

FURNACE FOR THE LARGE HAMMER AT WOOLWICH ENGLAND.

We have already described the 35 ton steam hammer, recently erected at Woolwich, England, for use in the Royal Gun Factories; and we present herewith an engraving of a reverberatory furnace (one of two) of unprecedented size, to be used in heating the coils of which the ponderous ordnance is built up. The furnaces are built upon a block of concrete 4 feet thick, laid in an excavation dug out for it, and having large slabs of cast iron placed upon the top, so as to distribute the pressure evenly throughout the whole mass. Upon these slabs a series of cast iron standards is erected for the floor of the furnace to rest on, four rows of standards being beneath the hearth, where, of course, the greatest weight, that of the "heat," comes. The hearth has four strong cast iron girders around it, forming a square frame above the standards; and the bottom of the hearth consists of thick cast iron slabs. It is sunk about one foot, so as to admit of a deep bed of fettling being formed within it upon the iron slabs. Girders also run along the sides of the furnace floor for the wall plates and brick side linings to be built on. These girders rest upon the standards before alluded to. The end walls are built upon large cast iron cross beams, which are perforated transversely with holes and grooved longitudinally to prevent their twisting and buckling with the heat. The two side walls of the furnace, and one end wall—that over the fireplace—are constructed externally of light plates of cast iron, as shown in the engraving (for which we are indebted to *The Engineer*), with flanges at the edges to connect them, and ribbed on the outside for strength. They are cast with large apertures in the plates between the ribs. A large circular aperture is contrived on the side opposite the door, which is ordinarily filled with a wall of fire bricks, but could be opened in emergency to introduce a long heat, required to be welded in the center. The plates are generally connected at the flanges by means of keys, wedges being driven into slots cut in the keys on one side. Where there is no room for driving the wedges, such as at the sides and lintel of the doorway, where there is a double flange, bolts and nuts are

employed. Within the walls of plates the lining of fire brick is built, and it is bonded here and there into the apertures of the plates to keep it in position, as, except at the ends, it is very thin. The bricks are all headers. The brick ends of the furnace are, of course, arched over, and meet in the center to form the roof. The side walls are prevented from separating by stout wrought iron bars, square in section, running across at the top and floor from outside to outside, which are keyed in a similar way to the flanges of the plates, with wedges passing through slots in the bars on either flank of the plates.

The flue leading to the chimney stack is supported upon plates and perforated beams; thus every facility is afforded for the free passage of a current of air around, above, and beneath the entire furnace, so that the exterior of it may be kept as cool as possible. This is essential for the preservation of the furnace and to prevent radiation, the lightness of its construction enabling an intense heat to be generated inside while the exterior is not affected by the temperature; at the same time, expansion and contraction may take place with impunity. Internally the furnace consists of three parts, the fire chamber, the hearth, and the flue leading away to the chimney. The first two of these are separated from each other by a low wall of fire bricks to throw the fire upwards and over the top of the heat. The fireplace is of the ordinary character, the fire being built upon trapezoidal bars. It is fed through two apertures in the iron and brick end walls. The hearth, which has already been described, has a channel beneath, on one side, for the slag to run off as it is formed. This is collected in molds in a pit behind the furnace, and afterwards hoisted up by a small hand crane for removal. The flue and chimney stack present no new features. The door of the furnace and the means for lifting it are novel. It consists merely of a cast iron frame filled in with fire bricks, and is bound together with bands of wrought iron, as shown in the engraving. It weighs 8½ tons. In order to lift this heavy weight, a massive chain, passing over two pulleys suspended to a girder above, has a counter weight attached to it weighing 7½ tons, which sinks into a

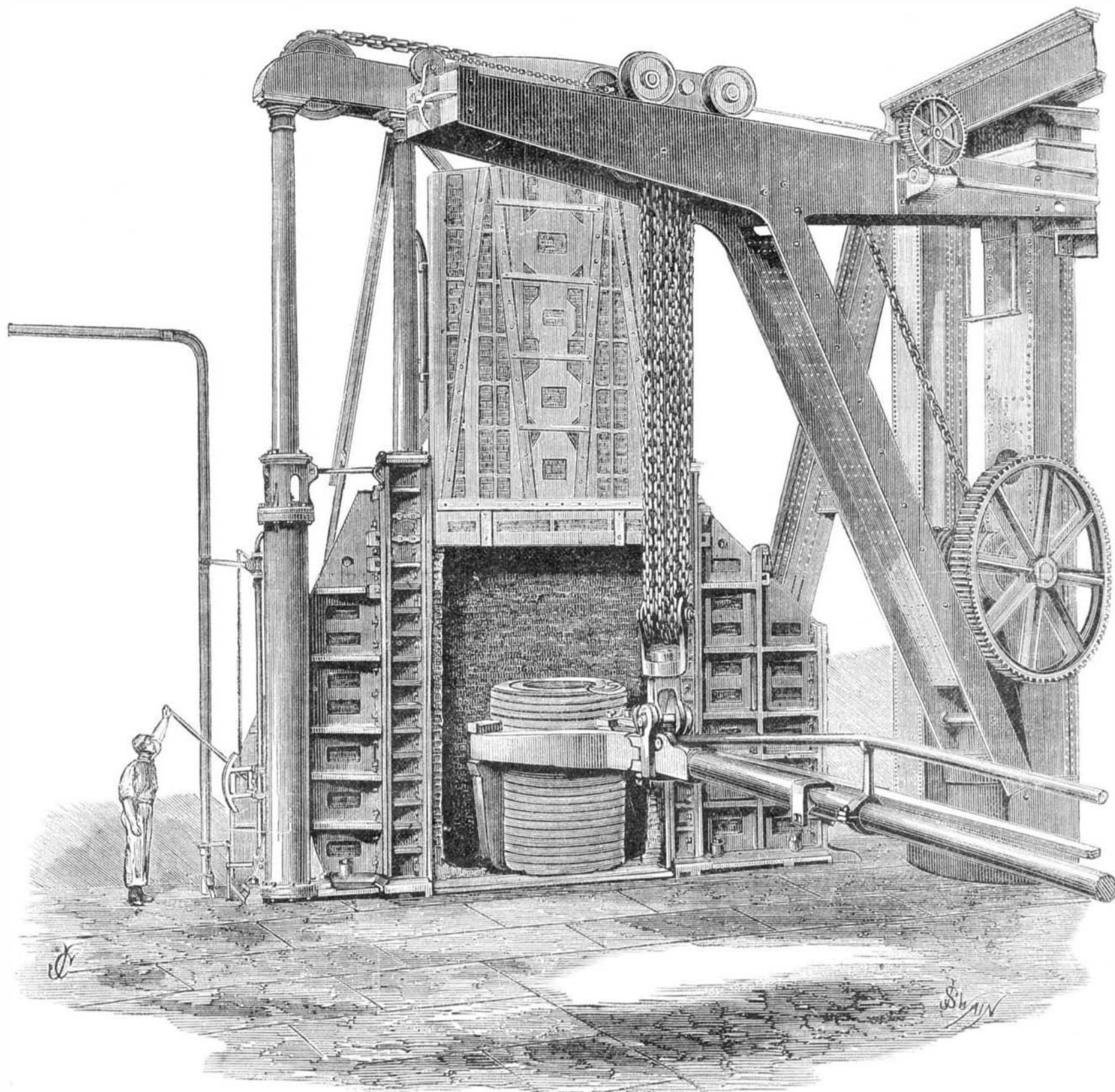
well in the ground as the door ascends. As, however, this counter weight would not of itself be sufficient, and in order to overcome friction between the chain and the counter weight, a long cylinder is contrived, to the piston rod of which the chain is attached. When it is required to raise the door, steam is admitted above the piston, which descends, the counter weight accelerating its movements. The door in closing, is sufficiently heavy to raise the counter weight and is given a slight excess of weight for this purpose over the latter.

A Case of Fragile Bones.

A correspondent, Mr. Z. P. M. King, says: "I noticed your account of a remarkable woman without bones. My wife once witnessed a case in Lodi, Wis., which bears some analogy to it. The bones of a child, 2½ or 3 years old, seemed to be of such tender nature as to be in danger of breaking every time it was moved. The limbs had been broken repeatedly in attempting to lift it, so it was carried on a pillow exclusively. The child had not outgrown the size of an infant 9 months of age. The bones seem to knit readily, but broke in another place as soon as the child was lifted."

The National Board of Fire Underwriters.

At a meeting of the Executive Committee of this body, held on September 23, it was resolved that, the authorities of Chicago having failed to comply with the suggestions put forth by the National Board of Fire Underwriters on the 24th of July last, "this committee now recommends that all companies belonging to the National Board discontinue the business of Fire Insurance in the city of Chicago, either by new policies or renewals, on and after October 1, 1874; and that the General Agent be instructed to communicate this decision at once to all National Board Companies for immediate action." The committee is advised that the board companies will carry out the above recommendation with great unanimity.

**HEATING FURNACE FOR THE MONSTER HAMMER, WOOLWICH, ENGLAND**