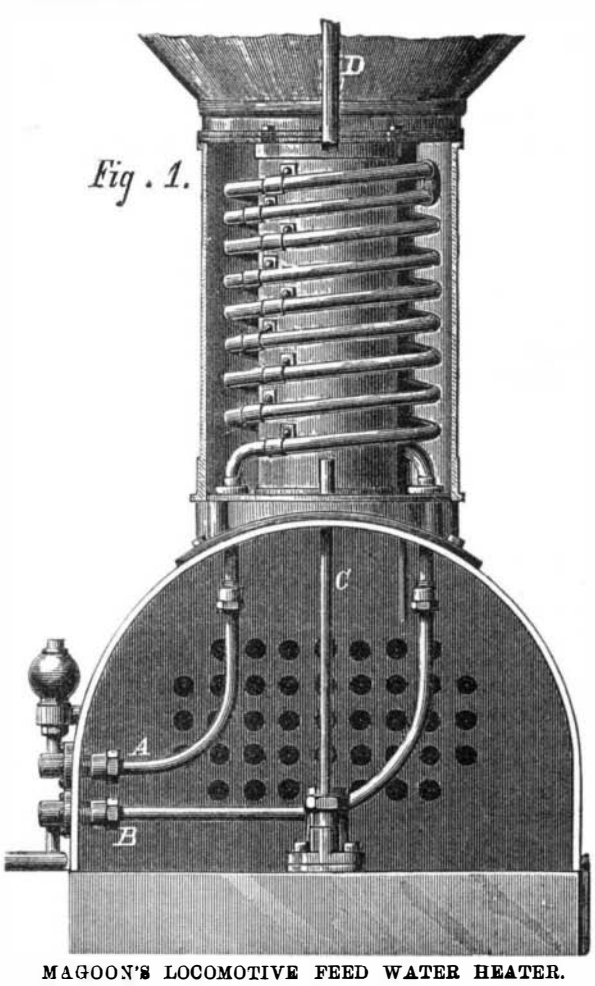
NEW LOCOMOTIVE FEED WATER HEATER.

The advantages arising from the use of hot instead of cold water, in feeding steam boilers, whether stationary or locomotive, are too apparent to need rehearsal, more especially where the hot water for that purpose is produced by utilizing heat which would otherwise be wasted, the most important results being the saving of fuel, prevention of the contraction and expansion of flues and flue plates, and the ability to maintain steam.

In the adaptation of a locomotive engine to heat its own feed water, four difficulties have always stood in the way; first, to use the waste or exhaust steam without lessening the draft of the chimney; second, to avoid the cumbersome and complicated devices necessary for heating the water in bulk; third, to prevent obstructing the smoke arch; and fourth, to so construct and arrange all parts of the apparatus as to obviate derangement and leakage, either from contraction and expansion, or the jarring of the engine. These difficulties have been overcome by the device illustrated in the annexed engravings.

In Fig. 1, which is a detailed sectional view, it will be seen that an insulated steam chamber is constructed about the smoke stack. Into this chamber leads the feed water pipe, A which is coiled around the stack, conducting the water to the top of the compartment and then down and out to the boiler, at B. The exhaust is divided, a branch pipe, C, being employed to conduct a part of the steam into the chamber for heating the feed water in the coiled tube, while the main exhaust discharges up the smoke pipe to promote the draft of the engine in the usual manner. A small eduction pipe, D, is provided near the top of the chamber, through which the waste steam passes, and there is also a drip pipe near the bottom of the chamber, for carrying off the water of condensation. There is a joint in the stack below the bonnet, to afford easy access to the top of the heater, and a second joint for like purpose at the bottom of the chamber

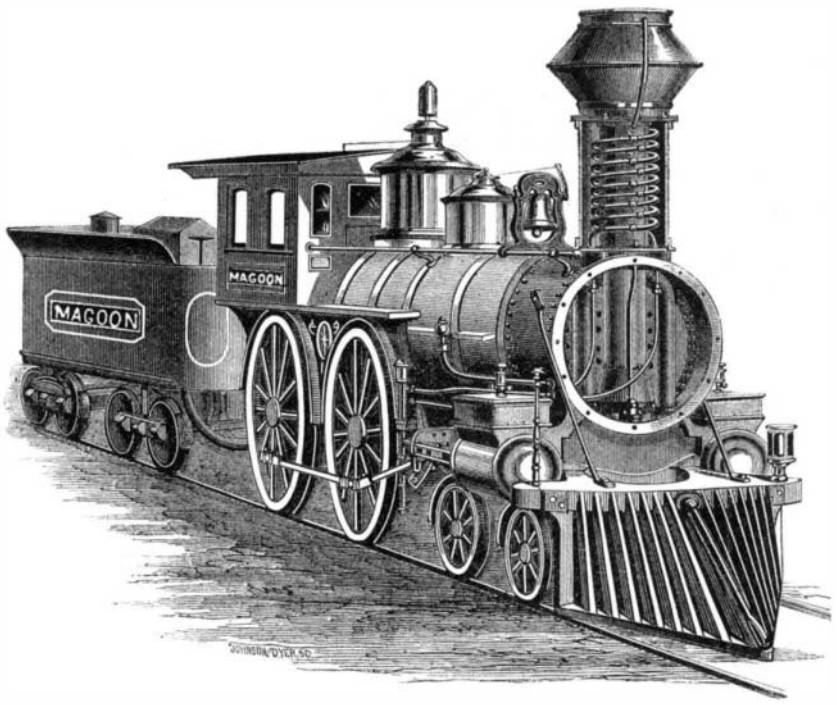
An improved arrangement of the water pipes which the company is now making, is to remove them from the interior of the smoke chamber and place them outside, where they pass through suitable saddles.



MAGOON'S LOCOMOTIVE FEED WATER HEATER.

According to certificates and testimonials submitted, it appears that the saving of coal attributed to this device, on one locomotive (the Saxon, of the Boston and Maine railroad), was about three quarters of a tun per day for four months in succession. On a small engine on the same road, the saving was nearly half a tun per day. The most recent tests show an economy of over 35 per cent of the fuel used, the value of which must evidently reach a very large aggregate in the course of a year, in the case of a road employing many locomotives. Fig. 2 gives a slightly different arrangement of the feed water pipes. The actual economy in fuel resulting from the use of this invention, coincides with the calculated economy of feed water heaters in general, as given in the SCIENTIFIC AMERICAN of November 7 last.

No difficulty is experienced in making the coiled pipe to withstand any necessary pressure, as proven in the cases before alluded to and in others. The coil is made at least one sixth part larger in interior diameter than the pump plungers; and the check valve is slightly larger than the coil in order to give free passage for the water into the boiler. If constructed in this way and properly stayed to the saddle and smoke stack, the device will be as permanent as any other part of the machine. Proper allowance is made for contraction and expansion of the stays and coil. We have obtained the foregoing particulars as to the construction from the Magoon Heater Company, 54 Sears Building, Boston, Mass., who are the manufacturers of the invention.



MAGOON'S LOCOMOTIVE FEED WATER HEATER.

New Aniline Violet.

A new pigment called violet gentiana, for producing the aniline colors of Martins and Meldensohn of Berlin much cheaper than the other violets in use, has for some time been on sale. A series of trials are said to have given the following results: When dissolved in thirty times its weight of hot water, brought quickly to the boiling point, and kept boiling for five minutes, and then passed through a sieve, it leaves little residue.

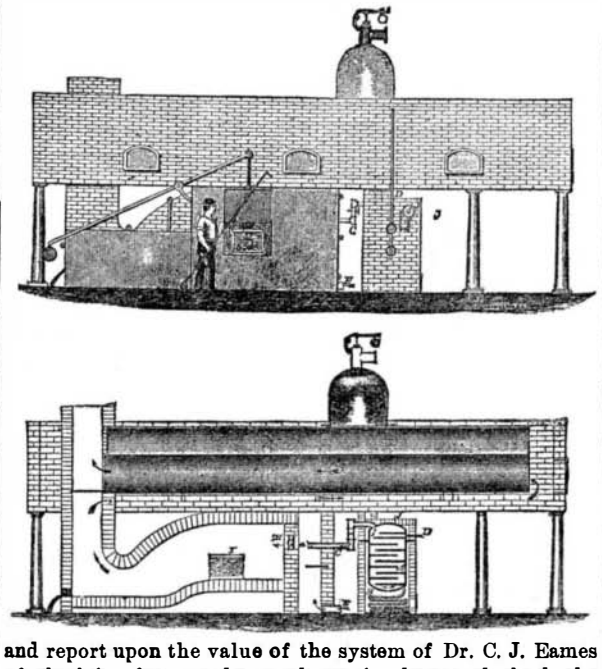
To dye 25 lbs. of woolen yarn, take 1 lb. of tartaric acid and a corresponding quantity of coloring matter; boil and skim the mixture. Pass the yarn three times through the dye, and it will assume a very uniform tint. The color obtained is as solid and as brilliant as that obtained from dearer violets.

The Patent One-Tailed Shirt.

An illustration of the absurdity of some of the official examinations made at the Patent Office is seen in the patent granted to J. H. Meyers for an alleged improvement in shirts. It consists of a common shirt with the sleeves and the back tail omitted. These parts, says the patentee in his specification, any person can readily supply; but the bosom, neck band, yoke and front tail, he thinks require more trouble to make; so he sews these together, and the Patent Office grants him a patent therefor "as a new article of manufacture." But there is nothing new about it. It is simply an unfinished garment, and an old pattern at that. With equal propriety the Patent Office might grant a patent for a shoe, as a new article, which consisted merely of the strings and the upper, with the sole left out. Verily, the Patent Office is a queer institution.

FURNACE WORKING WITH PETROLEUM.

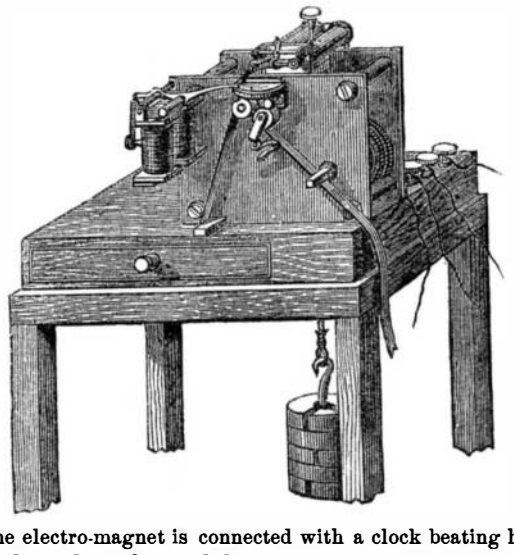
Professor Henry Wurtz was recently called on to examine



and report upon the value of the system of Dr. C. J. Eames of obtaining from crude petroleum simultaneously both the heat and the power needed for metallurgical operations upon iron. We extract the following from his report The upper engraving shows an ordinary reheating furnace for iron, such as the experiments were made with; but the form is by no means the best for developing the full merits of the new system, but answers tolerably well for the experiments made. This is an external, and the lower a sectional, view. In the latter, A B J D indicate the Eames vapor generator, called simply the generator, the main feature of the new apparatus and process. A is a cast iron vessel, with horizontal shelves projecting alternately from opposite sides, over which shelves the oil, entering at D, at the average rate—for this one furnace, when heating 3,000 lbs. of iron at a charge, and making steam for the rolls besides—of 30 gallons or 200 lbs., as a maximum per hour, flows downward in a thin layer, dripping from shelf to shelf. It thus meets a slow opposing current of steam heated to incandescence, and kept at a pressure of about 10 lbs. per inch, and which passes upwards from the superheating coil, B, inclosing the fire. Every trace of oil is taken up and swept on to a mixing chamber which occupies the former fire space, where it meets the air blast entering at the point, E (the former ash pit). It will be observed that the former bridge wall of the furnace is built up solid to the crown, except the space at H G, called the combustion chamber, an important and essential part of the inventions. This consists simply of a cellular tier of firebricks placed on end, and extending all across over the old bridge wall. Within these cells the combustion begins, and it is found that, if this combustion space has a horizontal thickness of more than 18 inches, the firebricks fuse down. I is intended to represent one of the piles of scrap iron, with its top and bottom covers, of which, however, six, averaging 500 lbs., each, are introduced at a charge, in regular working. The course of the flame under, and back through, one of the flues of the boiler above, and thence into the stack, is sufficiently indicated by the arrows.

ELECTRICAL SPEED RECORDER.

The accompanying engraving represents an electrical speed recorder, constructed by Mr. W. Groves, of London, England. The instrument consists of a train of clockwork, driven by a weight, and employed to move the strip of paper upon which the speeds are recorded. Two electro-magnets are attached to the frame, and opposite their poles an arbor is pivoted, carrying a soft iron armature: and in connection with each armature is a bent and pointed lever, the ends of which pass through holes in the ink trough when the armature is attached. These points carry on them sufficient ink to make a dot on the paper. The trough is divided into two compartments, one containing red and the other black ink. The former is used to mark half seconds, and the latter to record the speed. The holes in the trough are made so small that capillary attraction prevents the ink from flowing through.



One electro-magnet is connected with a clock beating half seconds; and as the pendulum passes over a mercury cup placed immediately under the point of suspension, the circuit with the battery is completed, and the half seconds are marked in dots at the edge of the strip. The other electro-magnet is placed in connection with the contacts for marking the speed dots; and by counting the numbers of half-second marks between each black dot, the speed is given between each contact lever.

Newspaper Circulation and Advertising.

George P. Rowell & Co.'s *Advertiser's Gazette*, after naming some papers which have reduced their rates for advertising, adds: "There are many large weeklies which are at present demanding for advertising more than double the price to which their circulation entitles them."

We have no doubt but that that is so. There has been a great falling off in the subscription list or a great many papers; but it is not so with others. The SCIENTIFIC AMERICAN has several thousand more circulation now than it had last year at this time; and it is continually increasing, but its rates for advertising have not been advanced. For machinery, tools, patents, and every want of contractors, civil and mechanical engineers, surveyors, artisans, manufacturers, and all similar industries, this paper is unequalled as an advertising medium