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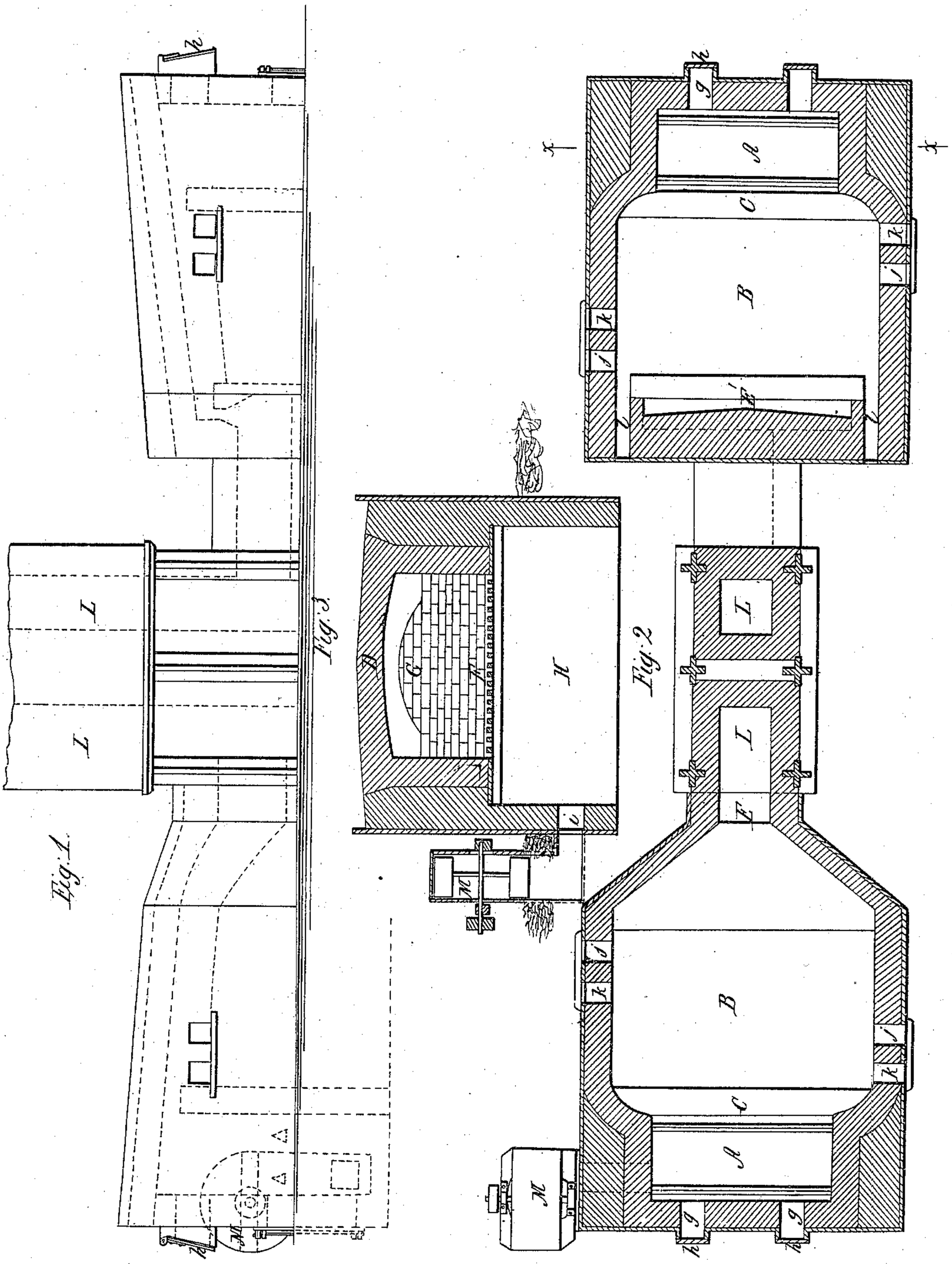
HEATING SKELPS FOR THE MANUFACTURE OF WROUGHT IRON TUBES.

No. 10,747. Patented Apr. 4, 1854.



UNITED STATES PATENT OFFICE.

JAMES McCARTY, OF READING, PENNSYLVANIA.

HEATING SKELPS FOR THE MANUFACTURE OF WROUGHT-IRON TUBES.

Specification of Letters Patent No. 10,747, dated April 4, 1854.

To all whom it may concern:

Be it known that I, JAMES McCARTY, of Reading, in the county of Berks and State of Pennsylvania, have invented certain new and useful Improvements in the Process of Manufacturing Wrought-Iron Tubes; and I do hereby declare that the following is a full, clear, and exact description of my invention, reference being had to the accompanying drawing, which forms part of this specification, and in which—

Figure 1 represents an elevation of a pair of my improved furnaces for heating pipe skelps; Fig. 2 a horizontal section of the same; and Fig. 3 a vertical transverse section at the line *x x* of Fig. 2.

Heretofore the skelps or blanks for tubes have generally been heated for welding over a fire of burning coke, in a furnace somewhat in the form of a long trough about twice as deep as its breadth and of sufficient length to receive the skelp. The coke fire extends throughout the whole length of the furnace and its combustion is excited by jets of air forced into it through nozzles in a manner similar to that in which the air is forced into a smith's fire. The skelp is introduced into this furnace endwise, through a door at one end, and as it is only supported at the ends, it must be constantly turned by the attendant while held over the fire, to prevent it from heating unevenly and from sagging down upon the fuel as it softens, for if it should sag so as to come in contact with the coke or the blast of any one of the nozzles, a hole would instantly be burned in it which would render it useless. As it is essential in this method of heating skelps, that the blast should be blown into the fire under a considerable pressure, the ashes and even small fragments of coke are blown against the skelp; these adhere to it and act upon the surface of the metal so as to render it rough and scaly. The objections to the method above described are so serious that many attempts have been made, both in this country and in England, to avoid them by heating skelps by other means, but not with success prior to the date of my invention, the object of which is to dispense with the most of the skill and labor hitherto required for heating skelps, and to render it an easy and certain operation.

My invention consists, first, in heating the skelps for welding, in a reverberatory furnace, and on sand bottom with raw coal, either anthracite or bituminous, as fuel, its combustion being excited by means of a forced blast. The fuel is burned upon a grate, separated from the sand bottom by a bridge, whose construction is such as to produce a horizontal reverberation of the flame, which, in connection with the reverberation downward which is produced by the crown of the furnace, insures a more thorough and equable dissemination of the heat among a quantity of skelps than can be produced by any means heretofore known.

The furnace which I employ for heating skelps is represented in the accompanying drawing. It consists mainly of a fire-chamber (A) in which the fuel is burned, of a bottom (B) of sand, or other suitable substance, on which the skelps are placed; of the fire-bridge (C) which separates the fuel from the sand bottom, of the reverberatory roof (D), and of the throat (E) through which the flame passes to the chimney. The fire-place is rectangular and is furnished with a grate (F) and with charging holes (g, g) through which the fuel is introduced. These charging holes are closed by doors, (h, h,) which prevent the escape of the flame. Immediately beneath the fire-chamber is the ash-pit (H) which is also furnished with doors that can be tightly closed to prevent the escape of the blast. The latter is conducted from some suitable blowing apparatus (a fan (M) for example) to the ash-pit, by means of an air trunk which terminates in an aperture (i) at one of the sides of the ash-pit.

The bottom (B) on which the skelps are heated is formed of sand, or of other substances having similar qualities, the most refractory being the best as it will resist for the longest time the combined action of the heat and the scales of oxid that drop from the heated iron. This bottom is of the shape represented at Fig. 2, its sides rise vertically to the roof (D) and are each furnished with two charging holes, one (j) through which the skelps are introduced; and the other (k) through which the heated skelps are withdrawn. These holes are fitted with suitable doors which are closed except during the time the skelps are being introduced or withdrawn.

The sand-bottom is separated from the fuel by a fire-bridge, (C) this is of peculiar form, being highest at its center and lowest at its extremities. The flame generated by

the burning fuel passes over this bridge to the sand bottom, and must be equally diffused from side to side of the same in order that the skelps may be heated equally from end to end, and it is evident that the particular form of this bridge will exercise an important influence upon the distribution of the flame over a sand bottom considerably wider than the fire chamber, as the determination of the draft against the boshes of the furnace by the enlargement of the flue toward each end of the bridge, will give to the flame a horizontal reverberation toward the middle of the hearth or bottom, and thus insure the thorough permeation of the flame throughout a mass of skelps which would not be reached by the reverberation from the roof alone, so as to insure the thorough and equable heating of the plates.

A fire-bridge constructed substantially in the curved form represented in the drawing has been found by actual experiment to effect this equal distribution of flame.

The fire-chamber and sand bottom are covered by a roof (D) which extends to the throat (E) through which the flame passes to the chimney. This throat may be either of the direct variety as represented at (E) or it may be of the drop form, as at B′. In either case the bottom is sloped from the fire-bridge to the throat and in the latter case cinder holes (*l*) are made in the wall of the furnace next to the throat. The throat conducts the flame to the chimney (L) which is fitted with a damper, and from which the flame may be allowed to escape directly into the air or it may be used for heating steam boilers, or for other purposes.

In working this furnace the fuel which is raw coal is introduced through the fire-holes upon the grate, and its combustion is excited by means of the forced blast introduced into the ashpit. As the flame is generated in the fire chamber, it passes over the fire-bridge (C) which by its peculiar form distributes it equably throughout the whole breadth of the furnace bottom, over which it is reverberated by the roof and boshes. After leaving the sand bottom the flame passes through the throat (E) to the chimney (L); the damper in the latter should be kept in such a position as will barely leave space enough for the escape of a volume of gas equal to the volume of air required to maintain the proper combustion of the fuel. By this method of working the furnace, its whole interior throughout is kept filled with burning gases, and the entrance of atmospheric air through the charging doors or other openings is prevented.

As soon as the furnace has been sufficiently heated a quantity of skelps are introduced endwise at the charging door and laid on the sand bottom, where they are quickly and equably heated from end to end. As fast as they arrive at the required temperature they are withdrawn one by one through the door (*k*) and carried to the welding machinery, while the place of each is supplied by a cold skelp. The operation is thus continuous and no time is lost in firing, as a constant fire is kept up by renewing the supplies of coal from time to time upon the grate without disturbing the sand-bottom; the latter lasts a long while without requiring renewing, as by this method of working the furnace, the skelps are not exposed to currents of unburnt air, and hence but a small amount of slag is produced to mix with and fuse the bottom. By the substitution of raw coal for coke which was heretofore employed, a very considerable saving is effected in the cost of fuel, which together with the saving that results from the greatly diminished number of skelps, either burned or rendered defective by reason or irregular heating, and the superior quality and finish of the product, renders this method of heating on a sand bottom, in a reverberatory furnace, in which the combustion of the fuel is excited by a blast, far superior to the old method of operation.

Having thus described my new method of operation in heating skelps for the manufacture of iron tubes, whereby a tube of better quality than those formerly made, is produced at less cost, what I claim as my invention and desire to secure by Letters Patent, is—

The new method of operating as described, viz: heating the skelps in a furnace constructed substantially as herein set forth, with raw coal as fuel whose combustion is maintained by a blast of air forced into the furnace under pressure as set forth.

In testimony whereof, I have hereunto subscribed my name.

JAMES McCARTY.

Witnesses:
MATTHIAS MENGEL,
S. WARNER.