A GUNBOAT FOR THE GREAT FRENCH EXPOSITION.

The gunboat Farcy, after a successful trip from Lyons to Paris, in which she passed through 233 locks, cast anchor in front of the Alma bridge, where the arrangement of the port seemed to favor the proposed scheme of taking her out of the water by means of a portable railway, in order to carry her to the Palace of Industry.

This very interesting operation was performed with complete success, on the 25th of July, in the space of a few hours, and some idea of it is given in our engraving.

The gunboat Farcy, which was built in 1886 by national subscription, is 65 feet in length and 16 in width. She carries a 5½ inch gun weighing 13,200 pounds. Her draught is but 2 feet, and this permits her to navigate in water of but slight depth. She passed without trouble through all the locks of the Bourgogne, Yonne, and Upper Seine canals, the narrowest of which is but 16 feet, and made her trip without the least accident, stopping only near Corbeil in order to allow the engineers of the Decauville works to study the arrangements to be made in order to remove her from the water at Paris and take her to the Palace of Industry—an operation that we should not have thought possible had we not ourselves witnessed it in its minutest details.

We shall not describe the Decauville track, which is sufficiently well known, over 4,000 miles of it having been put down in various parts of the world. The improvements made in it by Mr. Decauville in recent years permit of the carriage of 34, and even 48 ton guns on a two foot gauge, which has the great advantage over broader gauges of allowing of curves of very short radius—say 25 feet with traction by horses, and 65 feet with traction by locomotive—while the 3¼ foot gauge does not permit of the practical use of curves having less than 150 feet radius. A track of this type was laid on the bottom of the Seine, and extended to the top of the incline at the entrance to the Alma bridge. Two three-axled 9 ton cars having been sent down this track into the water, the gunboat was placed directly over them, and, as soon as she bore upon the first, a strong tackle, actuated by three horses, began to haul her out of the water. A few minutes thereafter, her stern bore upon the other car and she then began to ascend the incline. Reaching the top, a portable Decauville turntable changed her direction nearly at right angles, and, in a few minutes, she crossed the bridge where our artist has represented her.

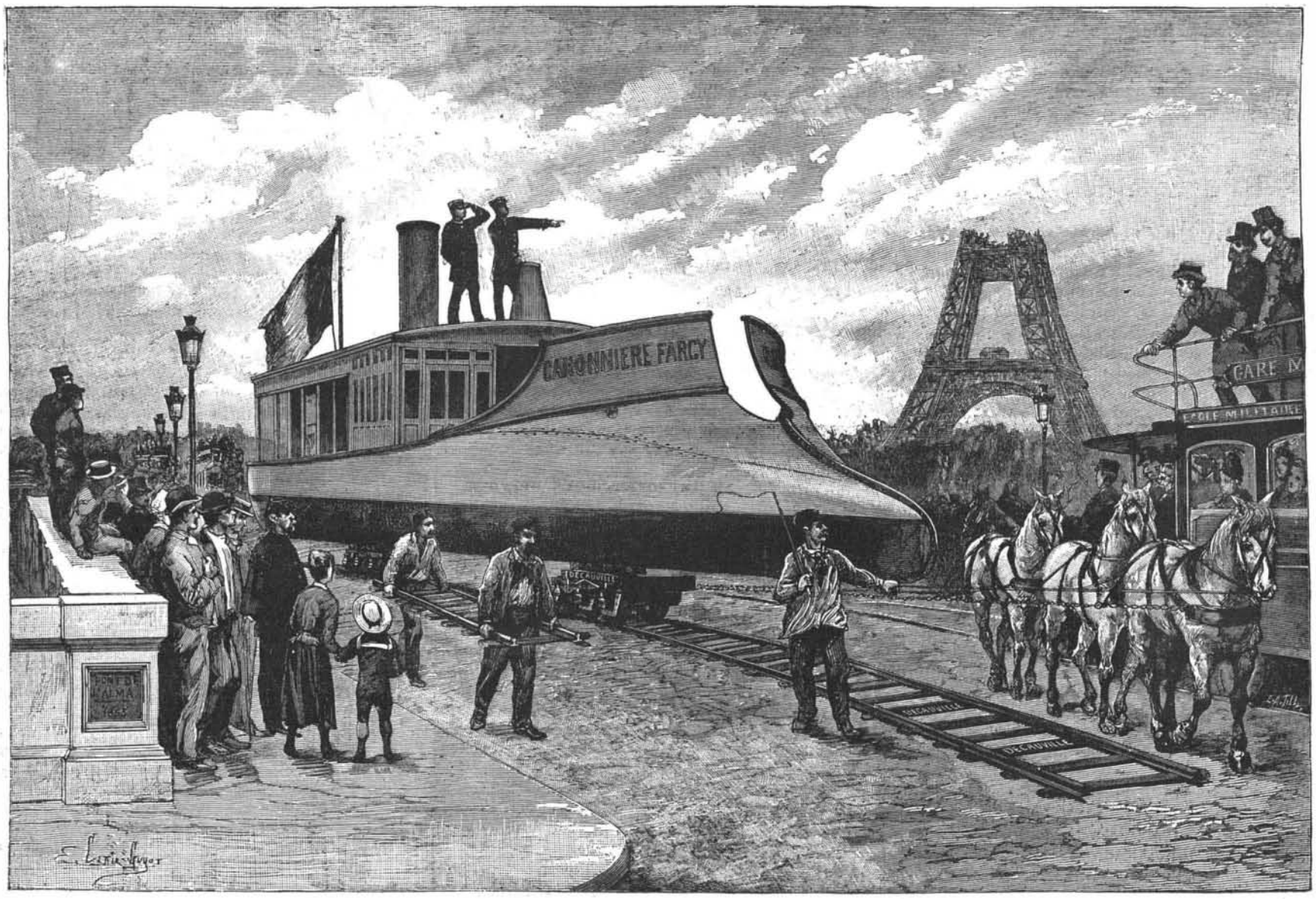
The distance to be traversed between the bridge and the Palace of Industry was 2,000 yards, but, as there was but a single carriage to be effected, Mr. Decauville found it preferable to use but a thousand yards of track, which was taken up behind the boat in measure as she advanced, and was laid down in front.

The laying of the Decauville track was done so rapidly that, when no obstacle presented itself, it was effected at the rate of 1,500 yards per hour with a force of eight men; but it was necessary to stop frequently, so as not to interfere with the passage of the tramway cars, which are very numerous on the Alma bridge, and the total operation lasted fifteen hours.

On arriving at door VI. of the Palace, near the Ledoyen restaurant, it was found that the boat was too wide to enter, and the managers of the exhibition hesitated at the expense of laying her upon her side and taking her in in that manner. To avoid swelling the expenses, Mr. Farcy proposed to introduce her on her keel, with a slight injury to her sides or a slight scratching of the door frame, for it needed an extra space of but six-tenths of an inch to allow her to enter and take her place upon the large basin constructed in the center of the Life-saving Exhibition. All applications made to the Ministry of Fine Arts, however, were fruitless, and the authority to scratch a few stones or displace them for a few days was pitilessly refused. The gunboat, therefore, had to beat a retreat for a few feet, so as not to interfere with traffic in this part of the Champs Elysees, and it was decided that she should remain outside of the Palace of Industry upon the Decauville railroad that had transported her.

Parisians, then, are going to have, during the whole summer, the somewhat rare spectacle of a ship railway, which will give them some idea of what the Americans wish to establish as a competitor at Panama.

Let us add that Commander Farcy has decided to allow his gunboat to be visited upon the payment of an entrance fee, the amount thus collected to go to the Fraternal Society of the Old Defenders of the Country. —*L'Illustration.*



THE FRENCH GUNBOAT FARCY EN ROUTE FOR THE PALACE OF INDUSTRY, PARIS.

Death in Bed Bolsters.

A medical officer of the health department was speaking recently about the danger that lurks in diseased bed clothes, to a *Mail and Express* reporter.

"Take notice," he said, "of the fact that disease and death lurk in the very pillows and bolsters on which we lay our heads at night. It is easy to talk of down and feathers, but it is a fact, if they were cut open, these articles would be often found to be more or less stuffed with the most heterogeneous materials. Pillows, bolsters, and beds have been examined and found to contain portions of filthy, coarse black serge, apparently parts of soldiers' coat sleeves, pieces of dirty, greasy silk dresses, old worsted braid from the borders of women's gowns, soiled linen rags and colored calico, and even nuts and walnut shells and pieces of crinoline wire. The bedding in this case was bought new, we are assured, a few years ago of an expensive and respectable upholsterer. Moreover, a woman who was employed to do the unpicking work of the trade informed the lady of the household that the practice of stuffing bedding with dirty rubbish and rags was very general, and that few beds or bolsters contain only the materials of which they are supposed to consist."

Spraying Bartlett Pears.

The practice of spraying or faintly showering young fruit with liquid poison, to destroy the noxious insects which injure it, has for many years been practiced by successful fruit growers. It has proved particularly advantageous to apples and pears, and more especially to the Bartlett pear, which from its earliness and texture appears to be particularly liable to the attacks of the codling moth and of the curculio. The work is done when the young fruit stands erect, ready to hold the poison in its upright cup, and when the young pears are between the size of peas and of cherries. It is sometimes necessary to repeat the operation two or three times, to replace what may have been washed off by heavy rains. The most commonly used poison is Paris green, thoroughly mixed and stirred with 700 times its bulk of water, and faintly and universally showered over the whole tree. It destroys all the codling worms, just hatching in the calyx where the moth has laid its eggs, and long before the pears are half grown the rains have washed off all the poison, so that it is perfectly safe to eat the fruit when mature.

Paris green is a very imperfect remedy for the curculio on plums, and usually destroys only a part, but it seems to be more efficient on pears, and, together with the codling moth, this remedy does valuable work on them. We have had an opportunity the present season of comparing, or rather contrasting, the two modes of treatment. An orchard of Bartlett pears was sprayed three times, the rains partly interrupting its action. The result now is that the heavily loaded trees are bearing scarcely a defective specimen, while a tree, likewise heavily loaded, growing forty rods distant in a garden, has nearly every pear more or less distorted and disfigured by the codling worms in the calyx and core, and by the curculio at the sides.

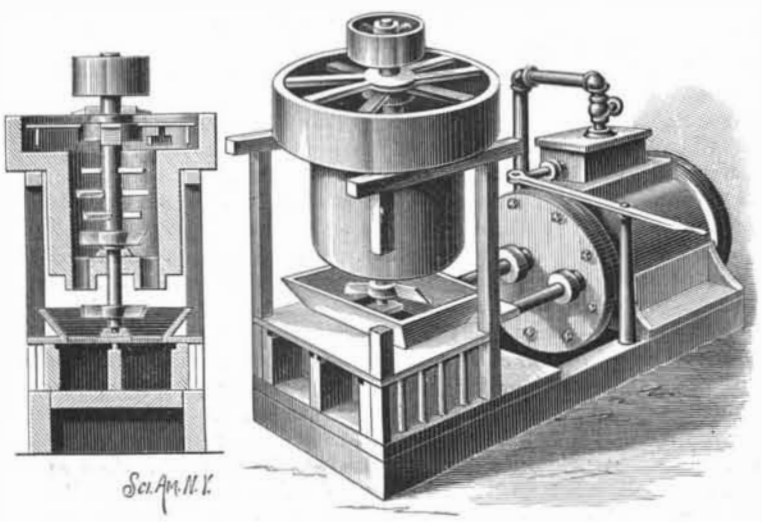
We have described more in detail the process of spraying in our past numbers. London purple, if pure, and when not choking or obstructing the fine spraying rose, answers as well as Paris green, and some orchardists have used the white arsenic, which they find cheaper and quite as efficient, but it is considered more dangerous than Paris green, because it does not exhibit so distinctly, in any vessel in which it has been used, its peculiar and conspicuous green color.—*Country Gentleman.*

New Observatory.

Denver is about to have an astronomical observatory that will rival the famous Lick Observatory in California. Its dome will rise from a plain and have 1,000 feet greater elevation. The building and instrument have been provided for through the liberality of W. B. Chamberlain, of Denver. The framework of the metal dome is of iron and steel, and is made as light as is consistent with a high degree of rigidity. The covering is of galvanized iron. The weight of the dome will be about twelve tons, and the devices for making it revolve easily are very ingenious; the endeavor is to substitute rolling for sliding friction. For this purpose a live ring is employed. This consists of a number of wheels set at equal distances around a circular track; on the circumferences of these the dome rolls. The telescope, which is now being completed, will be a very valuable and expensive instrument. The diameter of the object glass will be 20 in. and the length of the tube about 26 ft., of the best hard rolled steel.

AN IMPROVED PUG MILL.

A mill designed to thoroughly and economically mix and grind clay, and force the tempered clay into the mould box of a brick machine, is illustrated herewith, and has been patented by Mr. Henry Woodcock, of Perth Amboy, N. J. On the base of the machine is mounted a steam cylinder, together with a frame supporting the receptacle in which the clay is worked and tempered. This receptacle has a circular pan at the top, below which is a cylindrical mill, in the bottom of which are two passages through which the clay



WOODCOCK'S PUG MILL.

drops into a hopper below, in the center of which a vertical shaft is stepped. A spider frame is carried by the shaft in the circular pan at the top, the arms of the frame having blades and a scraper, to work the clay and force it into the mill below. In this mill the shaft carries arms for agitating and working the clay, and a propeller for forcing it through to the hopper, as shown in the sectional view. In the hopper the clay is further worked, and forced through passages in the bottom to boxes below, there being in each box a follower, both of them connected to the same piston head in the steam cylinder by piston rods, so that both are operated at the same time by a single steam cylinder. Each follower is provided with a plate at its upper edge to close the openings at the bottom of the hopper, when the followers are thrust forward to force the tempered clay out of the machine.

New York as a Milling Center.

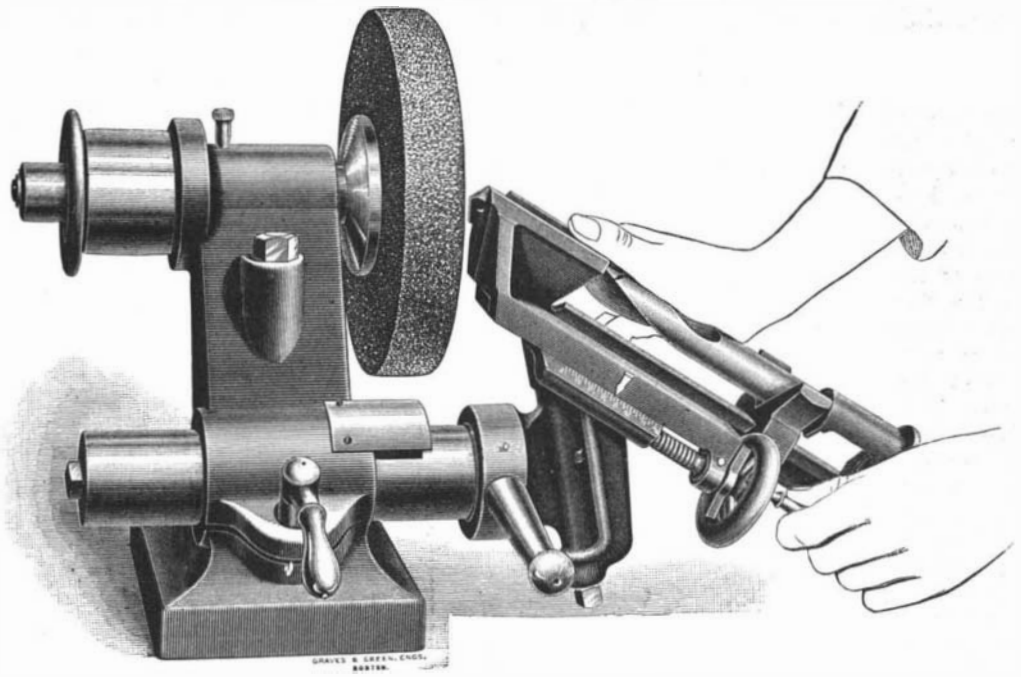
There is a steadily growing impression that New York City is destined to be one of the chief milling centers of the country ere long. There are many cogent reasons for this belief. Being the leading seaport and moneyed center of the country, with a large storage capacity, and also the natural terminus of the principal railways, as well as the Erie Canal, the available supply of wheat is generally likely to be abundant. Furthermore, as it draws its supplies from all quarters of the country, the assortment is, of course, apt to be better than ordinarily obtainable at interior points. This will assuredly give the miller a decided advantage. Loud complaint has been heard recently from the West, but particularly from winter wheat States, regarding the difficulty of obtaining supplies of wheat at prices on a parity with those current in New York. These facts have induced several gentlemen of means and experience to erect a first class mill here. Among the leaders in this enterprise are Messrs. B. B. Stewart, a well known citizen of Cincinnati, J. C. Ott, of the Produce Exchange, and William Sumner. The mill, which will be chiefly brick, and six stories high, with a daily capacity of 1,500 barrels, is now being constructed under the personal supervision of Mr. William D. Gray, the well known expert of the firm of E. P. Allis & Co., of Milwaukee. No pains or money will be spared to make this mill perfect in every respect. The location is an excellent one, being at Mariner's Harbor, on the Kill Von Kull, Staten Island. The property is 987 feet deep, 300 feet wide in the rear, and 265 feet front on the water. The dock will have 20 feet of water at high tide and 14 feet at low tide. Moreover, the Baltimore & Ohio Railroad will run tracks down the entire length of the property. This will give first-class railway as well as water facilities. Hence wheat can be delivered direct from cars or boats into the mill, and the flour out in the same way.—*Produce Exchange Reporter.*

Purification of Mercury.

The following process for the purification of mercury has been in use for some years at the Physical Institute at Kiel with the best results. The mercury containing chemical and mechanical impurities is poured into a glass tube, into the lower end of which is cemented a piece of bamboo cane which acts as a filter. The mercury passes through this into a larger glass tube almost entirely filled with dilute nitric acid (1 in 50), and on leaving this bath is sufficiently pure for some purposes. The distilling apparatus to prepare chemically pure mercury consists of a glass tube about 15 mm. wide and 80 cm. long, at top of which is a bulb of about 6 cm. diameter. The open end of this tube is placed in an inverted bottle with the bottom knocked out. Through the cork in the neck of this bottle is passed a second tube about 1 cm. wide and 145 cm. long, which passes through the other wider tube and up into the bulb at the top of it. This narrower tube is also contracted into a capillary one about 40 cm. from the top, and at the lower end is bent upward. To work the apparatus, the wide tube and bulb are filled with mercury and inverted, which creates a vacuum in the bulb, and more mercury is poured gradually, drop by drop, into the narrow tube to increase it, and the apparatus then acts like a Sprengel pump. The bulb is then heated by the flame from a circular burner, and distillation takes place continuously, the absolutely pure mercury flowing out at the bent-up end of the smaller tube. Unless the atmospheric pressure varies greatly, the apparatus can be left at work night and day, and only requires the addition of mercury two or three times in 24 hours.

AN IMPROVED DRILL GRINDER.

A drill grinding machine which can be sold at a moderate price, and which will hold twist drills varying in size from ¼ inch to 2 inches, is illustrated herewith, and has recently been perfected at the Washburn shops of the Worcester Polytechnic Institute, Worcester, Mass. The wheel spindle has a conical bearing, adjustable for wear, while the emery wheel is of cup form, the drill being applied so that its perfect grinding does not depend upon a perfect wheel surface, a new place on the wheel being used each time a drill is ground. The workman places the drill in the V-shaped holder, sets the pointer on the scale to a figure corresponding to the diameter of the drill, and with the thumb of the right hand places the drill with its lower cutting lip against a projecting gauge which secures its correct position. The drill holder is then pushed forward till the drill nearly touches the wheel, where it

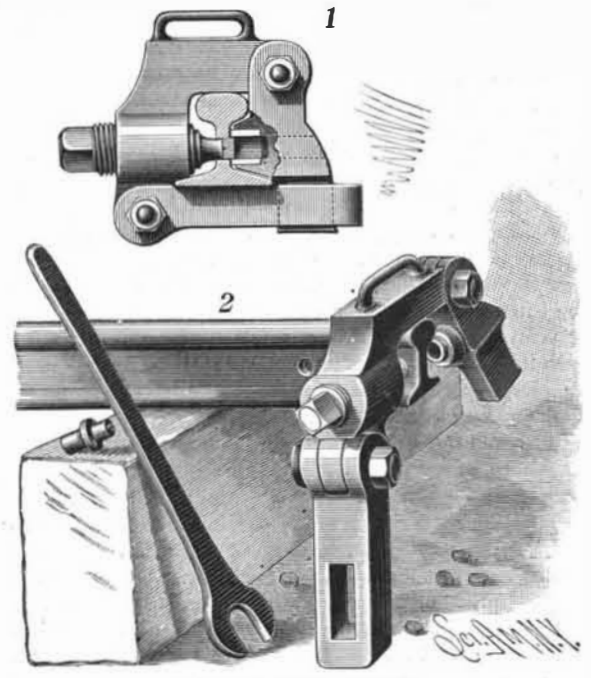


A TWIST DRILL GRINDER FOR GRINDING DRILLS FROM ONE-QUARTER INCH TO TWO INCHES DIAMETER.

is clamped by the handle at the left. Then the grinding is done with the two hands, the correct form of the cutting lip being made by rocking the holder and drill about a vertical axis at the same time that it is fed forward by the hand wheel. The amount ground off is gauged by the left hand on the feed wheel handle. After the first lip is ground, and before the holder is backed away from the grinding wheel, a pointer is set which indicates when both lips are ground alike. There is no adjustment of chuck holders, the rest for the shank of the drill being readily adjustable, and the end stop being adjustable for any length of drill from 16 inches down to a mere stub. The drill point is ground to a helicoidal surface of 59 degrees, and the adjustment for drills of various diameters is obtained by a combination of angles in the sliding holder, giving always the right adjustment when the pointer stands at the figure on the scale corresponding to the diameter of the drill to be ground.

AN IMPROVED RAIL PUNCH.

A punch for making bolt apertures in rails, and specially intended to supersede the use of the ratchet



HULME'S RAIL PUNCH.

and drill for such purpose, is illustrated herewith, and has been patented by Mr. Isaac Hulme, of Yaquina, Oregon. On a downward extension of one end of the frame is pivoted a bar adapted to be brought up against the base of the rail and held in engagement with the foot of a vertical arm pivoted to the other end of the frame. This foot passes through the opening in the bar, and has an offset to engage its bottom, as shown in Fig. 1. In one downward arm a punch screw is operated by a wrench, the central line of the screw and punch coinciding with a die held on the inner end of the other arm of the frame, and made in the form of a collar opening into a longitudinal aperture in the arm. As the operator turns the screw in which the punch is fitted, bringing its outer end against the body of the rail, the die in the other arm resting against the opposite face of the rail, the punch forces an aperture in the body of the rail, the punched part passing into the opening in the die corresponding with the punch. The device is designed to be very simple and durable, and has a handle for conveniently moving it from place to place.

THE plant now employed on the Manchester ship canal includes 98 locomotives, 3,221 wagons, 51 steam navvies, 49 steam cranes, and 104 pumping and other engines, with 161 horses and 8,568 men and boys. Almost the whole of the land required for the construction of the canal has now been acquired by the company.