No. 763,892. PATENTED JUNE 28, 1904.

J. HIRSCHMANN.

HEATING FURNACE.

APPLICATION FILED SEPT. 19, 1903.

NO MODEL. 3 SHEETS—SHEET 1.

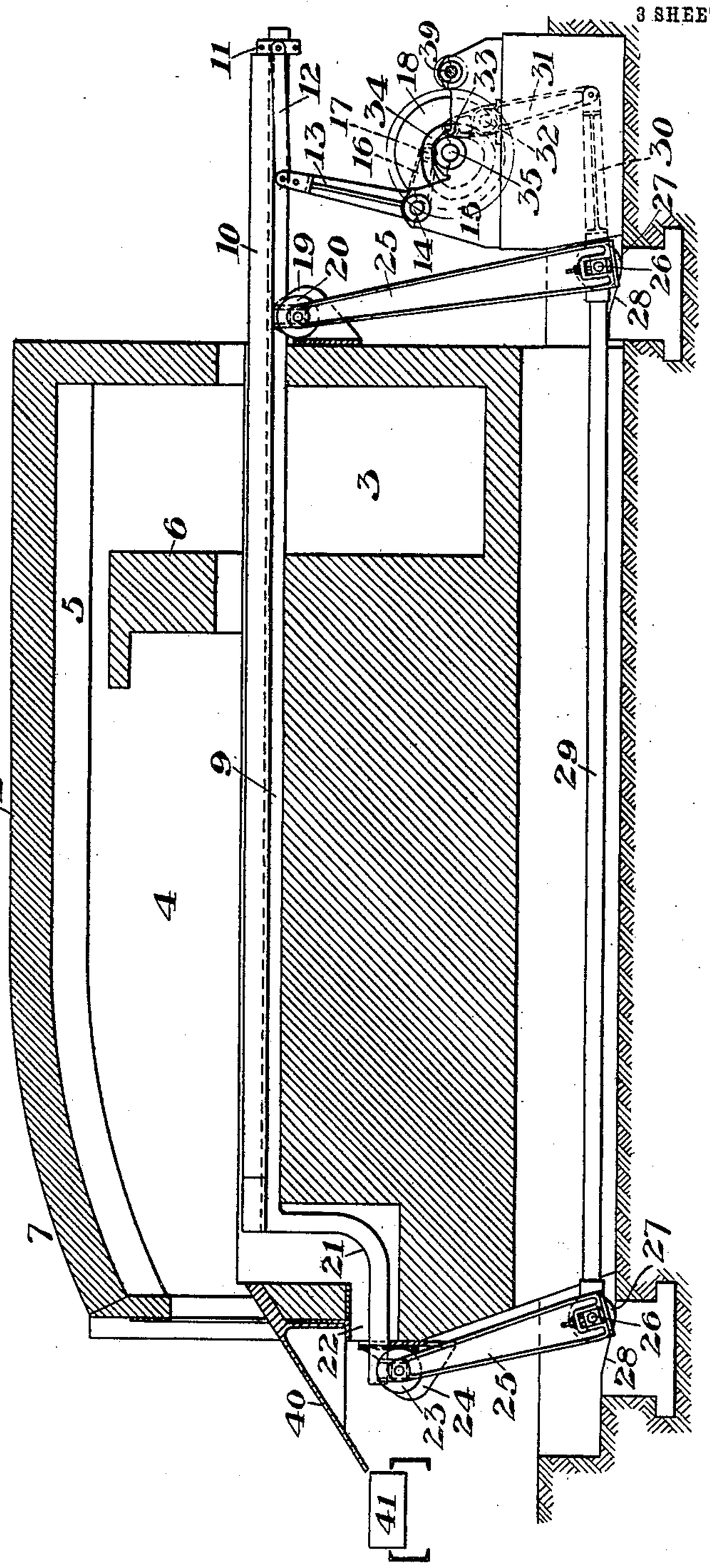

Fig. 1.

WITNESSES

Warren V. Swartz

Geo. B. Fleming

INVENTOR

Jos. Hirschmann

by Baldwin & Wyman

his attys

No. 763,892. PATENTED JUNE 28, 1904.

J. HIRSCHMANN.

HEATING FURNACE.

APPLICATION FILED SEPT. 19, 1903.

NO MODEL.

3 SHEETS—SHEET 2.

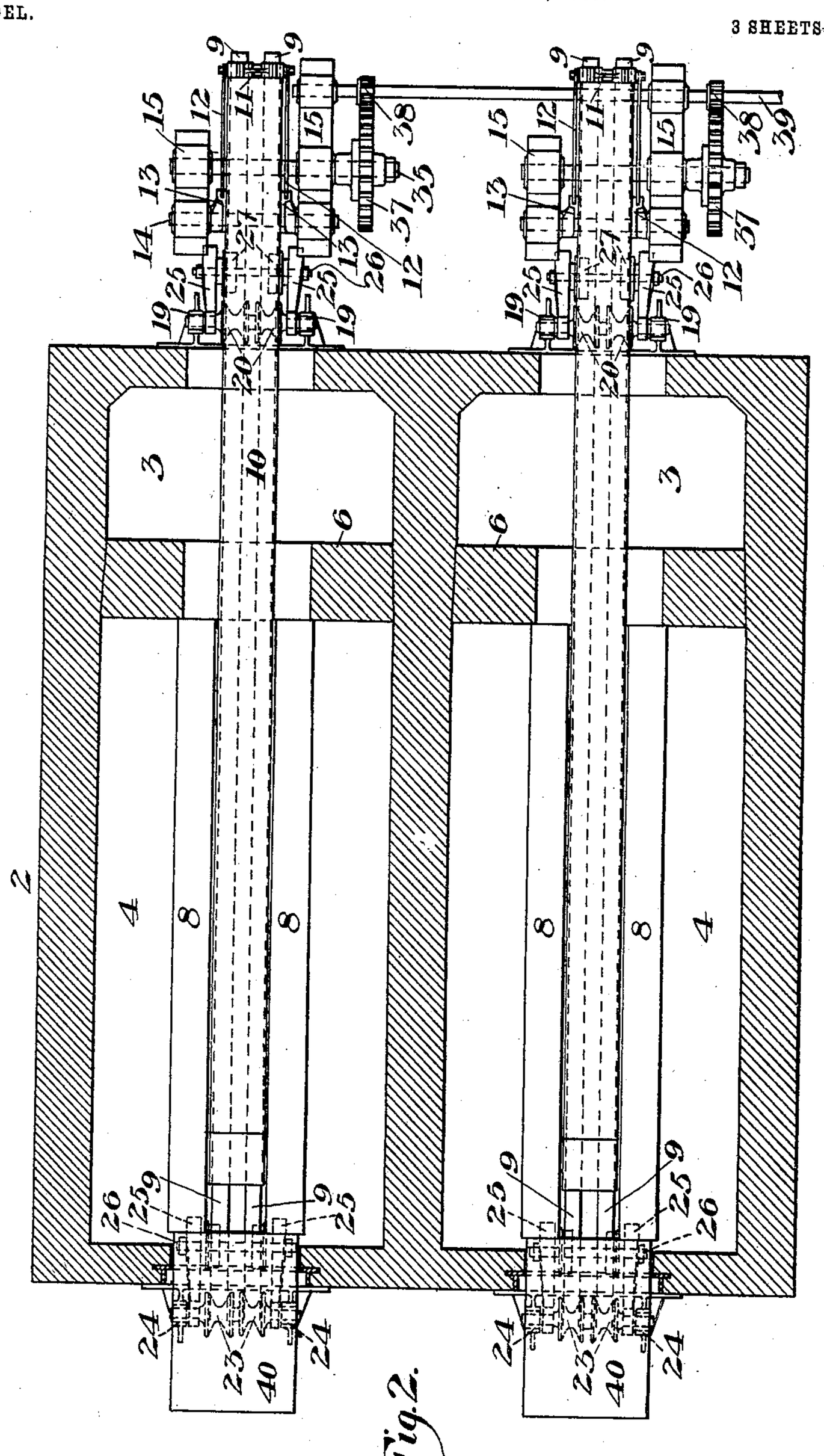

Fig. 2.

WITNESSES

Warren W. Swartz

Geo. B. Fleming

INVENTOR

Joseph Hirschmann

by Baker, Rae & Byrnes

his attys

No. 763,892. PATENTED JUNE 28, 1904.

J. HIRSCHMANN.

HEATING FURNACE.

APPLICATION FILED SEPT. 19, 1903.

NO MODEL. 3 SHEETS—SHEET 3.

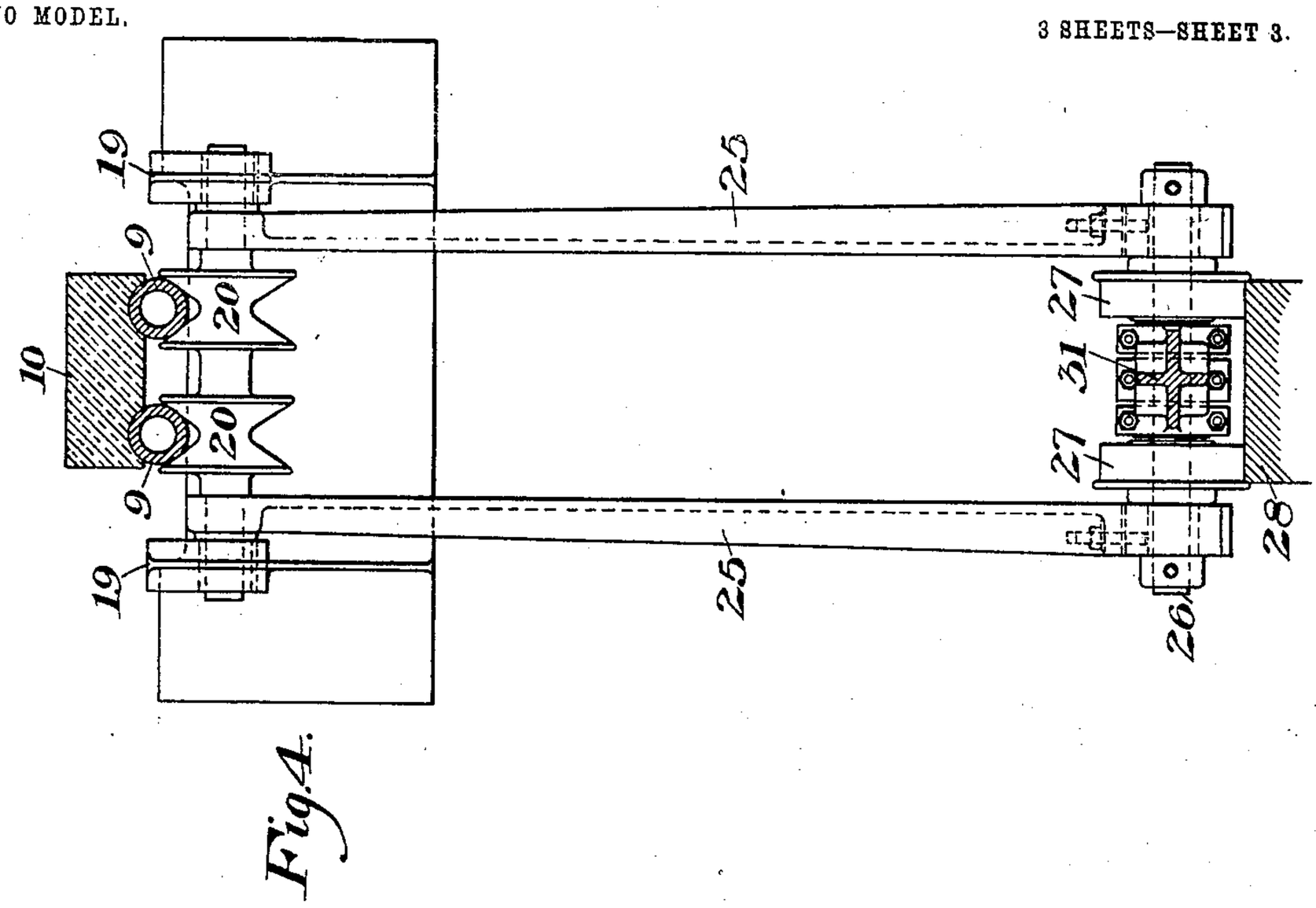

Fig. 4.

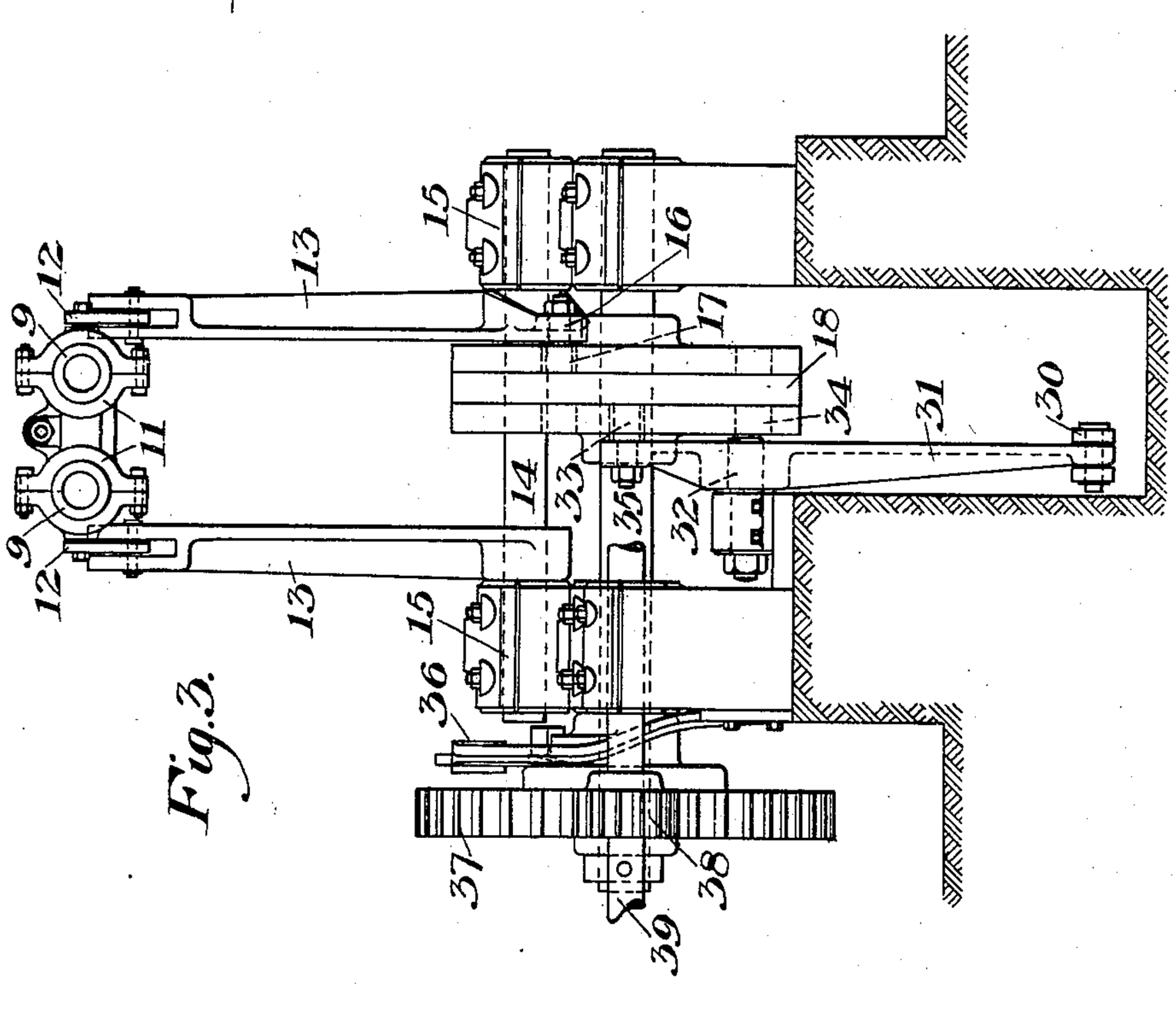

Fig. 3.

WITNESSES

Warren W. Swartz

Geo. B. Fleming

INVENTOR

Josef Hirschmann

by Baldwin & Bynes

his attys

No. 763,892. Patented June 28, 1904.

UNITED STATES PATENT OFFICE.

JOSEF HIRSCHMANN, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO AMERICAN TIN PLATE COMPANY, OF ORANGE, NEW JERSEY, A CORPORATION OF NEW JERSEY.

HEATING-FURNACE.

SPECIFICATION forming part of Letters Patent No. 763,892, dated June 28, 1904.

Application filed September 19, 1903. Serial No. 173,764. (No model.)

To all whom it may concern:

Be it known that I, JOSEF HIRSCHMANN, of Pittsburg, Allegheny county, Pennsylvania, have invented a new and useful Heating-Furnace, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a longitudinal vertical section showing the heating-furnace constructed in accordance with my invention. Fig. 2 is a horizontal section showing a pair of the furnaces. Fig. 3 is an end elevation of the operating mechanism for the traveling support; and Fig. 4 is a vertical cross-section, on a larger scale, showing the lifting-arms and traveling support.

My invention relates to furnaces for heating metal, and more especially to those for heating slabs or bars, such as tin-plate bars.

The object of my invention is to provide simple and efficient mechanism for carrying the bars through the furnace and ejecting them and also to prevent marks on the plates which have occurred where water-cooled pipes are used for supporting the plates or moving them through the furnace.

In the drawings I show a longitudinal furnace 2, having an inlet-port 3 at its rear end for gaseous fuel, which opens into the furnace-chamber 4 through a port 5, extending over the transverse bridge-wall 6. The front portion of the furnace-roof is preferably curved or inclined downwardly, as shown at 7, and the floor is provided with side ledges 8 8, of refractory material, which extend lengthwise from the bridge-wall to the front end of the furnace. Between these ledges the floor is recessed to receive the traveling support for the bars. This support consists of a pair of metal pipes 9 9, upon which is laid a refractory slab 10, having longitudinal recesses in its bottom face to fit on the pipes. The rear ends of the pipes are clamped in a yoke 11, the ends of which are pivotally connected by links 12 with upwardly-projecting levers 13, secured to a shaft 14. The shaft 14 is mounted in suitable stationary bearings 15 and carries a lever 16, having at its end a laterally-projecting roller 17, engaging a cam-groove in one face of the cam-wheel 18. I have shown the lever 16 as forming an extension of one of the levers 13; but it may be formed separately, if desired.

At the rear end of the furnace are provided slotted bearings 19, in which are mounted rollers 20, arranged to receive the pipes 9. The front ends of these pipes are bent downwardly and forwardly, as shown at 21, and project through the openings 22, extending through the bottom and front end of the furnace. The ends of these bent portions rest upon rollers 23, carried in stationary slotted bearings 24. The ends of the trunnions of rollers 20 are mounted in pairs of links 25. The lower ends of the pairs of links 25 are provided with bearings surrounding shafts 26, having flanged wheels 27, riding upon inclined tracks or ways 28. The shafts 26 are connected between the pairs of wheels by means of a longitudinal link or rod connection 29. The rear shaft 26 is provided with a rearwardly-projecting link 30, pivoted to the lower end of the lever 31, mounted on a stub-shaft 32 and having its upper arm provided with a lateral roller 33, which enters a cam-groove 34 in the cam-wheel 18. The cam-wheel is mounted on a shaft 35, having a pin-clutch connection (indicated at 36) with a toothed wheel 37, engaging pinion 38, secured to the driving-shaft 39.

At the front end of the furnace a sharply-inclined plate 40 leads downwardly and forwardly from the level of the ledges, the heated plates sliding down upon this incline and dropping upon a roller-table, (indicated at 41.)

The cam-grooves of the wheel 18 are so formed that in each revolution of the shaft in the first quarter the traveling support is lifted through the lever 31 and the coacting rollers and inclines. The bars are then moved forward during the next quarter, this movement preferably starting slowly, then increasing in speed, and then decreasing in speed toward the end of the forward stroke. In the next quarter after the forward movement the

lever 31 is actuated to lower the support slightly below the level of the ledges, and in the final quarter of the revolution the support is drawn back to its normal position.

The pipes are water-cooled by continuous circulation through flexible hose or other suitable connections at the ends of the pipes, and during the movements the entire row of plates is lifted except the foremost plate of the row, and as the carrier moves forward the front ends of the pipes will push the foremost plate forward, so that it slides down upon the outlet and upon the roller-table. The row of plates is thus moved forward substantially the width of one plate, and the carrier is then lowered to deposit the bars upon the ledges and then moved back to its original position.

The advantages of my invention result from the simple and effective mechanism for moving the row of plates forwardly and for ejecting the front plate. The refractory cover on the traveling support fills the space between the ledges and prevents the marks on the plates which would occur if the water-cooled pipes contacted directly with them. The pin-clutch is preferably used, so that when it is actuated by the operator the mechanism will be given one cycle of movement and then automatically stopped by the clutch.

Many variations may be made in the form and arrangement of the furnace, the traveling support, and actuating mechanism without departing from my invention.

I claim—

1. A continuous metal-heating furnace having feed-in and feed-out openings at opposite ends and internal supporting-ledges, longitudinal water-cooled supporting-bars within the furnace and extending beyond the feed-in opening, and external connections arranged to raise and lower the bars and move them endwise, the bars being so arranged relative to the ledges that the outer metal pieces are pushed through the feed-out opening as the bars move endwise in raised position to carry the other metal pieces forward; substantially as described.

2. A continuous metal-heating furnace having feed-in and feed-out openings at opposite ends and internal supporting-ledges, longitudinal water-cooled supporting-bars having a cover of refractory non-metallic material within the furnace and extending beyond the feed-in opening, and external connections arranged to raise and lower the bars and move them endwise, the bars being so arranged relative to the ledges that the outer metal pieces are pushed through the feed-out opening as the bars move endwise in raised position to carry the other metal pieces forward; substantially as described.

3. A continuous heating-furnace having feed-in and feed-out openings at opposite ends, ledges in the furnace arranged to support the metal, longitudinal water-cooled bars extending through the furnace, and normally below the ledges, said bars having a portion arranged to push the metal through the feed-out opening, and mechanism for raising and lowering and moving the bars endwise; substantially as described.

4. A continuous heating-furnace having feed-in and feed-out openings at opposite ends, ledges within the furnace upon which the bars normally rest, longitudinal water-cooled bars within the furnace and having refractory covers normally below the level of the ledges, said bars having a portion arranged to push the forward metal piece or pieces through the feed-out opening, and exterior connections for the bars arranged to raise and lower them and move them endwise; substantially as described.

5. A continuous heating-furnace having a feed-in opening at one end, a feed-out opening at the opposite end and in line with the feed-in opening, said feed-out opening having a chute leading to a conveyer, ledges within the furnace arranged to support the metal bars, longitudinal water-cooled bars within the furnace and having refractory covers arranged to substantially fill the space between the ledges, said bars extending beyond the feed-in opening and having an ejecting portion arranged to force the metal through the feed-out opening, and exterior connections arranged to raise and lower the bars and move them endwise; substantially as described.

6. A continuous heating-furnace having a feed-in opening at one end, a feed-out opening at the opposite end and in line with the feed-in opening, said feed-out opening having a chute leading to a conveyer, ledges within the furnace arranged to support the metal bars, longitudinal water-cooled bars within the furnace and having refractory covers normally below the level of the ledges, said bars extending beyond the feed-in opening and having an ejecting portion arranged to force the metal through the feed-out opening, exterior connections arranged to raise and lower the bars and move them endwise, and mechanism for automatically stopping the cycle of movements after the bars are raised, moved forward, lowered and retracted; substantially as described.

In testimony whereof I have hereunto set my hand.

JOSEF HIRSCHMANN.

Witnesses:

C. W. BRAY,

H. M. CORWIN.