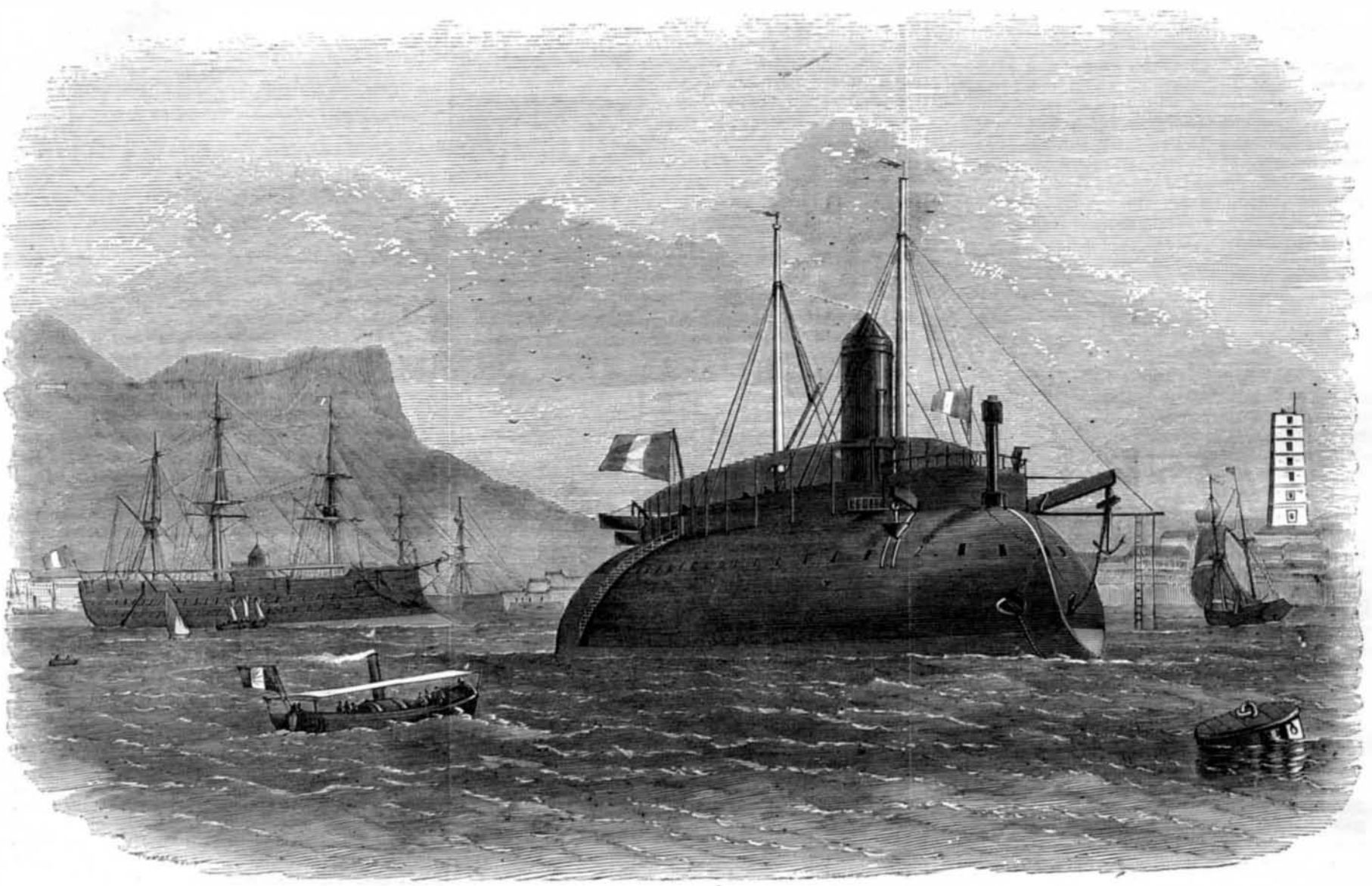
The First French Iron-clad.

Our engraving represents the appearance of the great ram constructed by order of the French Emperor, and which made such a nervous stir among the officials of the English navy some two years ago. At that time the performance of our initial *Monitor* and the accompanying efficiency of our other iron-clads had awakened a remarkable interest in the construction of war vessels among other nations. Impregnability and efficiency in assault were the two almost opposing qualities which it was desirable to combine in naval vessels. This was attempted in the *Taureau*, which is an iron-plated ram, defended by its plating and having its only means of offense in a single gun mounted near the bow in a turret. The principal advantage expected from the ship was its immense beak or prow, the ship itself being used as a projectile, to be hurled against those of an enemy. The sides of the vessel are protected by armor extending only about three feet above the water line amidships, and abaft and at the bow by five inches thickness of armor. The engines, two in number, are each of 250-horse power, and the vessel 197 feet long by 48 wide.

As a menace to hostile powers the *Taureau* may be valuable, but as a means of offence or defense it is doubtful if it would equal one of our unpretending monitors.



THE FRENCH IRON-CLAD RAM "TAUREAU."

How Guns are Fired.

The earliest means adopted for igniting the charges of big guns would seem to have been red-hot spikes or bars, which were introduced into the vent, and a pair of bellows for heating the irons formed a necessary part of the artillery equipment of the fourteenth and fifteenth centuries. The inconvenience and danger attending this plan became more conspicuous as the size and power of guns increased, and by the middle of the fifteenth century it had been almost entirely superseded by the system of priming with loose powder, a small train of which was laid up to and through the vent. But the red-hot priming irons were not at once got rid of, for until the adoption of a match made for the purpose, they were still used to ignite the priming powder; and of this match, or of the linstock used for holding it, we find no mention until some time in the sixteenth century. About the beginning of the seventeenth century the priming powder was in part superseded by a small piece of quickmatch, which, being introduced into the vent, acted like a weak tube. To this match the name *portefeu* was applied—a name which we still retain, although the modern "portfire," it need hardly be said, is a very different thing from the ancient *portefeu*. It is remarkable that, although the flint had been introduced about this time, or even earlier, as a means of firing small arms, no attempt seems to have been made for about 200 years to extend its employment to cannon. But the subject did not stand still, and a great improvement was effected in the first half of the eighteenth century, when the quick-match or *portefeu* was no longer used by itself, but was placed inside a small tube, which could be dropped into the vent, the head of the tube being primed, and the train of loose powder which led up to the vent being done away with. It was not until the beginning of the present century that the simplification of reducing all tubes to one uniform length was effected, but by this time the peculiar action of a tube came to be understood. This action is due to the hole in the center of the composition, the effect of which is to expose a large surface of composition to immediate ignition, and the gas which is thus generated, being subjected to considerable pressure in the cavity, necessarily rushes in the only direction in which an escape is open to it—viz: through the tube—with accumulating force, causing an explosion, the effects of which are directed in the prolongation of the tube. The adoption of a safer and more rapid means of ignition is due to Sir Charles Douglas, father of Sir Howard Douglas, the well known writer on naval gunnery.

In 1778 he formally submitted various propositions "for improving, facilitating, and quickening the service of naval ordnance," including the introduction of flint locks and quill tubes. His propositions were not immediately entertained, and their employment on land never became very general, and tubes ignited by a match or portfire were generally used until 1845 for land-service guns. The next great improvement was the application of the percussion principle of ignition, an improvement of considerable importance at sea, since it made the firing of the gun more instantaneous, and and thus considerably increased the accuracy of the practice made from the ever-moving platform of shipboard. No tubes of this sort were made for actual service until about 1831. They were contrived by Mr. Marsh, of the Royal Arsenal Surgery, and improved upon in 1846 by Col. Dansey, R. A. They consisted of a quill tube, with a small cross-quill filled with a detonating composition, which was exploded by the blow of a hammer fixed to the gun. For land-service, percussion tubes do not seem to have been used until about the year 1845, when they may be considerdd to have been established for both services, although their application to land guns was only partial. Meanwhile attention had been directed to a tube which was brought to this country by a German officer, which depended not upon percussion but upon friction for its ignition. In 1851 Mr. Tozer, of the Royal Laboratory, succeeded in perfecting a copper friction tube of the pattern now in use, which was adopted for all land-service artillery in 1853. It was not recommended for naval service on the ground that any metal tube would be dangerous and highly objectionable between decks. But by 1856 a quill friction tube had been designed and adopted for naval service—the percussion tube being retained, however, in a certain proportion, until last year, when it was formally pronounced obsolete. The introduction of friction tubes was a great improvement for both land and sea service; in the field they superseded the common tubes and portfires, which had rendered the service of the guns slow and imperfect, and the use of which was attended with the risk of setting fire to ripe corn, dry grass, etc., from the ignited ends of portfire which were cut off and thrown down. For sea, garrison, and siege services they got rid of the hammer, making the firing of the gun even more instantaneous and convenient. These are the tubes now generally in use. There remains only to be noticed a system of firing guns by electric agency, which is largely used at proof and for experimental purposes, when it is desirable for the firing party to be under cover. The first employment of electricity for firing gunpowder dates as far back as 1751, and is due to Franklin; and in 1767 Priestley turned his attention successfully in the same direction. Our space will not permit us to detail the various contrivances which have been proposed. Suffice it to say that it was not until 1856 that Mr. McKinlay, the proof-master at Woolwich, submitted his galvanic tube, the principle of which consisted in causing the current of electricity to pass at one part of its circuit through a wire of inferior conducting power, which, becoming instantaneously heated to redness, ignited the priming in the head of the tube in which it was embedded. The last improvement in this direction has been the application of magneto-electricity, which was successfully accomplished in 1862, by Messrs. Abel and Wheatstone. The inductive apparatus used with these tubes is extremely simple, portable, and durable. The electric tubes are used also for firing "time guns" at Edinburgh, Glasgow, Sunderland, and other northern towns, the current being daily flashed at noon along ordinary telegraph wires from the Royal Observatory at Greenwich.—*Pall Mall Gazette.*

Editorial Summary.

SEWING-MACHINE FACTS.—The following interesting statistics we gather from the quarterly returns, made, we believe, under oath, by the several manufacturers of sewing-machines throughout the United States. The figures which we present, and which we have been at some pains to collect, show at a glance the wonderful growth and great importance of this branch of American manufactures. It will be observed that one company alone has produced and sold within the year over *forty-three thousand sewing machines.* It is somewhat remarkable that, during the recent stagnation in trade, this business has been but slightly, if at all, affected. But below are the figures in detail:—

Sewing-machines manufactured and sold, as per quarterly returns, for the year ending June 10, 1867.

Double-Thread Machines:

The Singer Manufacturing Co.	43,053
The Wheeler & Wilson Mf. Co.	38,055
The Grover & Baker S. M. Co.	32,999
The Howe Machine Co.	11,053
The Florence S. M. Co.	10,534
The Weed S. M. Co.	3,638
The Elliptic S. M. Co.	3,185
The Ætna S. M. Co.	2,958
The Finkle & Lyon S. M. Co.	2,488
The Empire S. M. Co.	2,121
The Leavitt S. M. Co.	1,051
Total double-thread machines.	151,135

Single-Thread Machines:

The Wilcox & Gibbs S. M. Co.	14,152
The Shaw & Clark S. M. Co.	2,692
The Goodspeed & Wyman S. M. Co.	2,126
Total single-thread machines.	18,970

The foregoing facts and figures we find in the *Financial*