

Improved Tile-Laying Machine.

The accompanying engraving illustrates a machine for digging ditches and laying down tiles in them at one operation, invented by B. P. Foster and Wm. H. Chaffee, of Flint, Michigan. Its construction and operation will be understood by examining the cut.

1 1 is the frame of the machine; 2 2' 2'' are the buckets composing an endless chain. The first of these buckets 2 is armed with teeth at the edge which comes in contact with the ground; the next succeeding bucket 2' has its teeth so placed as to follow the interstices between the teeth of the bucket 2, which precedes it. These two buckets having passed over the ground, and having with their teeth thoroughly broken it up, the scraper on bucket 2'' follows them, and takes whatever of the loose dirt the others have left. This chain of buckets is hung on two sprocket wheels, 3 3, the lower one being hung on a shaft 4, which has its supports in the lower end of the hanger 5, the upper shaft 7 being hung in the adjustable frame 6. This frame is made adjustable for the purpose of regulating the depth to which the ditch shall be dug; as the endless chain is supported by it, the depth to which the said chain digs is determined by the height at which the frame 6 is secured. This adjustment is also used when the machine first begins to dig the ditch,

the buckets being allowed to descend gradually till they have reached the required depth. This adjustment is accomplished by means of the windless, 8, and the ropes or chains, 9, which wind on it, the said windless being turned by means of the crank, and prevented from running back by a ratchet wheel and pawl. The swinging frame 5 is secured in adjustment and supported in the desired angular position by means of the brace 28 attached at one end to said swinging frame or hanger 5, and at the other secured by a pin to the frame 6, in such a position as to secure the proper action of the parts under the circumstances of the particular case in which it may be used for the time being, said brace 28 being provided with several holes at intervals, as shown, to allow the proper or desired adjustment.

In the rear end of the machine is a reel 13, on which a roll of cloth is wound. This cloth is allowed to unwind as the machine advances, covering the tiles and protecting the joints from the entrance of the loose dirt. By the time the cloth will have rotted, the dirt will have become so compact as to leave no danger of inconvenience from that source. The tiles are laid on a slide or guide 14, represented in detail in figure 3, on which they slide down and take their position in the ditch; the lower part 15 of the guide, being just large enough for the tile to slip over it easily, will hold them in their places laterally, while the pressure exerted by those above will force them together longitudinally. This guide is fastened to the brackets on the under side of the machine, which are shown at 31.

The machine is driven ahead by means of a feeding apparatus connecting with the main driving shaft 7, and acting on ropes secured to the ground at each end by means of stakes, and passing once around a windlass attached to the machine. 16 is the band or cord leading from the pulley 17 on the main shaft 7, and drives the intermediate pulley, 18, which, by means of the belt or cord 19, drives the pulley 20 on the shaft 21. On the said shaft 21 are two gear wheels or pinions which mesh into the wheels 23. These two wheels 23 are upon the shaft 24', which serves as the forward axle of the machine, and around which the ropes 24 24 are passed in a groove on pulleys provided for that purpose. At the forward end of the machine are two vertical circular knives or cutters 27 which cut the sod on each side of the proper width for the ditch, so that the horizontal cutter 28 may remove the strip and throw it to one

side, leaving the earth bare, ready for the operation of the diggers. Should it be desirable to make a ditch simply, the spout or conveyer shown in figure 2 is put on in the place of the spout 29, which is otherwise used, and which is shown attached to the machine.

The machine is designed to have a platform on each side of it for the men to stand upon to operate the cranks. It may run upon a truck to overcome the inequalities of the ground, and keep the ditch on a regular grade.

As there is but little soil moved by this machine, it takes but little power to work it. The inventors

The bill is drawn back and the jaws opened by the spiral spring, c.

The form of the jaws enables nuts of any size to be grasped between them, and their peculiar configuration prevents shells from falling into the joint to obstruct their motion. They are serrated upon their inner surfaces to prevent the nuts from slipping. This nut cracker stands securely upon its broad base, and is portable, not being required to be secured to the table, or it may be readily secured by a single screw if it is to be constantly used in one position.

This invention is secured by two patents, one for the mechanical construction and one for the design, both procured through the Scientific American Patent Agency, and further information in relation to it may be obtained by addressing the inventor, S. J. Smith, at 18 Pell street, New York.

Salt and Horse's Feet.

Lucius A. White, Superintendent of the horses of the Avenue A stage line has testified before the Commissioners of Health in this city that out of 136 horses used last winter from 20 to 30 were laid up with frozen feet when the streets were salted. Some of them became perfectly useless, and the feet of one fell off. No salt has been used on the road this winter, and all the horses have been in good condition.

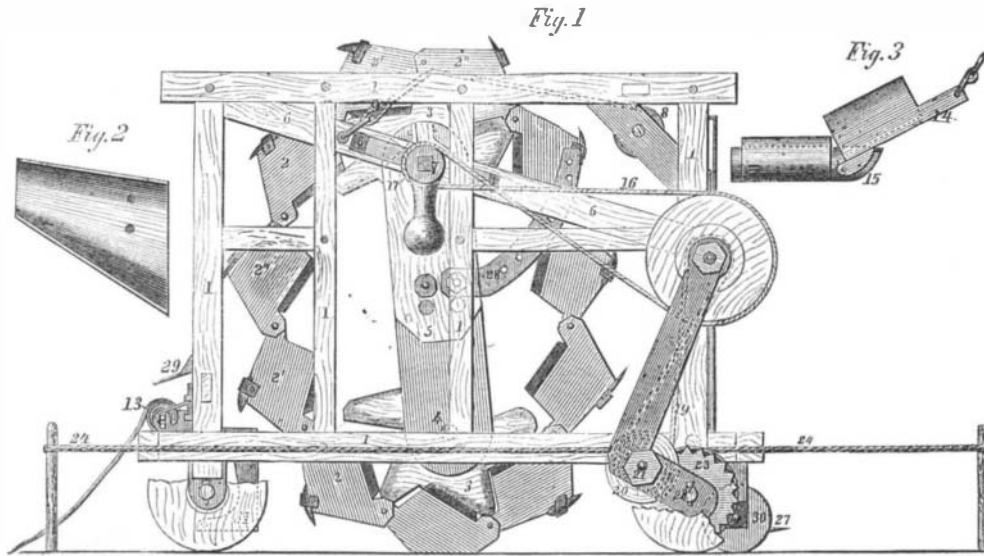
Thomas Murphy, superintendent of the horses on the Hudson River Railroad testified that during last winter he had over 70 lame horses, caused by the use of salt on the road. Fifteen died, four had to be killed, and the feet of three fell off. No salt being used this winter, the horses have been in good condition. This practical testimony is quite contrary in its character to that published in the SCIENTIFIC AMERICAN of two weeks since, as given by physicians in Philadelphia, and is in exact accordance with the settled principles of science, as pointed out by us in an editorial on page 41 Vol. II. (new series) of our journal.

The French Ocean Mail Steamers.

It is understood that the Messageries Imperiales Company have just concluded a contract with an English firm for the construction, for £1,000,000 sterling, of eight first-class iron steam vessels for packet service, three to be built on the Clyde and five in ports of France, under the superintendence of the firm. The first English built one is to be completed within 19 months, and the others at successive intervals of two months from the expiration of that term. With respect to the company's operations in connection with India, the three vessels intended for that service are now lying in the harbor of Marseilles completely ready for sea, in regard to equipment and furniture. They are the *Imperatrice*, the *Donau*, and the *Camboge*, all screw vessels of 2,300 tons burden each, and 500-horse power, and fitted entirely for first-class passengers and their servants. These ships are to leave Marseilles for Calcutta within two months from the present date, and are intended to run between that port and Suez.

Catalogue of Steam Pumps.

We have before us an illustrated catalogue of steam pumps, manufactured by Messrs. Guild, Garrison & Co., of Williamsburgh, New York. It contains well-executed engravings, dimensions, capacity and price of five different varieties which are used for feeding boilers, cleaning mines, draining, supplying locomotive, sugar houses and manufactories. One form is especially designed for evaporation on a large scale, as in the manufacture of sugar, camphene, coal oil, &c. Another form is designed for lifting large quantities of water to slight elevations, with but little attention, and cannot be choked by dirt and sand. This firm work for reputation as well as for money, and furnish a good machine in every respect.



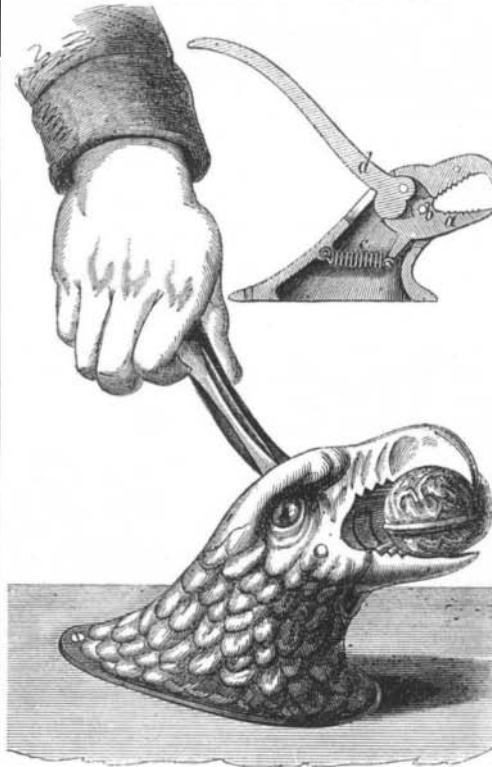
FOSTER AND CHAFFEE'S DITCHING AND TILE-LAYING MACHINE.

think that two men with a boy to feed, on the tiles, can ditch one hundred rods per day, and do the work in a very perfect manner.

The patent for this invention was granted Oct. 15, 1861, and further information in relation to it may be obtained by addressing Wm. H. Chaffee, who is owner of the patent, at Flint, Mich.

SMITH'S PATENT NUT CRACKER.

The accompanying engraving represents a nut cracker which, besides its neat and elegant appearance,



possesses extraordinary power. It is made of hollow cast iron in the form of a bird's head, the lower bill forming the movable or pivoted lever.

The construction is represented in Fig. 2. The bill, a, is pivoted at b, as shown, and is actuated by a cam on the long lever, d. It will be seen that this multiplies the power many fold, giving a very short motion to the bill for a long motion to the lever, d.