond the side beams, and is adapted to receive supporting wheels when desired, and the drum has on its periphery a series of disk-like cutters. Upon a transverse beam at the rear of the drum is secured a series of downwardly and forwardly curved fingers adapted to clear the drum and its cutters of any earth which may cling thereto.



THOMPSON'S MEADOW LEVELER.

Upon parallel beams on the top of the frame is a crossbar on which is secured a support for the driver's seat, beneath which is held an essentially triangular frame.

To each of the side beams of this frame is attached a cutter, consisting preferably of a steel plate, having a series of teeth with forward cutting edges. By means of front and rear rock shafts, pivotal arms connected by links, and a lever extending to within convenient reach of the driver, the frame carrying the cutters may be readily raised or lowered as desired, and may be so raised horizontally, the heel and toe of the frame being raised and lowered at the same time. The lever has a thumb latch adapted for engagement with a rack, whereby the frame may be held in adjusted position. The rear end of the main frame is supported by caster wheels, and when the machine is to be carried from the field, or is not in operation, supporting wheels of greater diameter than the drum are placed upon the forward axle. In operation, the disk-like cutters upon the drum are designed to chop the surface of the earth and partially level it, the evening and leveling being further carried out by the cutting frame, the teeth of which cut down or pull out any weeds or brush.

The Toxic Principle of Insect Powder.

The active principle of pyrethrum flowers is, according to Schlagdenhauffen and Reeb, an acid (pyrethrotoxic acid) soluble in alcohol, amylic alcohol, ether, and chloroform, which may be isolated by means of ether, after having been converted into an alkaline salt and decomposed by tartaric acid in aqueous solution.

When pyrethrotoxic acid was hypodermically injected into animals, it was observed that the poison produced its effects in two distinct stages. In the first there was an excitement more or less pronounced, proportional to the quantity administered, in the second there was a complete prostration, accompanied always by paralysis of the lower extremities, which might disappear after a time, or be the precursor of a fatal issue. the respiration and circulation being affected only in the latter case.