

No. 772,846.

PATENTED OCT. 18, 1904.

S. STEWART & H. HUGHES.
GAS SEAL FOR METALLURGICAL FURNACES.

APPLICATION FILED MAR. 10, 1903.

NO MODEL.

2 SHEETS—SHEET 2.

Fig. 2.

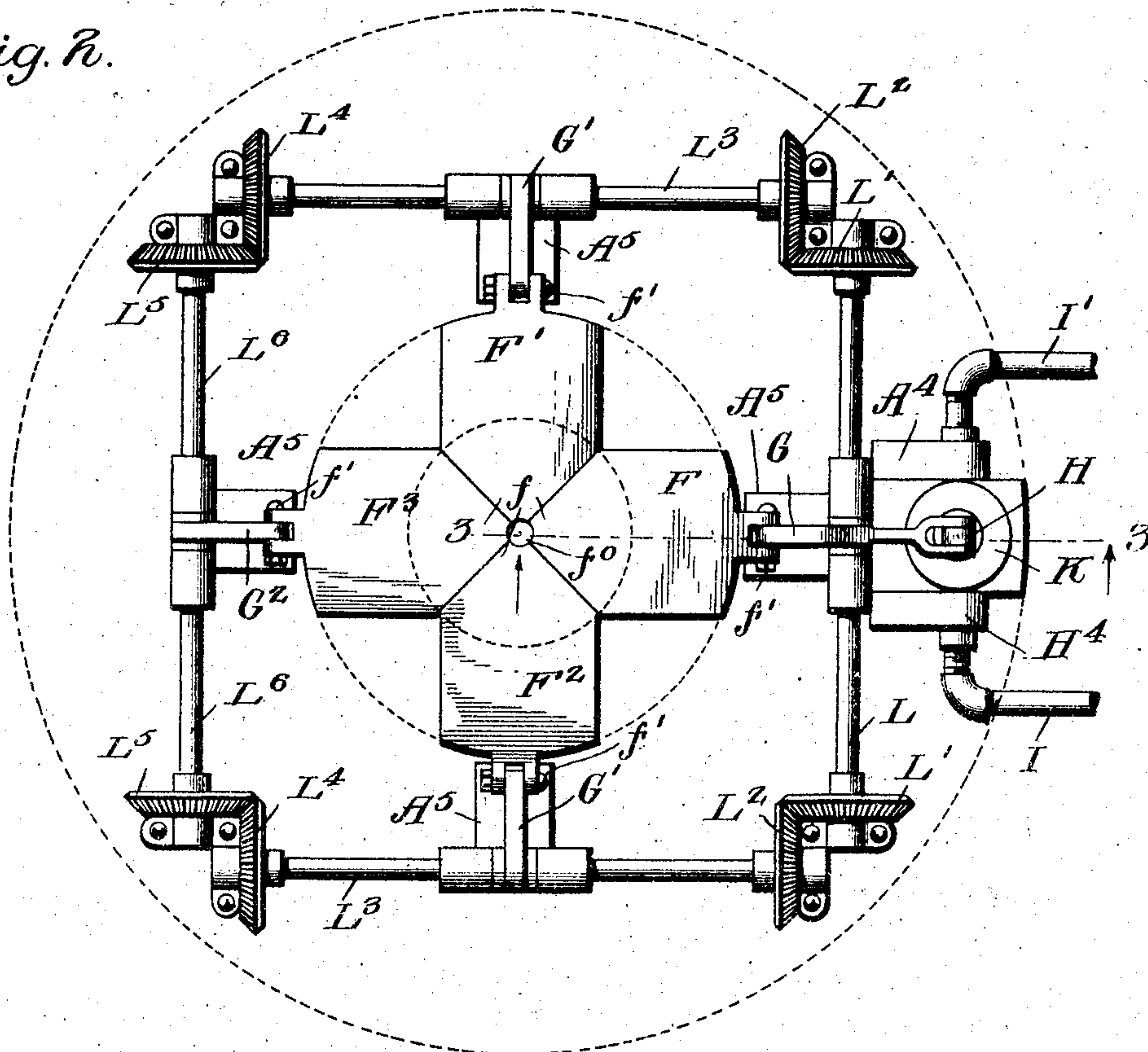
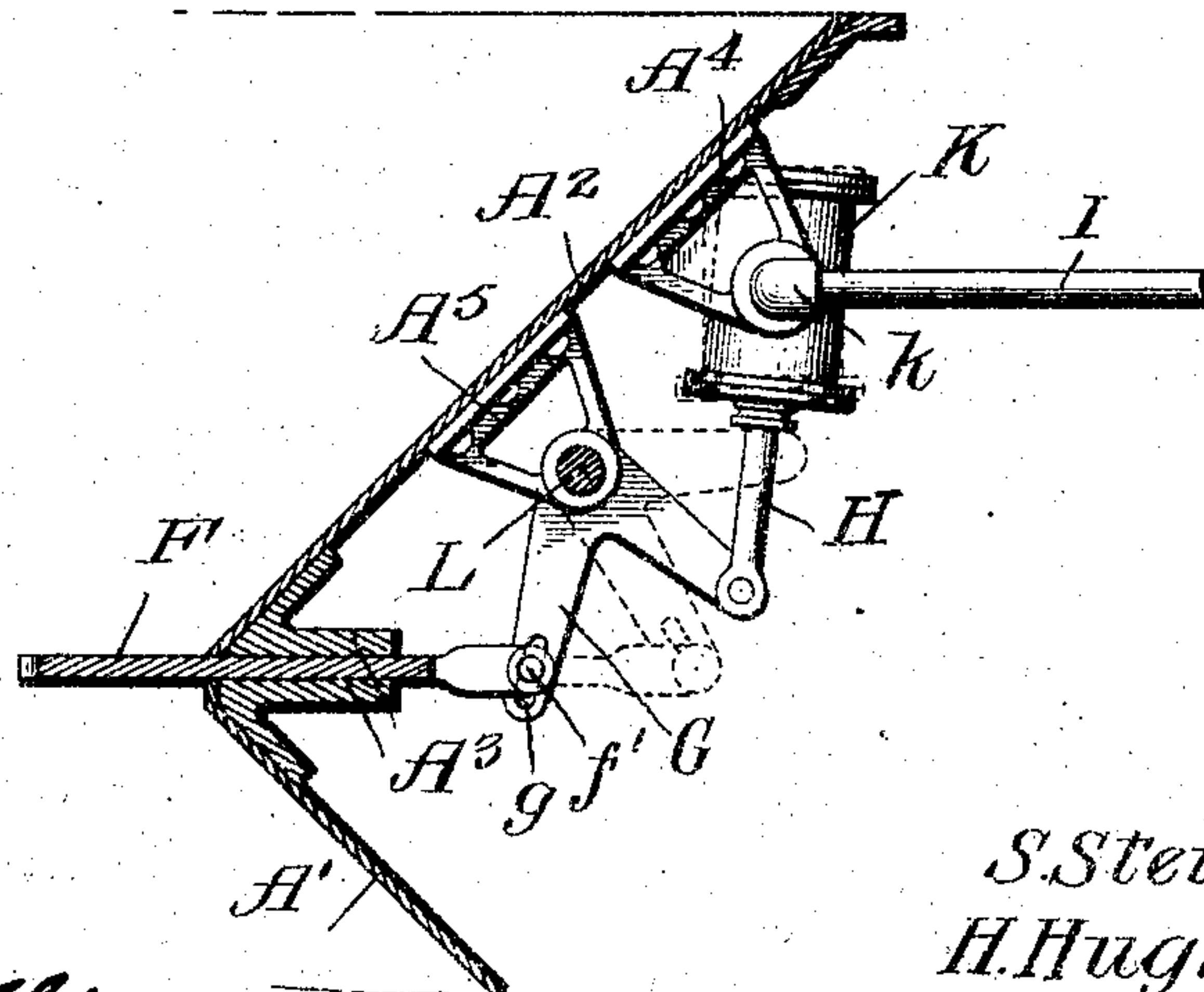


Fig. 3.



Witnesses

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UNITED STATES PATENT OFFICE.

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GAS-SEAL FOR METALLURGICAL FURNACES.

SPECIFICATION forming part of Letters Patent No. 772,846, dated October 18, 1904.

Application filed March 10, 1903. Serial No. 147,125. (No model.)

To all whom it may concern:

Be it known that we, SAMUEL STEWART, residing at Brighton, and HARRY HUGHES, residing at Woodward, in the county of Jefferson and State of Alabama, both citizens of the United States, have invented certain new and useful Improvements in Gas-Seals for Metallurgical Furnaces; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to improvements in gas-seals for metallurgical furnaces; and it consists in providing a gas-tight seal which may be readily applied or removed and which does not clog up.

Our invention will be understood by reference to the accompanying drawings, in which the same parts are indicated by the same letters throughout the several views.

Figure 1 is a side elevation of the top of a metallurgical furnace. Fig. 2 is a diagram showing the operation of the sliding gates. Fig. 3 is a section along the broken line 3 3 of Fig. 2 and looking in the direction of the arrows.

A represents the furnace, having the hood A', the hopper A², and the guides A³ for the sliding gates.

B represents a frame mounted on the top of the furnace; C, one of the cars for carrying the stock; D, the hoisting-rope for the cars.

E, E', and E² represent idlers over which the rope D passes.

F, F', F², and F³ represent gates which are mounted to slide horizontally in guides A³. Each of these gates is tapered, as at *f*, so that when all four are moved toward the center or to the closed position the edges *f* shall fit snugly to each other, forming a substantially gas-tight seal. These gates are cut away, as at *f*^o, to permit the passage therethrough of the rod Q, which supports the bell P. These gates are simultaneously moved to the closed position or withdrawn to the open position by mechanism controlled from the cylinder K, as will now be described. Each gate has con-

nected thereto a lever, (indicated at G G' G², respectively.) Each of these levers is slotted, as at *g*, to receive the pin *f*', by which the said gate is connected to the said lever. The various levers are rigidly attached to and rock with shafts L, L³, and L⁶, respectively. The shaft L is rocked by means of the piston-rod H, which may be connected to a separate crank-arm on the shaft; but the crank G is preferably in the form of a bell-crank fast on the shaft L and having one arm connected to the piston H and the other to the gate F.

The cylinder K is trunnioned, as at *k*, in the bracket A⁴, attached to the hopper A².

I represents a pipe connected to a steam-boiler or other source of fluid-pressure, and I' represents the exhaust-pipe. It will be seen that by rocking the shaft L in the direction to close the gates the beveled gears L will be rotated, turning the beveled gears L² on the shafts L³, which shafts will operate the bell-crank G' and will close the gates F' and F². These shafts L³ also carry beveled gears L⁴, which mesh in corresponding gears L⁵ on the shaft L⁶, and this shaft operates the bell-crank G² and closes the gate F³. The several bell-cranks are pivoted in brackets A⁵, which also serve for bearings for the corresponding shafts. Thus it will be seen that the motion of the piston-rod H down will close all the gates, while the motion of the piston-rod up will open all of the gates, leaving an unobstructed passage through the hopper of the chamber above the bell.

The bell P is supported by the rod Q, attached to the lever Q', which is operated in the usual way.

The rope R, connected to the piston T in the cylinder T', is used to lift off the bell lip-ring hood and hopper when desired. There are preferably two of these cylinders with two ropes and corresponding pulleys, as described in our application of even date herewith, serially numbered 147,124.

It will be obvious that various modifications might be made in the herein-described apparatus which could be used without departing from the spirit of our invention.

Having thus described our invention, what we claim, and desire to secure by Letters Patent of the United States, is—

1. A gas-seal for metallurgical furnaces, comprising a plurality of sliding gates tapered at the ends to fit snugly together when in the closed position, a series of shafts geared together, and a crank on each shaft pivotally connected to one of said gates, and means for rocking one of said shafts, substantially as described.

2. A gas-seal for metallurgical furnaces, comprising a plurality of sliding gates tapered at the ends to fit snugly together when in the closed position, a series of shafts geared together, and a crank on each shaft pivotally connected to one of said gates, a second crank-arm on one of said shafts, and a cylinder and piston-rod connected thereto for rocking said shaft, substantially as described.

3. A gas-seal for metallurgical furnaces, comprising a plurality of sliding gates tapered at the ends to fit snugly together when in the closed position, a series of shafts geared together, and a crank on each shaft pivotally connected to one of said gates, a second crank-arm on one of said shafts, a cylinder trunnioned on the furnace, and a piston-rod in said cylinder connected to said second crank-arm, substantially as described.

4. In a metallurgical furnace, the combination of a hopper, provided with guides at the throat thereof, of a plurality of gates sliding in said guides, the said gates being tapered to fit snugly together when in a closed position, a plurality of shafts journaled beneath the hopper, crank-arms on said shafts and connected to said gates, gearing connecting said shafts, and means for rocking one of said shafts, substantially as described.

5. In a metallurgical furnace, the combination of a hopper, provided with guides at the throat thereof, of a plurality of gates sliding in said guides, the said gates being tapered to fit snugly together when in a closed position, a plurality of shafts journaled beneath the hopper, crank-arms on said shafts and connected to said gates, gearing connecting said shafts, a second crank-arm on one of said shafts, and a piston-rod connected to said second crank-arm and rocking said shaft, whereby all of said gates are simultaneously moved, substantially as described.

6. In a metallurgical furnace, the combination of a hopper, provided with guides at the throat thereof, of a plurality of gates sliding in said guides, the said gates being tapered to fit together snugly when in a closed position, a plurality of shafts journaled beneath the hopper, crank-arms on said shafts and connected to said gates, gearing connecting said shafts, a cylinder trunnioned beneath the hopper, with means for supplying fluid-pressure

to said cylinder, a piston and piston-rod in said cylinder, and, a connection between the piston-rod and one of said shafts, substantially as described.

7. A gas-seal for metallurgical furnaces, consisting of a plurality of horizontal sliding gates tapered at the ends so as to fit snugly together when in the closed position, and indentations in the point of each gate to permit the passage of the rod supporting the bell, with means for moving said gates, substantially as described.

8. The combination with a furnace, provided with a hopper, of a bell, a rod attached to said bell, a rope or chain attached at one end of said rod, a piston-rod attached to the other end of said rope or chain, adapted to raise and lower said bell, a plurality of horizontally-sliding gates adapted to close the bottom of said hopper, said gates being cut away at their ends so as to fit snugly together and to leave a passage-way for said rod when in the closed position, with means for reciprocating said gates, substantially as described.

9. The combination with a furnace, provided with a hopper, of a bell, a rod attached to said bell, a rope or chain attached at one end of said rod, a piston-rod attached to the other end of said rope or chain, adapted to raise and lower said bell, a plurality of sliding gates adapted to close the bottom of said hopper, said gates being cut away to fit snugly together when in the closed position, also to permit the passage therethrough of the said rod from the bell, shafts geared together, cranks on said shafts for reciprocating said gates, and means for rocking one of said shafts, substantially as described.

10. The combination with a furnace, provided with a hopper, of a bell, a rod attached to said bell, a rope or chain attached at one end of said rod, a piston-rod attached to the other end of said rope or chain, adapted to raise and lower said bell, a plurality of sliding gates adapted to close the bottom of said hopper, said gates being cut away to fit snugly together when in the closed position, also to permit the passage therethrough of the said rod from the bell, shafts journaled beneath the hopper, bevel-gears connecting said shafts, a crank-arm on each shaft connected to the corresponding gate, and means for rocking one of said shafts, and thereby simultaneously moving all of said gates, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

SAMUEL STEWART.
HARRY HUGHES.

Witnesses:

W. Q. JAMISON,
S. HINE.