

# Mightiest of All Fighting Ships

**Our New Big Battleship "California" and Why It Is Different from Any Other War Vessel Ever Designed**

**H**UNDREDS of expert mechanics at the Brooklyn Navy Yard are now working on the new big battleship California, the keel of which was laid down a few weeks ago. This new monster of the sea will cost approximately \$15,000,000, which is more money than was ever put into a single ship before, and when she is finished, three years hence, she will have no match in any navy in the world. This latest creation of the naval experts will possess some features never before employed in battleship construction.

The most important and radical change is the use of electricity as the propulsive power. This new departure will secure greater efficiency in many directions. It will mean a saving in weight and space; it will bring economy in the use of fuel, and it will afford more convenient methods of operation.

The convenience of operation is due to the fact that electrical machinery is adapted to give two economical speeds, and it also makes for ease and quickness in starting or reversing the propellers. With the electrical motor any speed in either direction is obtained by a simple movement of the hand of a controller. No time is lost in signalling the engineer or in operating clumsy levers.

Due to the installation of the electric drive, the California will have a cruising radius about 50 per cent greater than her sister ships at cruising speed. The combination of electric drive and oil fuel will enable her to run at ten knots speed to steam for nine days longer than a coal burning dreadnought, and during that time she can cruise more than 2,000 miles further. In other words, the California will be able to steam nearly twice as far as the Wyoming or Arkansas.

She will have practically duplicate main engines, as either of her generators will give her a speed of nineteen knots. The all-around flexibility and manoeuvring qualities will be greatly improved, and in particular her backing power will be superior to that of any other ship in her class. The latter is an important military feature, and is not obtained in any efficient degree when ordinary reciprocating or turbine engines are used, because of the limitations of space and weight imposed in the design of the ship.

The electrical equipment consists of two 12,000 kilowatt, or 16,000-horsepower, alternating generators, each placed on the same shaft. The electricity will be furnished by oil-burning turbine engines. For operating at high speeds, as when pursuing an enemy, each turbine generator will drive two propeller motors, and all the machinery will be working at full power. But when cruising at moder-

ate speeds, about sixteen knots or so, only one turbine will be used, the other one being shut down. This will allow for a considerable saving in fuel.

Not only is the electrical system of drive more economical than the old methods heretofore in use, but it is also much cheaper to install. It also enables the ship to ride the sea with less vibration and more steadiness, an important matter when it comes to getting the range and firing the guns. The more stable the ship is the more accurate its fire.

The water-tube, oil-fired boilers of the California will be placed in heavily bulkheaded rooms, extending clear across the ship. There will be but one smokestack, and its base will be protected by a heavy coating of inclined armor. This is a new idea in battleship design, and is based on lessons learned from the battle of Tsushima, in which Russian ships suffered severely from shells which struck near the smokestack on unprotected material.

It is regarded now as an established fact that in future naval warfare a great deal of high-angle fire will take place. Happenings in the present war show that considerable damage can be done by a ship which is too far off to accomplish anything by shelling the armor protected sections of the enemy's ship. This damage is possible through the employment of high angle fire, throwing shells at the maximum range so that they will land on the deck and do more or less damage. This fact was borne in mind when the California was designed, and she will have a heavily armored deck to guard against the danger from high angle fire and bombs dropped by aeroplanes.

In addition to the deck protection against aeroplanes, the California will be equipped with a number of specially designed aeroplane guns. These guns have been through a long series of experiments and are regarded as the most efficient device yet produced. They use both solid shot and shrapnel, the latter being

**The Powerful New Super-Dreadnought "California," Now Under Construction at the Brooklyn Navy Yard, New York, Which Will Be the Most Formidable Battleship Afloat, and the First of the Electrically Propelled Fighting Monsters.**

employed when the enemy aeroplane is within close range. It will be very difficult for an aeroplane to get near enough to the California to inflict any damage.

Special attention has been paid to the matter of submarines and mines. A new kind of anti-torpedo bulkhead has been designed, with a view to localizing the effect of explosions either from mines or torpedoes. The shock from one or even

the elevation. In addition to this the placing of the three guns in one turret effects a considerable saving in weight.

The fourteen-inch guns which the California will mount are considered by expert ordnance authorities to be the best weapon of the kind in use or designed. Having extreme battle ranges and greater striking power than any naval gun now in use, they offer the distinct advantage of allowing the mounting of twelve of

how was obsolete many years ago. It was first designed on the theory that a battleship would have to fight at close quarters, and would, if occasion offered, attempt to ram her opponent head on. But even while ships were being built with this obsolete style of bow, guns of increasing range were being developed and armor of greater resisting power was being put into use, so that the possibility of close sea fighting was rapidly being relegated to the background, at least for ships of larger size.

The California will return to the graceful yacht-like bow of the older clipper ship. Its profile, if it were not for her smokestack, masts and turrets, will closely resemble a large steam yacht, and to the layman this beauty of outline will give the impression that she is not as

along the same principles as those now in use, but will be smaller and easier to handle. A number of them will be carried on board at all times, so if one happens to be shot away there will be another to take its place.

Experiments are now being carried on with a view to devising a satisfactory submarine detector, and if a really reliable one is perfected it will be made a part of the California's equipment.

Hydroplanes will henceforth play a prominent part in naval warfare, and will be a part of the regular fleet. The new battleship will have special apparatus for taking care of one or more hydroplanes.

The speed of the new dreadnought will be twenty-one knots, although in cases of emergency it is expected that she will do a little better than this. She is 600 feet long on the waterline, 624 feet in length on deck; her breadth is ninety-seven feet, her draft thirty feet. She will be provided with four submerged twenty-one inch torpedo tubes, located about a hundred feet from the bow, and her complement will consist of 1,056 officers and men.

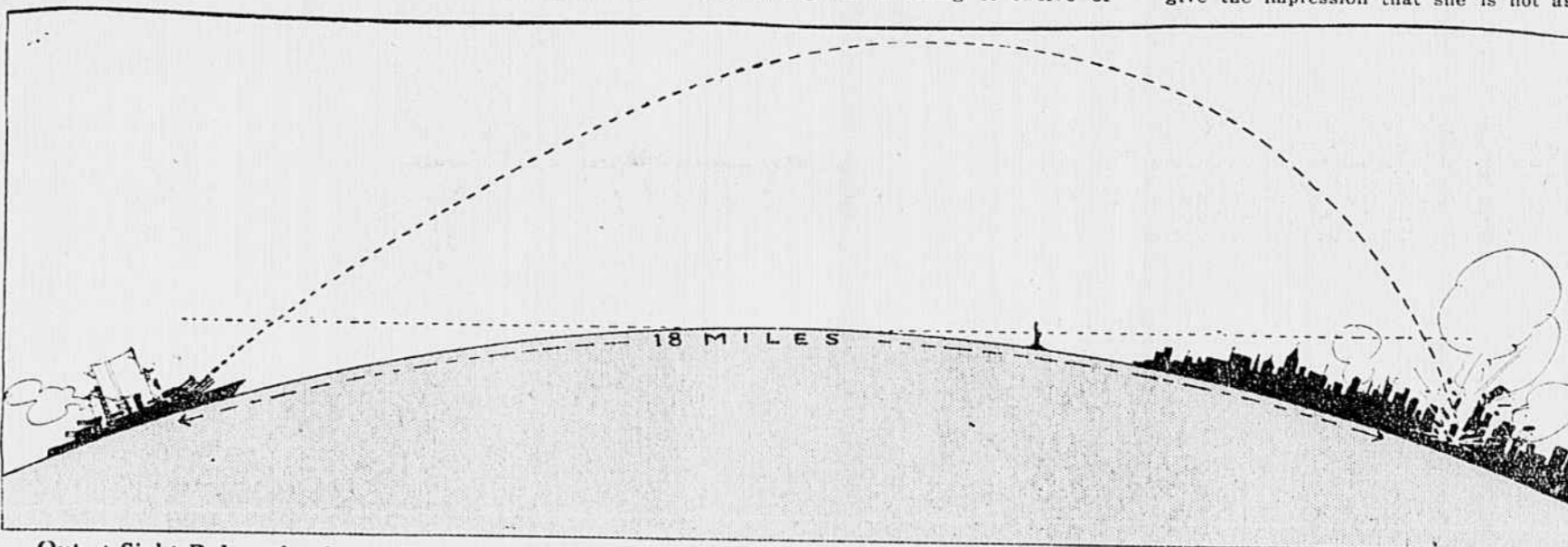
An admirable feature of the California is the exceptional height at which her amidship battery of five-inch torpedo defence guns is carried. There are twenty-two of these guns, four mounted in casemates on the main deck forward, four in casemates on the gun deck aft, ten in a central battery on the forecastle or spar deck, and four at the corners of the boat deck above the central battery. This arrangement gives a concentration of eight five-inch guns forward and aft, and of eleven on each broadside.

The elevation of her guns will be the same as on our other ships—15 degrees elevation and 5 degrees depression. This is the same elevation used on all foreign ships, and it will permit of the high angle fire so successfully employed in the present war.

The biggest foreign warship in service is the Queen Elizabeth. She carries eight fifteen-inch guns, but her tonnage is 4,500 tons less than the California's. The latter's fourteen-inch guns will be able to pierce the Queen Elizabeth's heaviest armor at seven miles, and from their greater accuracy will be able to make 70 per cent more hits. Therefore in actual warfare the California would, theoretically, easily destroy the famous British ship.

All in all, the California will be the very last word in battleship construction. The designers have utilized everything that experience has shown to be useful. The happenings of the present war have been carefully studied, and whatever lessons they brought out were made use of in designing the California.

It took less than three months to design this wonderful ship. Several departments of the navy took a hand in working out the various details. It will take about three years to complete the California, although if necessary, she could be hurried along and finished in about two years. To accomplish this the workmen would have to be increased in number and kept busy twenty-four hours a day, instead of eight, as at present.



**Out of Sight Below the Ocean Horizon the "California" Could Destroy New York City in Half an Hour with Long-Range Shells Which Would Seem to Drop From the Sky.**

two torpedoes exploding against the California will not be sufficient to put her out of commission. Her new torpedo bulkhead arrangement greatly extends her ability to assimilate punishment of this character. All the warships at present in service are very vulnerable in this respect, and one torpedo is more than sufficient to destroy any one of them.

The armor protection of the California is more complete than that of any other ship. The tremendous displacement of the new ship—32,000 tons—makes it possible to clothe her with armor far in excess of ships now afloat. The waterline belt of the California, with a maximum thickness of about fourteen inches, is seventeen and one-half feet wide, and this armor extends eight feet below the waterline. The conning tower carries sixteen inches of armor, and the port plates of the three gun turrets are no less than eighteen inches in thickness. The whole side of the ship between the extreme turrets up to the main decks will be heavily armored, and with the side armor will be connected heavy transverse armor bulkheads and several horizontal armor decks.

The California has a long forecastle deck, which is carried aft to the main lattice mast. Forward on this deck are two turrets, each containing three fourteen-inch guns, those in the after turret firing above the roof of the foremost turret. On the main deck aft are two three-gun turrets similarly disposed. This gives a concentration of six fourteen-inch guns ahead, six astern and a broadside fire of twelve fourteen-inch guns.

The three guns in each turret are mounted in one sleeve, and are elevated, trained and fired as one gun. This is a radical departure from previous practice, and it is capable of producing greater efficiency in handling of the guns and placing of shells. It will assist the spotter in locating the fall of the shots and making the corrections necessary in

them on a single ship, as against eight guns of the fifteen-inch calibre, which have been adopted by some of the other navies of the world. These fourteen-inch guns have an accurate range of twelve miles, but in cases of necessity, the California could stand eighteen miles off shore and throw her fourteen-inch shells into port.

The fourteen-inch guns on the California are fifty-three feet long and weigh about sixty-three tons. The weight of the projectile is 1,400 pounds. At a distance of 10,000 yards this projectile will penetrate over sixteen inches of armor. The projectile leaves the muzzle at a speed of 2,600 feet a second, a speed which if maintained would carry the shell around the world twice in twenty-four hours. The gun chamber will be bigger than two sugar barrels end to end, and in this chamber will be placed the 430 pounds of smokeless powder required to discharge the shell.

The muzzle energy of these fourteen-inch guns is 65,000 foot tons. To put this in simpler form, assume that two ships as large as the Lusitania are placed on one end of a scale. The amount of energy used up in each discharge of the gun would, if applied to the other end of the scale, raise these two ships one foot high. To withstand such terrific strain, the chambers must necessarily have tremendous power of resistance. Every time the gun is fired they get a shock equivalent to the shock that would ensue if a heavy engine drawing five Pullman cars, going at the rate of seventy miles an hour, suddenly came in contact with a stone wall.

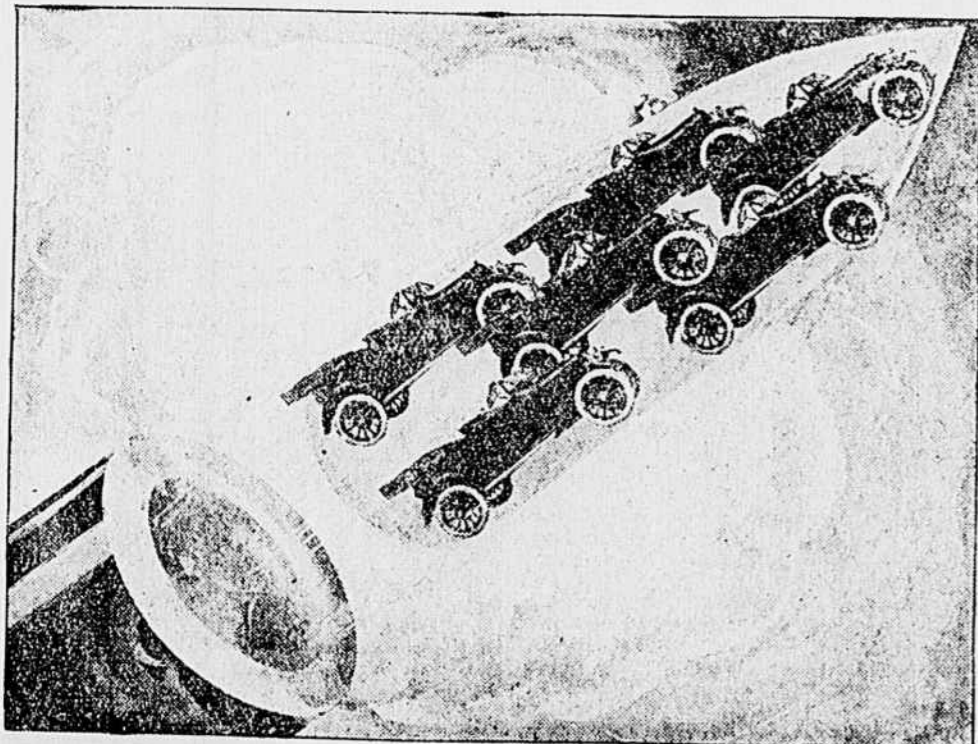
The cost of each gun is figured at \$85,000. If all the guns on the California were discharged continuously for one hour they would consume powder and shell to the amount of \$3,000,000.

Another radical change is in the type of bow. Heretofore all ships of all navies have been constructed with a ram bow. For all practical uses the ram

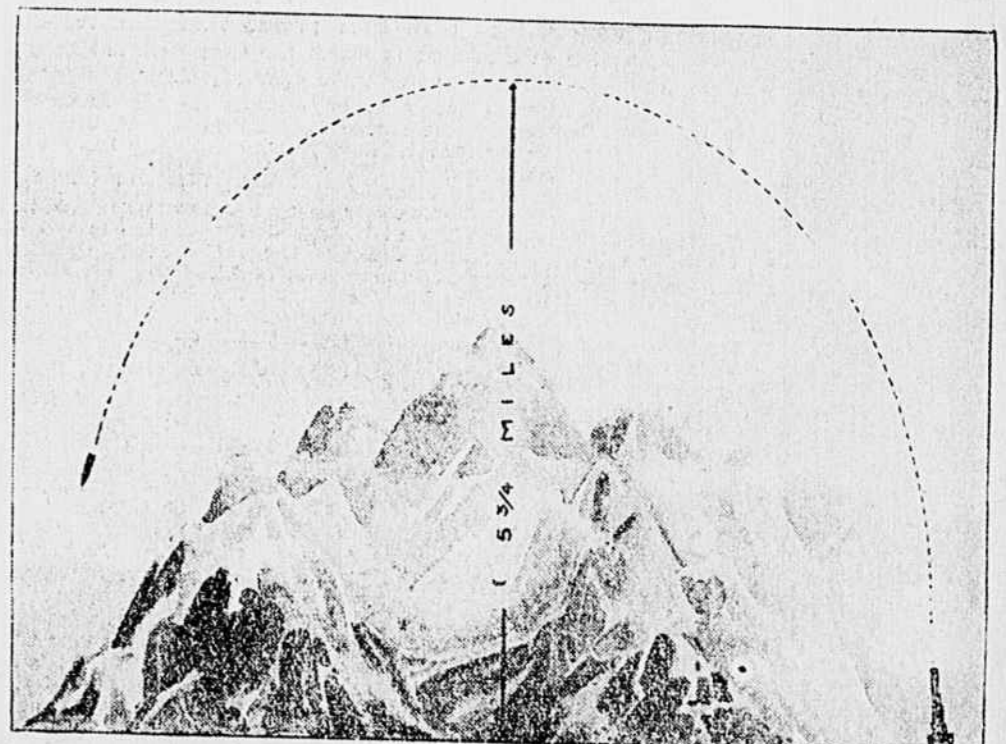
formidable as her more warlike appearing sisters in the fleet.

The reason for the change in bow has nothing to do with the fighting ability of the ship. The clipper bow, with its long forward overhang, offers advantages in the matter of handling the ship's anchors. It gives them a clearance not possible with the ram-shaped bow. Further than that it is expected to be of advantage to the ship in heavy weather, for the flaring bow and sides are calculated to keep her deck drier in a heavy sea than the bow of the ram type. Several foreign navies have recently begun to modify the ram-shaped bow, but none has gone to the length of this country in completely abandoning it.

A new form of range finder will be installed on the California. It will be



**One Broadside From All the "California's" Guns Would Be Equal to Throwing Six Touring Cars from Sandy Hook to New York.**



**The Shells from the Big Guns of the "California," Fired at Their Longest Range, Will Travel 5 1/2 Miles Up Into the Sky—Nearly Twice as High as Pike's Peak.**