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THE VOLTAIC PENCIL.

There is at the present time scarcely a single branch of industry to which electricity is not lending its aid. Art, however, has thus far received but little benefit from this source, if we except the application of electricity to electro-metallurgy. We are pleased to learn, then, that an important discovery has just been made at Paris by M. Bellet, whose invention consists of a voltaic pencil, by the use of which designers and draughtsmen will be enabled to dispense entirely with the aid of the engraver. The editors of *Electricité* state that they have examined beautiful proofs of lithographs and etchings obtained, without the use of the graver, by the effect of a voltaic arc produced at the point of an ordinary lead pencil. Encouraged by his success the inventor has taken out patents in various countries, and a company has been formed to carry out the process, which will soon be placed before the public. At present there are being prepared models of a series of apparatus which will allow any artist, however ignorant of the mysteries of electricity, to reproduce immediately, and without the aid of any artisan, the most delicate and complicated drawings; and this, too, by a very simple process and at a very moderate price. By a slight modification of the system there may be produced: (1) Stencils analogous to those produced by the Edison pen; (2) lithographs; (3) etchings; (4) stereotypes for typographical work. The initiators of this discovery are confident that an entire revolution will take place in the process of illustrating papers by means of their electrography.

ENGINE OF THE TORPEDO VESSEL DESTROYER.

The engine shown in the accompanying engraving was designed in 1878 by Captain Ericsson for his new torpedo vessel, *Destroyer*, an engraving of which appears on page 303 in the last volume of this journal. Both engine and vessel were built at the Delamater Iron Works.

The principal features of this engine are, that its base forms a surface condenser, 8 feet square, 24 inches deep, and that the cylinders, which are 24 inches diameter, 22 inches stroke, exhaust directly into the condenser. The cranks are placed at right angles, their journals being supported by pillow blocks bolted directly to the heads of the cylinders. The power of the pistons is conveyed to the connecting rod crosshead by four piston rods, two above and two below, equidistant from the center of the crank shaft.

It will be seen by reference to the engraving that the space between the ends of the valve and the crank shaft is so small that two valve stems become necessary.

The outer ends of these valve stems are connected by a vertical crosshead, to which the connecting rod of the reversing link is attached. It will be observed that the slide frames are unusually massive, the object being to obtain a firm support for the pillow blocks of two rock shafts provided with vertical vibrating levers, operated by the eccentric rods. The center of the reversing link being sustained by a pin inserted at the middle of the vibrating lever, it will be seen that the motion transmitted to the valve stems is twice that of the throw

of the eccentrics. It will be noticed that the eccentrics at the forward end of the crank shaft are very small, an advantage secured by bolting the same to the end of the shaft. The aft eccentrics, of course, are of the usual diameter. It may be mentioned that the steam valves are balanced by accurately fitted saddles of cast iron, under which they slide, effectually relieved from the heavy steam pressure (120 lbs. to the square inch) employed in these engines.

A NEW SWITCH PEDAL.

This novel device, which is the invention of Mr. C. A. Hussey, of 163 East 33d street, New York city, is designed



HUSSEY'S SWITCH PEDAL FOR CONTROLLING ELECTRIC MOTORS.

for controlling the electrical current employed in propelling small motors for driving sewing machines and other light machinery. A pedal is pivoted to the hollow base, and carries a spring that bears upon the block of insulating material at the toe of the base piece. This block is grooved transversely, and in the grooves are fitted three bars of metal, either of which may be touched by the contact spring as the pedal is pressed downward. The hollow base contains two

resistance coils and the wires which connect them with the binding posts seen on opposite sides of the base. This apparatus being connected with the electrical conducting wires of an electric motor, to start the motor, it is only necessary to depress the pedal so that the contact spring touches the first metal bar; the current then passes through both resistance coils and is thereby weakened. Should the power prove insufficient the pedal is further depressed so as to bring the spring into contact with the middle bar; this cuts out one of the coils and diminishes the resistance. By pressing down the pedal so that the spring touches the lower bar, the current passes directly, and its full power is realized; as the pedal is released the reverse of what has just been described occurs.

A Chance for Inventors.

There is a demand for a hand loom for amateurs' use. A correspondent writes: "We can get lathes and fret saws and printing presses and other machinery for the use of amateurs in abundance. But a compact, portable hand loom would be a novelty, of which it might with some truth be said that no house would be complete without it."

The number of people seeking industrial recreation is very large, and out of these a profitable clientele can be secured, no doubt, by whoever will offer them the novelty called for. It may pay some of our inventive readers to give the matter a little practical consideration.

New Mechanical Inventions.

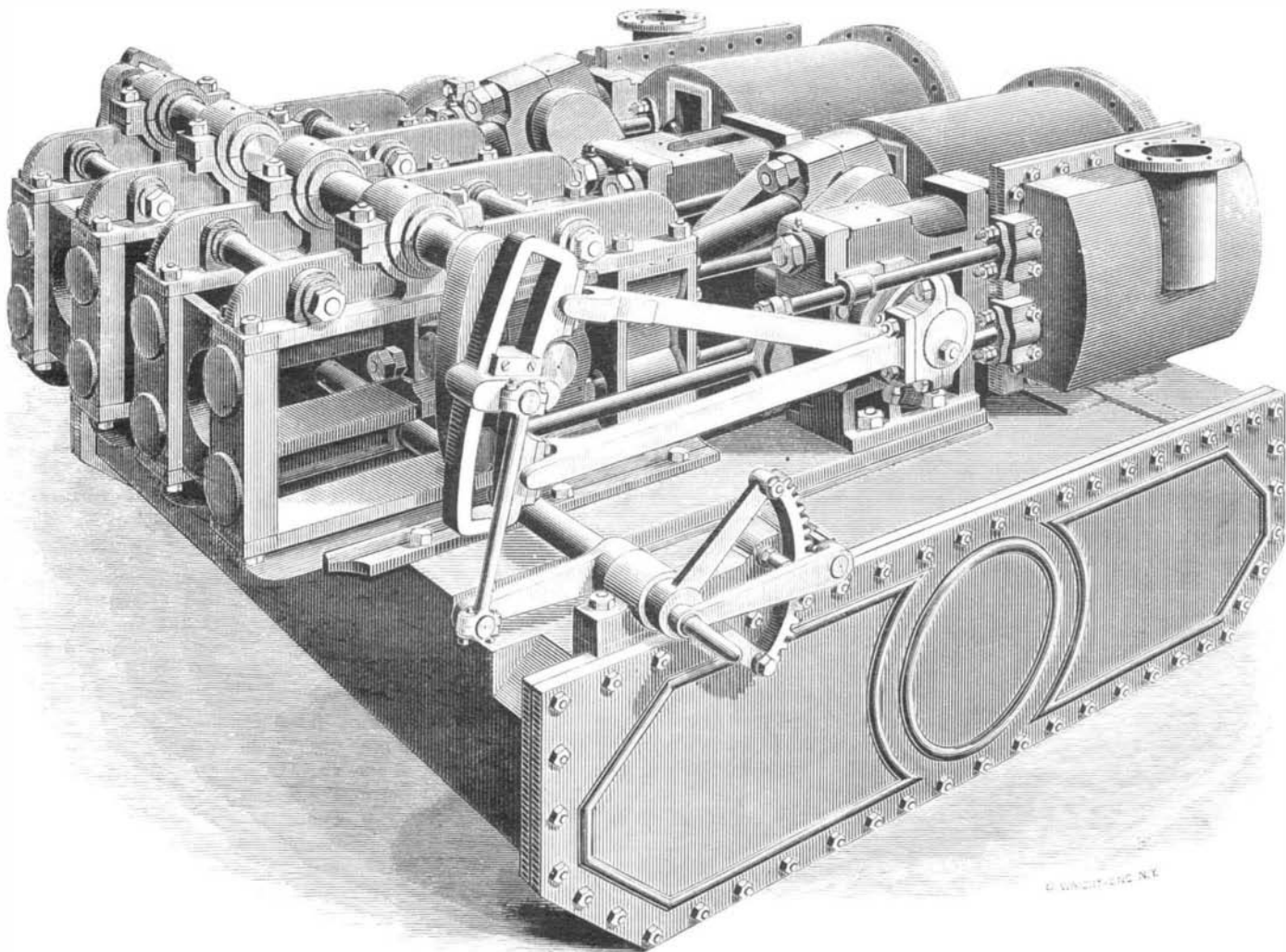
Mr. John T. O'Harra, of Dodge City, Kansas, has patented an improved Car Coupling, which is so constructed that the cars will couple themselves when run together, and they may be uncoupled when standing still. The coupling may be operated from the top and sides or from the platform of a car.

An improved Hydraulic and Wire Rope Pumping System has been patented by Mr. William P. Barclay, of Virginia City, Nevada. The object of this invention is to provide apparatus for economically raising water from mines and deep shafts, and it consists in the arrangement of a hydraulic engine, with a series of plunger and other pumps, and a system of wire ropes and connections.

An improvement in Railway Cars has been patented by Mr. Louis Prince, of Nashville, Ohio. It consists in constructing the sides or panels of the car in sections so as to fold together, and in a window casing carrying a sliding sash adapted to swing inward.

Mr. Arthur C. Gould, of Boston, Mass., has devised an improved Street Sweeper, having an endless belt of brushes, operated by gearing from the axle of the machine, which belt sweeps the dirt upon an apron and carries it to a receptacle. The belt can be raised and sustained out of operation when that is desirable, and in use it adapts itself to the surface of the street.

Mr. William Loudon, of Superior, Neb., has devised an improved Double Acting Lift and Force Pump, which is so constructed as to throw a continuous stream of water by means of a peculiar arrangement of piston and valves.



ENGINE OF CAPTAIN ERICSSON'S TORPEDO BOAT, "DESTROYER."