

mon glass manufactured in this country (similar to window glass) is *not* a non-conductor; the charge will pass through it readily, although many of our published works on electricity seem to have overlooked the fact. Nothing but clear, white English glass should be used.

Such an apparatus as that above described will answer almost every desirable purpose, and its cost is within the means of every one. Although I have now been engaged for several years in giving lectures on chemistry and electricity, making the principal part of my apparatus myself, yet I still carefully preserve my first electrical machine to remind me of the happy hours I occupied in making it in my boyhood days.

AMOS I. ROOT.

Medina, Ohio, June 29, 1860.

AMERICAN NAVAL ARCHITECTURE.

[Reported expressly for the Scientific American.]
THE STEAMER "SALVOR."

This steamer was constructed in Buffalo, N. Y., and has recently taken her appropriate position on the route of her intended service—Tampa Bay to Havana. As she is a well-built and staunch vessel in every particular, we surmise the details of her construction will prove of interest to the readers of the SCIENTIFIC AMERICAN; they are as follows:—Length on deck, from fore-part of stem to after-part of stern-post, above the spar-deck, 183 feet, 6 inches; breadth of beam at midship section, above the main wales (molded) 26 feet 6 inches; depth of hold, 12 feet 3 inches; depth of hold to spar deck, 19 feet, 3 inches; draft of water at load line, 9 feet 7 inches; tonnage, 470 tons. Her hull is of white oak, &c., and square fastened with iron, treenails, butt bolts and large spikes. Distance of frames apart at centers, 18 inches. The floors are molded 12 inches; sided 12 inches.

The *Salvor* is fitted with one vertical direct-acting engine; diameter of cylinder, 30 inches; length of stroke of piston, 36 inches, diameter of propeller, 10 feet 8 inches; pitch of same, 19 feet, and has four blades, materials of same, cast iron.

She is also supplied with one return flue boiler, located in hold; possesses a water bottom; does not use blowers to furnaces; has one smoke pipe; no bulkheads; knees under spar and main decks; has two extra size anchors, and two masts. In addition to these features, she has one independent steam fire and bilge pump, and bottom valves or cock to all openings in her bottom. Ample protection has been made with tin, &c., against communication of fire from boilers. The cabins are on her spar deck; bunkers of wood; she is well coppered her rig is that of a schooner. This vessel is designed to carry large loads of cattle on her main deck. The machinery was constructed by and under the supervision of Mr. David Bell, of Buffalo, N. Y.

THE STEAM PROPELLER "JOSEPHINE."

This steamer was constructed by the well-known builders, Messrs. Harlan, Hollingsworth & Co., of Wilmington, Del., for the Philadelphia Steam Propeller Company, to ply between the ports of Philadelphia and New York. As she is claimed to be a good vessel of its description, we proceed to give the essential elements of its construction for the benefit of the readers of this paper. Length on deck, from fore-part of stem, to after-part of stern-post, above the spar deck, 135 feet; breadth of beam (molded) 22 feet 8 inches; depth of hold, 9 feet 3 inches; draft of water at load line, 6 feet 6 inches; tonnage 275 tons.

Her hull is of wrought iron plates, $\frac{1}{4}$ and $\frac{3}{8}$ ths of an inch in thickness, and very securely fastened with rivets $\frac{3}{4}$, $\frac{5}{8}$, $\frac{1}{2}$ and $\frac{3}{8}$ ths of an inch in diameter, every 3, $2\frac{1}{2}$ and 2 inches.

The *Josephine* is fitted with one vertical direct-acting engine; diameter of cylinder, 30 inches; length of stroke of piston, 2 feet 4 inches; diameter of propeller, 6 feet, number of blades $4\frac{1}{2}$; materials of same, cast iron.

She is also supplied with one return flue boiler, located on deck; does not use blowers to furnaces; has no water bottom; one smoke pipe, one independent steam fire and bilge pump, and ordinary bilge injection. Ample protection against fire has been made; this vessel has two athwartship water-tight bulkheads, and freight-house on deck. The machinery was constructed by Messrs. Reaney, Neafe & Co., of Philadelphia.

We believe the propeller used on this vessel is the "Loper Propeller," invented by Captain R. F. Loper,

of Philadelphia. The screw is all cast in one piece, its diameter is 8 feet; width of blade at hub, 2 feet 3 inches; and at outside, 4 feet 4 inches. The angle of the blades at the axis is 30° ; at the outside 54° . The alteration of angle, on increasing pitch, affords a greater outward action of the blade at the entrance, and leaves the water without revulsion, thus avoiding the "slip." The blades occupy 6-10ths of the area of the circle, when viewed in the direction of the axis, thus leaving 4-10ths for the free escape of water between the blades. The weight of this wheel is about 3,000 pounds.

AN EXTRAORDINARY MILITARY DRILL.

A military company from Chicago—calling themselves the "Zouaves"—have recently visited this city and have astonished and delighted the New Yorkers with their extraordinary tactics. On one occasion the Zouaves paraded in the City Hall Park, in front of our office, and were then put through a course of the most vigorous drills in the manual; loading and firing, and company movements, in common, quick and double quick time; skirmish drill or disposition against cavalry and deployment. The universal sentiment was one of astonishment and commendation, and it was admitted on all sides that such a drill was never before witnessed in this city. The company seemed to move like a collection of clocks, even in loading and firing, and stacking arms.

In the manual, the light infantry drill commanded unusual applause. In the loading and firing, the regular ramming, and breaking of the cartridge with the hands, the return ramrod, and simultaneous firing, were excellent. In the company movements, the "break into platoons," "exchange ranks while on the march," "oblique by platoons," "wheeling," and "counter-marching," both in quick and double quick time, drew down continued plaudits, even from the military spectators who constituted the escort to the Chicago company. But the most surprising part of the drill was that without knapsacks; the deploying from one end of the park to the other in companies of five as skirmishers; formation of company pyramid, preparing against cavalry assault, the bayonet exercise, retreat and shout of the rally, produced a perfect *furor* of applause. The whole wound up with an exhibition of loading and firing while lying on the ground, running forward and retreating with an agility that would seem to enable them to dodge between the balls in a real engagement. Their surprising springiness, muscularity and general gymnastic excellence was particularly developed in these movements, and the rapidity with which they dropped down on their stomachs, turned over on their backs and loaded, turned back and fired, jumped up by platoons, ran ahead and repeated the same process, was highly interesting though somewhat ludicrous.

The drill lasted nearly three hours, including stoppages for rest, a few moments each time, and although performed under a scorching sun, on the hot sand, and comprising a series of vigorous exercises, the men stood it well and attended to their business. The entire drill of which the corps is capable includes a large number of movements not touched upon for want of time, including the silent manual, charging on a street crowd, and other novel movements. The latter was tried in one of the western cities on their way here, and their assumed ferocity and horrid yells at the charge set even the military scattering helter-skelter.

IMPORTANT INFRINGEMENT CASE.

Just as we were going to press, we received the following telegraphic despatch:—

CLEVELAND, Ohio.

JULY 20.—*Obed Hussey, versus Whitely, Foster & Kelley.*—This was a bill in chancery filed, in Cincinnati, to restrain the defendants from infringing Hussey's patents. A motion for injunction was reserved for argument at Cleveland, and was heard before Judges McLean and Wilson. The court held, first, that Hussey's patents had heretofore been adjudged to be valid on a final hearing, and the defendants had shown no good grounds for impeaching them; secondly, that the machines of Whitely & Co. infringed Hussey's patents; and thirdly, that an injunction be ordered as prayed for.

To Messrs. MUNN & Co., New York City.

A COLUMN OF VARIETIES.

An alloy consisting of 10 parts cast iron, 10 of copper and 80 of zinc does not adhere to the mold in casting, and it is of a beautiful luster when filed and polished. The most fractious metals are melted first and the zinc last, in making it.

The greatest discoveries have been made in leaving the beaten tracks of science and going into the by-paths. Let inventors mark this sentiment well.

Polished surfaces of steel and iron may be prevented from rusting, by exposure to water, if they are coated over with a mixture of lime and oil.

A transparent cement for glass is made by dissolving one part of india-rubber in chloroform and adding 16 parts, by measure, of gum mastic in powder. Digest for two days, and frequently shake the vessel in which these substances are contained. The cement is applied with a fine camel's-hair brush.

In a pumping engine there are two classes of work performed, namely, *useful* and *lost*; and the two, added together, make the *gross* work of the engine. The useful work in a given time is the product of the weight of water lifted in that time multiplied by the height to which it is elevated; the lost work is that performed in overcoming the friction of the water in the pump, pipes, valves and piston.

A "combustible" means some simple or compound substance which is capable of combining rapidly with oxygen to produce heat. There are many combustible substances, such as phosphorus, sulphur, &c., but the most common are carbon and hydrogen, and these are found in nature intimately combined and on a large scale. The trees of the forest, the bituminous coal fields, and the fat of animals are principally composed of carbon and hydrogen.

An excellent furniture polish is made with one pint of linseed oil and about half a gill of alcohol, stirred well together and applied to the furniture with a linen rag. After this, it is rubbed dry with a soft cotton cloth and finished by rubbing with an old piece of silk, when a most beautiful gloss on the furniture will be result.

When the glass case which covers the magnet of a compass becomes electrified, it affects the needle. This deflection can be remedied by damping the glass with water, the moisture removing the electricity.

The speed to which the steamship *Persia* attained on her first trial trip, in 1856, was $16\frac{1}{2}$ knots per hour. Her engines have cylinders of $100\frac{1}{2}$ inches diameter and 10 feet stroke; her wheels are 38 feet 9 inches in diameter and make about 18 revolutions per minute. Her consumption of coal was, formerly, from 120 to 150 tons daily, but she has just had an apparatus for superheating the steam applied, and by this it is expected that from 25 to 35 per cent of fuel will be saved.

One great cause of *mysterious* boiler explosions, we believe, is due to the inequalities of strength in the iron plates of which the boiler is constructed. The exact strength of a plate of iron cannot be ascertained without breaking it. Some plates of iron, of the same size and thickness as others manufactured from the same stock, have varied as much as 10,455 lbs., in breaking weight, to the inch, when tested.

The Electric Telegraph Company in London have an air-tight tube laid between their central station and other stations at Cornhill and the Stock Exchange, from which the air is exhausted by a pump and documents sent through the tube by atmospheric pressure, upon the same principle as Richardson's telegraph, which was illustrated on page 265, Vol. VIII. (old series), SCIENTIFIC AMERICAN. This system has been in operation, privately, in London, for several years, and it is now proposed to lay down a complete and extended series of public lines in London, on a scale which will receive not merely papers and packages, but parcels of considerable bulk, including the mail bags of the post-office between the railroads and the district offices; and a company is now in course of formation to carry out the object.

The new Commissioner of Patents, Gov. Thomas, desiring to infuse new life into the Agricultural department of his office, has sent out Col. Clemson to Europe to purchase good seeds suited to our climate and wants. Wheats, Italian barleys, &c., are to be special objects of acquirement. New and valuable seeds and plants are also to be obtained at any cost consistent with the appropriation of \$60,000.