

the 850 pounds of powder which constitute a charge was fired. Both the burst of flame from the muzzle and such brown smoke as there is when "smokeless" powder is fired, were up to expectations, but the report was surprisingly "soft" for a charge of these great dimensions. However, this was not surprising to those of us who are familiar with proving ground effects. The writer remembers that when he was on board the "North Dakota" during battle practice, the sharp crack of a 5-inch gun was more severe on the ear drums than the deeper-noted report when the 12-inch gun was fired.

The barbette mount functioned satisfactorily, and the heavy rifle swung back and down into the loading position with the same smoothness and absence of jar which has marked the smaller mounts for guns of 8-, 10- and 12-inch caliber. The roof-like structure is an inclined shield of sufficient thickness to protect the gun attachment from small shell fragments and machine-gun fire.

THE SIXTEEN-INCH BARBETTE GUN.

Not far from the 16-inch disappearing gun was a sister rifle on a barbette mount. In the disappearing mount, the gun, upon discharge, is thrust back and down until she is below the parapet and sheltered from direct fire. In a barbette mount the rifle is permanently above the face of the parapet. The gun and its carriage rotate upon a massive turntable, consisting of a base ring bolted to the concrete foundation, and an upper ring known as the "Racer," between which are 42 live rollers. A pinion attached to the racer engages a circular rack bolted to the outside of the base ring. By this means and by means of a micrometer index which is carried on the racer, the gun and its carriage can be laid in direction with an accuracy of 1/200 of a degree. An electric motor and hydraulic speed gear permit the carriage to be traversed by power.

Bolted to the movable platform, one on each side, are two cast steel side frames in which rest the trunnions, the elevation of the gun being controlled by circular racks bolted to the right and left sides of the cradle. The range of elevation is from minus 7 to plus 65 degrees. The cradle forms a circular sleeve in which the gun recoils, and this cradle contains or supports all the mechanism which controls the recoil and counter-recoil of the gun. The cradle is a 50-ton casting, the inside of which is very accurately bored to fit the outside contour of the gun. The actual bearing on which the gun slides consists of a number of circular bronze strips bolted to the inside of the cradle. The gun and cradle, which together weigh 550,000 pounds, are so accurately balanced on the trunnions that one man, by hand power, can easily set the gun at any angle of elevation. Elevation, normally, is effected by electric motors. The recoil is controlled by four oil cylinders, cast integrally with and around the cradle. The energy of the recoil is dissipated by throttling the oil with which the recoil cylinders are filled, by causing it to pass from the rear to the front of the piston through grooves cut in the wall of the cylinders. There is also a counter-recoil mechanism which serves to return the gun gently into battery—that is, into firing position. When the gun is laid at an elevation of 45 degrees, it has a range of 50,000 yards, or nearly thirty land miles. Even at this great range the shell will pass through the heaviest armour afloat in any foreign navy.

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