the answer to which decides the value of any printing process, no matter how simple and otherwise advantageous it may be. Our answer is brief. In all or any of the good qualities of a print—in tone, vigor and gradation—the prints which we saw produced by this process were not inferior to the finest quality of silver prints we have yet seen. Some of the specimens which we examined were totally devoid of any approximation towards the glaze which characterizes prints on albumenized paper, and these were perhaps the richest-looking photographs which have yet come under our notice; while others possessed the characteristic glaze alluded to in greater or less degree. This would seem to indicate the power of modifying the process to a considerable extent.

"With respect to the peculiar chemical agents employed, beyond the fact that some preparation of uranium constitutes an important ingredient in the collodion, we are not aware of what it consists. In the course of a few months, however, complete details will be given to the public. The toning bath contains some salt of gold; and, we believe, retains its toning powers up to the last atom of gold present in it."

On this discovery the London *Times* remarks:—

"The new process which has been discovered in Germany by Herr Wothly, and from him has been named 'Wothlytype,' discards nitrate of silver, and discards albumen. For the former it uses a double salt of uranium, the name of which is at present kept secret; for the latter it uses collodion. We have explained that by the ordinary method, the paper to be printed is sized with albumen, and the surface of the albumen receives the silver preparation, which is sensitive to the light, and shows the printed image. The paper thus does not receive the image, but is, as it were, a mere bed on which lies the material that does receive it. By the substitution of collodion for albumen, a different result is reached. In the first place, the film of collodion on the paper yields a beautiful smooth surface on which to receive the image, and the result is, that pictures are printed upon it with wonderful delicacy. In the second place, the collodion, before it is washed upon the paper, is rendered sensitive by being combined with the salt of uranium. The sensitiveness, therefore, is not on the surface alone of the collodion film, it is in the film itself, and so completely passes through it, that even if it be peeled away from the paper, the image which it received will be found on the paper beneath. The vehicle thus employed is not less superior to all others yet known for receiving the negative image on paper, than it is to all others yet known for receiving the negative image on glass. The metallic salt which combines with it has also rare merits.

"In the first place, the manipulations are very simple and easy—far more so than in the silver printing process—and thus the labor saved is considerable. Next, the paper, when rendered sensitive for printing, or 'sensitized,' as the photographers say, keeps perfectly for two or even three weeks—an immense boon to amateurs, who can thus have their stock of printing paper 'sensitized' for them; whereas, at present, when the paper receives the sensitive preparation, it has to be used almost immediately, and will not keep more than a day or two. Thirdly, the color and tone obtained are very various, including every shade that can be got by the ordinary silver plan; but, in addition, it has the advantage of being able to print any number of impressions of exactly the same color, and of doing away with all such difficulties as show themselves in mealiness and irregular toning. The precision of result is a great point. By the silver process, the results are never certain, and even when the print comes out perfect from the frame, the subsequent process of washing and fixing go seriously to alter it. Lastly, the permanent character of the new method is very remarkable. Nobody seems to know exactly why the old silver process gives way—whether it be on account of the albumen, or the nitrate of silver, or the hyposulphite of soda. We only know, that so many of the prints prepared by the old method fall away, that no reliance can be placed in those which seem to stand firm."

CORNISH PUMPING ENGINES.—The number of pumping engines reported in England for August is thirty-five. They have consumed1, 719 tuns of coal, and the average duty of the whole is 51,000,000 lbs., lifted one foot high by the consumption of 112 lbs. of coal.

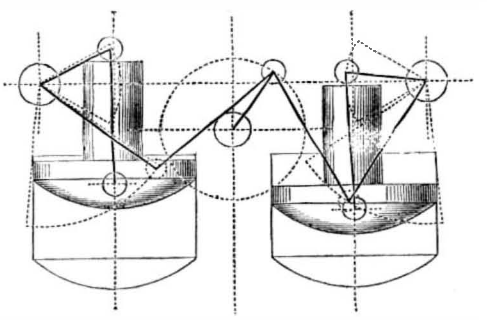
THE ENGINES OF THE "DICTATOR."

To the professional observer the engines in the ocean iron-clad ship *Dictator* are not less remarkable, or interesting, than the vessel itself. As an example of what modern screw engines should be, they are worthy of examination. The simplicity of the design, the directness of the action, the entire absence of superfluous ornament and weight of metal, as well as the harmony in the vast proportions of the machines, strike the engineer at once. The cost of construction, which is usually very great in large engines, must have been much reduced in these, for there are no intricate castings, no joints, levers, or other parts which are not readily made in any ordinary machine shop.

It is a great advantage in these engines that they can be repaired in ports where there are only the ordinary facilities. No costly and ponderous crank shafts are to be seen, but the rod of each engine connects directly to a driving wheel on a straight shaft.

Neither are there any massive links for engineers to sweat and tug at in order to reverse the engines. A simple movement of the hand controls both of them with facility, and a boy ten years old could work them. They have been reversed from full ahead to full back in 20 seconds. Hydrostatic pressure moves the reverse gear as well as the cut-off valves, and the system is free from the objections which have hitherto attended this method of working reverse gear. Means are provided for working the engines by hand if necessary. The engines sit athwart ships, and the valve-gearing is in the center. Everything is in plain sight, and from his post the engineer can see every pin and principal part at a glance.

We take pleasure in being able to present a diagram of the movement, which is here appended.



THE MOVEMENT.

The diagram represents the engine as viewed from the stern of the ship; the cylinders, pistons and trunks being seen beyond the cranks and levers. It also shows the relative positions of the various parts, just as the port engine has commenced its descent, the starboard piston being somewhat above half up-stroke, with the connecting rod acting on the driving crank of the propeller shaft, nearly at right angles. Letters of reference are unnecessary, the movement being self-evident on inspection. The extreme movements, and the arcs described by the vibrating levers, are indicated by dotted lines; also the circle through which the crank-pin sweeps. The movement and general arrangement are identical with those on the U.S. steamship *Princeton*, constructed by Ericcson in 1842. If we substitute vibrating pistons, moving in semi-cylinders, for the two horizontal rock-shaft levers, we have the *Princeton's* engine. The arrangement is appropriately termed the "Princeton movement." All the vessels of the *Passaic* and *Tecumseh* class of monitors have engines built on this plan, with the difference only that the cylinders are placed horizontally, back to back; forming, in fact, one cylinder, with two pistons, which actuate the short rock-shaft levers. The *Monadnock*, the daily press tells us, has engines of Mr. Isherwood's construction. This is an error. Her engines are of the same kind, and built under Ericsson's patent.

ADVANTAGES OF THE SYSTEM.

The intelligent engineer will at once notice that the driving crank of the propeller shaft has a much greater throw than that due to the stroke of the pistons. This is the distinguishing feature of the vibrating lever engines; the great advantage resulting from it being a reduction of the strain on the main crank pin and journal, about one-half that of ordinary engines of equal power. It will be seen also that the slides of ordinary steam engines, which are exposed to such heavy angular thrust from a short connecting rod, have been done away with, and, above all, that the right-angled cranks of the common screw engine have been superseded by this arrangement. The serious difficulty of keeping several crank-shaft journals and crank pins always in line is thus obviated, as also an immense saving in the cost of construction.

DIMENSIONS.

Diameter of cylinders, 100 inches; stroke of piston, 4 feet; throw of main crank, 3 feet 8 inches; long rock-shaft lever, 7 feet 4 inches; short ditto, 4 feet; diameter of crank-shaft journal and propeller shaft, 21 inches; rock shafts, 23 inches diameter, with 14 inches journals at the ends. Main piston links, 7 feet from center to center; main crank pin, 14 inches diameter and 20 inches long. The cylinders have two steam ports, 24 by 9 inches at each end; cut-off steam ports, 3 by 24 inches, 8 in number, opening and closing simultaneously; air pumps, 50 inches diameter, 2 feet stroke; propeller, 21 feet 6 inches diameter, 34 feet pitch; weight, 39,082 pounds. The entire frame work and pillow blocks of the engines are composed of polished wrought iron. The main crank is inserted in a polished cast-iron balance wheel, 12 feet diameter, the balance weight being arranged in a peculiarly tasteful and symmetrical manner. Viewed in connection with the massive character of the working parts—also all composed of polished wrought iron —the *Dictator* engines may be considered the finest specimen of marine engineering afloat. The engine room is 32 feet wide, 33 feet long, 12 feet high, and well lighted.

VENTILATION OF THE ENGINE ROOM.

A remarkable feature of this engine room is a fan wheel, eight feet diameter, composed of polished copper, suspended horizontally under the upper deck, and worked by a direct-acting horizontal engine, also bolted to the deck beams. A cylindrical trunk, 4 feet diameter, 3 inches thick, made of plate iron, is secured to the deck above the center of the fan wheel, a hole being cut in the deck for admitting the air from without to the fan, which is not inclosed in a box as usual. The fresh air drawn in is therefore distributed all over the engine room by the rotation of the wheel; complete ventilation being the result of this peculiar arrangement. The air thus drawn in and distributed passes off through two hatches in the engine-room floor—which is ten feet above the ship's bottom—into the boiler room.

THE BOILERS.

The *Dictator* has only six boilers, but they are unusually high, and are constructed with two tiers of furnaces. The total amount of heating surface is 3,400 square feet; total grate surface in 56 furnaces, 1,120 square feet. The boilers are of the Martin pattern, somewhat modified, and contain 10,640 tubes, the united length of which is 7⅓ miles; nearly two miles more than in the *Warrior* and *Black-Prince*, English ironclads. In addition to the circulating fan in the engine room, already described, the combustion in the boilers is aided by two Dimpfel blowers, 78 inches diameter each, applied under the turret, through the top of which the air is drawn in. The smoke pipe is 10 feet diameter, 8 inches thick at the base, and is provided with a shell-proof grating placed about 6 feet above deck. The ash trunk through which the ashes are hoisted up at sea, is within the smoke pipe, there being a door on the side through which the ash bucket is taken out from the top of the hurricane deck, sufficiently high to be out of reach of the waves at sea.

LARGE COPPER CASTING.—Mr. Thornton, of the Elms, has in his possession the largest copper idol ever brought to this country, and one of the modern wonders of the world. Under a shed in his coach-yard is no less a personage than the god Buddha, measuring over seven feet in length, and one of the most marvellous pieces of copper casting ever found. Direct from one of the lower rooms of his temple, where he had been hidden away some 2,000 years ago, his godship has been brought to the New World capital of copper and bronze castings. It will probably be deposited in the Midland Institute. Thus, after a lapse of 2,500 years, Buddha will be enthroned again in a temple better worthy of him, because devoted to higher and more ennobling pursuits than the one in which he found his first resting place in the temple of Scottangunge.—*Birmingham Post.*