STENOGRAPHY BY MACHINERY.

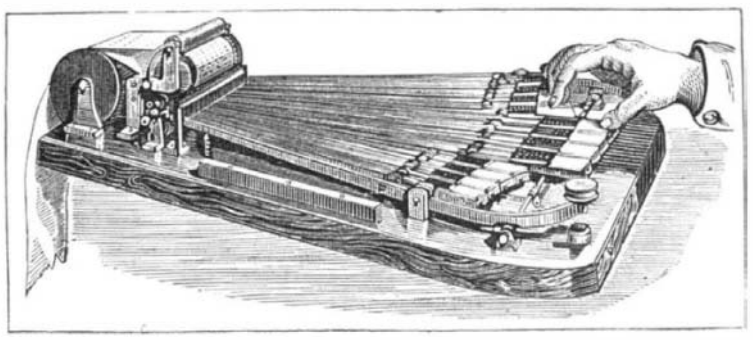
A curious apparatus has recently been invented in France, by the aid of which stenographic writing may be accomplished at the rate of from 200 to 250 words per minute, which is probably as fast as the language can be spoken by the readiest speaker. The device, an engraving of which is given herewith, consists of a keyboard operated as shown by the hand of the reporter, and composed of twelve black and an equal number of white keys. On each side of the instrument is a large key moved by a pressure of the wrist, and serving to give supplementary signs which simplify the reading of the characters printed.

All the keys, when operated, produce indications in ink on a roll of paper, which is taken from a reel in manner similar to that on the Morse telegraphic apparatus. The black keys, however, give long marks, while the white ones cause simple dots to be transcribed. At each pressure of the fingers on the keyboard, the paper is automatically unrolled for about 0·02 of an inch, so that on each line any combination of twelve double signs may be imprinted, and these signs are arranged in three groups of four each, and read from left to right in the ordinary manner.

The number of characters which may be made on each division of four is more than sufficient to to require a single movement to form a single letter. In other words, with practice, three letters or less can be written at once. If the useless letters be suppressed, such as double letters, e mute, etc., frequently a single movement will produce an entire word. In case, however, the word is to be continued to the next line, a movement of one of the wrist keys makes a character indicating the fact.

The manipulation of the keyboard requires great skill. Learning to read the characters is very easy, but at least six months' practice is necessary for one to become an expert operator capable of following every word as it is uttered in a large assembly.

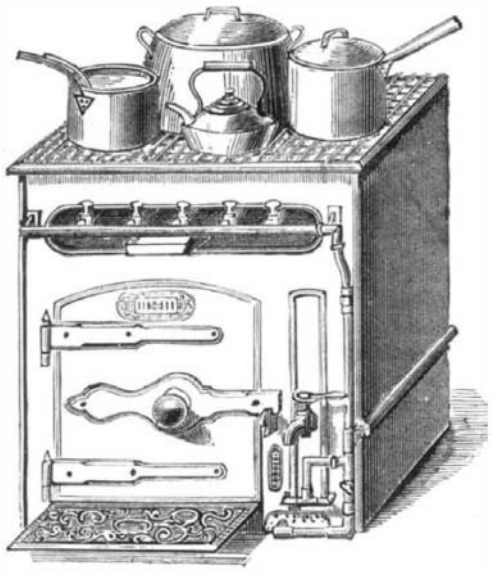
The paper roll is of no great length. About sixty or seventy feet, four inches in width, is required for an hour's continuous writing.



STENOGRAPHIC MACHINE.

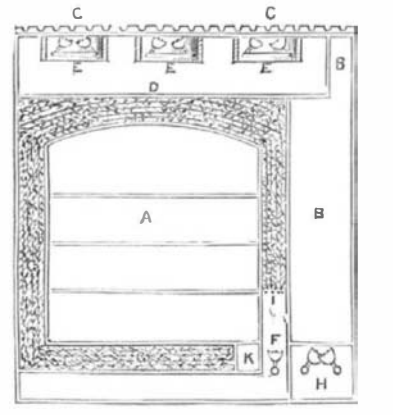
COOKING BY GAS.

We publish herewith engravings of a gas-burning cooking stove, the invention of B. Giles, Blackheath, England, who



claims to have succeeded in cooking the most delicate dishes without their imbibing the slightest flavor from the products of combustion.

Fig. 1 is an isometrical view of the small sized apparatus, in which, it will be seen, great attention has been paid to compactness and neatness in working out the design. The outside dimensions are 22 inches in width, 16 inches in depth, and 33 inches in hight. By a reference to Fig. 2 (a diagram of a transverse sectional elevation of the whole kitchener), it will be seen that the oven, marked A, is surrounded by a chamber. This chamber, marked ●, is filled with coils of thin iron, except where room is left for the burners, marked F, which heat the oven and the water in the boiler, B. Over the burners, F, is a grating, marked I. This grating, which supports the coils of thin iron, is placed at a hight sufficient to allow of the gas burning to advantage for developing heat. The heated products of combustion from the burners, passing through the grating, circulate freely among the coils of thin iron, and pass out at the point, K, after the coils of iron have absorbed and utilized the greater part of the excess of temperature of the products over the atmosphere. By the adoption of this system the heat is kept uniform, and is the more equally distributed over the whole surface of the oven. The space, D, constitutes a most effective plate warmer. Over the oven gas burners, E, are placed in sets of four, for the purpose of heating digesters (for making soup), fish kettles, saucepans, etc. Each set (as with those for heating the boiler and oven) is so arranged as to thoroughly consume every particle of gas, and generate the maximum amount of heat possible. Each set of these burners for heating saucepans consumes about eight cubic feet per hour when the gas is turned full on; the heat thus evolved will raise the temperature of a gallon of water from that at which it is usually delivered to that of the boiling point of water (212° Fah.) in about thirty minutes, with a consumption of about four cubic feet of gas.



THE ALEXANDRA.

The launch of the twin screw ironclad Alexandra on April 8 adds to the British navy the finest and most powerful broadside ironclad in the world.

The principal dimensions are: Length between perpendiculars, 225 feet; breadth, extreme, 63 feet 8 inches; depth in hold, 18 feet 7½ inches: tunnage, 6,049; displacement, 9,492 tuns; draft forward, 26 feet; draft aft, 20 feet 6 inches; indicated horse power (intended), 8,000; speed, 14 knots.

Like all her predecessors of modern type, the Alexandra has her water line protected by a belt having a maximum thickness, over the water line, amidships, of 12 inches, a thickness which, in masted ironclads, has been equaled as yet only in the French vessel Redoubtable, in the Independencia (Brazilian ironclad, whose launch was so unfortunate), built in England from Mr. Reed's designs, and in the Kaiser and Deutschland, built and building there—also from Mr. Reed's designs—for the German government. Towards the ends the belt tapers to a much less thickness, an inevitable defect of the belt system, to which it does not appear to be customary to attach much importance, though its existence is to our mind the great argument in favor of making the ends into coal tanks, which, being penetrable with absolute impunity to the ship, solves all questions of thickness of armor by enabling the designer to dispense with it altogether.

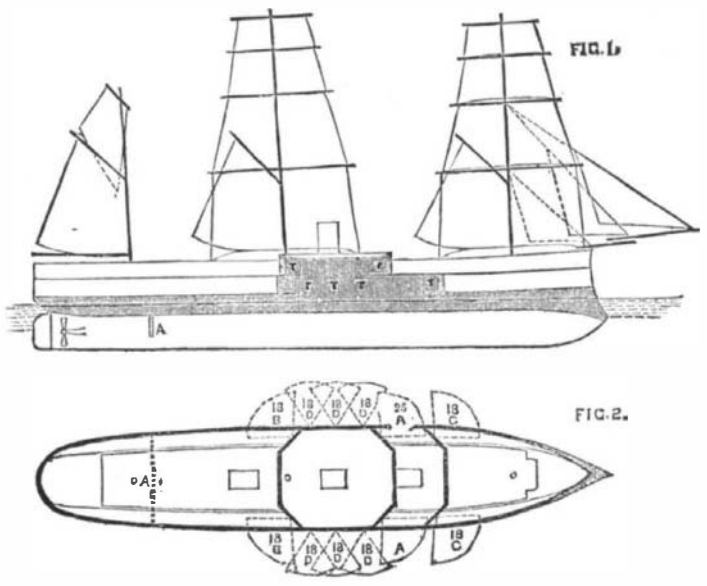
The Alexandra is a central battery ship in the best sense, that is, she needs no bow or stern batteries to give her end-on fire. For the first time the English navy really has a masted ship with satisfactory all-around fire (which even the Monarch turret ship has not), for out of twelve guns the new ironclad can fire four (including the two heaviest) straight ahead, and two straight astern. On each broadside from four to six guns can be fought, according to the bearing of the enemy. The Alexandra, by virtue of her two-gun decks with end-on fire from both, thus approximates very closely, as regards range of fire, to an ideally perfect broadside ship.

Splendid ship as she is, and advantageously as she compares with other broadside ships in the English or any other navy, the Alexandra shows in places, says *Engineering*, that deficiency of protection which is always observable in vessels of her type. Thus the batteries are armored with only 8 inch and 5 inch armor—the latter a miserable defense against the guns of other ironclads The reason of course is that the ship must, before all things, be kept above water. There is much to be armored, and not much to do it with; and when the waterline is fairly secured, the batteries are left, to say the least, very unequally protected.

It should be noted that in the Alexandra, as in previous ships built on the two-deck battery system, the upper battery serves as a conning tower, and enables that weight to be dispensed with. It will be seen by Fig. 1 that the armor forward is carried down over the ram, both to strengthen the latter, and to guard the vitals of the ship from injury by raking fire from ahead, at times when waves or pitching action might expose the bows. The magazines, engines, etc., are similarly protected against a raking fire from abaft by a hanging bulkhead, A, across the hold, plated with 5 inch armor.

The sills of the main deck ports are 9 feet, and those of the upper deck ports more than 17 feet, above the water. The total weight of armor and backing is 2,350 tuns, and of guns and ordnance stores about 660 tuns.

The only defect of the Alexandra appears to us to be that she is too good. She is too large a version of the type. A small Alexandra, that is, an improved Audacious, would appear to us a valuable addition to the navy, well fitted for certain necessary services for the discharge of which such masted broadside ships are probably as well fitted as, or even better fitted than, masted turret ships. But if so much money was to be spent, it should have been spent upon an Inflexible, or even upon a Devastation.

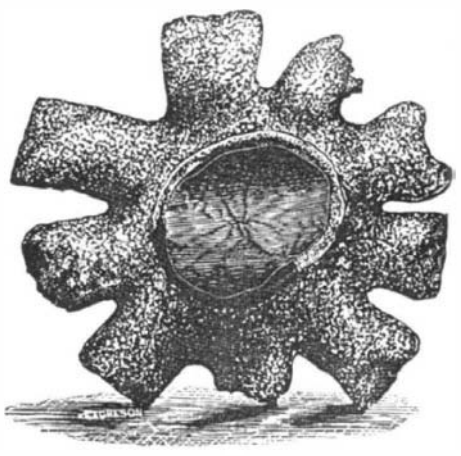


THE ENGLISH IRONCLAD ALEXANDRA.

BRACHIOSPONGIA.

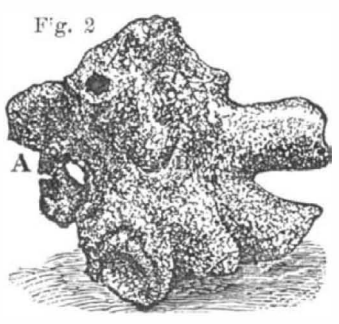
"During a geological trip in 1855, I discovered a new genus of fossil sponge, which may be worthy of a brief notice. My first specimen was exhibited to Professor L. P. Yandell, of Louisville, Ky., and while in his hands it was seen and described by Professor D. D. Owen. (Second Report of Geology of Kentucky, page 111.) He styled it an amorphozoon, and suggested the name of *scyphia digitata*. I doubt if he ever saw the fossil in place, though he correctly refers it to the birdseye group of the lower silurian. It was again described and imperfectly figured by Professor R. Owen. (Indiana Geological Survey, 1859–60. pp. 362, 363). He changed the name to *syphonia digitata*, and he recognized it as a sponge. The specimen thus described, having nine arms, I claim as my discovery, and it should be acknowledged as typical of the genus. Professor S. S. Lyon afterwards found one with eleven arms, of which casts have been

Fig. 1.



widely distributed. In 1867 I placed my original specimen in the hands of that accomplished naturalist, Professor O. C. Marsh, of Yale College, for a more careful examination. The result was the rejection of the former unsuitable names and the substitution of *brachiospongia* (the arm-bearing sponge), with the specific name of *Roemerana*, in honor of Professor F. Roemer, the leading authority on palæozoic sponges. Over fifty additional specimens, complete or fragmentary, were obtained by me on a subsequent visit to Franklin county, Ky., and a map of the sponge region was prepared. Specimens have also been found in the same geological horizon

Fig. 2



in Tennessee. Allied forms were likewise found, but they were so highly silicified and distorted as to make an accurate description impracticable. Professor Marsh's notice appeared in the *American Journal of Science and Arts* (vol. 44, p. 88), and it was afterward corrected and elaborated in the form of a paper read before the American Science Association in 1868. Fig. 1 represents *b. Roemerana*.

The general appearance of the *brachiospongia* is vasiform; a central cup, oval, with a rim one or two inches high, being surrounded by tubular arms or fingers, hollow at the base, and closed at the extremity. These arms vary in number,