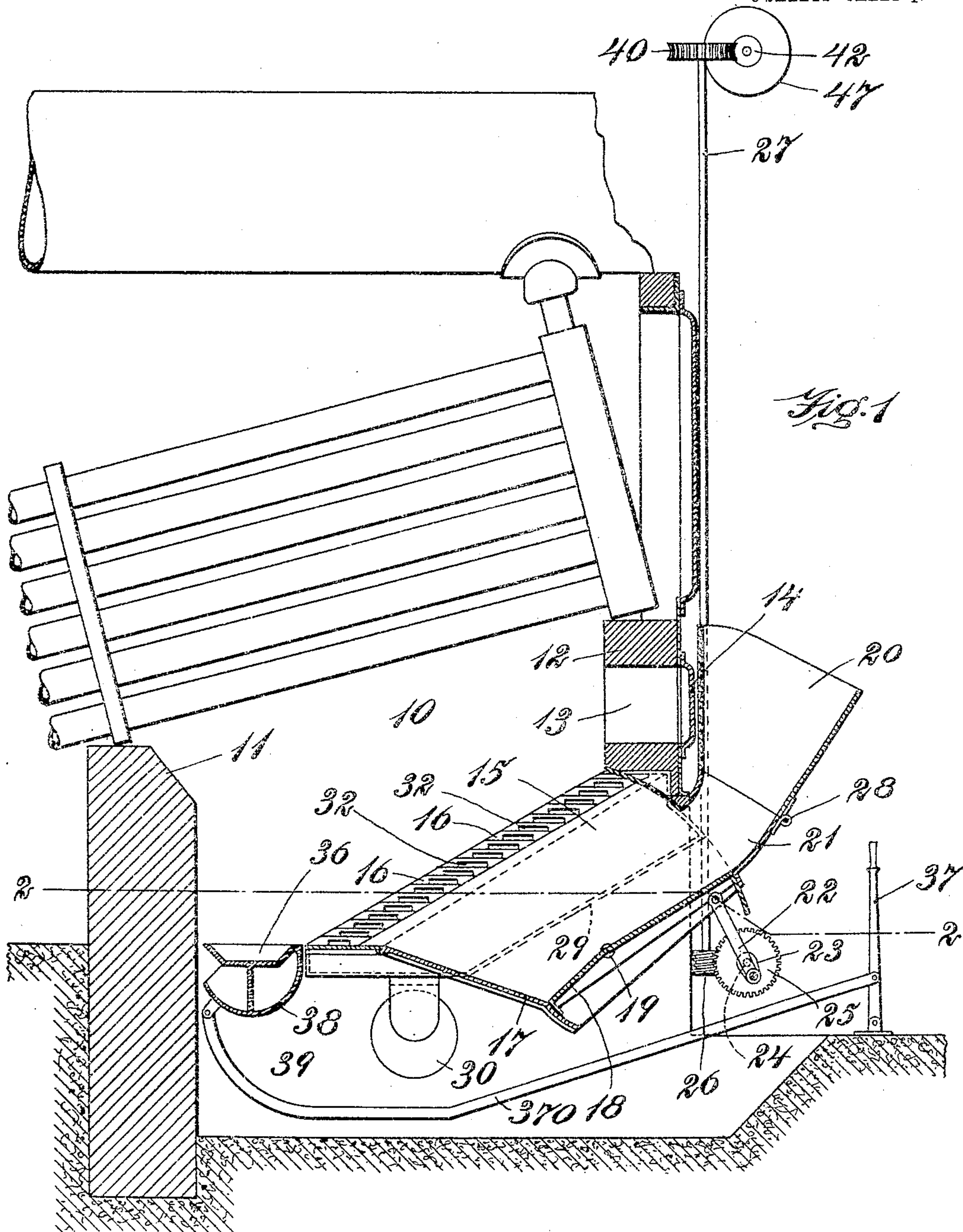


No. 778,812.

PATENTED DEC. 27, 1904.

E. E. TAYLOR.
UNDERFEED STOKER.
APPLICATION FILED DEC. 26, 1903.

3 SHEETS—SHEET 1.



Witnesses:
A. C. Catigan
A. Bullock.

Inventor:
E. E. Taylor,
by *Wright, Brown & Lundy*
Attorneys:

No. 778,812.

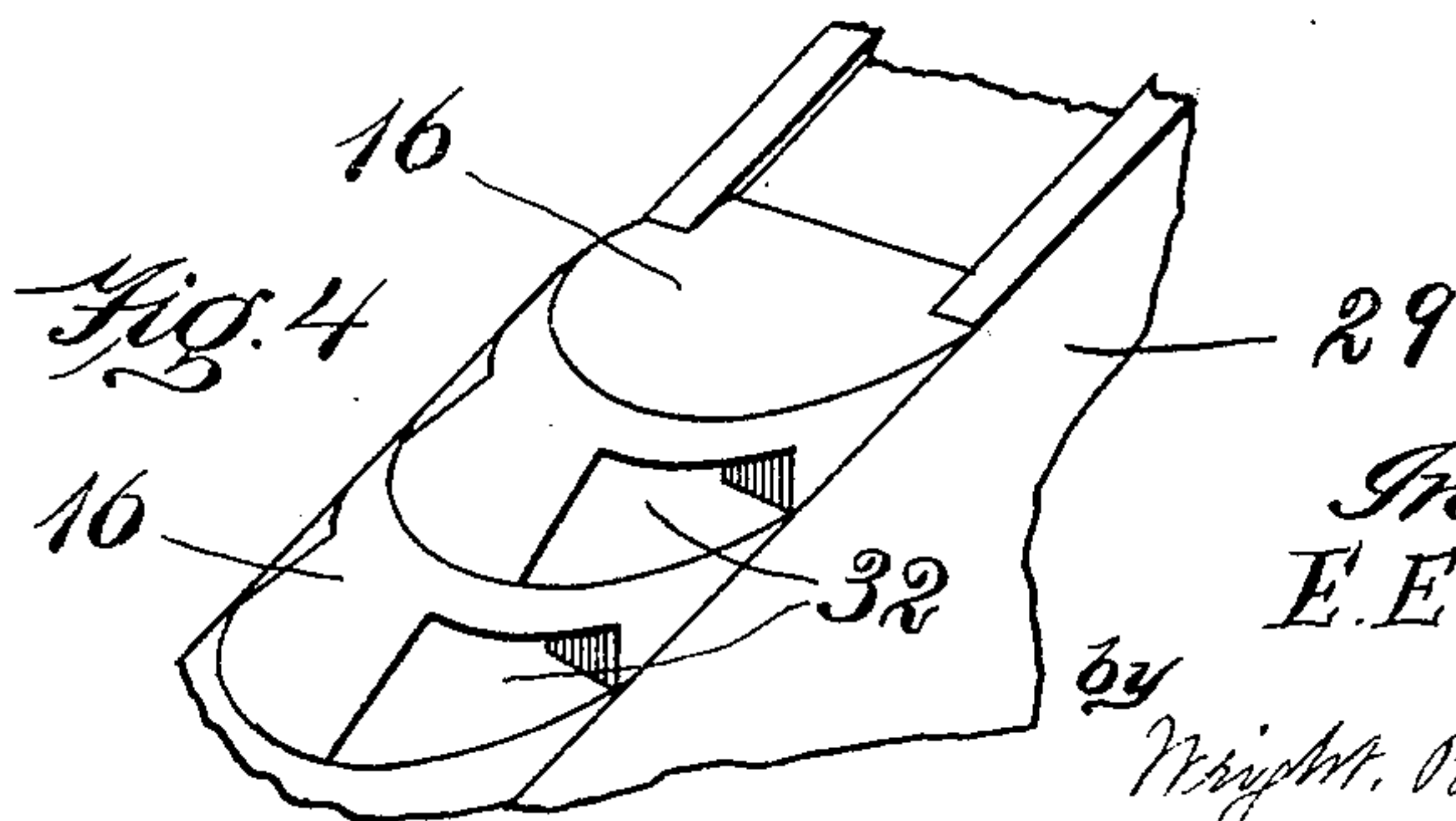
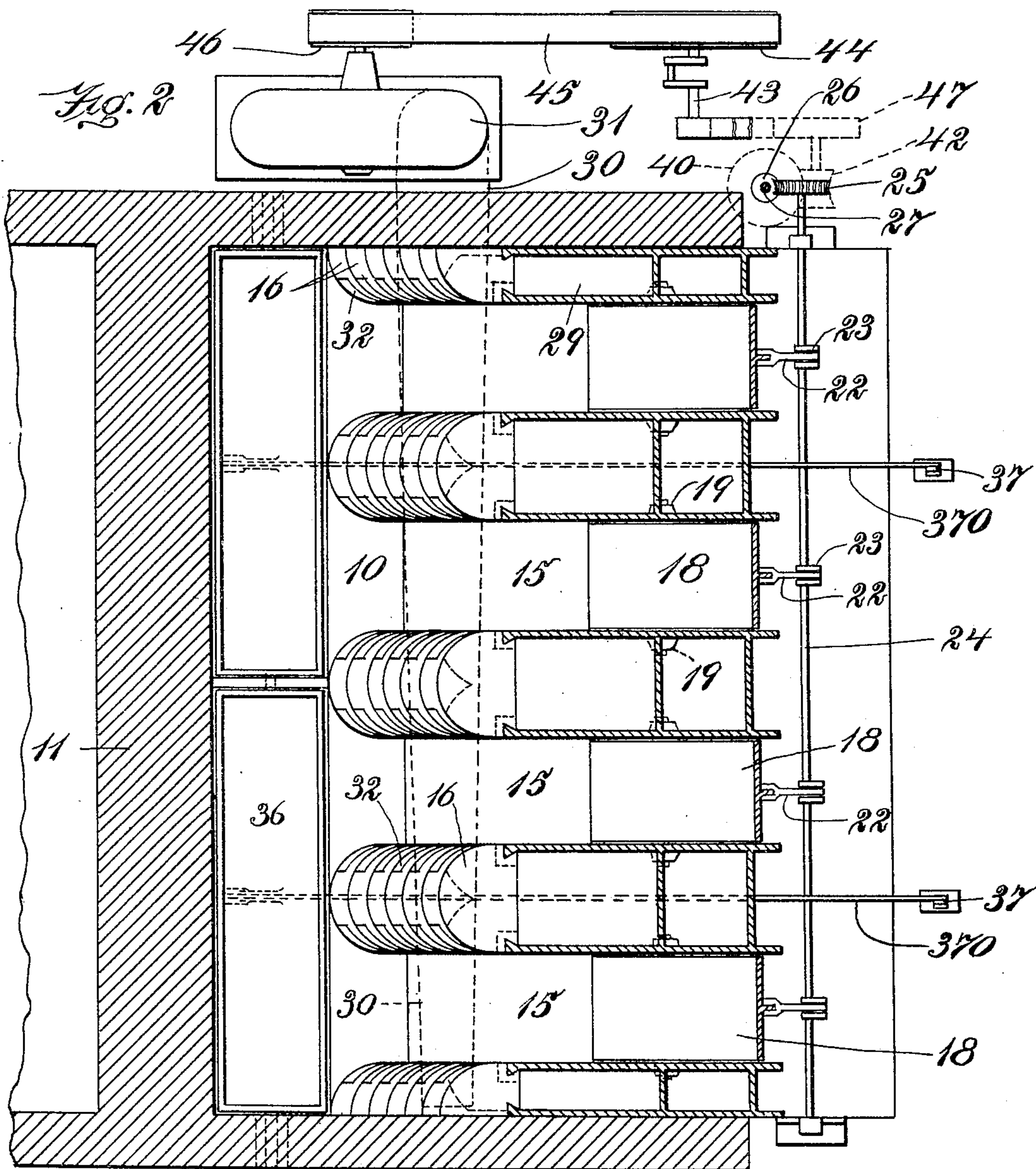
PATENTED DEC. 27, 1904.

E. E. TAYLOR.

UNDERFEED STOKER.

APPLICATION FILED DEC. 26, 1903.

3 SHEETS—SHEET 2.



Witnesses:
A. C. Ratigan
R. Bullock.

Inventor:
E. E. Taylor,

by
Wright, Brown & Quinby
Attorneys.

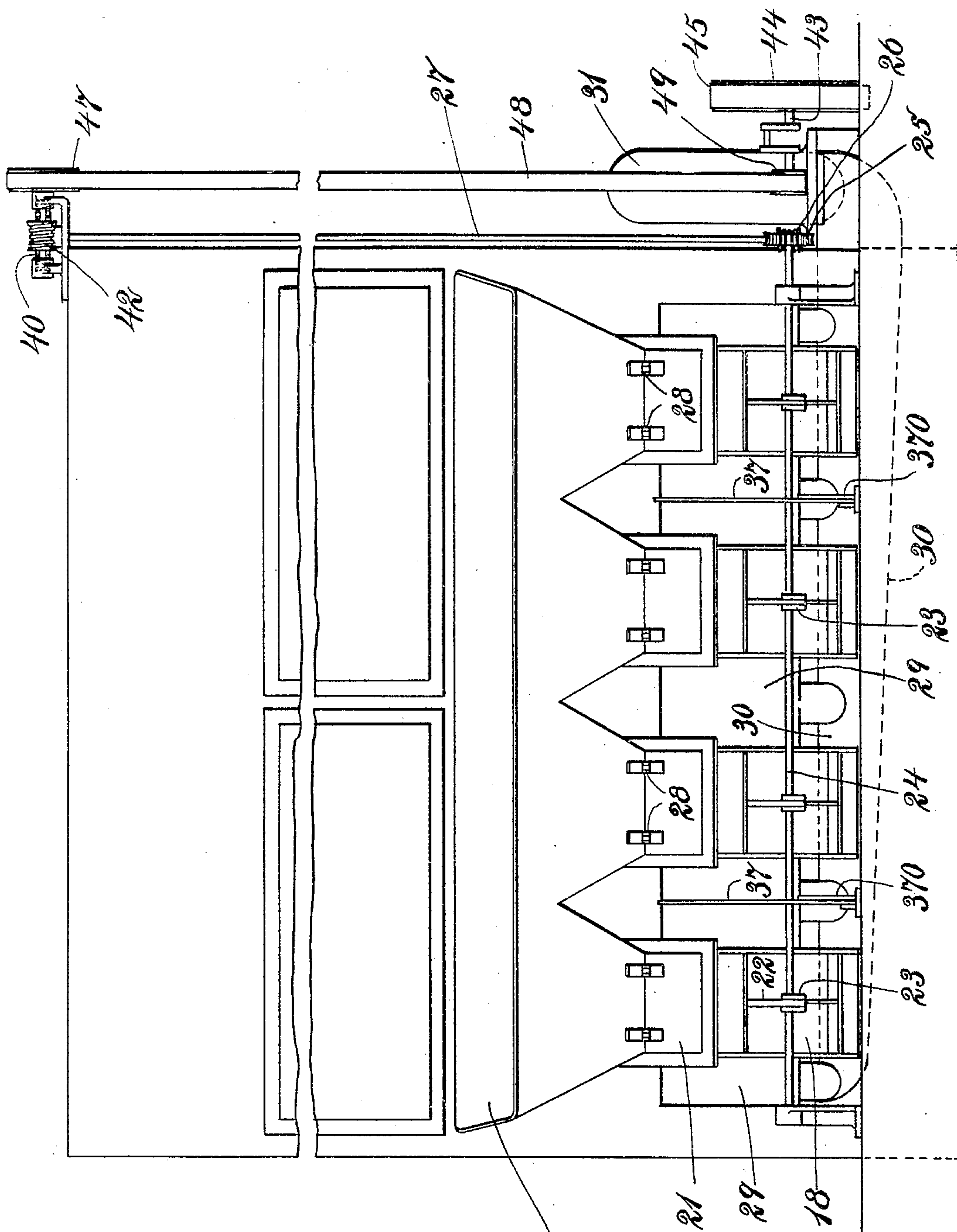
No. 778,812.

PATENTED DEC. 27, 1904.

E. E. TAYLOR.
UNDERFEED STOKER.

APPLICATION FILED DEC. 26, 1903.

3 SHEETS—SHEET 3.



Witnesses:
A. C. Ratigan
R. Gullork.

fig. 3

Inventor:
E. E. Taylor,
by Wright, Brown & Quincy,
Attorneys.

UNITED STATES PATENT OFFICE.

ELWOOD E. TAYLOR, OF BOSTON, MASSACHUSETTS.

UNDERFEED STOKER.

SPECIFICATION forming part of Letters Patent No. 778,812, dated December 27, 1904.

Application filed December 26, 1903. Serial No. 186,526.

To all whom it may concern:

Be it known that I, ELWOOD E. TAYLOR, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and
5 useful Improvements in Underfeed Stokers, of which the following is a specification.

This invention relates to mechanical stokers operating on the underfeed principle; and its
10 objects are to secure certainty and uniformity of action, avoid clogging, decrease the feeding power required, and to simplify and otherwise improve the construction of the stoker, as will more fully hereinafter appear.

In the preferred embodiment herein selected
15 for illustration the stoker is constructed with a series of retorts located side by side in the same lateral zone—that is, occupying successive positions along a zone which extends crosswise of the direction of feed and having
20 sloping mouths longest in an up-and-down direction and inclined sufficiently to effect a gravity-feed of the ash and superficial burning portions of the fuel to the bottom of the incline, where they accumulate upon an adjustable support, which may be inverted to
25 dump the ashes and clinker. Between the retorts and flanking the same are inclined air-boxes receiving compressed air from a fan and provided with renewable twyer-blocks,
30 between which are twyers or air-outlets. The fuel is fed from a hopper onto the back wall of the retort, which is inclined sufficiently to effect a gravity-feed and is pivotally mounted and oscillated by suitable mechanism, so as
35 to feed the fuel outwardly across the plane of the retort-mouth, both ends of the pivoted retort wall or pusher acting to feed the fuel.

Of the accompanying drawings, Figure 1
40 represents a vertical longitudinal section of a furnace provided with my improved stoker. Fig. 2 represents a horizontal section on line 2 2 of Fig. 1 with parts in plan. Fig. 3 represents a front elevation. Fig. 4 represents a detail perspective view illustrating the man-
45 ner of mounting the renewable twyer-blocks.

The same reference characters indicate the same parts in all the figures.

In the drawings, 10 is the furnace-inclosure, 11 the bridge-wall, and 12 the front wall, provided with firing-opening 13 and door 14 for
50 introducing kindling, &c., to start the fire.

15 15 are a series of fuel-feeding retorts longest in an up-and-down direction—that is, parallel to the slopes of their mouths. The sloping plane or imaginary surface including
55 the mouths of these retorts coincides substantially with the location of the twyer-blocks 16, hereinafter referred to, and, as seen in the drawings, it is inclined to the horizontal or ground plane at an angle in the neighborhood
60 of thirty degrees, this angle being insufficient to cause the fuel to slide as an avalanche, but being such an angle as will effect a gravity-feed of the ash and superficial portions of the
65 fuel-bed when the fuel feeds outwardly, as hereinafter described. The lower plate or bottom 17 of each retort is inclined upwardly from front to rear, and the front wall or pusher
18, pivoted at 19 on a horizontal axis, has a general inclination substantially parallel to
70 the plane of the retort-mouth. The fuel is received in a general hopper 20, having branches 21 connecting to the tops of the several retorts and leading onto the pushers 18 thereof. These pushers are oscillated through a small
75 angle by links 22 and cranks 23 on a common shaft 24, the latter having worm-gear 25 meshing with worm 26 on vertical shaft 27. It will be noted that the pusher 18 is pivoted intermediate its ends and has pushing portions
80 both above and below its axis, the upper portion being longer, so as to feed more fuel from above than from underneath. The hopper 20 is normally in front of the fire door or doors
14, but is hinged at 28 on a horizontal axis,
85 so as to swing outwardly and downwardly to give access to said door.

Between the several retorts and flanking the two side ones is a series of inclined air-boxes 29, having a thirty-degree slope and
90 connecting underneath, through suitable branches, with an air-trunk 30, supplied with compressed air by a fan-blower 31. These air-boxes are provided with twyers or air-

outlets 32, directed slantingly across the mouths of the retorts and formed between a series of overlapping twyer-blocks 16. These blocks are removable and renewable, being
 5 secured to the sides of the air-boxes by a dovetail construction, as shown, although other means of securing may be employed.

Extended along the lower ends of the retort-mouths and air-boxes is a dead or unperforated plate 36 to receive the clinker and ashes, said plate being pivoted on a horizontal axis and oscillated by links 370 and levers 37. The plate is formed with a segmental cylindrical lip or apron 38, concentric with
 15 its axis, so that when said plate is turned in an anticlockwise direction to bring its horizontal face vertical and dump the collected ashes into the ash-pit 39 the lower part of the fuel-bed will not drop into the ash-pit. The
 20 ashes may therefore be successfully dumped while the furnace is in operation:

The shaft 27 is represented as connected, through worm-gear 40, worm 42, pulley 47, belt 48, and pulley 49, with the crank-shaft
 25 43 of a motor, said crank-shaft also connecting, through pulley 44, belt 45, and pulley 46, with the shaft of the fan-blower 31. Therefore when the speed of the motor is increased or decreased to vary the feed of the fuel the
 30 speed of the fan-blower is varied accordingly, and the amount of air supplied will therefore correspond to the amount of fuel fed.

In the operation of the stoker the fuel-bodies in the several retorts 15 constitute legs of a single fuel-bed spreading over the mouths
 35 of the retorts, this fuel-bed burning with the incandescent fuel on top and the coking fuel underneath and extending back into the retorts. The fuel-bed receives its support from
 40 the walls of the retorts, and owing to the cohesion and arching property of the coking fuel as it swells during the coking process and is fed outwardly by the retort-pushers the fuel-bed is kept substantially free from the
 45 twyer-faces of the air-box 29 by arching over them, thereby to a large extent protecting the twyer-blocks from burning out. The feed of the ash is a gravity-feed down the slope of the fuel-bed, induced by the outward
 50 feed movement of the fuel across the plane of the retort-mouths. The feed of the green fuel from hopper 20 is an alternation of gravity-feed along the inclined pusher 18 and outward feed produced by said pusher. Arch-
 55 ing of the fuel in the retorts relieves the pressure on those portions of the fuel in contact with the pusher 18 when said pusher retracts, and accordingly a gravity-feed of fuel takes place from the hopper, this fuel being pushed
 60 toward the furnace on the inward stroke of the pusher.

My invention is to be distinguished from those forms of mechanical stokers employing

inclined grates, in which the feed of the green fuel is an overfeed along the slope of the
 65 grate produced by a movement of the grate-bars. In my invention there is no grate or fuel-support, such as employed by an overfeed stoker, the fuel being instead supported from the retorts. The feed of the ash is a
 70 gravity-feed induced by the feed of the green fuel, and the feed of the green fuel is a combined gravity-feed and positive pusher-produced feed.

I claim—

1. An underfeed mechanical stoker comprising a retort having a sloping mouth longest in a direction up and down the slope thereof and inclined sufficiently to effect a gravity-feed of the ash lengthwise thereof, and means
 80 for feeding the fuel through said retort from the front thereof across the plane of said mouth.

2. An underfeed mechanical stoker comprising a retort having a sloping mouth longest in a direction up and down the slope thereof and inclined sufficiently to effect a gravity-feed of the ash lengthwise thereof, air-feeding conduits provided with outlets distributed
 90 along the two sides of said mouth in the same lateral zone, air-propelling means connected with said conduits, and means for feeding the fuel through said retort from the front to the mouth thereof.

3. An underfeed mechanical stoker comprising a plurality of retorts arranged side by side in the same lateral zone and adapted to support a single fuel-bed, air-supplying means at the sides of the several retorts, and means to feed fuel through said retorts, said
 100 retorts and air-supplying means alternating in a horizontal direction.

4. An underfeed mechanical stoker comprising a retort having a movable front wall sufficiently inclined to effect a gravity-feed of
 105 fuel therealong, said retort being longest in a direction up and down the slope of said front wall, and means to reciprocate said movable wall.

5. An underfeed mechanical stoker comprising a series of air-outlets, means for forming an arch of fuel over said air-outlets, and means for renewing said arch from the legs thereof, said devices having a substantial
 115 slope longitudinally of the arch for the purpose specified.

6. An underfeed mechanical stoker comprising a retort, a pivoted pusher forming a wall thereof and inclined sufficiently to effect a gravity-feed of the fuel, and means to oscillate said pusher.
 120

7. An underfeed mechanical stoker comprising a retort, a pusher therefor pivoted intermediate its ends and having a pusher portion on each side of its pivotal axis, and means
 125 to oscillate said pusher.

8. An underfeed mechanical stoker comprising a retort, and an inclined pusher there-
for pivoted intermediate its ends on a sub-
stantially horizontal axis and having its larger
5 pushing portion above said axis and its smaller
pushing portion below the same, and means
to oscillate said pusher.

In testimony whereof I have affixed my signature in presence of two witnesses.

ELWOOD E. TAYLOR.

Witnesses:

R. M. PIERSON,
A. C. RATIGAN.