(No Model.) 2 Sheets—Sheet 1.

J. T. HUTSON.

MACHINE FOR STIRRING AND AGITATING ORES.

No. 599,843. Patented Mar. 1, 1898.

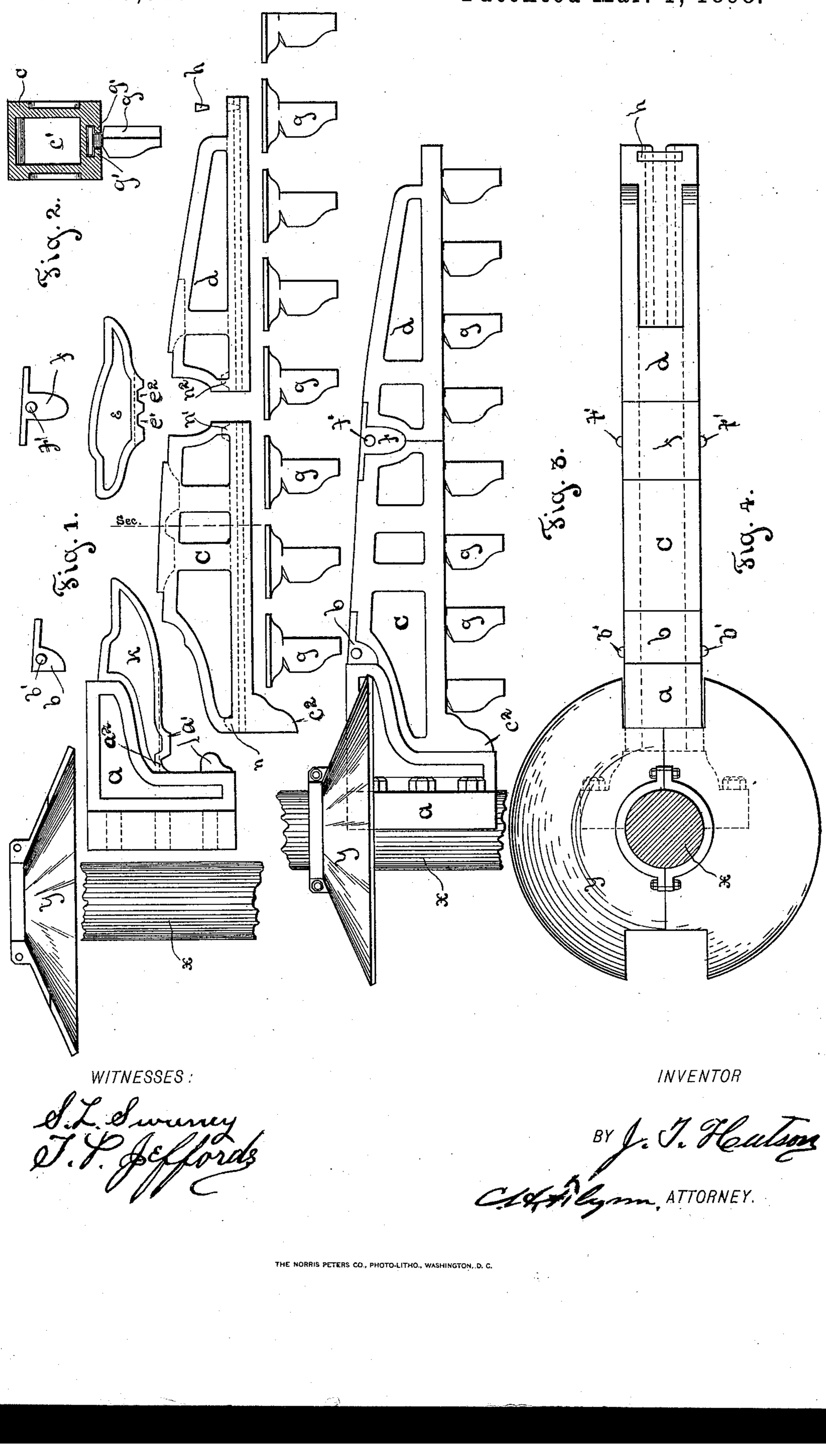

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

WITNESSES:

S. L. Sweney
T. P. Jeffords

INVENTOR

BY J. T. Hutson

C. A. Wilgus, ATTORNEY.

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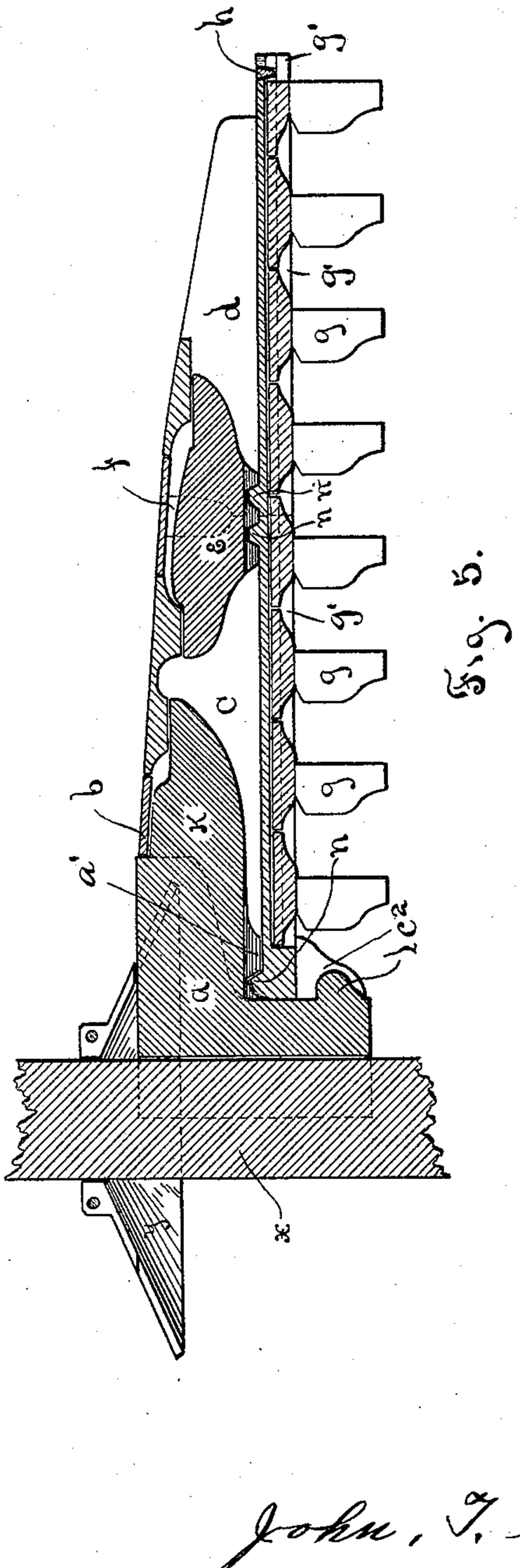

Fig. 5.

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UNITED STATES PATENT OFFICE.

JOHN TIMOTHY HUTSON, OF COLUMBIA, SOUTH CAROLINA.

MACHINE FOR STIRRING AND AGITATING ORES.

SPECIFICATION forming part of Letters Patent No. 599,843, dated March 1, 1898.

Application filed June 1, 1897. Serial No. 638,964. (No model.)

To all whom it may concern:

Be it known that I, JOHN TIMOTHY HUTSON, a citizen of the United States, residing at Columbia, in the county of Richland and State of South Carolina, have invented a new and useful Improvement in Machines for Stirring and Agitating the Ore in Pyrite-Furnaces, of which the following is a specification.

My invention relates to improvements in pyrite-furnaces, in which horizontal arms revolve upon or with a vertically-arranged shaft and in their revolution agitate the burning ore, thereby preventing the clogging of the furnace and allowing the desired amount of air to have access to the ore.

The objects of the improvements herein described and illustrated are, first, to provide means whereby the ore will be thoroughly agitated; second, to provide an agitating-arm which shall contain a relatively small amount of metal, whereby it may be readily handled and adjusted, and, third, to construct such an arm of a series of sections securely held together in such manner that, if desired, any section may be removed and replaced without shutting down the fire in the furnace.

As is well known, the portions of the stirrer-arms or agitating devices in these furnaces which are out of the direct path of the air frequently "burn out," while those portions of such arms which are in the direct line or path of the draft through the furnace are still in serviceable condition, and when, as has been the customary practice prior to my invention, the arms are made of a single piece or casting it is necessary to remove the entire arm whenever any section or portion thereof becomes unfit for satisfactory work. This is a laborious proceeding, owing to the great weight of the arm, and it is ordinarily necessary to entirely shut down the furnace-fire to permit of such a change. By my invention, however, I provide an arm in which the portions exposed to the greatest heat and out of the direct path of the air-currents are detachably secured in position, so that they may, if required, be readily removed without disconnecting the inner main supporting section or part of the arm from the power devices.

As my improvements relate particularly to the construction of a stirring or agitating arm adapted for use in furnaces of various styles, I have illustrated nothing else in the accompanying drawings, referring to which—

Figure 1 illustrates in side elevation the various parts composing my improved stirring-arm, said parts being shown as separated in order that the peculiar form of each may be more clearly seen. Fig. 2 is a transverse vertical section through one of the sections of the arm. Fig. 3 is a side elevation of the arm when the sections thereof are secured together. Fig. 4 is a top plan view. Fig. 5 is a longitudinal sectional view through the arm.

In the drawings, x designates the vertically-arranged power-shaft. To this shaft is secured the stirring or ore-agitating arm, which is composed, in the embodiment of the invention herein illustrated, of an inner section a, an intermediate section c, and an outer section d. These are rigidly but detachably connected together by means to be hereinafter described and support a series of teeth g. The section a of said arm is provided at its inner end with laterally-projecting flanges, which are adapted to be securely bolted to corresponding flanges on the inner section of another correspondingly-formed but oppositely-extending arm, (not shown,) and such bolts serve to bind each of said arms firmly to the shaft x. Said section a is provided with a projecting substantially horizontally-arranged lug k and with a relatively small projecting lug l. The main lug k is preferably made in the form shown clearly in Figs. 1 and 5, it being gradually reduced in height from its inner toward its forward end and having a slight downward-projecting enlargement a', which is separated from the forward face of the portion of the body of section a between the lugs k l by a socket or recess a^2.

The sections c d are preferably made hollow or provided with a longitudinal passage c', and the section c is of such form and construction that the lug k on the inner section a is adapted to enter said passage. At the bottom of the inner end of the passage c' in said section c is formed a transversely-extending rib or lug n, which when the parts a c are connected fits in the above-described recess or socket a^2. The section c is also provided at its inner end

with two parallel downwardly-extending lugs c^2, between which the lug l on the section a fits.

The section c is connected with the outer section d by means of a lock-piece e. This is of the form shown in Fig. 1, is of such cross-sectional form and size as to enter the passages c' in the said sections c d, and is provided in its lower edge or surface with two sockets e' e^2, adapted to receive lugs n' n^2, respectively formed at the outer end of the section c and the inner end of the section d.

As shown in Fig. 1, the lug k does not extend up to the top line of the section a and the sections c d project slightly above the locking-piece e, the ends of which are reduced in order to readily enter the passages c'. To close the recesses thus formed, cap-pieces b f are provided, each having a horizontal top flange adapted to lie flush with the surfaces of the tops of the adjacent sections of the arm, and two downwardly-extending side flanges, which are provided with laterally-extending projections b' f', by which such cap-pieces can be removed when desired.

In the body of each section of the arm is formed a longitudinally-extending groove which has a relatively narrow portion extending through the bottom surface of the arm, and within such groove are fitted the enlarged heads of the teeth g. These heads are projected both forwardly and rearwardly from the body of the tooth and abut one against the other, they being held within the slot by a transversely-extending pin h.

To prevent any of the ore which may be delivered adjacent to the shaft x from lodging about said shaft, a deflector y is provided. This is made in two sections bolted together about the shaft and provided with notches which form passages y' for the sections a of the two arms, which are partially covered by said shield or deflector.

The flanges g', by which the tooth-receiving groove or way of the arm is partially closed, extend inwardly far enough to permit of the passage only of the reduced neck portions of the teeth to extend between them.

It will be seen that the lugs k l on the section a positively prevent the other portions of the arm from moving vertically or laterally in either direction, the lug k positively preventing upward movement of the inner end of section c when the cap-piece b is in position, and the lug l, bearing against the lugs c^2, prevents any lateral movement, while the engagement between the projecting portion of the section a and the section c prevent the outer end of the arm from dropping.

What I claim is—

1. A stirring-arm, for an ore-roasting furnace, consisting of a head, or inner section, a, provided with a tongue, k, and a lug, l, and a section, c, having a socket or passage to receive said tongue, k, and having its end reduced to extend into the space between said tongue and the lug, l, substantially as set forth.

2. In a stirring-arm, the combination of the detachable sections c, d, provided with lugs, n', n^2, and with grooves adjacent to said lugs, and a connecting-piece or lock adapted to fit in the sockets in the sections c d and provided with means for engaging with said lugs n', n^2, substantially as set forth.

3. In an ore-roasting furnace, the combination of a vertical shaft, a head or hub, a, secured to said shaft, a stirring-arm, detachably connected to said head by a tongue-and-groove joint, and a removable cap-piece covering the joint between said arm and head, substantially as set forth.

4. The herein-described stirring-arm for ore-roasting furnaces, consisting of a series of sections, a, c, d, the section a being adapted to be secured to a suitable power-shaft, locking-pieces adapted to connect said sections together, and removable cap-pieces, b, f, covering the exposed portions of said lock-pieces, and lying flush with the top surfaces of the said sections, substantially as set forth.

5. The herein-described stirring-arm for an ore-roasting furnace, consisting of a section, c, adapted to be connected to a revoluble support and provided at its outer end with an upwardly-extending lug, n', and with a socket or recess opening through its lower edge and said outer end, a section, d, provided at its inner end with a corresponding lug and socket or recess, a detachable tooth adapted to have its body or head enter the aforesaid sockets or recesses in the sections c, d, and a lock plate or bar, adapted to engage with the said lugs, n', n^2, on said sections, substantially as set forth.

JOHN TIMOTHY HUTSON.

In presence of—
C. H. FLYNN,
T. P. JEFFORDS.