ted in hold, and possesses water bottom; does not use blowers to furnaces; has one smoke pipe, no independent steam fire and bilge pump, no bilge injection, but bottom valves or cocks to all openings in her bottom. Ample protection against fire has been made.

This vessel has three athwartship water-tight bulkheads, also freight house on deck, which is inclosed, thereby protecting all merchandise from damage by storms. A very pleasant cabin is on the promenade deck. The machinery of this vessel was constructed by Messrs. Harlan, Hollingsworth & Co., as above.

As we have previously explained, vessels of this class have, until recently, been fitted with the "Loper propeller," a description of which will be found on page 71, Vol. III (new series) of the SCIENTIFIC AMERICAN. We believe this steamer is of this kind, but it lacks many of the advantages of a new propeller recently invented and manufactured in Buffalo, N. Y., which has of late been extensively introduced. The novelty of this late essay is that the wheel is lighter than the "Loper," and the pitch of the blades, which are four in number, can be changed whilst the vessel is afloat, and without taking up the screw. It will be readily observed that this enables the engineer to regulate the set of the blades to accommodate their angle to whatever draft and whatever capacity of producing steam he may have to deal with. It is really an important advantage, and it is being generally appreciated, as it is being adapted in nearly all the new propellers now being erected, and also those being repaired by changing the screw.

WORKING STEAM EXPANSIVELY.

MESSRS. EDITORS:—Your correspondent G. H. Reynolds on page 118, of the present volume of the SCIENTIFIC AMERICAN, speaks of his belief in working steam expansively, and requiring more proof to the contrary than the recent experiments at the Metropolitan Mills, in this city. Now, there were no stronger believers in "cut-offs" than the proprietors of the Metropolitan Mills, but they have found their error at a very great cost; and when any one who is foolish enough to believe in the economy of working steam expansively can point to one single experiment in the history of the steam engine as fairly tried at one of the mills and can show any saving, he will have some grounds for his belief and not otherwise. Here is more proof to the contrary, from an English work on the economy of fuel by T. S. Prideaux, (page 100):—"At a recent trial of one of Her Majesty's screw steamers constructed with 4 cylinders for the *express* purpose of better obtaining the economy due to a considerable extent of expansion, it was found that a better effect was obtained by using only two cylinders, and cutting-off at half-stroke, than by using the same quantity of steam in four cylinders and cutting-off at quarter-stroke, although the result in the latter case ought to have been 50 per cent more; the cause of this anomaly was obviously the greater proportional condensation of the steam in the four cylinders than by the two, and the result might have been predicted. The proprietor of an extensive manufactory has told me this very day, the result of the trial of a "cut-off" which he had on his engine; he said it made no difference, in the cost of the coal used, whether he cut off at one-seventh of the stroke or one-half stroke."

The Metropolitan Mills, in this city, have six engines working in pairs, one pair driving 7 run of 4 feet burr stones; another pair driving 7 more run, and one pair doing the rest of the work of a flouring mill, such as driving the elevators, coolers, bolts, cleaners, &c. The engines driving the stones were constructed expressly for that purpose by Henry Waterman, 239 Cherry-street, in the most perfect form for using steam expansively. They are 14 inches diameter of cylinder, and 3 feet stroke. The engines doing the other work are a pair made at the Novelty Works, of their usual pattern, some 12 years since for the Bridge-street mill, Brooklyn, and were used there til the mill was burnt down. They are 15-inch cylinders and 4 feet stroke. The valves on all the engines are the ordinary slide, with the cut-off valve on the back, each worked by an eccentric. The point of cutting-off is varied by hand. The experiments were as follows: The engines were run for 36 hours, on an even quality of wheat, with their usual arrangements, steam at 90 lbs. pressure in the boiler, and cutting-off at 1-5th to 1-6th of the stroke. The amount of wheat ground and flour made, and coal used, were correctly noted. One engine was then taken off from each pair, and the cut-offs from the other engines, and a 36-hours experiment with the same kind of wheat made; the steam was at the same pressure in the boiler, following as near as possible the full length of the stroke, and running at the same speed. The wheat ground and flour made was the same, with 10 per cent less coal, which was quite contrary to the received "notions"—a positive gain by using the steam the full length of the stroke over using it expansively. The stones were sharpened as often in one case as the other. The condenser was not used at the time of the above experiment.

WARREN ROWELL.

New York, August 25, 1860.

TELEGRAPH BETWEEN THE ATLANTIC AND PACIFIC STATES.

The Secretary of the Treasury has advertised for proposals for building the line of telegraph to the Pacific, from the west line of the State of Missouri, by any route which the contractors may select (connecting at such point or points by telegraph with the cities of Washington, New Orleans, New York, Charleston, Boston, and other cities in the Atlantic, Southern and Western States) to the city of San Francisco, in the State of California. The bids are required to conform to the Act of Congress passed at the late session, which limits the compensation to $40,000 per annum, and prevents the public from imposition by limiting the charges for dispatches over said Pacific telegraph to 30 cents per word, with "the usual proportionate deductions upon larger dispatches." And it is further provided that this contract shall not prevent the building of other telegraph lines to the Pacific.

The bids or proposals were opened on the 2d of last month, at Washington, and no doubt considerable excitement is felt among those personally interested in telegraphic enterprises. The parties who control the American Telegraph Company are the owners of all the patents now in use to facilitate telegraphic communication, and must be reconciled before any contract can go into effect. There is another obstacle that will have to be overcome before messages can be sent through to the Pacific. On the California end of the route there are two separate companies now working their way with the wire in hand towards the east. One company has extended its stations far into Carson valley; the other, by this time, is working as far south as Los Angelos, 480 miles below San Francisco, on the line of the Overland Mail route. Whichever route is decided upon by the successful contractors, the line already built will be in the way, unless allowed a share in the enterprise. The same difficulty surrounds it on the east. Without perfect harmony between the bidders and the present telegraph companies no telegraph can ever be worked; but all these difficulties may, and no doubt will be removed, and mutual agreements made between all parties.

THE DISTRIBUTION OF CURRENCY.—A correspondent of the New York *World* says:—"It has been estimated that the currency required in the United States does not ordinarily exceed $9 per inhabitant, of which, at the utmost, only one-quarter is in coin. In England, it amounts to $28, of which one-third is in coin; whilst in France it is probably double the first-named sum, the largest portion being in coin." On the 4th ult., the liabilities of New York were:—Deposits, $83,846,988; circulation, $9,176,386; total, $93,023,374. The assets were:—Loans and discounts, $130,118,247; specie, $22,128,189; total, $152,246,436. The specie is a reserve to fall back upon in a case of emergency; but not a fund to meet the aggregate indebtedness of the banks.

PLATINIZING RIFLES.—A correspondent of the London *Mechanics' Magazine*, gives the following receipt for preventing rifles rusting in the interior of the barrels. "If nitro-muriate of platina be mixed with one-fourth of its bulk of ether, and the mixture then allowed to settle, the platina solution will fall to the bottom, when the lighter liquid may be poured off. The platina solution is then poured into a well-cleaned rifle barrel, when a galvanic action quickly takes place, and a thin coat of platina is deposited upon the surface of the barrel, and prevents it from rusting."

A COLUMN OF VARIETIES.

The bells of the Paris ornamental clocks are composed of 72 parts by weight—copper, 26.55 tin, and 1.44 iron.

The sulphate of barytes is the substance which is employed for giving that beautiful white glossy surface to card and other papers.

Hard iron when melted and cast in large masses, and then allowed to cool very slowly, becomes quite soft. Large castings of iron should be so constructed as to be cooled rapidly by a stream of water or a current of air passed through the center of them.

The annual gold product of Australia, since the first discovery of this metal in 1851, has been as follows:—1851, for five months, 145,145 ounces; 1852, 1,974,975; 1853, 2,497.723; 1854, 2,144,699; 1855, 2,576,745; 1856, 3,003,811; 1857, 2,729,655; 1859, 2,516,976. Total for the eight years, 17,589,729 ounces, valued at £4 per ounce. Total value, £70,358,916, or $340,535,153.

Some of the heavy engines for drawing on common roads in England are called "steam elephants." One of these lately built at Birkenhead for the Dutch government draws a load of 40 tuns on a level. It is provided with one of Gwynne's American centrifugal pumps to lift water, and it has also a common force pump, so that it may be used as a steam fire-engine when required.

In one of the libraries in Newark, N. J., there are a number of drawings formerly belonging to Robert Fulton, and executed by himself. These embrace diagrams of his submarine torpedoes. One of them represents the English channel sown with 190 marine torpedoes, so anchored as to destroy any French fleet that would attempt to invade England. The British government refused to entertain Fulton's propositions for protecting their coast.

Within the past three years, 10 barks, 5 brigs, 41 schooners, 1 propeller, and 8 tug-boats, which were built on the inland lake waters, are now employed in salt water service in our coasting trade. From their flat build they make excellent cotton traders, and large numbers of them are engaged in that branch of sea service.

An important improvement in some classes of plated goods, lately introdnced, consists of solid rolled silver edges, beads, and moldings, instead of plated ores, which from their prominence have their silver surface speedily worn off. The silver employed in forming the ornamental edgings is laminated exceedingly thin.

One drop of the essence of bitter almonds will communicate an agreeable taste and smell to an ounce of the castor oil of commerce, and will not at all affect its medicinal action.

The American steamship *Vanderbilt* has proved herself to be the fastest sailer afloat. She sailed from New York July 28, at 2.30 P. M., and arrived at Southampton Aug. 6, at midnight. Allowing five hours for the difference of time in sailing eastward between the two ports, making 9 days and 4 hours, the fastest voyage on record.

Copper mines have been discovered in British Columbia, in which large blocks of the pure metal, similar to those obtained in the mines of Lake Superior, have been found. These blocks are said to be very numerous. Silver is also found in considerable quantities in these mines.

Dr. Wollaston obtained very fine platinum wire by inserting a platinum wire in a small cylinder of silver, then drawing them both through a draw plate, after which the silver was melted, leaving the platinum wire finer than the thread of a spider's web. Silver wire may be drawn to the three-hundredth part of an inch in diameter, and platina to the three-thousandth part of an inch.

On the Lexington and Danville Railroad, in Kentucky, Mr. J. Roebling is engaged in constructing a suspension bridge, which will form a span of 1,224 feet, from center to center of towers over a chasm 300 feet deep. When completed, it will be the most stupendous work of the kind in the world.

Two of Fawke's steam plows are now being constructed in Philadelphia for Cuba for the purpose of being used on tobacco plantations.

In Philadelphia, there are now in actual running order nineteen passenger railway companies, with 395 cars, 2,744 horses, and 1,623 men employed. There are 160 7-40 miles of single track.