A COMBINATION PIPE AND BENCH VISE.

A complete and efficient bench or pipe vise, having a sliding jaw which is operated by the screw and which is adjustable to any position, is an invention for which Peter Broadbooks, of Batavia, N. Y., has received a patent.

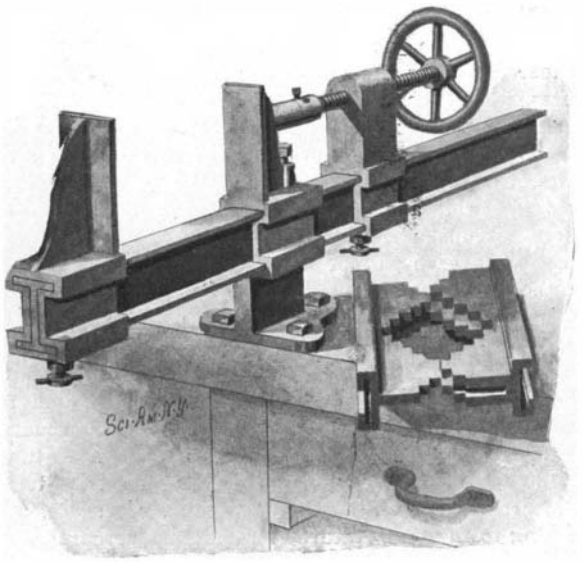
The fixed jaw is carried by a suitable base. Through the fixed jaw a bar slides, on which a movable jaw is adjustably secured. On the bar a screw-block is fitted to slide, through the top of which screw block a screw is threaded. In the fixed jaw a rod is swiveled, which can be bound to a chuck carried on the end of the screw. Thus constructed, the apparatus is an efficient vise designed to be used in the ordinary manner.

But when it is desired to use this vise for the purpose of gripping pipes, auxiliary pipe-jaws are employed, formed with flanges which are passed over corresponding flanges of the fixed and movable jaws and are held in place by set-screws. These pipe-jaws are made to interlock—that is to say, the one jaw is adapted to pass into a slot formed in the other jaw, so that the elongated teeth formed on each of the jaws may slide past one another and therefore receive pipes of various sizes.

STEERING TORPEDOES BY WIRELESS TELEGRAPHY.

A few months ago attention was drawn in the SCIENTIFIC AMERICAN to the invention of a young English electrician, Mr. Cecil Varicas, by which it was rendered possible to steer torpedoes and other light craft by means of Marconi's wireless telegraphic system. In that article a description was given of a severe trial that had been carried out with a model launch by Admiral Colwell. Since that time the inventor has been furthering his experiments with a view to steering submarine torpedoes in the same way, and a short while ago an exacting test was made in the open sea of the English Channel, in which the inventor was able to manipulate by means of ether waves and with conspicuous success the movements of a torpedo in any desired direction while it was traveling below the surface.

The Varicas torpedo resembles in outward appearance the familiar Whitehead projectile. The dimensions are precisely the same, and the propeller is of equal caliber. The interior of the torpedo, however, is vastly different. The explosive and the driving engines



A COMBINED BENCH AND PIPE VISE.

are localized in the same positions, but the gyroscope is supplanted by the electrical apparatus and receiver necessary for the actuating of the rudder. The torpedo installation consists of a Marconi coherer in circuit with a relay and battery. The relay closes the circuit of a decoherer and electromagnet, which attracts an armature. The latter is made to actuate the valve of a steering engine which is connected to the craft's rudder.

The stationary apparatus upon the shore, battleship, or other point from which the torpedo is fired, comprises a periodic interrupter placed in circuit with an induction coil, which in time works a wireless telegraphic transmitter.

When this periodic interrupter makes circuit the coil works the transmitter so that ether waves are produced, and the coherer on the craft conducts, working the relay which closes the circuit of both the decoherer and electromagnet. This causes the valve of the steering engine to move, so that the rudder is also turned in a certain direction.

When the interrupter breaks circuit the ether waves cease, and the coherer is decohered by the decoherer and ceases to conduct—the same as is now done in the Marconi system of wireless telegraphy—causing the relay to break the circuit of the electromagnet on the steering engine so that it releases its armature. The rudder is then reversed to the opposite direction by a strong spring. By this it will be seen that so long as the interrupter on shore makes circuit the rudder is pointed in a certain direction, but directly the circuit is broken the rudder assumes the diametrically opposite position.

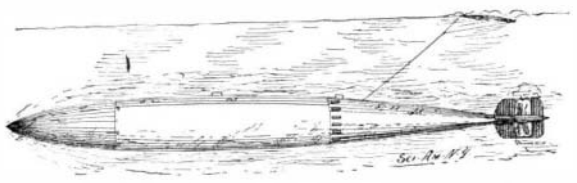
From this it will be recognized that if the alternate making and breaking of circuits is continued with regularity, answered by corresponding regular deviations of the rudder, the craft must travel in a direct straight line. On the other hand, if either the making of the circuit is longer than the period of breaking, or vice versa, the rudder is maintained in one position for a longer period, so that the direction traveled by the craft is in a curve.

One of the illustrations represents the shore section with various connections with battery coil, etc. The variable periodic interrupter consists in a drum, *O E*, over the periphery of which are secured two tubes of conducting and insulating material cut so as to fit into one another in triangular zig-zags, *z r*. The whole drum is rotated by clockwork, *G*, at a uniform velocity.

The sliding contacts, *B C*, press on the drum as it is in rotation. *C* is fixed and serves to maintain a continuous electrical connection with the conducting half, *O z*. The other contact, *b*, is movable in a direction parallel to the axis of the drum by means of the screw, *t*, which can be turned by the handwheel, *W* As the drum rotates this contact is brought into the position shown by the dotted line, *p*, so that it traverses the insulating and conducting portions for equal periods. By moving the contact toward *K*, however, the successive periods in which it will pass over the conducting portion will be greater than the successive intervals of the insulating portion, the difference increasing as the contact is removed from the equi-periodic line, *p*. But, on the other hand, if the contact be brought on the other side of the equi-periodic line, *p*, toward *L*, the reverse happens. That is to say, the successive intervals of break become longer, and those of make shorter, the difference increasing the farther the contact is removed from the line, *p*, so that by turning the wheel, *W*, in either direction intervals of make and break can be equal on the successive intervals of either, or make made greater than the successive periods of break or vice versa.

The recovery apparatus employed on the craft is shown. *C* is the Marconi coherer in circuit with the relay, *Y*, and battery, *B*. The relay is made to close the circuits of the decoherer and the electromagnet, *M*, which electromagnet attracts its armature, *a*, fixed to the valve arm, *l*, of the steering engine, *S S*. This armature is acted upon by a spring, *s*, which tends to pull it from the electromagnet, *M*. When this electromagnet attracts its armature it turns the valve in a certain direction, and the steering engine by aid of the levers (shown in dotted lines) also turns the rudder in a certain direction, but turns it in the opposite direction upon the release of the armature, *a*, acted upon by the spring, *s*.

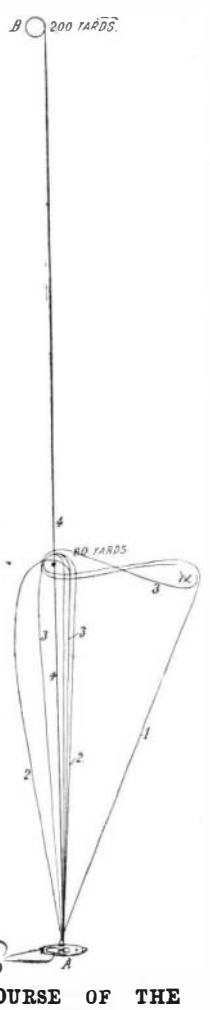
When the variable periodic interrupter, *O E t*, on shore makes circuit the coil works the transmitter, *T*, which produces ether waves, making the coherer on the craft conduct, causing the relay to close the



TORPEDO WITH RECEIVING FLOAT.

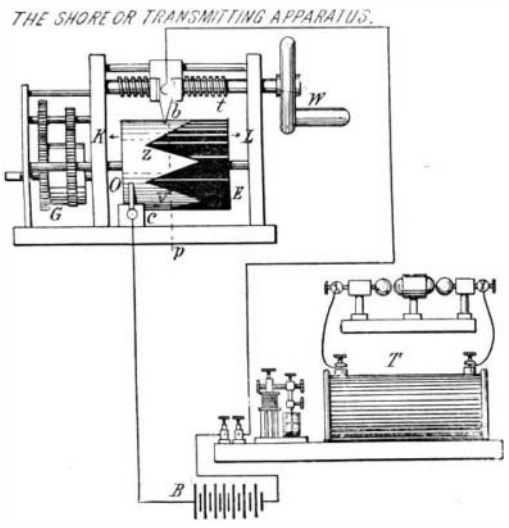
circuit of the decoherer and electromagnet, which last turns the valve of the steering engine, causing it to turn the rudder, *R*, in a certain direction.

When the variable periodic interrupter on shore breaks circuit, the coil and transmitter cease to produce ether waves. The coherer on the craft is decohered by the decoherer, which causes the coherer to cease to conduct. The relay then breaks the circuit of the electromagnet, which, consequently, releases its armature, *a*, and the spring, *s*, then actuates the valve of the aforesaid steering engine in the opposite direction, so that when the interrupter on shore makes circuit the rudder on the vessel to be steered turns in a certain direction, but when the circuit is broken it turns in the opposite direction. By equalizing the periods of make and break, therefore, the movements of the rudder neutralize one another, so that the craft must necessarily travel in a straight line. But by the handwheel, *W*, of the interrupter on shore in either direction, the successive intervals of make may be made greater than those of break, or vice versa.

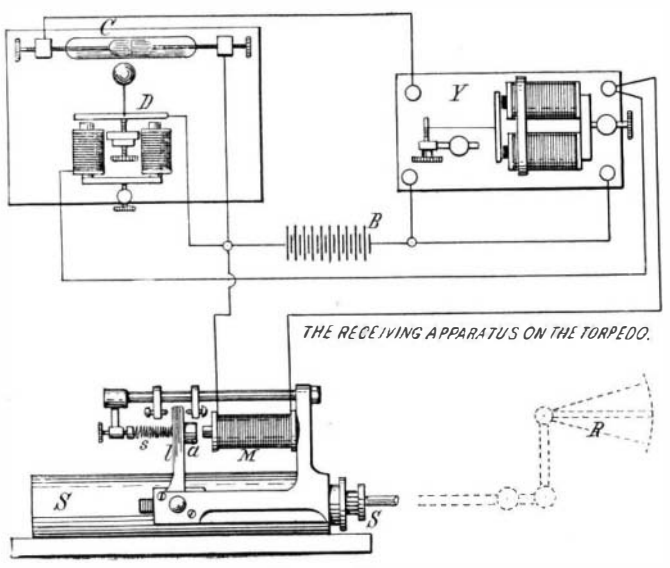


COURSE OF THE TORPEDO.

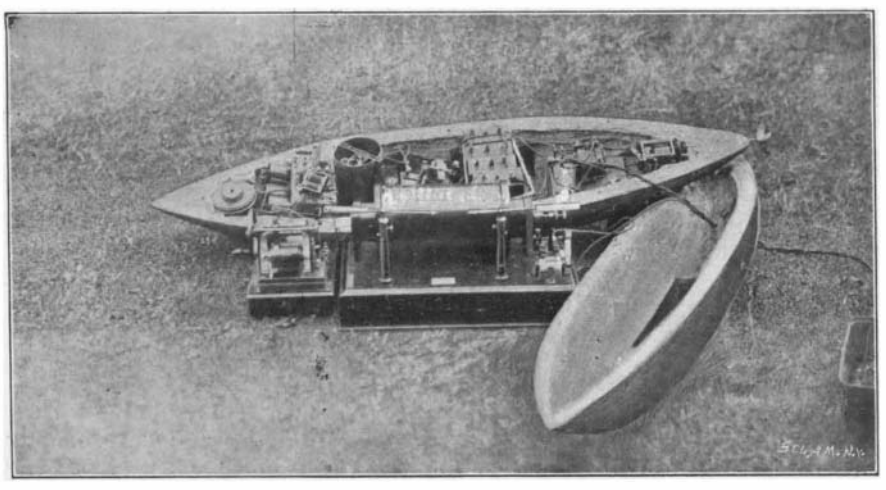
With regard to the torpedo, the inventor has designed an ingenious contrivance for arresting the ether waves from the transmitter in their progress through the air and conducting them to the instruments within the torpedo, which is submerged to a depth of about ten feet. On the upper surface of the projectile, near the stem, is a small recess containing a bobbin of fine wire with one end attached to a metal float which fits into the recess, forming part of the outer casing of the torpedo. When the projectile enters the water, from the tube, this float is detached by the concussion and rises to the surface, at the same time unwinding the bobbin. This float serves the same purpose as Marconi's high mast. The waves are received and conducted through the wiro to the bot-



TRANSMITTER.



RECEIVER



TORPEDO ARRANGED TO BE STEERED BY ELECTRICAL IMPULSES.