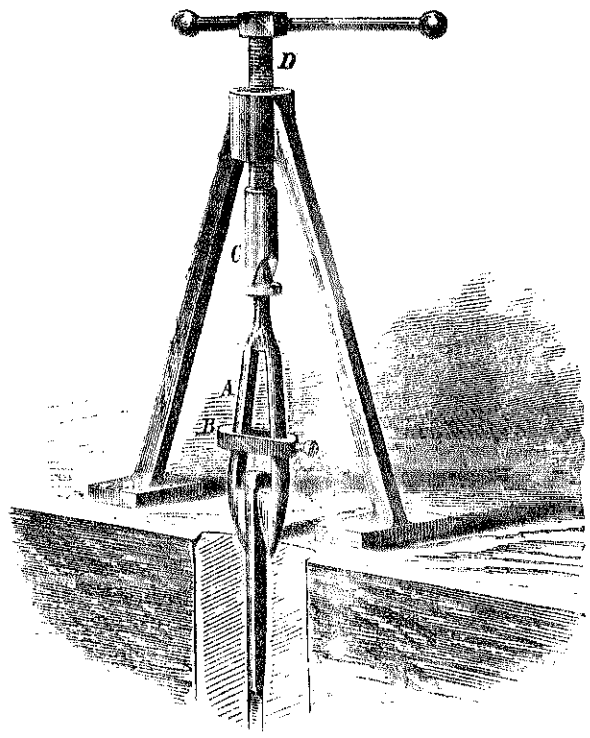
IMPROVED SPIKE EXTRACTOR.

The object of this invention is to remove railway spikes, heavy nails, or similar fastenings from wood, quickly and without bending the iron, so that the spike or nail can be used again without straightening. The arrangement of the device is also such that the extraction is easily accomplished, even when the spike is headless.

The arms of the grapple, A, may be hinged, or arranged to spring together, as shown in our illustration. The sharp corner ends of the jaws are driven into the wood on each side of the spike, and then, if hinged, further compressed by the becket, B. The head of the grapple passes through a notch into a tube, C, which last is swiveled to the lower extremity



of the screw, D. By turning the latter, the grapple and with it the spike—under the head of which the jaws catch—are lifted. The jaws have sharp cutting edges, which, when they are forced together, bite into the nail, so that a good purchase is gained on the latter, whether it has a head or not. A stout standard is provided, supporting the apparatus. The device seems to be an efficient and useful invention, and doubtless will meet a favorable reception from railway builders and others having occasion for its use.

Patented through the Scientific American Patent Agency, September 29, 1874. For further information, address the inventor, Mr. William Devine, Brownsville, Cameron county, Texas.

THE ERICSSON PNEUMATIC TORPEDO.

Through the courtesy of the inventor, Captain John Ericsson, of Monitor fame, we have been favored with sketches of the craft, from which the accompanying illustration has been prepared.

The body of the torpedo consists of a box of thin steel plates, 8 feet 6 inches long, 30 inches deep, and 20 inches wide. The explosive is placed at the bow. During the experiments a block of wood 27 inches long represented the containing vessel. A tapering block 18 inches long and secured to the rear of the box forms the stern, immediately aft of which are the propellers. These are of the two-bladed type, 3 feet 2 inches in diameter with a pitch of 5 feet. Both revolve around a common center, yet in opposite directions, a necessary condition, since the powerful rotary movement of a single screw would cause the small hull to keel and probably revolve, unless retained in a vertical position by the ingenious expedient of causing the rotary tendency of one propeller to counteract that of the other. The displacement is greater than might be supposed, considering the small dimensions of the body, 2,000 pounds being barely sufficient to balance the weight of the whole apparatus.

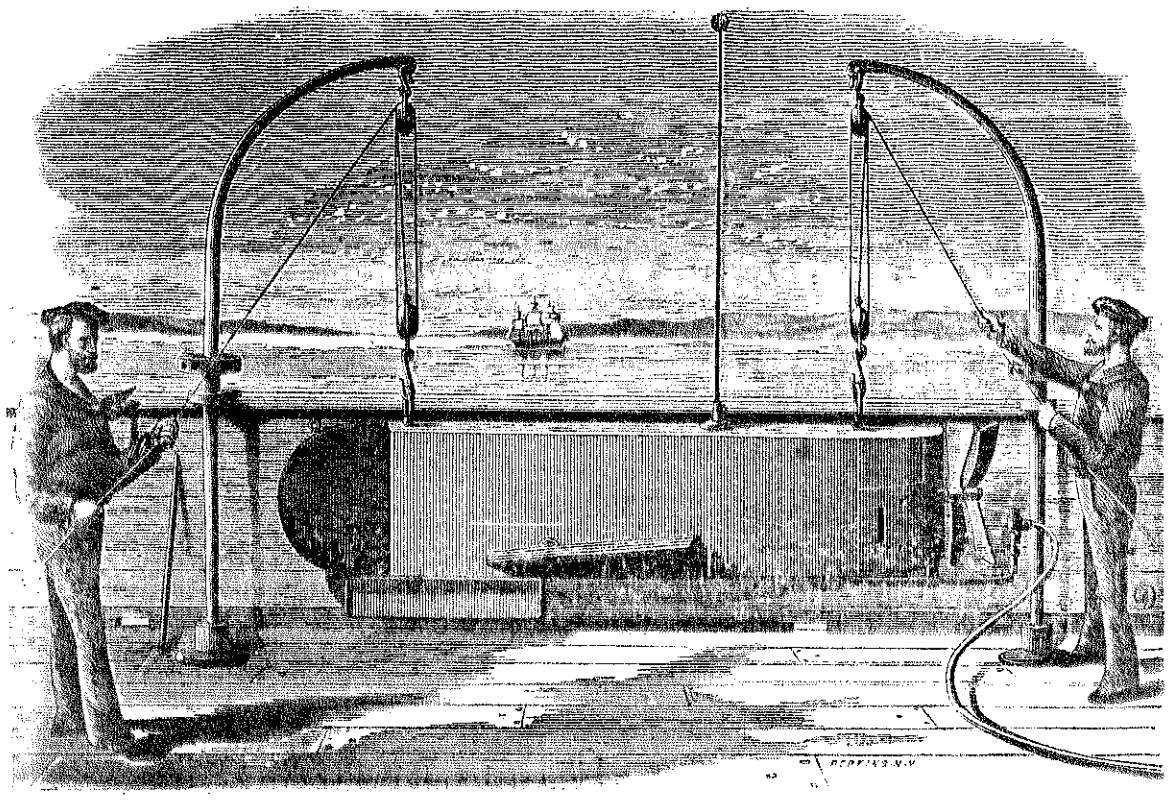
The motive power is a small double cylinder oscillating engine, driven by compressed air, which is transmitted through a tubular cable, connected just abaft the stern, as shown in our engraving. The air pressure also governs an equipoise rudder, secured under the bottom and near the bow. The steering is effected by applying the force of the air against the tiller on one side, counteracted by the tension of a spring on the opposite side. The action of the apparatus is such as to be wholly independent of the differential force of the compressed air and the spring tension, and it is set in motion by admitting more or less air into the cable, thereby opening, more or less, a small connecting valve.

The submersion is regulated by two horizontal rudders turning on a transverse axle, which projects from each side near the bow. These wings or rudders are so contrived and governed that they keep the torpedo at a depth of from 7 feet to 12 feet below the surface, and are provided with automatic devices, so that the latter limit cannot be exceeded. In order to note the course of craft, a light steel mast is secured to the deck. This is 12 feet in length and terminates above in a wooden ball, the forward side of which is painted sea green, so as not to be perceptible to the enemy, and the rear white, so as to be easily distinguished above the water by those dispatching the torpedo. Openings are made in the engine compartment, through which the water enters, completely filling the interior space. The machinery is made of bronze with boxwood bearings, so that the water serves as a lubricant to every portion, thus doing away with stuffing boxes at the rudders, and, besides, avoiding any danger of the mechanism failing to operate through rust or neglect to oil.

To the engine power of the torpedo, no precise limit can be set. The whole force of the heavy engines of the torpedo boat, from which the weapon is dispatched, may be used to compress air up to almost any desired point. Captain Ericsson informs us that, small as the craft is, it towed a scow, forty feet long by fourteen beam and drawing two feet of water, without trouble. Driven at a high velocity by its large screws, it seems probable that the machine would make light work of piercing ordinary torpedo netting, or at any rate the explosion of its heavy charge of 400 pounds of nitro-glycerin, at such a short distance from a vessel as the length of her lower booms, would be sufficient to accomplish its purpose. Of course the torpedo hull is destroyed by the explosion but this would be a trivial loss in exchange for the total wreck of an enemy's man-of-war. The cable, however, remains uninjured, for it necessarily becomes detached and may be readily hauled in.

Our illustration represents the mode of launching the torpedo from the deck of the vessel. To this end the apparatus is hoisted up on swinging davits, the arms of which are previously turned over the deck. When lifted clear of the rail, the torpedo is carried outboard by revolving the davits, by bars inserted in the sockets in the broad portion of the davits, as shown. Nothing remains but to lower the machine into the water by the falls. The whole operation, we are informed, is accomplished in one minute.

A series of trials with the Ericsson pneumatic torpedo has lately been conducted on board the Intrepid, Commander A. P. Cooke, U. S. N., commanding, which has demonstrated the invention to possess a remarkable degree of efficiency. If further experiments, soon to be instituted from another torpedo boat, the Nina, prove, with the slightly modified steering gear, as successful as the initial tests above referred to, we may fairly conclude that that long-sought weapon, a reliable fish torpedo, has at length been devised. As to the probable result upon naval warfare, it is only possible to surmise. Against the attack of the torpedo, there is practically no defense, for its approach cannot be seen. Armor plating, even did it extend to the keel, would prove no shield, and the Inflexible's one hundred and twenty watertight compartments, which the English constructors hope will render her proof against such attacks, would fare badly under the terrible effects of 1,200 pounds of gun cotton, with which Captain Ericsson says he could break any ironclad completely in two. We do not doubt but that the same ingenuity which can devise a weapon of offense is equally competent to provide a means of defense, at least such has been the experience of the past, as evidenced by the almost uniform progress in guns on one hand and armor on the other; but what defense, save that of giving an enemy the widest berth possible, and fighting at enormously long range, is likely to prove efficacious, we are at a loss to conjecture.

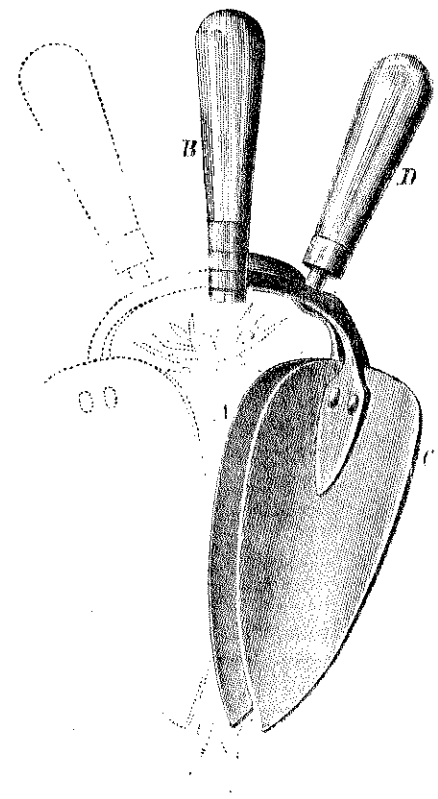


THE ERICSSON PNEUMATIC TORPEDO.

COPPEN'S IMPROVED TRANSPLANTER.

This is an ingenious arrangement of a double-bladed trowel, the object of which is to remove plants from the ground and set them in another place without destroying the soil around the roots.

The outer blade, A, has a curved shank, and a tong which enters and is secured to the handle, B. The shank of the inner blade, C, is curved to fit upon the inner side of the shank of the outside blade, and is pivoted thereto, at its extremity, by



a screw. Upon the middle part of the outer shank is formed a bend to receive the tong, which, on the inner shank, supports the handle, D.

In using the device, the blades are brought together, and thus thrust into the ground at one side of the plant, as shown in our illustration. The handles, B and D, are next operated to force one or the other of the blades around the roots, bringing the two directly opposite each other (see dotted lines). The instrument is then raised from the ground, taking the plant with it, and holding the soil undisturbed. The plant may easily be set in the desired place, the blades turned back to their former position, and the implement removed. By taking off the movable blade, the device may be converted into an ordinary garden trowel.

Patented through the Scientific American Patent Agency, October 27, 1874. For further particulars regarding sale of rights, address the inventor, Mr. George E. Coppen, P. O. Box 686, Evansville, Ind.

Electric Railway Whistles.

The French have lately introduced a system by which a stationary electric battery is made subservient to blow the whistle of an approaching locomotive, in case the road is not clear, without the engineer having to give any attention to it. Such an arrangement is, of course, exceedingly valuable at night, and especially during a fog, when signals cannot be seen at a distance. It is the reverse of the system introduced on the Hudson river railroad, by which every approaching locomotive sets a stationary electro-magnetic alarm bell at the depot in motion. In the French system referred to, the obstruction at the depot starts the steam whistle on every approaching locomotive when the train is still far enough away to slacken speed and stop. It has now been in uninterrupted operation on the line of the Northern Company of France for some time, and has been found practically successful in use, regularly informing the engineer whether the way is clear or not. The signal tender turns a disk and sends an electric current in the direction of the coming train to a bar placed between the rails; when the engine reaches the spot, a metal brush, placed between the wheels, sweeps the bar, the current passes to the engine, and, by means of an electro-magnet, presses upon a lever which opens the steam whistle, thus making it blow automatically. The rapidity with which the danger signal can be seen appears to be much in its favor.