ENGINES OF THE "PURITAN" AND "DICTATOR."

These two magnificent vessels-of-war now fast approaching completion will certainly be unsurpassed in their speed and invulnerability. We do not suppose that twenty miles per hour will be got out of them, as is stated; but we do think that three-fourths of it is not too much to expect when their models and engines are considered. We have had an eye on the construction of the machinery for some time, and have taken great interest in it. The following details will be found of general interest:—The cylinders are 100 inches in diameter, and the piston has 4 feet stroke; they are "kettle bottomed," being cast solid, of the same shape as that utensil named; they are 2½ inches thick through the sides, and have 4 strong lugs by which they are held to their places. They stand vertically, and have no bed plates; in fact there are none for the whole engine, but the cylinders are bolted to two massive wrought-iron kelsons, 10 feet deep and some 24 inches or more in width; four huge bolts secure each cylinder to the kelsons. The cylinders are both in line, athwartships, and have large slide and expansion valves, the latter working over the former; in each valve there are two stems which proceed to strong cross-heads working between vertical guides on the end of the steam chests. The chests are bolted, not cast to the cylinders.

A peculiar feature of this machinery is the absence of guides, cross-heads, and other cumbrous parts. The piston has a trunk attached to it, but the engines are not, strictly speaking, trunk engines. The usual connection is attached to the bottom of the piston, runs up the trunk, and takes the end of a lever attached to a vibrating shaft running fore and aft; this shaft transmits the power of the piston to the propeller or screw shaft; it is supported in wrought-iron blocks, with brasses, as usual, and has a vertical lever placed on it, from which the main connecting rod proceeds directly to the crank pin; these are the principal parts. The vibrating shaft blocks are bolted to the kelsons (of which there are six in all), and there is one shaft to each cylinder, making two shafts, two connecting rods, and two trunks between the pistons and the crank pin. The air-pump is placed inside the condenser, and worked by a lever on the end of the vibrating shaft. The condenser is of the old-fashioned jet variety, and sits directly aft the cylinders. The shaft is 21 inches in diameter, is 72 feet long in several sections, and works in a tunnel or alley way made for it.

The boilers have 56 furnaces, and an aggregate grate surface of 1,100 feet; allowing 12 pounds of coal per square foot of grate surface, the vessel will require at the least 175 tuns of coal per day, of 24 hours steaming at full speed.

These engines are precisely similar in all respects for each vessel; the propeller is 21 feet 6 inches in diameter, has 32 feet pitch, and weighs 39,000 pounds; there is no out-board bearing for the shaft. What piston speed will be obtained from the engines remains to be seen; we hope that the highest expectations of the builders, and the designer, Captain John Ericcson, will be attained.

COATING IRON, WHITE COPPER, AND BRASS.

Articles made of wrought-iron soon become rusty when exposed to a moist atmosphere, owing to the affinity which the metal has for oxygen. Cast-iron contains more carbon than wrought-iron, and is not so liable to corrosion; nevertheless all articles of cast-iron require to be coated with some substance to protect them from rusting. Copper exposed to the atmosphere, or to water, resists corrosion in a superior manner; hence it has been sought to coat iron with a thin skin of copper. Articles of cast and wrought-iron may be coated with copper by two modes; namely, dipping in molten copper; and by electro-deposition. The most simple method of electro-deposition is executed without a galvanic battery, and the process is quite old. It consists in making the surface of the iron bright, by scouring or otherwise; then dipping into a strong solution of moderately warm blue vitriol (sulphate of copper). By electrical affinity, a small quantity of pure copper is deposited from the solution, on the surface of the iron, in a thin coat. The articles should be quickly removed from the solution, washed in soft warm water, and dried in sawdust. The copper thus deposited on cast and wrought-iron articles, is liable to become black on the surface afterward by the formation of oxide; and the copper also wears off rapidly, because it is so thin. However, by dipping them into varnish, then drying them, the surface will be protected from the atmosphere. It would cost too much to turn or file cheap cast iron articles, to prepare them for being coated with copper; but they may have their oxide removed entirely by agitation in warm dilute sulphuric acid, at the rate of 1 pound of acid to 10 of water; after which they may be scoured by agitating them with sand and water in a barrel-like vessel rotated on journals. But in addition to the simple deposit of the copper solution without a battery as described, a thicker deposit of copper will be secured by using a battery in the common way in which copper is deposited as in electro-plating.

Another method of coating iron with copper is by dipping it into fused metal. In all such operations the iron must first be cleansed and perfectly freed from oxide, scouring with sulphuric acid being the cheapest method of effecting this object. The clean iron is first immersed in a bath of the stannate of soda for a few minutes; which is made by dissolving one pound of the stannate (tin dissolved by soda and forming a white salt) in one gallon of water; then taken out, dried, and drawn slowly through molten copper contained in a crucible. Another method consists in dipping the clean iron articles in a bath of the muriate of zinc and tin (tin and zinc dissolved and saturated in muriatic acid), at the rate of one pint of the muriate to five of water; then taken out, dried, and dipped in the molten copper as already described. Instead of copper, brass and German silver may be the molten metals employed to coat the iron; the same process will answer for all these metals. In each case, the surface of the molten metal in the crucible or melting pot should be covered with borax in powder, and some ground glass. When the articles lifted out of the molten copper have become cold, they assume a blackish appearance from the absorption of oxygen. This is removed by dipping them into dilute muriatic acid, then washing in warm water, and drying in sawdust. Iron nails, and other small articles may thus be coated with copper, brass, or German silver. In all attempts hitherto made to coat iron with a thick coat of copper or brass, some medium between the iron and copper seems to be necessary. Tin or zinc will answer; hence the use of the solutions of tin and zinc described, to prepare the iron for receiving the copper. In coating iron with brass, the common method is to give the iron a coat of tin first.

An Absurdity.

"Every kind of artificer can be found in Gen. Grant's army, and their skilled labor is called into frequent operation. An ample supply of rolling stock for the railroad from Vicksburg to Big Black has been improvised by them. The trucks were cast, and the remainder of the engines gathered from the debris of destroyed engines by piecemeal. Part came from the Tennessee roads, part from Kentucky, and other parts from Mississippi. From such materials were made good, neat, and strong locomotives in a very few days."

[This is very good for a paragraph, but it happens to be an impossibility. No such thing could occur. Engines have to be made with great care, and to say that pieces taken from different machines 500 miles from each other would fit accurately, is paying a compliment to machinists which though flattering is impossible. Cases may occur where one piece of machinery will fit an engine it was not made for; but these are extremely rare, and do not occur once in a lifetime.—Eds.

Wool Abroad.—During the first seven months of the present year, as we learn from late English exchanges, 93,608,625 lbs. of wool were imported into England, against 86,652,325 lbs. in the same period last year. Most of this wool came from British possessions abroad, Australia alone furnishing 44,311,317 lbs. Of the above amount 8,518,040 lbs., were exported to the United States, besides 572,340 lbs. of English grown wool.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week. The claims may be found in the official list:—

Horse Shoe.—This invention consists in applying vulcanized india-rubber to a horse shoe, in such manner that a firm connection of the rubber to the shoe is obtained, and the feet of the horse prevented from clogging up with snow or "balling," as it is technically termed, and the feet also prevented from slipping; while the feet are prevented from being subjected to the jars and concussions which are the fruitful source of disease in horses, especially if driven over pavements in cities. The above improvement is the invention of O. A. Howe, of Fort Plain, N. Y., and the patent bears date Sept. 15, 1863.

Railroad Car Brake.—This invention consists in a novel means employed for operating the brakes of a series or train of cars; the several parts being so arranged that, by actuating a single lever on the engine or locomotive, all the brakes may be applied simultaneously or nearly so, thereby avoiding the necessity of a plurality of brakesmen, and placing the whole power of the brakes and the manipulation thereof under the control of the engineer. The above improvement is the invention of Augustine Irel Ambler, of Chicago, Ill.

Surgical Splints.—This invention consists in a surgical splint, stamped or otherwise produced, of sheet metal instead of wood, said metal being provided with a series of perforations so that secretions or lotions which may come in contact with the splint will evaporate quickly, thus avoiding the necessity of frequent changes of the wadding, and producing by the evaporation itself a beneficial cooling effect on the limb. The metal is protected against oxidation by Japan varnish, and it is strengthened by curves or beads. This splint, according to the occasion for which it is to be used, is also provided with a peculiar device for the purpose of adjusting the same to the axis of the joints of a limb, and the foot-plate is set upon springs and provided with hinged screws which allow of adjusting the same to the desired position of the foot. The above improvement is the invention of Charles Wittmann, of Brooklyn, N. Y.

Quoins and Furniture for Locking up Forms of Type.—This invention consists in the construction of the quoins in the form of rollers, with surrounding recessed teeth or cogs, and the furniture with racks or series of teeth or cogs to gear with the said teeth or cogs on the quoins, such quoins being applied to roll between the furniture and the chase or between the two sticks of furniture, and being turned with a key to move them from a wider to a narrower portion of the paper space between the furniture and the chase or between the pieces of furniture, and thereby made to tighten up the type in the page or pages and tighten up the page or pages in the chase. R. Hoe & Co., of New York are the assignees of this patent. The above improvement is the invention of Hippolyte A. Marinoni and Francois N. Chandré, of Paris, France.

Means of Directing Motion in Right Lines.—There are many instances in machinery in which the direct application of fixed guides to a body, which is what is termed "parallel motion" has been used, but this does not produce a perfect rectilinear movement. The object of this invention is to obviate the imperfection of the "parallel motion," and to obtain a perfect rectilinear movement of a body without the application of fixed guides directly to it; and to this end it consists in the combination of one or more oscillating and longitudinal moving arms by means of an attached slide or roller with a fixed arc or curved surface, whereby a certain point in the said arm or arms is caused in its oscillation to describe a right line and to produce a rectilinear movement of any body that is attached to it at that point. The above invention is due to Andrew Buchanan, of Jersey City, N. J.

Joint for the Tubes of Surface Condensers.—The principal object of this invention is to provide for the removal of any one of the tubes of a condenser for repair or any other purpose without disturbing the others, and at the same time to provide for the free longitudinal expansion of the tubes, and to this end it consists in forming the joint between a tube