

THE NEW VICKERS-MAXIM 12-INCH BREECH-LOADING WIRE-WOUND GUN.

BY THE ENGLISH CORRESPONDENT OF THE SCIENTIFIC AMERICAN.

The new type of 12-inch breech-loading wire-wound gun made by Vickers-Maxim, and herewith illustrated, possesses several improvements, notably in the breech operating gear. This gun, which will figure largely in the new cruisers and battleships now being built for the British navy, has a total length of 556.5 inches, which is equivalent to 46.375 calibers, the length of the bore being 540 inches, or 45 calibers, while the shot has a travel of 459 inches, or 38.25 calibers, the length of the projectile chamber thus being 81 inches. At the breech the diameter of the weapon is 5 feet 6 inches, and at the muzzle behind the swell 1 foot 10 inches. The wiring jacket ranges from 80 wires at the breech through gradual reduction to 16 wires at the muzzle. The weapon fires a projectile of 850 pounds with a charge of 310 pounds. The muzzle velocity is 2,850 foot seconds, and the muzzle energy 47,874 foot tons. The powder pressures within the bore of the gun vary from a maximum of 18 tons to the square inch against a circumferential strength of 34.4 tons per square inch at the breech to 7.65 tons to the square inch against a circumferential strength of 16.1 tons to the square inch at the muzzle.

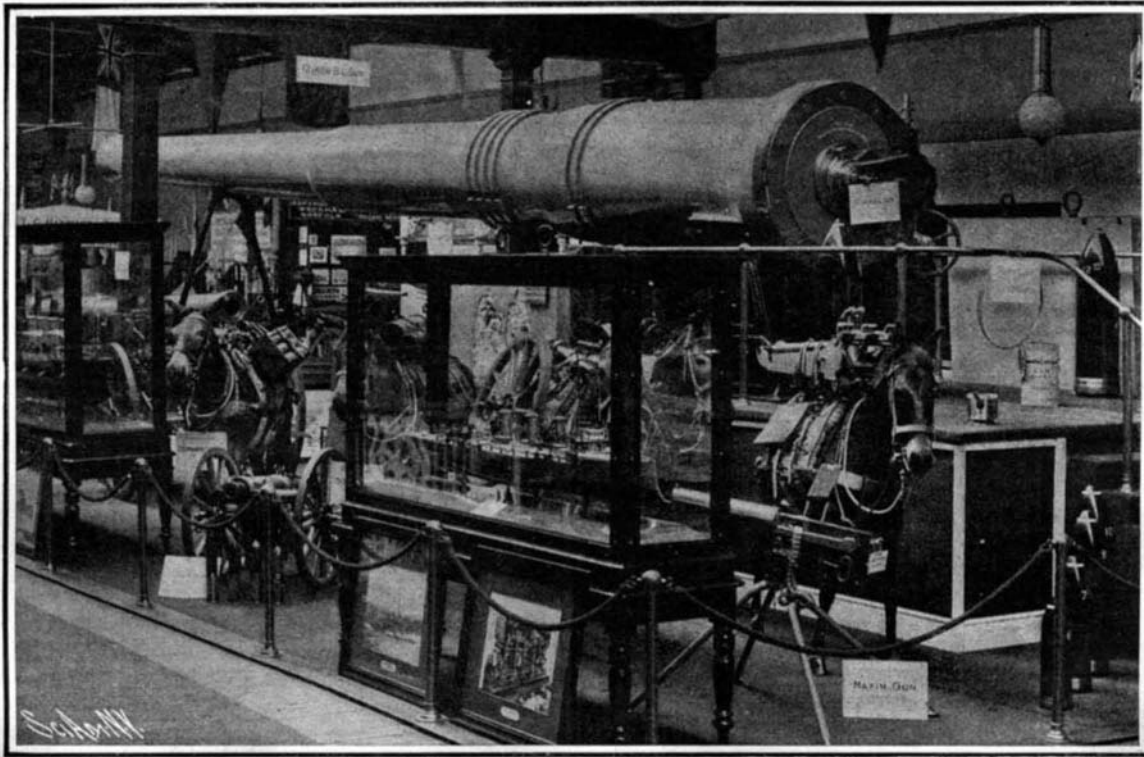
This weapon is considerably larger and more powerful than the latest type of 12-inch 50-ton wire-wound gun produced at the British government arsenal at Woolwich. This Mark IX. class is five calibers shorter than the new Vickers production, being only 496.5 inches in length—41.375 calibers—yet the longer weapon is considerably stronger, especially toward the muzzle.

The breech operating mechanism for this latest Vickers 12-inch gun is of a new type, containing several distinctive improvements, whereby a considerable increase in power is obtained when closing the breech. The mechanism is operated by a hand wheel with worm and worm-wheel gear mounted in a bracket carried on the end frame of the gun, as shown in the accompanying illustrations and the gearing is so arranged that to operate the mechanism completely seventeen turns are necessary—12.2 turns to unlock the breech and 4.8 turns to swing it out to fully open position. The Vickers type of breech screw is used, mounted and retained on the stem of the carrier by interrupted screw threads.

In this mechanism a pure "couple" for rotating the breech screw is applied, and the inherent defect of the general type of breech mechanism, wherein the screw is rotated by a turning movement which sets up appreciable friction, due to a tendency to produce axial displacement of the breech screw, is obviated. By the

utilization of a couple, the whole of the available turning force applied to the breech screw is employed in seating the obturator, and all possibility of friction from the above-mentioned tendency is completely overcome.

The breech block carries the Welin screw in which the thread is cut in successive steps of decreasing radii. In unlocking the breech it is necessary to rotate it only through as much of arc as equals the length of one step of the thread. This disengages all the threads so that the block can be withdrawn. The advantage of this type is that a minimum amount of the thread has to be cut away, and the breech-block can



The New Vickers 12-inch Wire-Wound Breech-Loading Gun, Which Fires a Projectile of 850 Pounds. Muzzle Energy, 47,874 Foot Tons. Length, 46.375 Calibers.

be proportionately reduced in length and weight. There are two sets of safety slides, one for percussion lock and the other for the electric lock, fitted to the box slide. On opening the breech the percussion striker is automatically fully cocked. A floating needle is arranged so that normally the point of the needle is always within the face of the lock frame. The electric lock is of special design, there being two levers, one on each side of the lock frame, and these are simultaneously operated on the first movement of the lock frame on opening the breech. The arrangement of these two levers is such that there is a small projection round their bosses which trips against the lock slides on the box slides. As the outer ends of these levers act directly on the electric needle, the latter is drawn away almost instantaneously from the lever on the first movement of the unlocking of the breech.

In the event of a miss-fire the lock frame can be drawn away sufficiently to eject the primer without opening the breech, owing to the arrangement of the spring bolts engaging the lock frame with the slide link in the carrier, and the engagement of the slide with the operating cam on the crank.

The extractor is of special design upon new lines. It is of great strength and is made in two parts. The operation of the lock frame acting, because of a fine incline on the first part of the extractor which is the toe, first powerfully wedges out the primer before its rapid ejection by the engagement of the second part of the device which is comprised by the lock of the extractor.

The complete weight of the weapon exclusive of the carriage is 57 tons 8 hundredweight 2 quarters 16 pounds. Its penetrative capacity with capped shot so far as has been ascertained is 24.3 inches through Krupp cemented plate. Further tests with the weapon are, however, to be carried out, when definite data on the point of penetration will be available.

Injection of Trees.

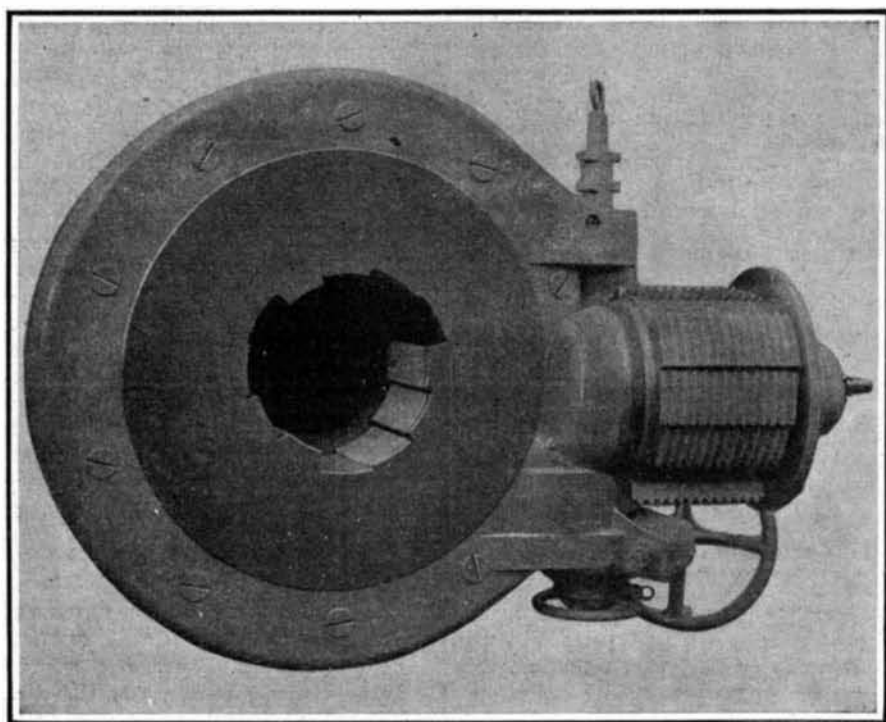
Often the roots of fruit trees, more exhausted than the parts in the air, refuse to supply the branches with their subterranean sustenance. To cure or prolong the life of cases possessing still a certain vigor, recourse was had, says L'illustration (Paris), of March 17, to powders, then to the injection into the trunk of a solution of sulphate of iron. This last expedient is valuable for treating chlorosis in vines. A Russian entomologist, Mr. Sigismond Monryetsky, wished to ascertain the laws that regulate the penetration of the liquid into the cells of the tree. By employing colored solutions, he proved that the liquid never penetrates into the old wood. It follows the young layers, descending into the roots to

the depth of a meter (3¼ feet), and rising to the top of the tree, with a uniform distribution. In consequence, Mr. Monryetsky recommends injection through a single hole made in the neck of the root.

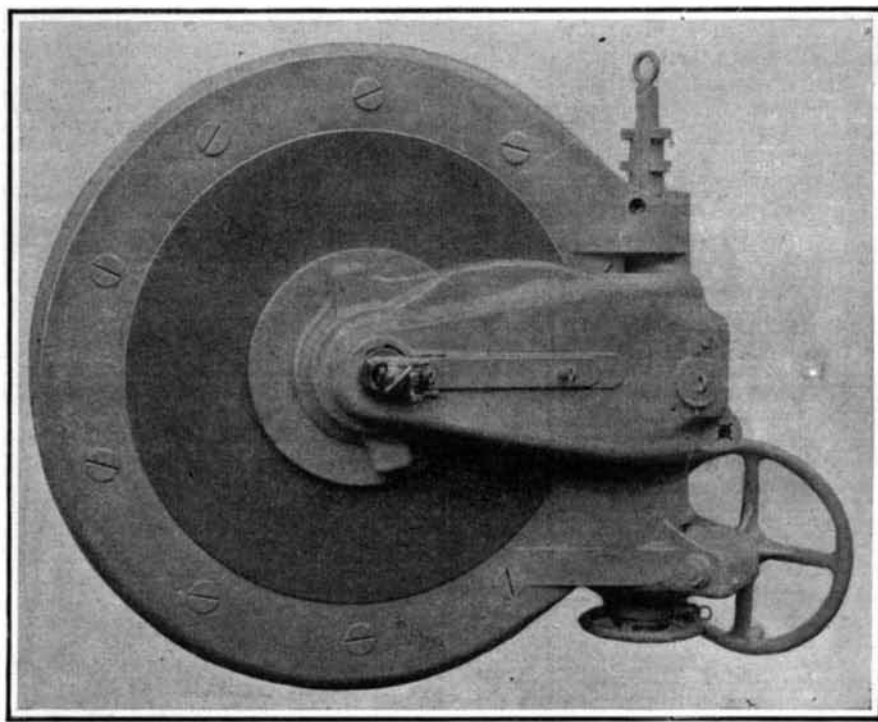
In these conditions, the process seemed applicable not only for injecting nutritive elements into the tree, but besides for curing diseases determined by the presence of a bacterium. The experiments have confirmed the theory, in so far as that disease of stone-fruit trees is concerned, which consists of an efflux of gum through a wound in the bark: plum trees, peach trees, almond trees, etc. Into these weak solutions of oxalic acid, of citric acid, of creosote, or of salicylic acid were injected. The last gave the best results.

Erratum.

In our issue of May 12 we published an article on the Economical Use and Properties of Reinforced Concrete, which we credited to Mr. Charles S. Hill. It seems that our excerpt was taken from a monograph jointly written by Mr. Charles S. Hill and Mr. A. W. Buel. Our excerpt was taken from that part of the monograph which Mr. Buel prepared, and should have been credited to him.



The Breech Open.



The Breech Closed.