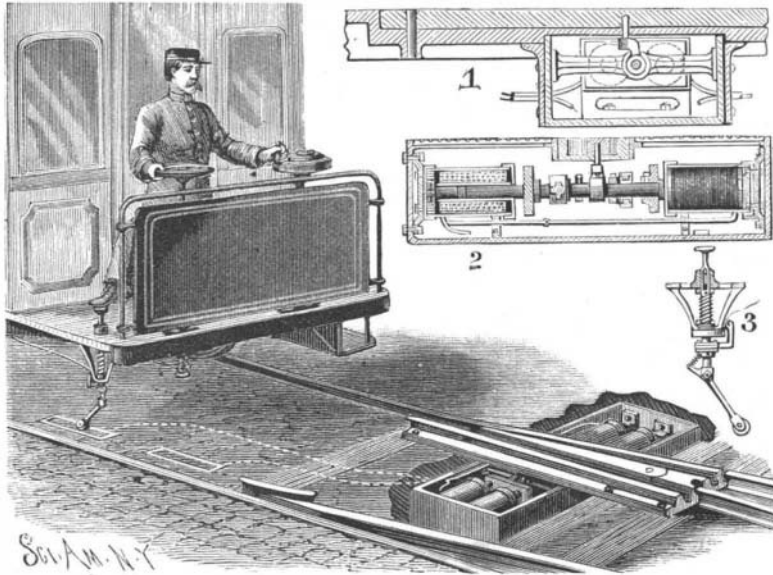


AN ELECTRICALLY OPERATED SWITCH.

The improvement shown in the illustration is designed principally for application to electric cars, although it admits of being applied to cars propelled by other power. It has been patented by Mr. Henry L. Falco, of No. 643 Carlton Avenue, Brooklyn, N. Y. The view in perspective shows the operation of the improved switch, Fig. 1 being a longitudinal and Fig. 2 a transverse section, while Fig. 3 shows the contact making device. The car may be supplied with the electrical current through a trolley, by storage batteries, or by a small dynamo taking power from the



FALCO'S ELECTRICALLY OPERATED RAILWAY SWITCH.

car axle, the wire carrying such current leading to the contact maker just under the car platform, and carrying at its upper end a foot piece to be pressed upon by the driver or motor man. The contact maker adapts itself to any distance between the car and the contact plates. The switch tongue turns on a pivot, and is mounted in a casting in the usual way. A pin projects from the tongue through a slot in the casting, and enters an arm on a sliding rod in the switch pit, there being on opposite ends of the rod cross bars carrying armatures which enter the coils of electro-magnets. These magnets have short cores and are inclosed in lead to prevent their being acted on by water entering the pit, and the mechanism is inclosed in an iron box with cross bars through which the rod slides, there being on the rod buffers to prevent shock when the armatures are drawn in either direction. There are two insulated contact plates in the roadbed near the track rail, a wire from one plate extending to one of the magnets, while the other plate is connected by a wire with the other magnet. When, therefore, a car approaches the switch, the driver can swing the switch tongue in either direction, to open or close the switch to the main or the side track, by simply pressing on the foot piece to bring the roller on the lower end of the contact maker down upon one of the contact plates in the roadbed, the current then being made to energize one or the other of the magnets to move the sliding rod connected with the switch tongue. The box containing the magnets is closed at the top by serrated covers in the usual way.

Gaseous Theory of the Earth.

The idea of M. Rateau, as expressed the other day to the French Academy of Sciences, is that the phenomena of the earth's crust are well explained by considering that the planet's interior is molten, and that a layer of gaseous matter separates it from the portion of the crust forming the continents, whereas the seabeds rest directly upon the igneous globe. The continental masses tend generally to rise, being forced up by the accumulating gases, while the sea beds sink. The gradual escape of the gases, imprisoned under high pressure, will in time exceed the production of new supplies, when the pressure will diminish and the continents fall in, giving rise to more or less crater-

form configurations. This is the state in which the moon now appears. Assuming the crust to be 18½ miles thick, the pressure of the gases should be 650 atmospheres, their temperature 900° C., and their density nearly equal to that of water. This theory makes it clear why volcanoes in the interior of continents give off gas instead of lava, and why lines of coast volcanoes have successively receded inland where the sea has encroached.

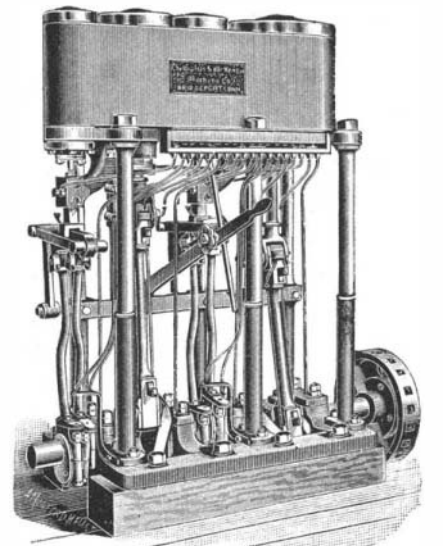
A FINE YACHT ENGINE.

A fast steam yacht has been recently completed at Bridgeport, Conn., for Mr. H. M. Hills, proprietor of the *Evening Post* of that city. It is 60 feet long, 12 feet beam, and 5 feet deep, drawing 20 inches forward and 3 feet 4 inches aft. The engine for this yacht, shown in our illustration, is a fore and aft compound, designed and built by the Coulter & McKenzie Machine Co., of 500 Water Street, Bridgeport. It is designed to furnish 75 horse power, turning a 3 foot screw 250 turns per minute with 100 pounds of steam, supplied by a Herreshoff water tube boiler. The high pressure cylinder is 6 inches in diameter, the low pressure 12 inches and the stroke 9 inches. The exhaust from the high pressure cylinder passes around that cylinder and into the low pressure valve, thus making a receiver and jacket in one and permitting the passage of steam to the low pressure cylinder without piping.

The pistons are fitted with a sectional Dunbar packing, consisting of a solid center, or "bull" ring, and on each side of which is fitted an L-shaped ring and a square ring. These rings are cut in three or four segments, as may be desired, and are adjusted so as to break joints. The rings are pressed against the walls of the cylinder by means of round wire springs of a diameter equal to the inside diameter of the rings.

The valves are of the balanced piston type, made up of a center and two end pieces held together by the valve stem and fitted with a steam-tight ring on each end. The live steam enters on the top of the valve,

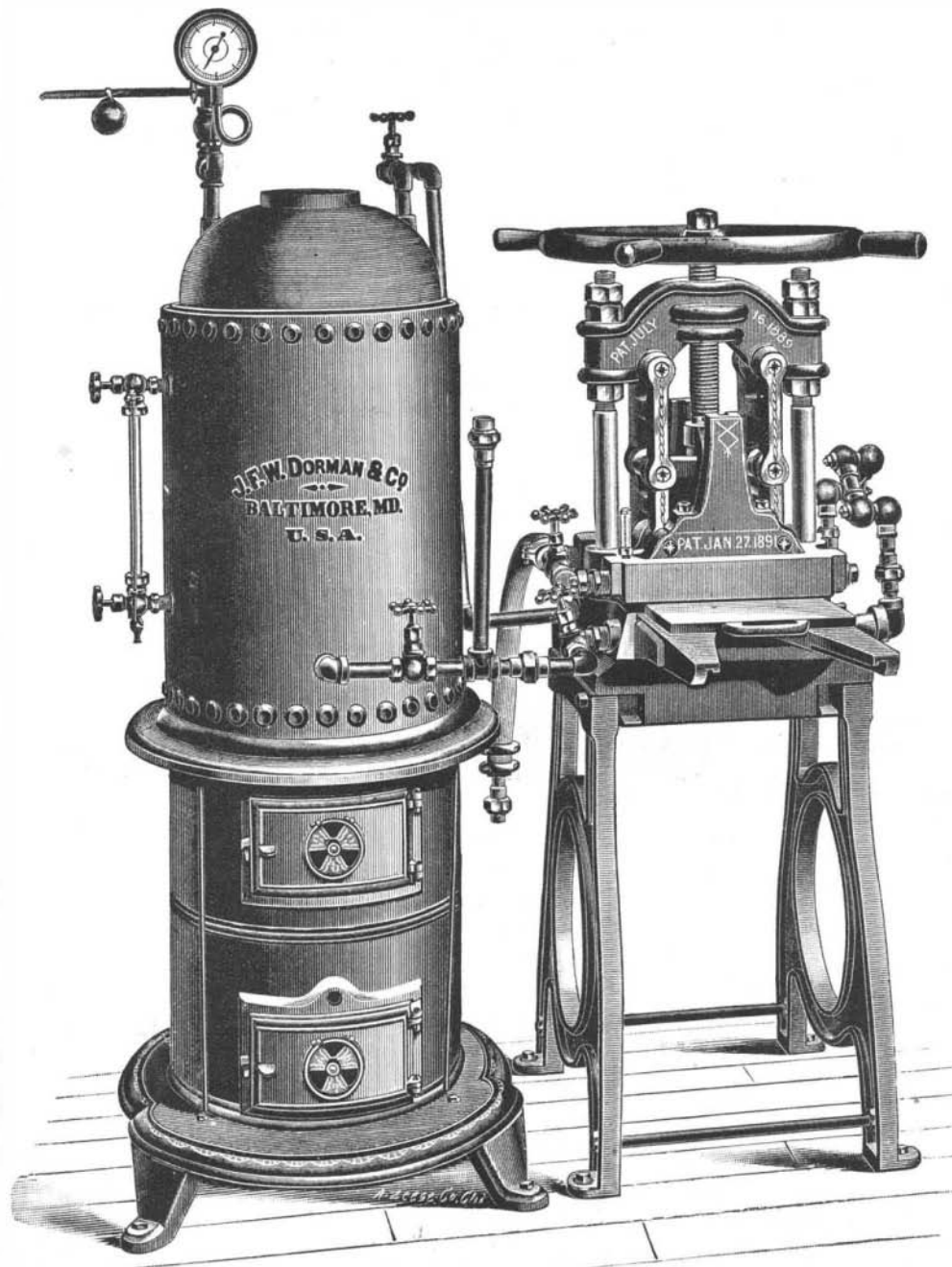
passes through the center and enters the cylinder from each end, the exhaust steam passing around the center. All the rods, connections and links have every means of adjustment for taking up wear. The shaft is of steel ¾ inches in diameter and has bearing surface of 18 inches on the bed. The crank pins are ¾ inches in diameter by 3 inches long, and are set at an angle of 90 degrees. The shaft is fitted with a Pry wheel, which is also used to balance the two cranks and forms one-half of the coupling connecting the wheel shaft. The cylinders and their heads are neatly incased with German silver covers. On the front and bottom of the cylinders is a reservoir for oil, under which there is fitted a trough holding 18 separate pipes carrying oil to the different bearings, separate oil holes being also provided for each bearing for use in case of need. The propeller shaft is fitted with a patented roller thrust bearing of new design. It consists of a box casting, in which are fitted two bearings, one on each end. Centrally between these bearings is a thrust collar rigidly to the shaft. On each side of this thrust collar is a loose steel collar having four projecting arms or studs on which rollers are loosely mounted. The thrust of the shaft is received by these rollers, which are turned slightly rounding on the face, so as to overcome the sliding motion that would occur if they were flat. One set of these rollers acts when in head motion and the other when in back motion. The box containing this bearing is filled with oil, so that the parts are constantly lubricated and friction is reduced to a minimum.



ENGINE OF STEAM YACHT DREAM

MAKING CELLULOID STEREOTYPES ETC.

The illustration shows a combination machine embodying recent improvements designed to facilitate stereotyping and moulding, where in a regulated amount of heat is necessary, and especially for the making of celluloses, or celluloid plates, to be used in place of electroplates or metal stereotypes. By means of this machine, and the improved methods now followed, it is claimed that celluloid plates are made equal to electrotypes as to sharpness of face, and superior for durability, the plates not being affected by any of the fancy colored inks, and the work being done in far less time than now required. Where one has the necessary steam supply, at a pressure of some sixty pounds, the boiler is not necessary, but where this is not available, as in most small printing offices, the combination machine includes an efficient and specially adapted construction of boiler, whereby the press may be quickly and economically heated, in both its platen and bed, to the required temperature, and then again as rapidly cooled, by the adjustment of valves regulating the circulation of water and steam. The mould is made of a specially prepared powder and gluten water, in which, when it has attained a proper consistency, the type form, engraving, or other representation to be reproduced is impressed in the press, and in this mould an impression is afterward made in a thin sheet of celluloid, the press, mould, and celluloid sheet being heated up to about 240 degrees. The machine is afterward cooled with the celluloid in it under pressure, and the cellulotype thus made may be employed in printing as an ordinary electroplate. This process of making plates is well adapted for the representation of



THE "CLIMAX" STEREOTYPER AND MOULDING PRESS.