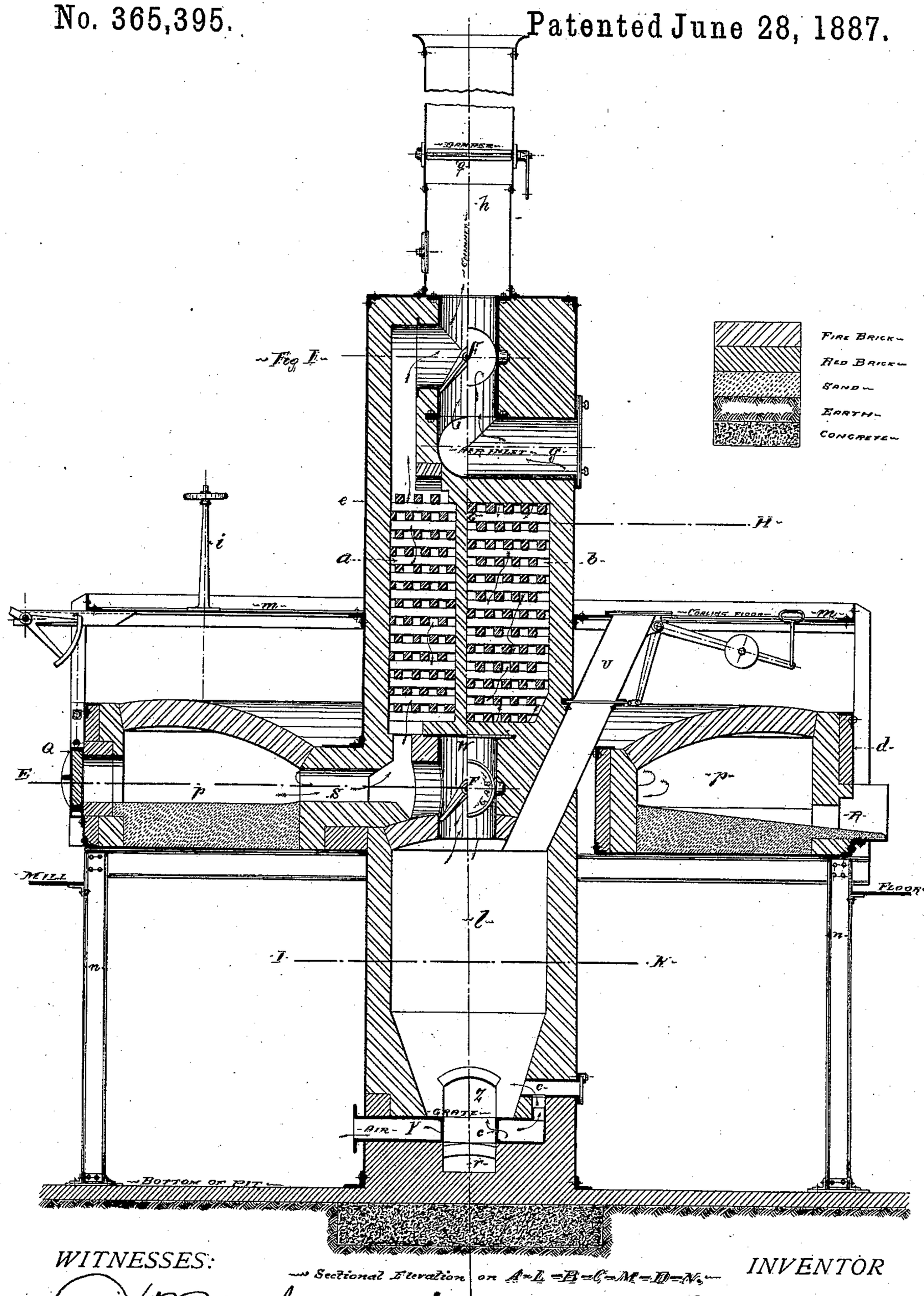
(No Model.)

2 Sheets—Sheet 1.

H. W. LOSS.

GAS FURNACE.

No. 365,395. Patented June 28, 1887.



WITNESSES:

Jam's L. Prince Jr.
Robt. B. Armstrong

INVENTOR

Henry W. Loss

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(No Model.) 2 Sheets—Sheet 2.

H. W. LOSS.

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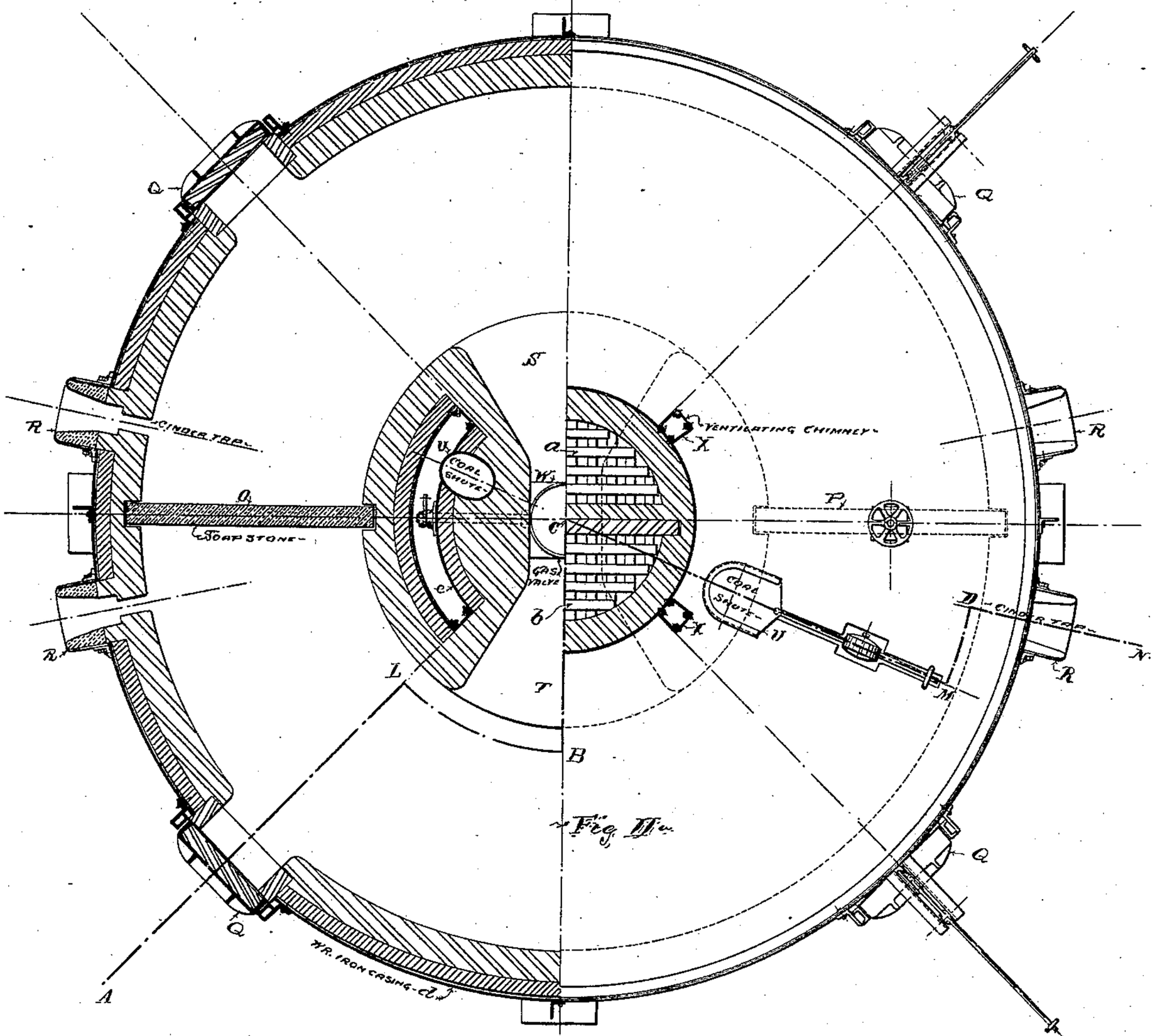

Fig. II.

Plan View.

Half Section on E-F. Half Section on G-H.

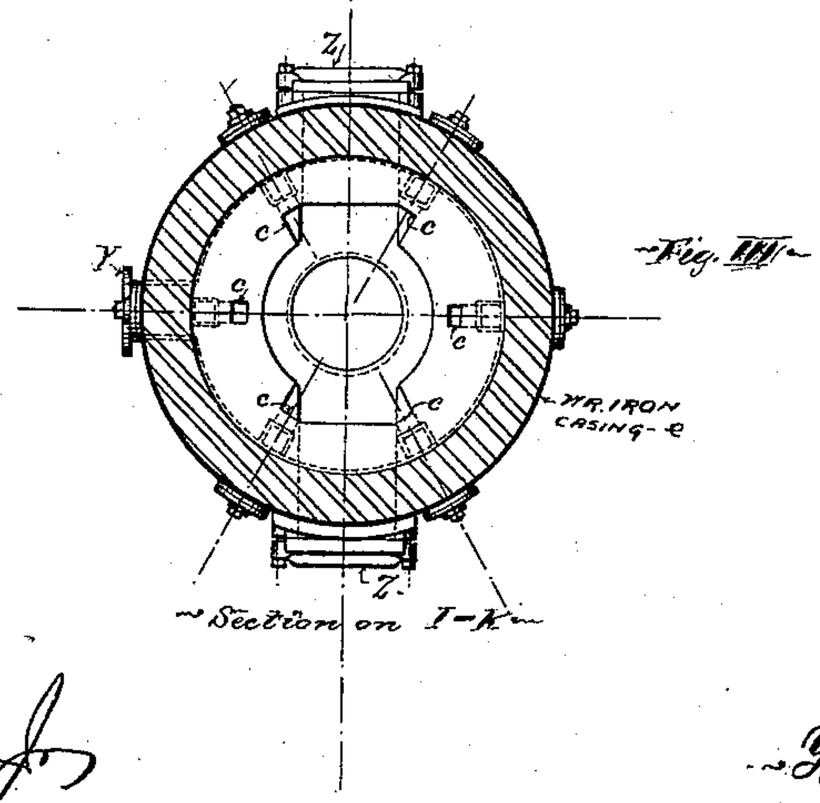

Fig. III.

Section on I-K.

WITNESSES:

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UNITED STATES PATENT OFFICE.

HENRY WILLIAM LOSS, OF EDGE MOOR, DELAWARE.

GAS-FURNACE.

SPECIFICATION forming part of Letters Patent No. 365,395, dated June 28, 1887.

Application filed June 7, 1886. Serial No. 204,332. (No model.)

To all whom it may concern:

Be it known that I, HENRY WILLIAM LOSS, a subject of the King of Norway, residing at Edge Moor, in the county of New Castle and State of Delaware, have invented a new and useful Reversible Gas-Furnace, of which the following is a specification.

My object in making the improved design has been economy in fuel and simplicity and durability in the construction.

Referring to the drawings, Figure I represents a cross-section of the furnace, showing the hearth *p*, the gas-producer *l*, recuperator *a* and *b*, and chimney *h*. It also shows the gas and air valves *w* and *f* and the coal-chute U, for feeding the producer from an upper coaling-floor, *m*. Fig. II represents a plan section of the furnace, and Fig. III represents a plan cross-section through the gas-producer.

By my arrangement of reversing the flame in the hearth, by help of the sliding soapstone doors O and P, Fig. II, a very uniform temperature can be maintained throughout the whole hearth, and as the charge of metal is continuous through its entire length the colder stock at the exit end of the hearth will absorb so much heat from the waste gases before these enter the recuperator *a* and *b* that the function of this latter, and therefore also its size, can be greatly diminished as compared with any other regenerative furnace in the market. By having the furnace circular, a minimum amount of radiating-surface is obtained, thus securing a minimum loss of heat from radiation. By having the gas-producer *l* in the center, the travel of the gases here generated is diminished to the least possible, thus again avoiding any loss of heat by radiation through long and expensive brick-flues. By having the recuperator *a* and *b* and also the stack *h* in the center, the distance from the hearth to the atmosphere (the travel of the waste gases) is also brought down to a minimum, thus enabling the use of a small and cheap stack, doing away with expensive and leaky brick flues, and also permitting the recuperator and producer to be made in one structure. This latter point secures simplicity in construction, as also durability, as the expansion of this part of the furnace can now take place without interfering with the expansion of the outside ring-shaped hearth, which latter practically, by this construction, forms an entirely separate structure.

If so wished, the recuperator can be removed, thus leaving the producer standing by itself in the center. The waste gases will in this case be led directly from the hearth to the chimney.

Referring to Fig. I, the gas is generated on the grate in the bottom of the producer *l*, this being filled with coal through the two coal-chutes U, one on each side, as shown in Fig. II. The fire can also be stoked through these holes, while the grate can be cleaned and the ashes removed through the doors *z* and *r* in the bottom part of the producer. The generated gas ascends through the glowing coal and leaves this part of the furnace through a regular Siemens butterfly reversing-valve, *w*, the shaft of which can be worked from the coaling-floor *m* by help of proper levers. A similar valve, *f*, is inserted over the top of the recuperator and acts as an inlet for the air and as an outlet to the chimney for the waste gases. The recuperator is parted by a central partition wall into two compartments, *a* and *b*, each one of which is filled with checker-bricks 3″x3″x9″ to absorb the heat of the waste gases which circulate around them. A large pipe, *g*, leads the air which is necessary for the combustion of the gas from the outside atmosphere into the valve *f*, and taking the position of the valves *f* and *w*, as shown on the drawings, the cold air is led in through *g* and *f* and passes down the *b* half of the recuperator, absorbing on its down passage heat from the checker-bricks, (which were already heated up previously to the conditions considered at present.) The air after being thus heated passes out through the bottom of this compartment and mixes now with the upcoming gas from the producer *l*, after which both air and gas enter the furnace-hearth through one of the two throats S and T, as shown in Fig. II, where combustion now takes place. The cast-iron box Y at the bottom of the producer receives the steam-blast (mixture of steam and air) which is necessary for the generation of the gas, sending the mixture out through openings *c* in sides and top of box, as shown in Figs. I and III. The hearth is divided into two halves

by help of the vertical sliding doors O and P, which are pieces of soapstone, so as to withstand the intense heat. During the working of the furnace one of these doors is always up, leaving a free passage of the flame, while the other is down. These doors or dampers are raised and lowered by help of screw-stands *i*, which are stationed on the coaling-floor. If the air and gas enter the hearth through the throat T, and the sliding door O is up, the left half will be scoured by the flame, the other door, P, being down. After the discharge of the metal here deposited and the recharge of cold stock, the door O is lowered and P is lifted. The same process is now repeated for the remaining half of the hearth, the waste gases in each case obtaining their outlet by the throat S and up through the *a* half of the recuperator, heating the there-deposited checker-bricks as they ascend. After the discharge and recharge of metal the doors O and P are again reversed, but this time also followed by the immediate reversal of the two valves *w* and *f*. The result of this operation is to throw the *b* half of the recuperator open to the chimney, (was formerly open to cold blast,) and also to throw the *a* half of same open to the cold blast, (was formerly open to the chimney.) In this way the one half recuperator which under the previous conditions gave out heat to the cold air and was thus cooled off is now again reheated, while the heat which was formerly stored in the other half is now utilized by the incoming cold air. This reversing of the valves *w* and *f*, in connection with the necessary reversal of the doors O and P will absolutely result in a very uniform heat throughout the entire furnace-hearth. The reversal of the valves only would render one-half of the furnace-hearth useless, never receiving any flame, but when worked in combination with the sliding doors the full benefits from a continuous hearth of the above construction is obtained.

Q represents the working-doors of the hearth, and R are openings for the discharge of cinder.

The hearth is represented on the drawings as to contain only solid charges; but there is no reason why the bottom should not be hollow, so as to be able to contain a melted liquid, as steel or glass.

As will be seen on the drawings, the outer ring-shaped hearth, as well as the inner cylinder containing the producer and recuperator, are both surrounded by wrought-iron plating, which supports the weight of the structure and holds the parts within their proper limits.

Having now specified the differences between my design and those of older origin, I proceed to state my claim, which is—

A continuous hearth of a circular, elliptical, or polygonal outline with two removable partition-doors, combined with and surrounding an inner independent structure consisting of an upper partitioned regenerator with a reversible valve and a lower gas-producer with a similar valve, the inner structure being connected with the outer hearth by two diametrically-opposite situated openings or throats, substantially as and for the purpose specified.

HENRY WILLIAM LOSS.

Witnesses:

SAML. F. PRINCE, Jr.,

ROBT. B. ARMSTRONG.