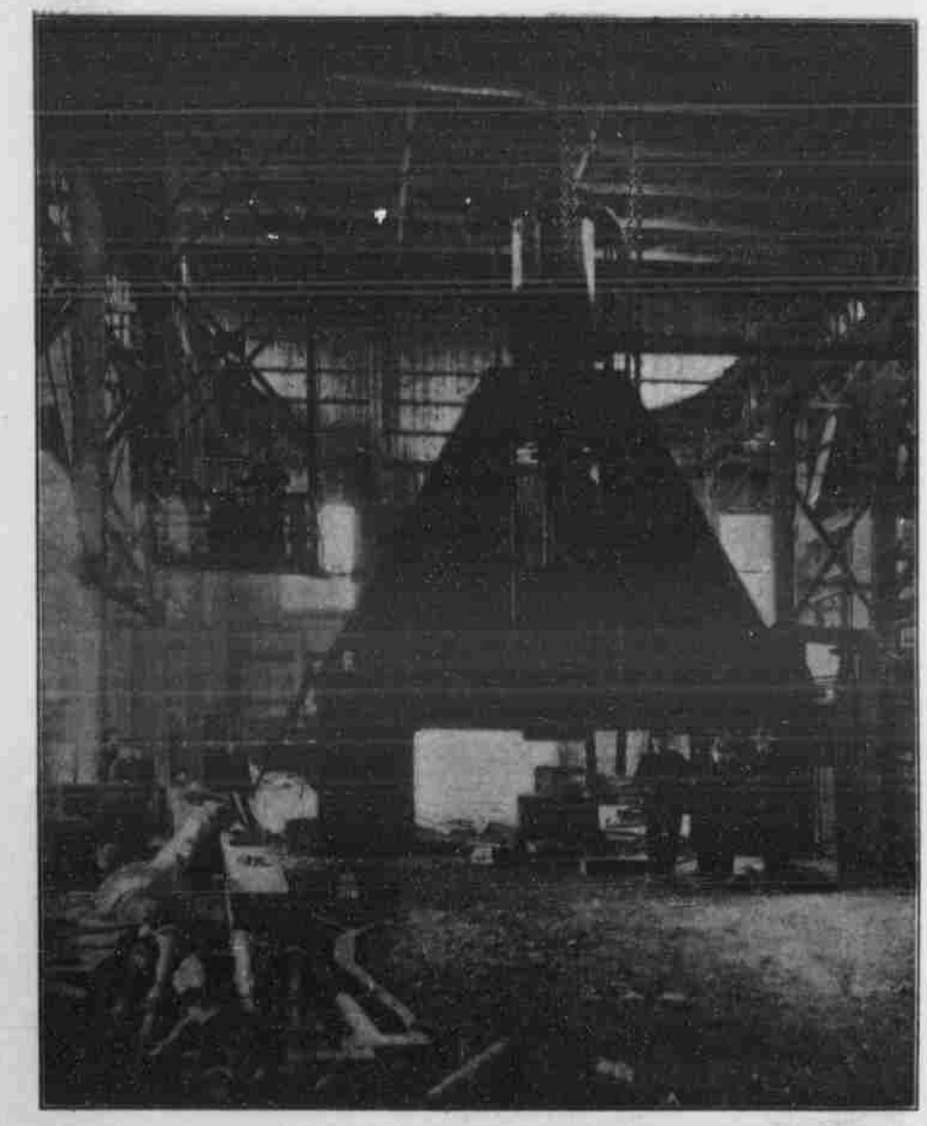
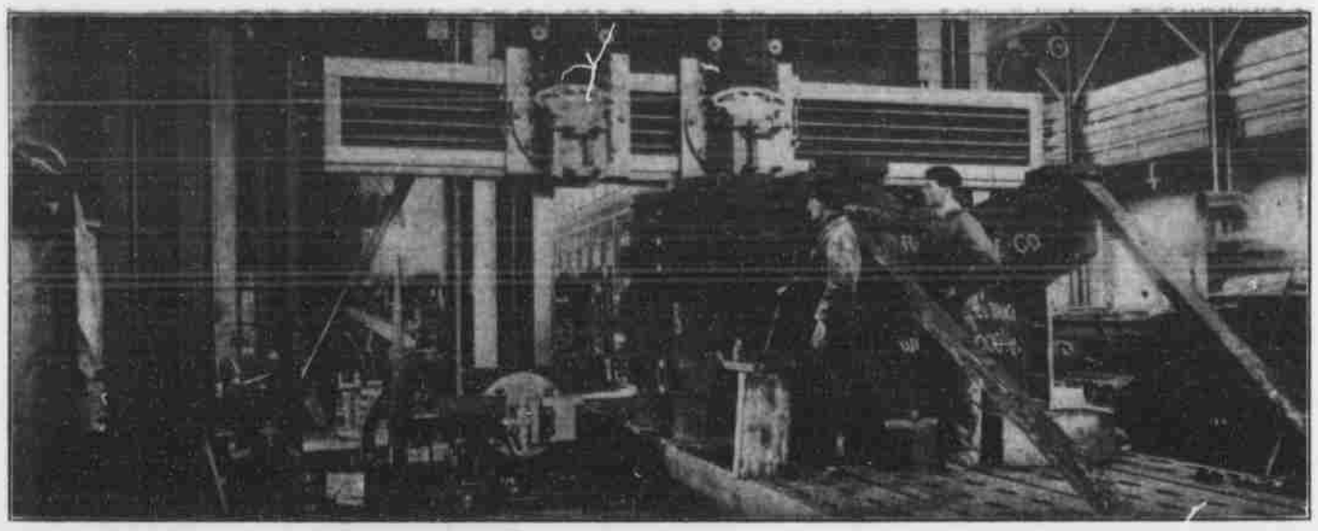
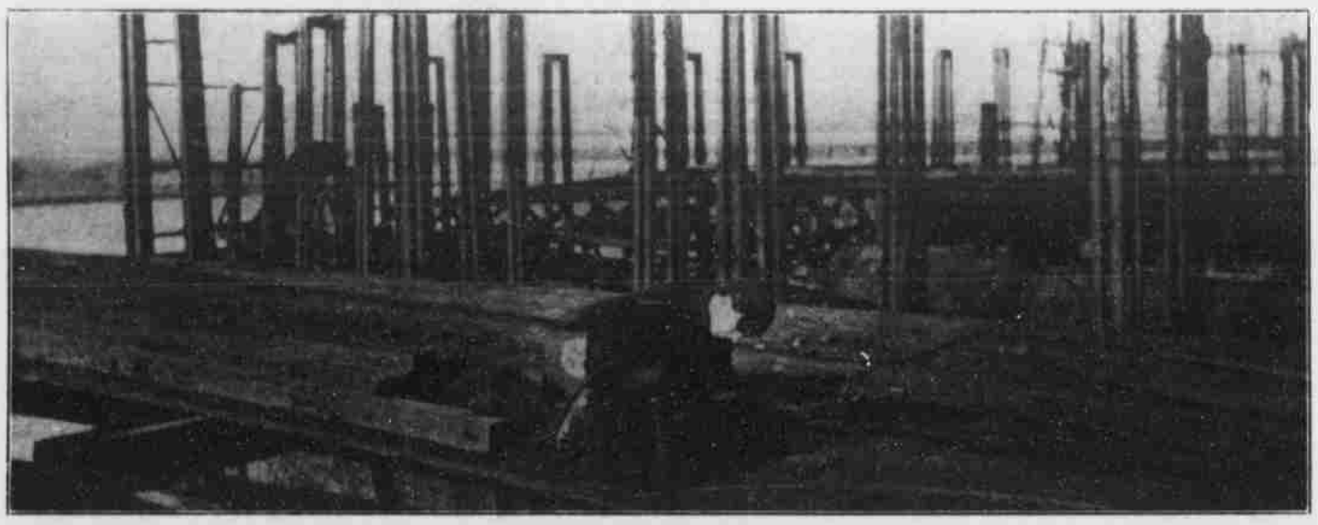
Building Uncle Sam's Biggest Battleships



FORGING THE ENGINE STANCHIONS.

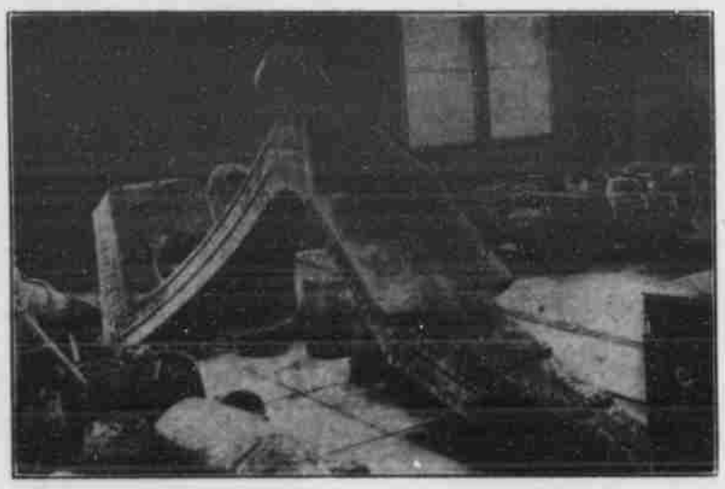


FINISHING A CYLINDER FOR ONE OF THE BIG BATTLESHIPS.

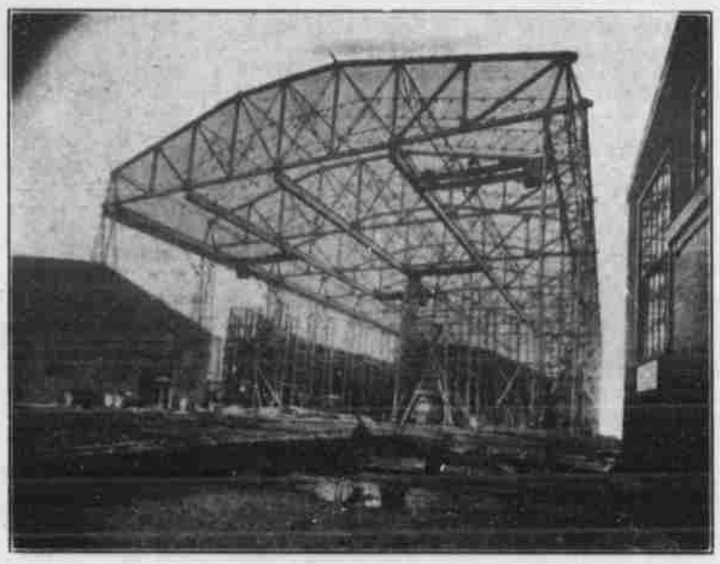


A SHIP FITTER AT WORK.

ON THE PROTECTION DECK.



A BATTLESHIP'S STERN PART.



THE FORE RIVER SHIP HOUSE.

BOSTON, Jan. 14.—(Special Correspondence of The Bee.)—Two first-class battleships for the United States navy, New Jersey and Rhode Island, are being built side by side from the same designs and at the same time at the new Fore River shipyard down in the southeastern corner of Boston harbor. The like is not being done in any other American shipyard, so that the visitor who takes pleasure in watching his white navy in actual process of construction may find here a suggestion of the formidable power of this new class of fighting ships that he can hardly look for elsewhere.

The size and general outline of these two heavyweights are only just beginning to be apparent, however. As you come within hearing distance of that dull, continuous roar of hammers, without which no battleship can proceed, and stand opposite the huge skeleton "shiphouse" with its electric cranes traveling back and forth overhead, like so many trolley cars on an inverted four-tracked street, two belligerent looking cast steel prows stick out at you from a confused mass of wooden staging, their lower corners projected forward like the under jaw of a bulldog. These are the "business ends" of the two great steel hulls, which are reckoned among the largest and are, indeed, quite the widest that have ever been built for vessels of war in this country or any other. Each is exactly alike to the last rivet, but neither details nor shape nor size can be more than guessed at on account of the mass of props and platforms that surround and hide them and the gangs of busy mechanics everywhere at work.

But by way of the inclined runway one is soon up on deck—or what appears to be the deck at this stage of construction. Here the whole ship, as far as it has proceeded, lies in view beneath one. The deck on which you stand as it approaches the vessel's sides and ends slopes downward, giving the two ships the appearance of Noah's arks or of enormous twin turtles with their legs drawn safely in under their shells. This is as little as possible what the vessels will finally resemble, for, although it looks like a long way down into the cavernous hold, much more hull remains to be added above and we are still only a few feet above what will ultimately be the water line.

The advantage of being on hand so early is that certain very essential features of modern battleship building are plainly evident which will later on be built over and hidden from view. The heavily armed battleship, like these two monster turtles, is in a class by itself and fights by its own particular methods. It makes no boast of fleetness of foot, like the slender "destroyer," or of combined pugnacity and long-distance endurance, like the protected cruiser, or even of sheer defensive strength like the monitor's. It expects, unlike the proverbial policeman, always to be at the right place at the right time, always to take up the most dangerous position it can find in the line of battle, and everlastingly to stick there to the despite and destruction of its enemies.

The battleship, therefore, is built to take many hard blows, as well as to give them, though knowing all the time that these hard blows, coming from modern twelve-inch rifles, will probably shatter the heaviest armor it can float under. But there are certain vital organs within it—above all, its engines and boilers—that must be made absolutely safe against shots, and the only way to make them so, since impenetrable armor has not yet been invented, is to add one safeguard to another until chance of injury is practically eliminated. So, if you will climb down the slope of the "protective deck" on which you have been standing and look over the side, you will see below you a jog or shelf running along the vessel's side, above which it is narrower than it is below. Upon this is to go the eleven-inch nickel steel armor plating, extending a few feet above and below the water line and going nearly all around the vessel from end to end like a stout belt around a man's body. This is to take care of all small shots from the enemy's guns. For the larger, more penetrating shots, the V-shaped space in which we now stand, between the upright side of the vessel and the slant of the protective deck, will be filled solid with coal, as a part of the ship's bunker capacity, to a horizontal thickness of nearly ten feet. This is a much more efficient shield than the steel armor itself, on the same principle that a rifle bullet can be shot through a chilled plowshare but not through a feather pillow. Furthermore, in order that water shall not follow in where the shot has entered, there is to be a three-foot space between the armor and the coal bunkers which will be filled with compressed cornstalk pith, called cellulose, which swells up as soon as it is wet and closes the shot hole in the plates. And even suppose the enemy succeeds in sending a shot through armor and coal both, then when its steel head finally reaches the slanting "turtle back" beneath our feet it is deflected up through the vessel's upper works, and, if it still has the force to carry it, out into the air, precisely as a skipping stone will glance upward from the surface of a pond.

As for any destruction which may take place above the armor belt and the protective deck, there are here but two points which, at the last resort, are really indispensable—the two turrets, that is, which carry the twelve-inch rifles. And these, from their combination of rounded shape and extra heavy armor, are supposed to be invulnerable. After all, then, we have in the modern battleship little more, so far as principle goes, than an old-fashioned monitor—or impenetrable "whaleback," if you like—with a few stories of superstructure added above it; and if our vessel really lived up to the naval constructor's ideal, we might find it at the end of a hard engagement totally dismantled above the protective deck, with all its smaller guns disabled and their gallant crews killed, with its deck house knocked into junk and its funnel, masts, boat derricks, and all the rest of it overboard, but with four twelve-inch rifles still swinging toward the enemy and below decks a perfect set of boilers and engines and a still workable emergency steering gear.

In the two Fore River battleships progress has been made to the point where one may begin to trace out the general plan within the hold. We can follow the outlines of the six boiler rooms, all separate from one another to insure greater safety; then, aft of these, the narrow space which is to be filled with coal to guard against explosion, and beyond this the two larger spaces for the twin engines. Farther aft still you see daylight shining through the places where the stern posts are to be fitted in. One notes, too, the stouter ribs and rigid reinforcements under engine beds and boilers, the greater depth of keel at certain points, and the firm braces at the points where any unusual strain may be expected to come.

In order to appreciate the reasons for this tremendous strengthening in special places one has to think of the battleship not as on the stocks, but in action. In the first place, the hull of such a craft, according to the recent calculations of a Japanese naval officer, comprises only about 38 per cent of its total weight. The remaining 62 per cent is simply loaded on in the shape of guns, armor, machinery and general outfit. Yet this weight is not, like the cargo in a freighter, evenly distributed, nor can it be got rid of while the vessel is in dry dock. Then, again, as soon as the officer in command orders it "full speed ahead" the engines, in the narrow space allowed them, must begin to put forth the energy of about 20,000 horses on the run, pounding on the shaft bearings, and from them onto the very keel itself, with a pressure of about sixty tons—or say, six times the weight of an ordinary trolley car. The pressure on the thrust bearings, as well as on the foundations, which receive the push of the propellers in their struggle to drive the ship ahead, is collectively over 100 tons. Seven heavyweight freight engines, coupled one ahead of the other, could hardly exert the same force. So, too, whenever the commander wants to turn quickly and orders the helm put hard over, the stern post and adjacent framings must stand the strain of pulling 230 square feet of rudder surface—much more than the area of a big barn door—sideways through the water at the rate of twenty miles an hour. Every time one of the twelve-inch rifles is fired the result is much the same, so far as stresses and strains on the mountings are concerned, as if a healthy passenger locomotive running at ten miles an hour were to find the gun sitting inopportunely on the track and engage it in end-on collision, while as to the strains resulting from actually ramming an enemy in battle, nobody has ever more than vaguely guessed at what they may amount to.

Notwithstanding the fact every point of construction seems to be proceeding with the greatest rapidity—as well as the utmost accompaniment of noise—the visitor might come to Fore River after a month's absence and notice no extraordinary change. A battleship is inevitably a creature of very slow growth. Take for example the matter of shaping and attaching one of the trough-shaped plates under the keel. Wooden "templates" or patterns must first be made to cut it out by. Then upon an iron floor iron clamps and gauges must be painstakingly arranged on which to shape it. It must spend a long time in the fierce heat of a petroleum furnace, growing red and limp, before the actual shaping can be begun. Half a dozen men, when it finally emerges, must attack it with hammers and bending levers and even then return it several times over for further heatings. By the time it is ready the best of a day is gone. Another day will be spent in planing the edges smooth and marking and drilling the rivet holes. When at last it is sent swinging off through the air on the end of a crane hoist, a third day goes in placing it, "reaming" the holes out fair and driving the rivets. A single rib, with its queerly shaped web, its flanges to be heated and bent, and the scores of rivets needed to drive it down into a solid piece with the whole ship, is nearly as great a problem; and vessels like New Jersey and Rhode Island require scores of ribs and thousands of plates, many of the latter as complicated as the keel plates.

Meanwhile, of course, many things are going on apart from the vessels themselves. At present the engines that are to propel them are well under way. Here is a pyramid of cylinders already cast and waiting to be finished; there a stalwart connecting rod or a length of shafting revolving slowly in a huge lathe which is driven mysteriously by electricity with no sign of pulleys or belts. Then there are the great cast steel stern posts being made ready to go into place—so large you can walk under them as they stand in the shop without hitting your head. Last and most interesting of all is the giant steam hammer—one of the largest in the world—which is forging out the steel engine stanchions from bars as big as the body of a horse with the customary accompaniment of hot

(Continued on Fifth Page.)