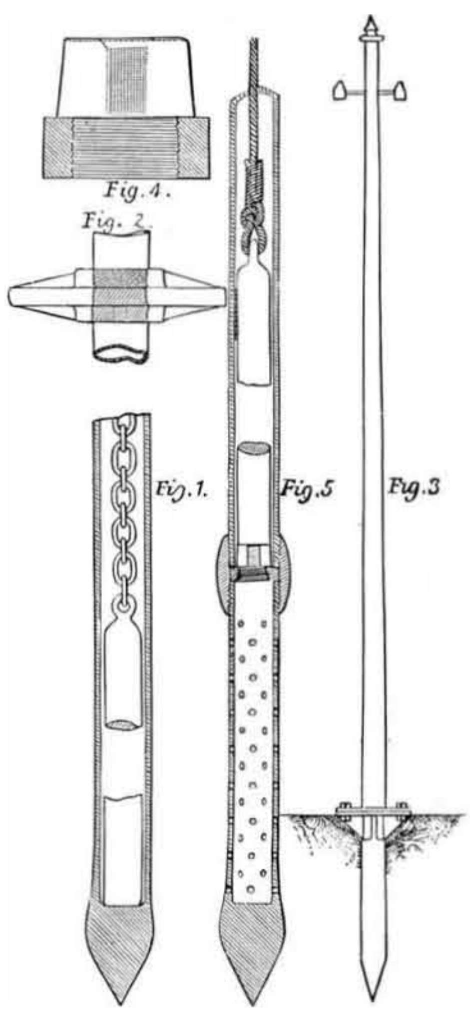
TUBULAR PILES.

A novel and ingenious system of constructing and driving piles has of late been introduced into practice by Messrs. Le Grand & Sutcliff, of London, artesian well engineers. It involves a considerable departure from ordinary practice, inasmuch as the piles are driven internally and at the bottom, instead of externally and at the top. The invention originated with the senior member of the firm, whilst the credit of some of the applications of the principle is due to the junior member. The piles, says *Engineering*, are tubular, and can



TUBULAR PILES.

be made of either wrought or cast iron, and the thickness of the metal can be proportioned to suit the varying circumstances of construction. The lower end of the pile, as shown in Figs. 1 and 6 of our engravings, is made solid and pointed, and is generally of wrought iron and steel tipped. The piles are made in sections, which are screwed together by strong steel sockets or joint covers, which are barrel shaped on the outside in order to diminish friction when being driven.

The method of driving these piles is as simple as it is novel. Instead of the blows being delivered on the head of the pile, the driving force is expended just where it is wanted, namely, at the point. This result is attained by using an elongated cylindrical driving weight, which travels easily inside the tube. The weight is raised by means of rope or rods, and is allowed to fall on the flat head of the solid point, the pile thus forming its own guide for the driving weight. The effect of each blow is to drag rather than to drive the pile down. It will be seen that the point is swelled, and is of sufficient diameter to effect a clearance for the joint covers which have to follow it down. The form of the joint cover is seen in Fig. 5. A considerable experience in driving tubes into the ground has shown the inventors that, thus made, the point does all the real work, and that a very slight strain is brought on the joints above. An increase of stability is given to these piles in cases where the depth to which they have to be driven is previously known by the use of a flange which is proportioned to suit the nature of the soil into which the pile has to be driven. This flange is shown at Fig. 2, and is so placed that at the final driving it just embeds itself on the river or sea bottom. The tubes forming the pile are screwed into the flange, which in this case takes the place of the usual steel socket, and unites the two lengths of the pile together. It thus in no way diminishes the strength of the pile as it would if screwed on to the tube below an ordinary socket.

With this system of piles it is not necessary to test the ground previously to driving them, inasmuch as lengths can always be added until a firm foundation is reached, failing which the pile can be withdrawn. In prospecting for a site small tubes can very rapidly be driven to ascertain the nature of the soil. Another advantage the system possesses is that piles can be driven in deep water with great facility, and they can be of extreme length. Their strength, moreover, can be increased by filling them in with concrete after they have been driven, if desired. When meeting with obstructions, screw piles have a tendency to become diverted from their position, and are liable to loosen the ground around them. The tubular pile, on the other hand, is not open to this objection, as it will fracture and pass through minor obstructions until it reaches a solid foundation, and being forcibly driven into the ground, the earth firmly surrounds it. These piles are applicable to all classes of engineering work, and they are now being tried by the Royal Engineer Committee, under instructions from the Under Secretary of State for War.

The principle of internal driving has been applied by Messrs. Le Grand & Sutcliff to the sinking of tube wells, driving the foundations for telegraph posts (as shown in Figs 3, 7, and 8), flagstaffs, and the like. When used in connection with tube wells a slightly modified arrangement has to be employed in consequence of the necessity which then arises for keeping out of the tube the water, which in the ordinary way flows in through the perforations. In this case the first socket above the perforated end is made sufficiently long to admit of a stout iron ring or washer being placed in the center of it in such a way that the two lengths of tube when screwed tightly together butt against it, one on the under and one on the upper surface. The interior of this ring is of sufficient size to allow the water to pass freely through it, but it has a screw thread cut throughout its whole length. During the operation of driving, the opening in this ring is closed by a steel plug, which is screwed down into it until the upper part butts on the ring, as seen at Fig. 4, where the ring is shown in section. The upper part of the plug forms an anvil, upon which the driving weight falls, the blow being thus delivered a short distance above the point of the tube instead of directly upon it, as in the case of the piles. In the center of a plug a hole is bored and tapped, into which a rod can be screwed for removing the plug when the driving has been completed. The male thread on the exterior of the plug is cut left handed, so that ordinary boring rods can be used in removing the plug without incurring the risk of unscrewing them.

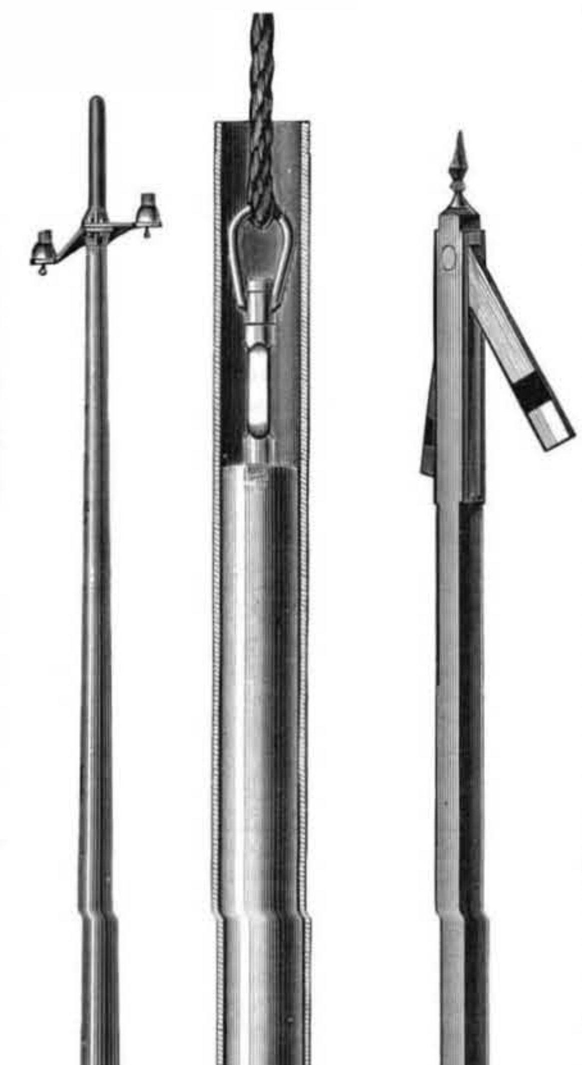
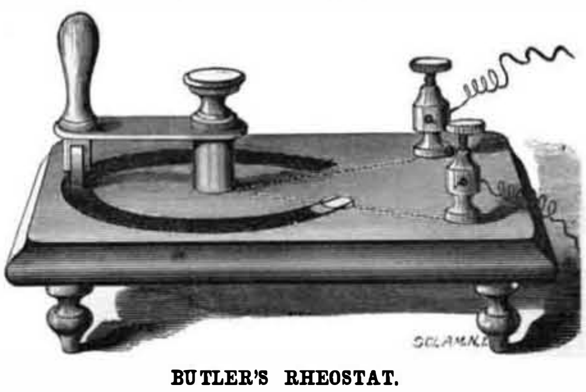


Fig. 7. Fig. 6. Fig. 8.
TUBULAR PILES.

The general arrangement of this system of driving tube wells is shown at Fig. 5. It will be seen that the water cannot rise in the tube above the underside of the steel plug, and in practice no difficulty has been experienced in any other respect. Altogether the system is one which commends itself for its simplicity, and for the facility it offers for carrying out that class of works to which the invention addresses itself.

IMPROVED RHEOSTAT.

The rheostat shown in the engraving is the invention of Mr. John Butler, of this city. It is designed for introducing more or less resistance into an electrical circuit. The bed plate is made of non-conducting material, and in an annular groove in its upper surface there is a film or plate of material that offers considerable resistance to the electrical current. Generally the groove is partly filled with plumbago. One end of the resistant is connected with a battery, and the current is completed through a movable key whose pivot is at the center of the circular groove. The key is provided with a roller



BUTLER'S RHEOSTAT.

which rests upon the plumbago and moves over its surface without abrading it.

This rheostat seems especially adapted to the use of physicians and experimenters.

IMPROVED INSTRUMENT FOR RINGING SWINE.

The instrument shown in the engraving is used for forcing through the flesh and gristle of a hog's nose one end of a piece of wire, while the other end remains at rest. The main object is to close the ends of the wire together outside of the flesh, so that the joint cannot enter and irritate the wound. The invention consists of a pair of pincers having

INSTRUMENT FOR RINGING SWINE.

one curved and one V shaped jaw, each jaw having a guide groove for receiving the pointed wire which forms the ring. The wire, slightly curved at one end, is inserted between the jaws, when, by closing the handle, the end of the wire will be forced through the hog's nose and bent up into a ring.

This device is the invention of Mr. W. D. Brown, of Indianapolis, Ind.

Wood Stains.

To turn oak black so as to cause it to resemble ebony, the wood should be immersed for forty-eight hours in a hot saturated solution of alum, and then brushed over several times with a logwood decoction, prepared as follows: Boil one part of best logwood with ten parts of water, filter through linen, and evaporate at a gentle heat until the volume is reduced one half. To every quart of this add from ten to fifteen drops of a saturated solution of indigo, completely neutral. After applying this dye to the wood, rub the latter with a saturated and filtered solution of verdigris in hot concentrated acetic acid, and repeat the operation until a black of the desired intensity is obtained. To imitate rosewood a concentrated solution of hypermanganate of potassa is spread on the surface of the wood, and allowed to act until the desired shade is obtained. Five minutes suffice ordinarily to give a deep color. A few trials will indicate the proper proportions. The hypermanganate of potassa is decomposed by the vegetable fibers with the precipitation of brown peroxide of manganese, which the influence of the potassa, at the same time set free, fixes in a durable manner on the fibers. When the action is terminated, the wood is carefully washed with water, dried, and then oiled and polished in the usual manner. The effect produced by this process on several woods is remarkable. On the cherry, especially, it gives a beautiful red color.

Antidote to Poison.

If a person swallows any poison whatever, or has fallen into convulsions from having overloaded the stomach, an instantaneous remedy, most efficient and applicable in a large number of cases, is a heaping teaspoonful of common salt, and as much ground mustard, stirred rapidly in a teacupful of water, warm or cold, and swallowed instantly. It is scarcely down before it begins to come up, bringing with it the remaining contents of the stomach; and lest there be any remnant of the poison, however small, let the white of an egg or a teaspoonful of strong coffee be swallowed as soon as the stomach is quiet, because these very common articles nullify a large number of virulent poisons.—*Medical Brief.*