

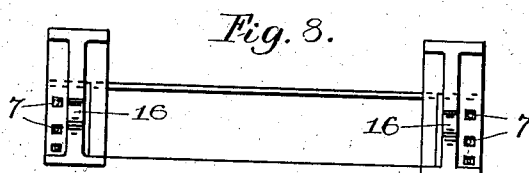
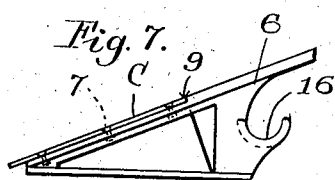
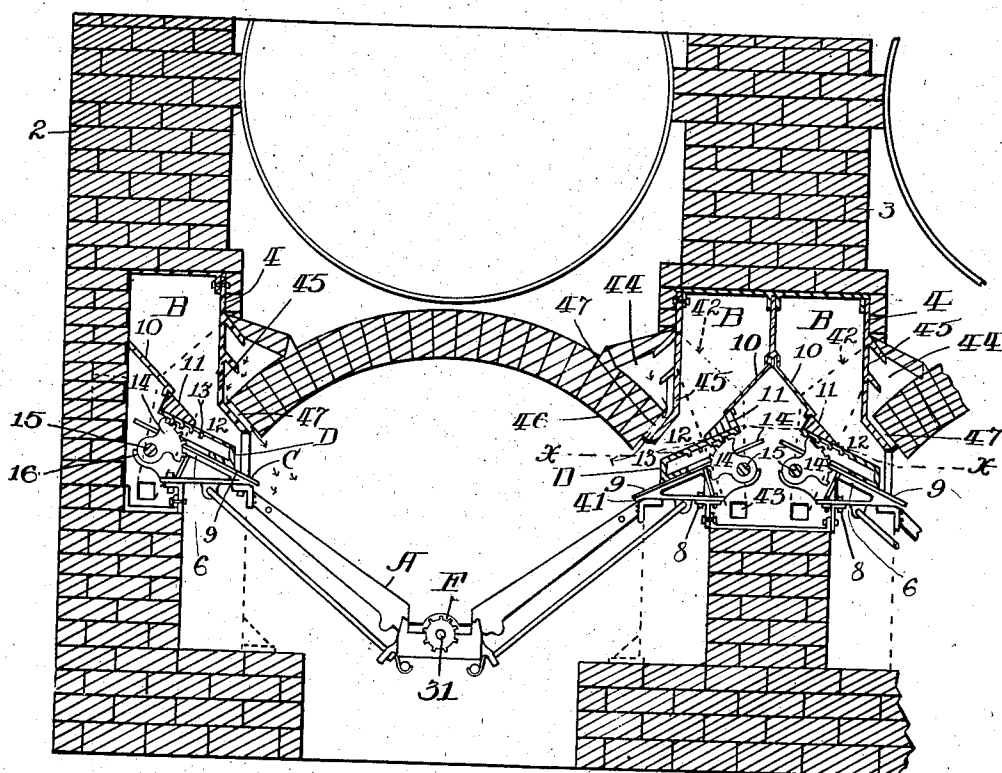
No. 827,146.

PATENTED JULY 31, 1906.

W. I. ELY.
SELF FEEDING FURNACE.
APPLICATION FILED NOV. 23, 1904.

3 SHEETS—SHEET 1.

Fig. 1.



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E. M. Boul

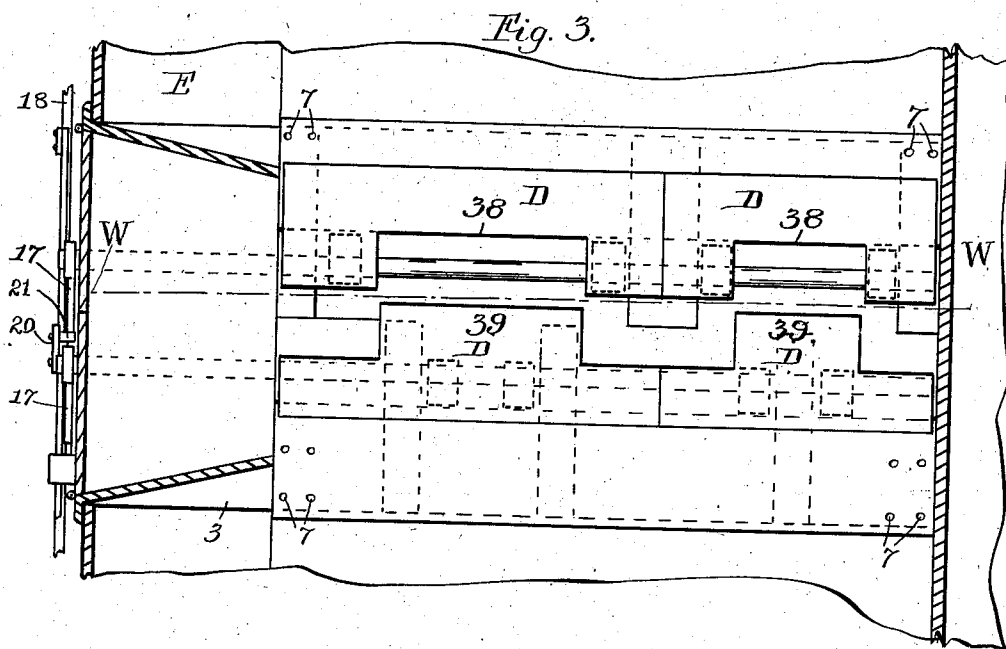
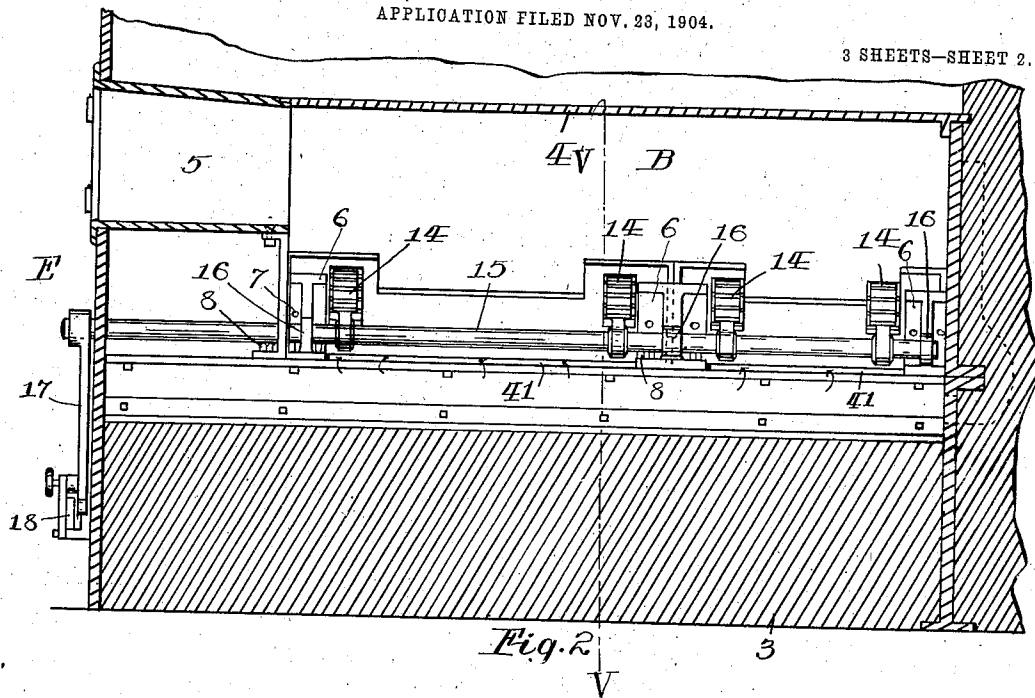
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3 SHEETS—SHEET 2.



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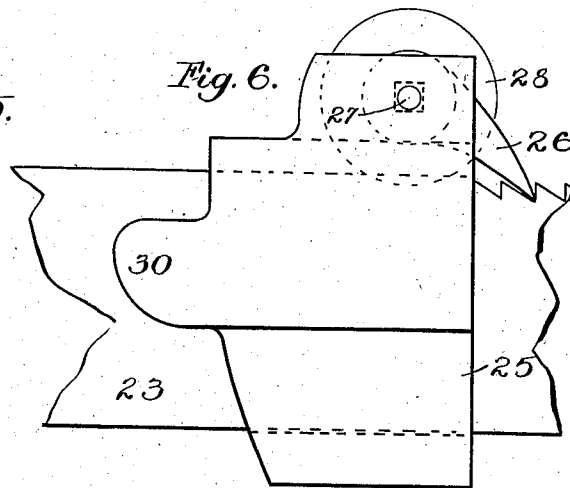
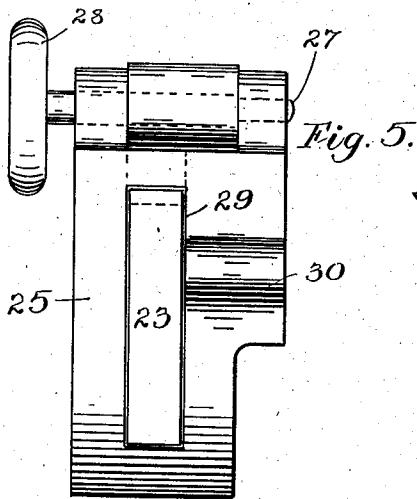
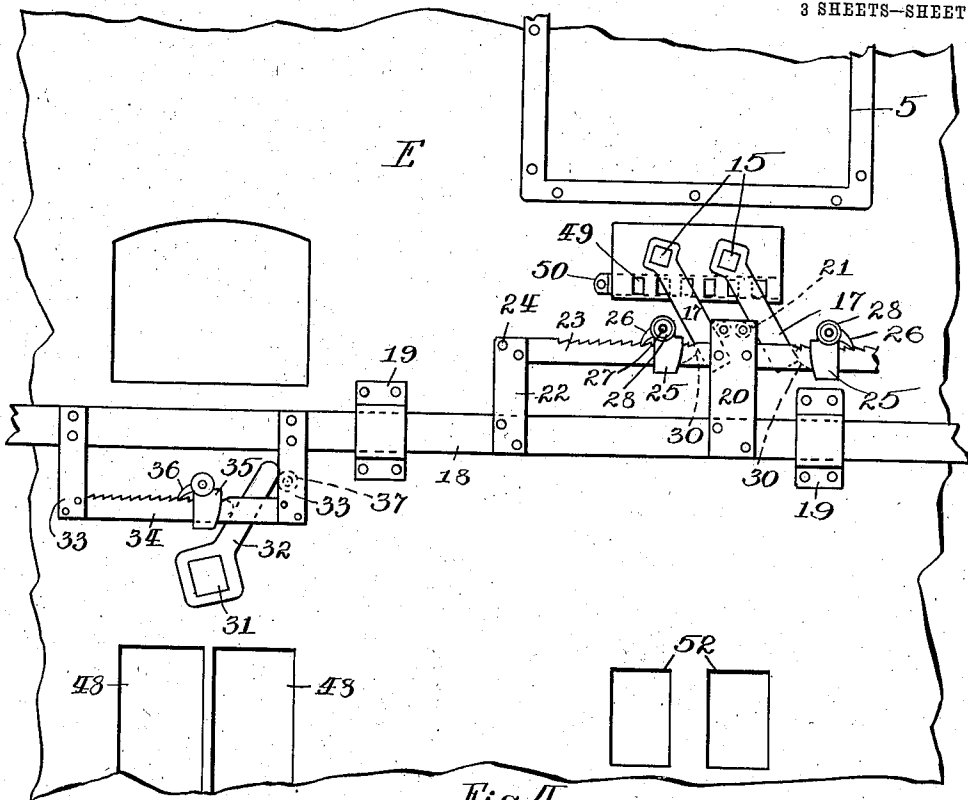
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3 SHEETS--SHEET 3.



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UNITED STATES PATENT OFFICE.

WILLIAM I. ELY, OF ST. PAUL, MINNESOTA.

SELF-FEEDING FURNACE.

No. 827,146.

Specification of Letters Patent.

Patented July 31, 1906.

Application filed November 23, 1904. Serial No. 233,976.

To all whom it may concern:

Be it known that I, WILLIAM I. ELY, a citizen of the United States, residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented a new and useful Self-Feeding Furnace, of which the following is a specification.

My invention relates to improvements in self-feeding furnaces, and particularly, though not exclusively, to that class in which the grate-bars are arranged in two rows on the opposite sides of the furnace-chamber and inclined downwardly toward the center, the fuel being introduced at the top and fed toward the middle, said class of furnace being usually provided with a device for mechanically removing the clinkers.

The object of my invention is to adjust the parts of the working mechanism and to improve the means for feeding the fuel and introducing air into the furnace.

Further, my invention contemplates improved features of construction and combinations of parts, hereinafter more particularly described and claimed.

In the accompanying drawings, forming part of this specification, Figure 1 is a front view in section of my invention, taken on the line V V of Fig. 2. Fig. 2 is a longitudinal section in elevation taken on the line W W of Fig. 3. Fig. 3 is a detail sectional plan view taken on the line x x of Fig. 1. Fig. 4 is a detail front view showing the adjusting mechanism for regulating the feed and movement of the clinker-bar. Figs. 5 and 6 are detail views showing part of the adjusting mechanism, and Figs. 7 and 8 are detail views of the coking-plate.

In the drawings, A represents the grate, made in two sections inclining toward the center and forming substantially a V-shaped grate, which is fed from magazines B in the side walls 2 and 3 by means of the stokers D. The fuel delivered by these stokers D advances over the grates, and the cinders collect in the interval between the two grate-sections, whence they may be easily removed by means of the clinker-bar F. Each magazine has a frame 4 in the side walls, said walls having passage-ways or openings 5, which communicate with the front of the furnace. The coal-magazines extend alongside and the whole length of the combustion-chamber and are provided with coking-plates C, detachably fastened to the supports 6 by means of the bolts 7. These coking-plate supports

are of skeleton form and fastened, by means of bolts 8, to the bottom of the coal-magazines. The coking-plates and their supports have surfaces 9, which are inclined toward the grate-bars in the furnace. The coal-magazines are provided with division-plates 10 and guides 11 for the stokers. These division-plates and guides are also inclined toward the grate-bars in the furnace and with the surfaces 9 and the walls of the magazine form passage-ways 12, in which the stokers oscillate to pass the coal onto the grate. The stokers are adjustably operated by the following parts:

Each stoker is provided with teeth 13, with which the toothed segments 14 engage to oscillate said stoker. The toothed segments are mounted on shafts 15, which rest in the bearing-cups 16, formed in the coking-plate supports 6. These shafts are longitudinally disposed, pass through the front wall E of the furnace, and are provided with lever-arms 17 on their ends.

A rack-bar 18, sliding in the bearings 19 on the front of the furnace, is connected with any suitable source of power, such as a steam-engine, (not shown,) to reciprocate the same, and this bar carries an upright 20, provided with the inwardly-projecting lugs 21. Vertical supports 22 are also carried by the rack-bar, and a horizontal toothed bar 23 is held in position on the vertical supports 20 and 22 by means of bolts 24. An adjusting device 25 is placed on the toothed bar 23 on each side of the pair of levers and engages the teeth on the rack-bar by means of the dog 26, mounted upon the shaft 27, which is provided with the handle 28. This adjustable connecting device has an opening 29, through which the rack-bar passes, and is formed with a lug 30 on its inner side. The levers 17 are engaged by the lugs 21 and 30 as the rack-bar 18 oscillates to turn the shafts 15 and feed the coal from the magazine into the furnace. By turning the handles 28 and lifting the dogs 26 the connections between the rack-bar and shafts may be adjusted, and the travel of the stokers D is thus regulated as desired. Substantially the same construction is shown for adjusting the movement of the clinker-bar F, which is between the lower ends of the grate-bars and carried by the shaft 31. An auxiliary rack-bar 34 is supported by depending arms 33 on the bar 18. An adjusting device 35, similar in construction to the adjusting devices 25 above described,

has a dog 36, which is adapted to engage the teeth on the bar 34. The lug on the back of the adjusting device 35 and the lug 37 on the back of one of the depending supports 33, as shown, are adapted to engage the lever 32 and operatively connect with the shaft 31 as the rack-bar 18 reciprocates. By moving the device 35 on the toothed bar 34 the motion of the clinker-bar may be adjusted.

Where the furnaces are double, a single wall between furnaces of each pair is preferably used, and the stokers and their corresponding coal-magazines are double, as shown in the drawings. In this arrangement of furnaces that portion of each stoker farthest from the fire-box has strips cut away to form openings or passage-ways 38 and leave tongues 39. These tongues 39 on one stoker are positioned to alternate with those on the other. In other words, the tongues on one stoker correspond with the openings cut away in the second stoker, so that said tongues on one may pass without contact between those on the other if by chance both stokers reach the upper ends of their respective strokes concurrently. This construction is shown in Fig. 3.

Air is admitted into the furnace through the openings 48 below the grate-bars and the draft passage-ways, which are regulated by the damper 50 on the front of the furnace, to circulate freely around the working parts of the stokers, and another current of air enters through the door 52 and openings 41, the latter being below the coking-plates and above the grate-bars for the purpose of keeping the coking-plates cool and aiding combustion. A passage-way 42, leading from the ports 43 below the stokers, communicates with the space 44 between the sides 47 of the magazines and the archway 46 above the furnace and ultimately leads through the exit 47 into the furnace to cool the contiguous parts and also to assist in the combustion of coal.

Having described my invention, what I claim as new, and desire to protect by Letters Patent, is—

1. A furnace having a grate, a stoker, a movable clinker-bar and a coking-plate, two independent means, each consisting of a ratchet and pawl, for regulating, respectively, the stroke of the stoker and the movement of said clinker-bar, and an air-inlet above the furnace-grate and below the coking-plate.

2. A double furnace having two oppositely-inclined coking-plates arranged between the combustion-chambers thereof and with their upper sides adjacent to each other, in combination with a pair of reciprocating stokers, each resting upon one of said coking-

plates and adapted to travel thereon, said stokers being provided on their adjacent sides with spaced tongues, the tongues of one being adapted to pass freely between those of the other to permit the stokers to reach the upper ends of their respective strokes concurrently.

3. In a double furnace, the combination of V-shaped grates formed by inclined bars, a coal-magazine provided with two outlets above said grates and between the combustion-chambers, inclined, reciprocating stokers, whose lines of travel overlap beneath said magazine, said stokers being formed with alternately-arranged tongues adjacent to said magazine, the tongues on one stoker being adapted to pass freely between those on the other when they meet, and means for reciprocating the stokers and for regulating the strokes thereof.

4. A side-feed furnace, comprising a plurality of combustion-chambers provided with V-shaped grates, two oppositely-inclined coking-plates, with their upper sides adjacent, between the combustion-chambers, reciprocating stokers adapted to travel one above each coking-plate and overlap when at the upper extremities of their strokes, said stokers having portions of their upper sides cut away so that the adjacent stokers may reach the upper ends of their respective strokes concurrently without collision, and adjustable means for regulating the stroke of the stokers.

5. A furnace having a reciprocating stoker, a movable clinker-bar and two independent means, each consisting of a ratchet and pawl, for regulating, respectively, the stroke of the stoker and the movement of the clinker-bar.

6. A furnace having two grates downwardly inclined toward each other, a movable clinker-bar between the lower ends of said grates, coal-magazines, above said grate, in the walls of said furnace and having outlet passage-ways into the combustion-chamber, coking-plates at the bottom of said outlet passage-ways, stokers adapted to reciprocate in said passage-ways, actuating mechanism for operating said stokers and clinker-bar, and separate means for independently adjusting the travel of said stokers and the movement of the clinker-bar.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM I. ELY.

Witnesses:

E. M. BOESEL,
W. H. WILLIAMS.