

the existence of which is fatal to success, into magnetic oxide. This method of first oxidizing and then partially reducing may be repeated until a layer of the required thickness is obtained, and it is stated that with steel very good results are obtained by a repetition at intervals of half an hour for a period of six hours.

The Bower method possesses some important advantages over the Barff in its application to cast iron, and from present information we are inclined to believe it specially promising as an adjunct in stove making. The color imparted to pieces of cast iron treated by this method is exceedingly pleasing to the eye. It is a gray or neutral tint of varying depth, that is to say, ranging between a light and a dark shade. Some of the samples that we have examined possess a very delicate color, and one which renders further ornamentation by means of subsequent treatment unnecessary. Notwithstanding the delicacy of the tint, we are informed that exposure to the influences of atmosphere and weather and the application of severe tests have no detrimental effect upon it.

THE MESSINGER BOILER FEEDER.

We show in the accompanying illustrations a boiler feeder manufactured by the Messinger Boiler Feeder Co., of Boston, Mass., which combines certain novel features of construction which are claimed to give it decided advantages over other machines of its class. We have witnessed the operation of the device, and find the claims of the manufacturers, in respect to its performance and special features, to be fully justified by the test of actual practice.

Machines of the class to which the Messinger boiler feeder belongs, and which are popularly known as injectors, inspirators, etc., are deservedly held in high estimation by steam users, and have come into very general use for feeding locomotive, stationary and marine boilers. The Messinger feeder, however, differs from others of its class in possessing certain peculiarities of construction by which its capacity, range of duty and reliability are substantially increased, and by which certain difficulties hitherto supposed to be inseparably connected with this class of machines, are obviated. These peculiar features will appear from the following description. The machines heretofore manufactured have but one inlet for the water supply, so that all the water drafted is required to be cold enough to condense the steam, otherwise the apparatus ceases to operate. The utility of this class of apparatus is, therefore, limited by reason of their inability to draft hot water, and by their liability to become heated, in which latter case they refuse to operate until cooled off, giving rise to frequent annoyance and delays.

The Messinger feeder (Fig. 1) is bored perfectly straight, and by disconnecting the apparatus and removing the spindle and cap, and turning on the steam, it can be blown out perfectly clean in a moment's time, thus avoiding the serious delays which occasionally occur with machines of complex construction whenever anything is drawn into them with the water to clog them. Again, the apparatus is not affected by a variation of 25 pounds in the steam pressure. It is furnished with a pump in the supply pipe, with which the feeder can be instantly filled with cold water should it become too hot to condense the steam, thereby doing away with all delays with a heated injector. It will draft one-third of its water boiling hot through its auxiliary draft, which does not depend upon the condensation of steam for its action, and at the same time draft two-thirds of its supply as hot as will allow of the condensation of the steam. By another attachment, the feeder will draft from two or more tanks at different levels, or draft from a depth of 25 feet and take water under a head, both at the same time; and will deliver water at different levels and against widely different back pressures, both at the same time; and will feed two boilers at the same time, whether the pressure upon them varies or not, and it is asserted to be the only machine of its class which has the double delivery, or that will accomplish these results.

The water from the overflow is not wasted, but is taken up by the auxiliary drafts, so that no water is wasted by the apparatus. The Messinger feeder will lift water from a depth of 25 feet below the level of the machine, and deliver it to the boiler and to tanks above the level of the machine, both at the same time, or to one or the other as may be desired. This feeder is not dependent on the steam pressure to lift its supply of water, as all other machines are that will draft at all from below their own level. A few strokes of the pump, which is part of and peculiar to this apparatus, will lift the water to the feeder, when it will draft from a depth of 25 feet with 10 pounds pressure of steam.

The specially meritorious features of this apparatus will be appreciated when it is remembered that other machines of its class

have but one inlet for water, and on this account must draft all the water cold enough to condense the steam, and are capable of but one delivery at a time.

Fig. 2 shows the Messinger feeder piped for all the uses of which it is capable, and will be understood from the following description: A, B and C are draft pipes. A is the main suction, and through this pipe the machine will draft water from a well or tanks 25 feet below its level, or take water under a head. B is the auxiliary draft pipe, through which the machine will draft water either cold or boiling hot, as may be desired, adding one-third to the capacity of the machine, and will also draft from a depth of 25 feet. This draft may be used or not, as desired. C is a connection in the auxiliary draft pipe B, under which a pail may be set in the boiler-room, and through which the machine will draft any liquid to be put into the boiler for the purpose of cleaning, where lime or impurities exist in the water used, or for the purpose of injecting oil to stop foaming. D is a pipe attached to a drip-cup, through which all the water from the overflow is carried back to the well, or where water is taken under a head, to the tank with which the auxiliary draft B connects, so that no water need be wasted under any circumstances. E is the auxiliary delivery, through which water may be forced to a second boiler while the machine is delivering water to another boiler through its main delivery F. G is a delivery pipe which will deliver hot water to tanks in the upper stories of a building while the machine is delivering water through its main delivery F. All the water may be delivered through either E or G, or these pipes may be used without stopping the delivery through the pipe F. H is the steam pipe for supply of steam to the machine, and through which steam may be taken from boiler No. 1 at K, boiler No. 2 at I, or from both at once. M is a pump, by which the machine may be instantly started, when any condition exists which would make other machines of this class inoperative for forcing cold water into the machine when it becomes heated, cooling the machine instantly, and is claimed to be a sure means of starting the machine to draft from a depth of 25 feet under low pressure, 10 pounds only being needed, even with the water at this great depth, to set the machine in operation.

The makers of this apparatus claim for it the following qualities and advantages: They warrant it to be absolutely reliable under all circumstances and conditions; that it is the only boiler feeder of its class that is not dependent upon the steam pressure to lift its water supply at starting, or that can be started and draft from a depth of 25 feet with 10 pounds of steam pressure; that it is the only boiler feeder that has an auxiliary attachment for drafting boiling hot water, and for increasing the capacity of the apparatus at will; that it is the only boiler feeder avoiding a heated suction pipe, and that does not waste water; that can be instantly started under all conditions, and that will feed two boilers at the same time.

Among those interested in this company, we notice the names of a number of men prominently identified with important manufacturing interests, amongst whom we find the name of Wm. P. Hunt, President of the South Boston Iron Co., and the Boston Machine Co.; and Chas. Carr, General Superintendent of the Boston Machine Co., both of whom are widely and favorably known throughout New England. The Treasurer of the company is Mr. Amos L. Wood, one of the leading representatives of the mechanical arts, and who represented the State of Massachusetts in the capacity of Associate Commissioner at the Vienna Exposition in 1873.

The office of the Messinger Boiler Feeder Co. is located at 370 Atlantic avenue, Boston, Mass.

AN ELECTRIC HAMMER.

The Siemens "electric furnace" described in this number has been supplemented by an electric hammer, the invention of Messrs. Siemens and Halske, Berlin. The device consists of three hollow coils of insulated wire having a movable core or rod of soft iron which is free to move up and down under the axial attraction of the coils when a current circulates in them. The central coil is traversed by a constant current, which magnetizes the rod or hammer, and the two extreme coils are traversed by alternating currents from a dynamo-electric machine in such a manner that they alternately attract and repel the magnetic rod up and down so as to make it beat like a hammer. The range of blow is limited on one side by a spiral spring placed within an elastic cushion. Of course a very great rapidity of action can be given to the hammer, while the arrangement is apparently applicable to working a rock-drill.—*Engineering.*