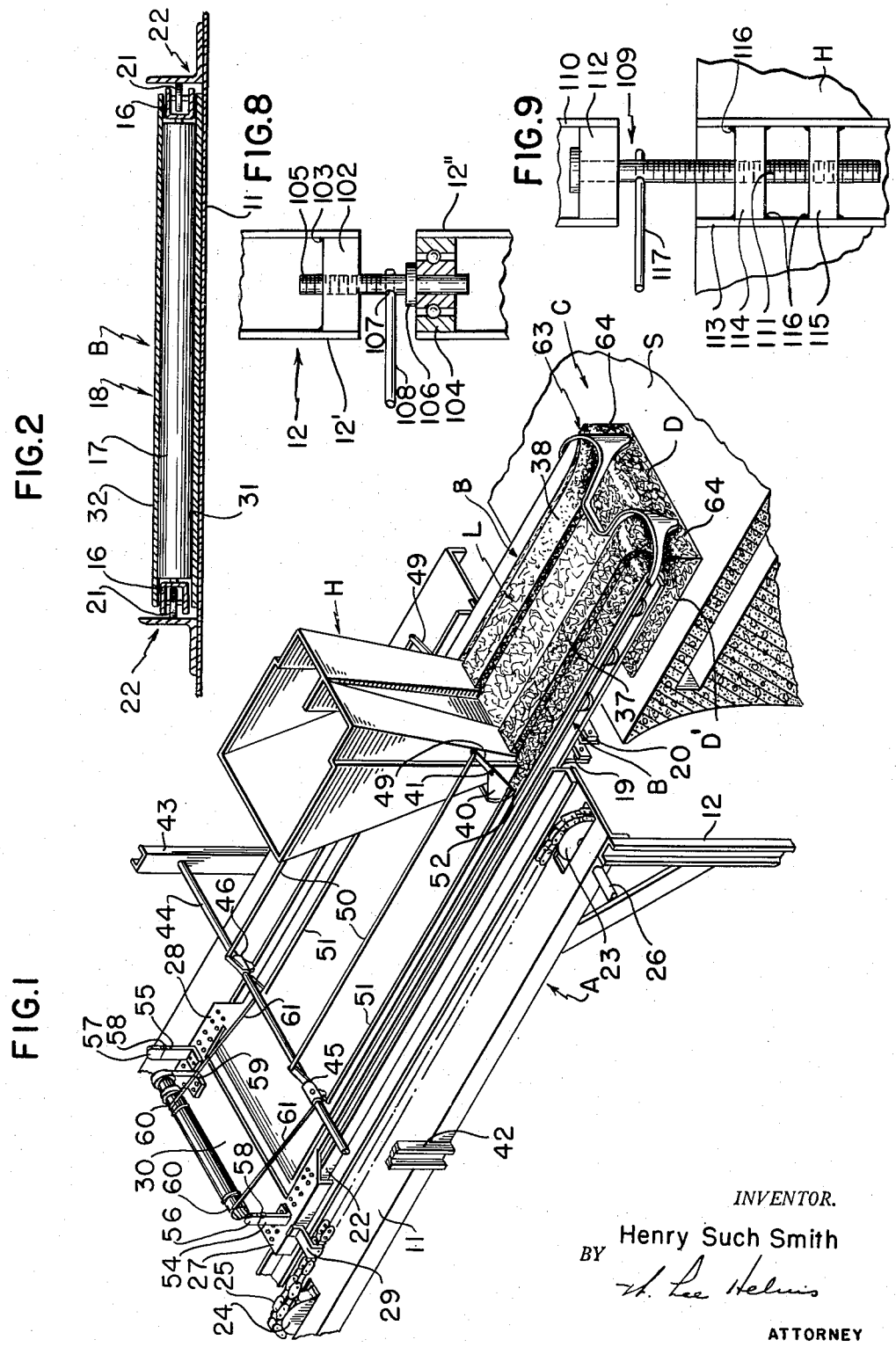
Aug. 25, 1953 H. S. SMITH 2,649,978

BELT CHARGING APPARATUS

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BELT CHARGING APPARATUS

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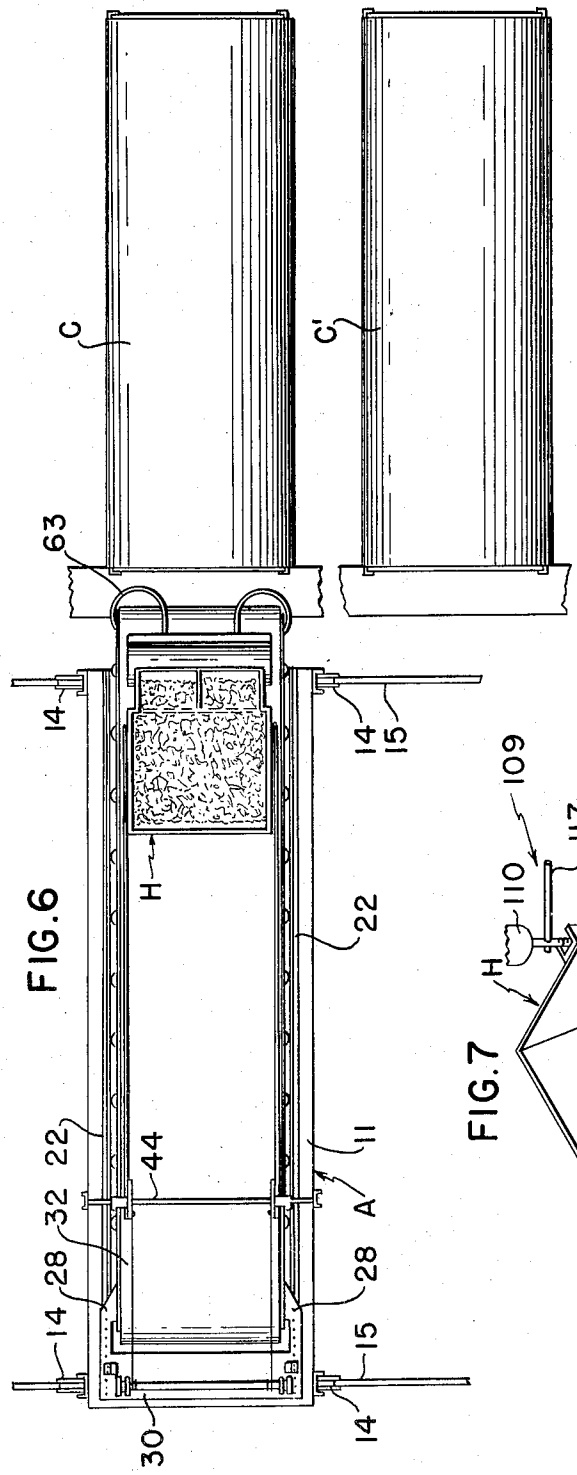


FIG.6

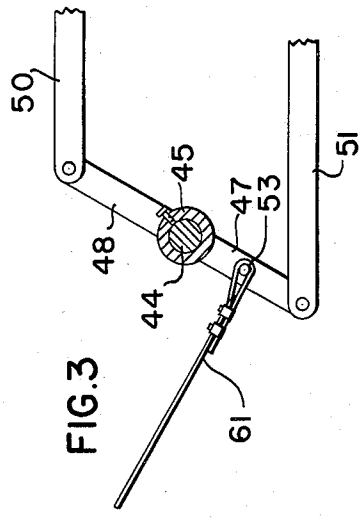


FIG.3

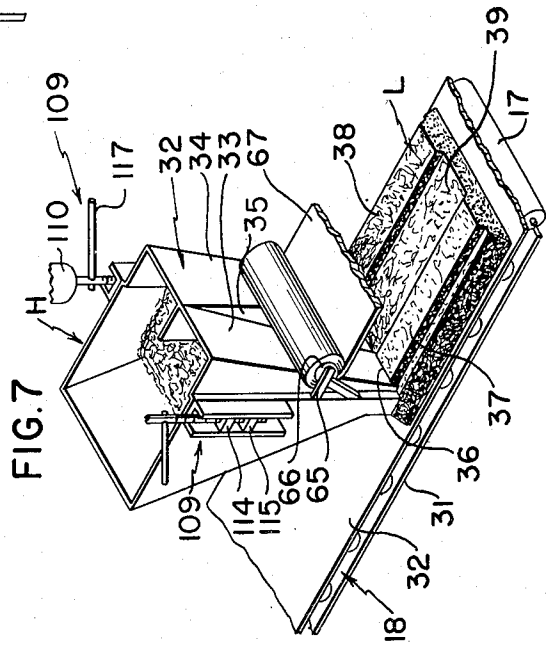


FIG.7

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FIG. 4

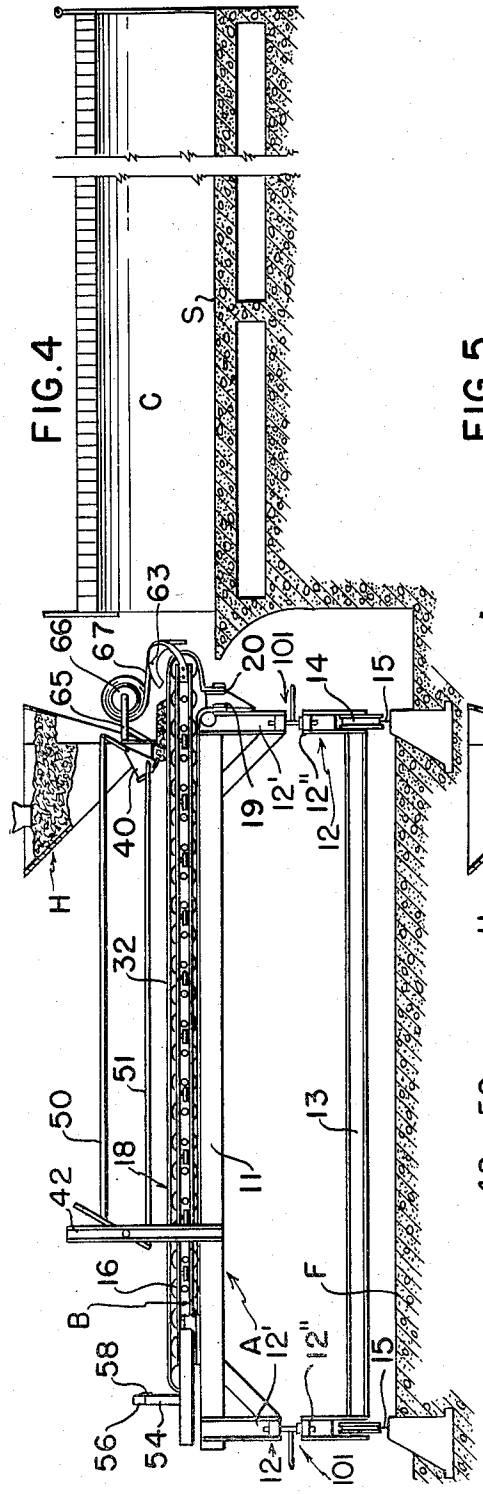
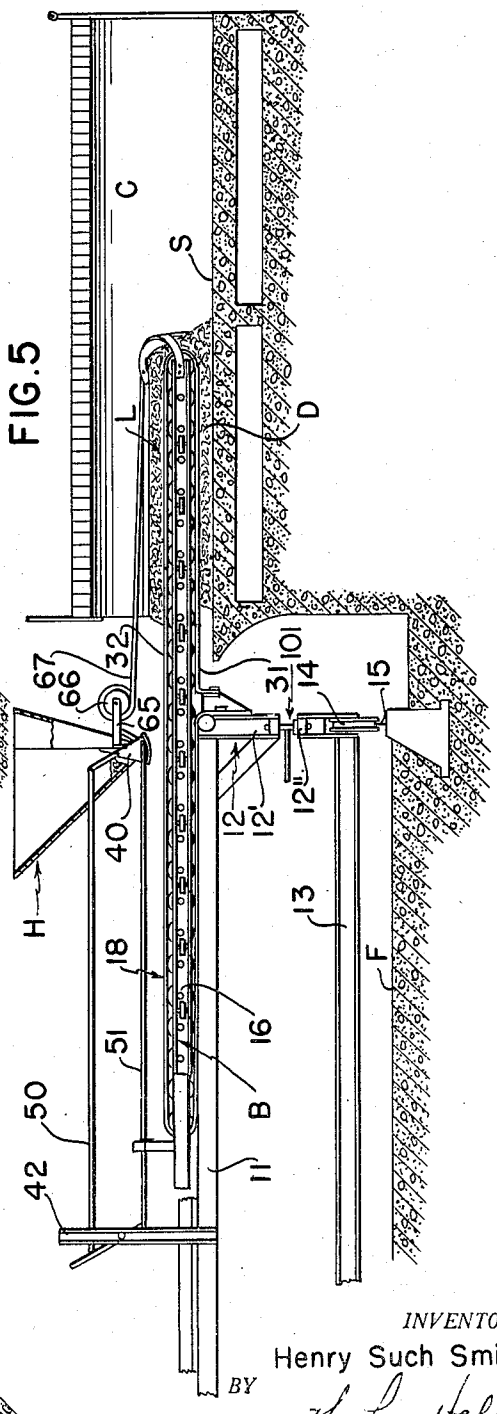


FIG. 5



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Patented Aug. 25, 1953

2,649,978

UNITED STATES PATENT OFFICE

2,649,978

BELT CHARGING APPARATUS

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Application October 7, 1950, Serial No. 188,959

4 Claims. (Cl. 214—26)

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This invention relates to a belt charging apparatus, and more particularly, to a device having a substantially continuous endless conveyor belt adapted to deposit an even layer of coal, coke or other solid material on the fuel bed of a furnace, oven, or similar enclosure.

In the present state of the art of charging ovens with coal or other solid fuel, there are many varied types of charging apparatus all of which involve serious disadvantages. A major defect of conventional charging devices resides in their complicated structures involving heavy cantilever devices and moving mechanical parts which increase the initial cost of the apparatus. Furthermore, the mechanical moving parts of these prior art devices present difficulties in that they are operated within the high temperature areas within the furnaces and hence must be constructed of expensive heat resistant metal.

Notwithstanding the expensive metals used in these moving mechanical parts, considerable wear and breakdown frequently occur due to the severe operating conditions of high temperature and stress existing within the furnaces. Although some prior art charging devices have been constructed without cantilevers for projecting the fuel conveying elements into the furnaces, these devices usually require bearing surfaces within the furnaces for slidably mounting the fuel conveying elements, resulting in considerable wear on the furnace lining or other parts which provide the slidable bearing surfaces.

Another major disadvantage in the prior art of charging devices resides in the inability to deposit on the fuel bed a uniform evenly-distributed layer of fuel of a predetermined depth for covering the entire area of the fuel bed. Furthermore, it has hitherto not been possible to provide a charging apparatus capable of rapid one-cycle charging of a considerable weight of fuel without resorting to an extremely complicated heavy mechanical structure, both expensive in initial cost and upkeep.

It is a primary object of the present invention to provide a radically novel fuel charging apparatus which obviates the above noted disadvantages heretofore present in prior art structures. Briefly described, the charging apparatus of the present invention comprises a frame having a plurality of rotatably mounted rollers around which a substantially continuous endless belt extends. The belt acts as a "caterpillar" tread so as to provide for locomotion of the frame into the interior of a furnace and along the top surface of the furnace fuel bed. As the frame

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caterpillars on the belt inwardly toward the interior of the furnace a hopper deposits an even layer of coal, coke, or other solid fuel on the upper run of the belt.

During the advancing movement of the frame the upper run of the belt also advances forwardly whereby the layer of fuel will discharge over the forward end of the belt and on to the fuel bed in the form of an even layer immediately in advance of the moving frame. As the latter continues to advance, the lower run of the belt will rest upon and "caterpillar" along the deposited layer of fuel so as to support the frame on the fuel bed, thereby eliminating all necessity for cantilevers or other structures for supporting the frame within the interior of the furnace. Furthermore, the layer of coal on the upper run of the belt and also the layer of coal deposited on top of the fuel bed and upon which the lower run of the belt rests, will both serve to protect the belt and frame from the extreme heat within the interior of the furnace, thereby obviating the necessity for utilizing expensive heat resistant materials and extending the operating life of the structure.

It is to be understood that the specific embodiment of the invention disclosed in the drawing and this specification is merely illustrative of one of the many forms which the invention may take in practice. Many modifications may be made in the disclosed structure without departing from the scope of the invention as set forth in the appended claims. For instance, the invention is shown as applied to the charging of a furnace with coke or coal. However, it is contemplated that enclosures other than furnaces may be charged with solid material other than fuel by means of charging apparatus embodying the present invention, and it is to be understood that the terms "fuel," "coal," "coke," "furnace," "oven," and similar terms, as used throughout the specification and claims, are intended to be generic so as to include other solid charging materials and other types of apparatus to be charged.

Another object of the invention is to provide a charging apparatus requiring very little headroom. In the present invention all the headroom required is merely a height equal to double the thickness of fuel layer to be deposited plus from four to eight inches for the diameter of the rollers and the upper and lower runs of the belt.

A further object of the invention is to provide a heat resistant roller curtain that covers the up-

per run of the belt so as to protect the layer of fuel from wind loss during the advance of the frame into the furnace and also to protect the belt from heat on retraction of the frame outwardly of the furnace.

Another object is to provide a novel means for depositing on the upper run of the belt a layer of fuel of uniform cross-section throughout its length and including a hopper automatically closed and opened at a predetermined rate in proportion to the speed of the belt.

A further object is to provide a mold-board means at the forward end of the frame so as to provide that the fuel will be discharged over the forward end of the belt in a wide even layer over the surface of the fuel bed and extending from side to side of the furnace.

Other advantages of the present invention are inherent in the structure as claimed and disclosed and will appear in the detailed description below and in the drawings wherein:

Fig. 1 is a perspective view of the belt charging apparatus of the present invention and showing the frame and belt advancing within the interior of the furnace, the latter being broken away for purposes of better illustration;

Fig. 2 is a transverse sectional view through the axis of one of the rollers;

Fig. 3 is a detail view of part of the mechanism for opening and closing the hopper at a rate in proportion to the speed of the belt;

Fig. 4 is a side elevational view of the apparatus showing the general arrangement of the wheeled platform on which the frame is mounted and also a sectional view of the furnace or oven;

Fig. 5 is a side elevational view similar to Fig. 4 but showing the frame advancing inwardly within the interior of the furnace so as to deposit a layer of fuel or other charge on the fuel bed;

Fig. 6 is a plan view of the apparatus shown in Fig. 4 and including a second furnace to illustrate how the wheeled platform may be moved so as to charge successively a series of aligned furnaces extending parallel to the tracks on which the platform is wheeled;

Fig. 7 is a partial perspective view, somewhat schematic, showing the configuration of the hopper for forming ridges along the longitudinal edges of the layer of fuel on the upper run of the belt, and also the heat resistant roller curtain rotatably mounted on the exterior of the hopper;

Fig. 8 is a detail view showing the mechanism for varying the lengths of the legs 12 of the platform and hence for adjusting the height of the platform with respect to the fuel bed of the furnace; and

Fig. 9 is a detail view of the mechanism for adjusting the height of the hopper with respect to the upper run of the belt so as to control the height or thickness of the layer of fuel deposited on the belt and on the fuel bed of the furnace.

Referring first to Fig. 1, the invention comprises generally a platform A having a flat horizontal upper surface on which a frame B is adapted to ride or "caterpillar" by means of a plurality of rollers and a substantially continuous endless belt extending around the rollers. A hopper H is adapted to deposit an even layer of coke, coal or other solid charging material on the upper run of the continuous belt. As the frame B moves forwardly from the forward end of the platform A and enters the furnace C, the layer of fuel on the upper run of the belt is moved forwardly over the forward end of the belt so as

to discharge on the fuel bed of the furnace C in front of the advancing frame. The discharged layer is deposited on the surface of the fuel bed in the form of an even layer of freshly charged fuel. The frame B is supported on the fuel bed of the furnace C since the lower run of the belt rests upon and "caterpillars" along the freshly deposited layer of fuel discharged over the forward end of the belt in the path of the advancing frame.

In more detail, the platform A comprises a flat horizontal plate 11 mounted on the upper ends of a plurality of vertical legs 12, as best seen in Fig. 4. Transverse brace members 13 may be secured to the lower ends of the legs 12 so as to lend strength and rigidity to the platform structure. A plurality of wheels 14 are rotatably mounted on the legs 12 of the platform A and are adapted to ride on tracks 15 extending along the floor F, whereby the entire platform A may be wheeled in a direction perpendicular of the plane of Fig. 4. As best seen in the plan view shown in Fig. 6, a series of furnaces C, C' are arranged parallel to the tracks 15 so as to enable the platform A to be wheeled successively in alignment with the charging door of each of the furnaces C, C' so as to charge the furnaces in succession.

As best seen in Figs. 2 and 4, the frame B comprises two parallel longitudinal side members 16 of U-shaped or channel configuration. A plurality of rollers 17 extend between and are rotatably mounted to the members 16 for rotation about horizontal axes transverse to the direction of movement of the frame B. A substantially continuous endless conveyor belt 18 is mounted around the rollers 17. It is to be understood that the terms "continuous" and "endless" as applied to the belt 18 are not to be interpreted strictly since in the preferred form of the invention shown in the drawings, the belt 18 is segmented and provided with two adjacent ends 19, 20 fixedly secured to the platform A, as best seen in Figs. 1 and 4. It will become obvious as the description of the mode of operation of the subject invention proceeds that this arrangement is equivalent to that of a completely continuous endless belt having a portion thereof fixedly secured with respect to the platform A. Therefore the terms "substantially continuous" and "endless" have been employed throughout the specification and claims for want of a more descriptive and accurate term.

As shown in Fig. 2, a plurality of discs or bearing members 21 are rotatably mounted between the flanges of the members 16 for rotation about vertical axes. A pair of L-shaped longitudinally-extending brackets or guide members 22 are secured on the upper surface of the plate 11 of the platform A along both sides of the frame B and engage the peripheries of the bearing members 21 so as to guide the forward and rearward reciprocal movement of the frame B.

Referring now to Fig. 1, a pair of sprocket wheels 23, 24 are rotatably mounted within suitable openings in the plate 11 of the platform A. The wheels 23, 24 have a conventional drive chain 25 extending therearound and in driving engagement therewith. Sprocket wheel 23 is provided with a shaft 26 adapted to be drivingly rotated by any suitable means (not shown). A pair of inverted U-shaped channel members 27, 28 are provided at the rear of the frame B, each being secured to one of the longitudinal members 16 and extending over and around the upstanding leg

of the respective bracket 22. A bracket 29 is secured at one end to the chain 25 and at the opposite end to the U-shaped member 27. A transverse brace member 30 extends between the U-shaped members 27, 28 and is secured thereto at its opposite ends.

It will thus be seen that as the drive shaft 26 is drivingly rotated, the chain 25 will be actuated so as to move bracket 29, flange members 27, 28, longitudinal members 16, and hence the entire frame B, along with the chain 25. Since the forward portion of the lower run 31 of the belt 18 is provided with ends 19, 20 fixedly secured with respect to the platform A, it will be seen that when the drive shaft 26 is rotated so as to move the frame B to the right as viewed in Fig. 1, the rollers 17 of the frame B will roll forwardly along the lower run 31 and the upper run 32 will also move forwardly and around the forward end of the belt 18 so as to become part of or continuous with the lower run 31.

That is, when the chain drive moves the frame B, the latter will undergo a caterpillar-like movement with the belt 18 acting as the Caterpillar tread. It should be understood that the same effect may be obtained without fixedly securing the forward portion of the lower run 31 of the belt 18. Instead, the belt 18 may be made continuous and endless and friction will maintain the lower run 31 stationary with respect to the flat plate 11 of the platform A or the upper surface of the fuel bed. The disclosed practice of securing the lower run 31 at 19, 20 is merely to assure against any slipping between the lower run 31 and the surfaces upon which it rests during the "caterpillar" motion.

As best seen in Fig. 7, the hopper H is provided with a forward wall 32 having two divided chutes 33, 34 on both sides of a central intermediate portion 35. The configuration of the discharge openings 36 of the chutes 32, 33, as compared with the discharged opening of the central intermediate portion 35, is such that the layer of fuel L will be deposited on the upper run 32 of the belt 18 with two raised longitudinal mounds or ridges 37, 38 extending along the longitudinal edges. That is, the portions 37, 38 of the fuel layer L will be raised and at a somewhat higher elevation than the intermediate central portion 39, for a purpose to be described below.

Referring now to Figures 1 and 3, the mechanism for opening and closing the hopper-door at a predetermined rate proportionate to the speed of the belt will now be described. The hopper H is provided with a door or closure 40 pivotally mounted at 41 for opening and closing movement. A pair of vertical standards 42, 43, extend upwardly from opposite sides of the plate 11 of platform A and support a horizontal shaft 44, rotatably mounted therein at its opposite ends. A pair of collars 45, 46 are secured to the shaft 44 and are each provided with a pair of radially extending levers 47, 48. The hopper closure 40 is also provided with a pair of extensions or arms 49 extending radially upwardly from the hopper pivot 41.

A pair of links 50 connect the upper ends of the levers 48 with the respective upper ends of the arms 49 of the hopper closure 40. Similarly, a pair of links 51 connect the lower ends of the levers 47 to the hopper closure 40, as at 52. It will thus be seen that the links 50, 51, levers 47, 48, hopper closure 40, and arms 49 provide a quadrilateral linkage mechanism and that rotation of the shaft 44 will cause an equal angular displacement of the hopper closure 40 about its horizontal pivot 41.

The levers 47 on the collars 45, 46 are provided with abutment pins 53 projecting laterally outwardly and perpendicular to the levers 47. It should be noted that the distance between the center line of the shaft 44 and the pins 53 is exactly one-half of the distance between the center line of the shaft 44 and the lower outermost ends of the levers 47 to which the links 51 are pivotally connected. A pair of abutment brackets 54, 55 are secured respectively to the inverted U-shaped brackets 27, 28. Each of the brackets 54, 55 is provided with an upper segment 56, 57 hinged at its forward lower edge to the lower segment of the respective bracket by a suitable hinge means indicated at 58.

The abutment pins 53 on the levers 47 are so positioned that they will contact the hinged abutment segments 56, 57 of the brackets 54, 55 as the latter move forwardly during the advancing or forward "caterpillar" movement of the frame B. It will be seen that the hinged upper segments 56, 57 will contact the pins 53 so as to rotate the levers 47, 48, collars 45, 46, and hence also the shaft 44, in a counter-clockwise direction (as viewed in Figure 3) during the advancing movement of the frame B. This will cause the upper links 50 to move rearwardly and the lower links 51 to move forwardly, thereby pivoting the hopper closure 40 about its horizontal pivot 41 in a counter-clockwise direction (as viewed in Figure 1). This counter-clockwise movement of the closure 40 is also a closing movement and serves to diminish the flow of fuel leaving the opening of the hopper H.

It will be understood that since the abutment brackets 54, 55 are fixedly secured with respect to the longitudinal members 16 of the frame B, they will move at exactly the same speed as the frame B. Furthermore, it will be clear that the upper run 32, of the belt 18, will travel at exactly twice the speed of the frame B. Since it has been discovered that the best results are obtained when the hopper closure 40 opens and closes at the same speed as the upper run 32 of the belt 18, it is necessary that the hopper closure 40 move at twice the speed of the frame B, and hence twice the speed of the abutment brackets 54, 55. This ratio of speeds is obtained by locating the abutment pins 53 midway on the levers 47. It will be obvious that when the hinged abutment segments 56, 57 contact the pins 53 so as to pivot the levers 47 in a counter-clockwise direction as viewed in Figure 3, the lower ends of the levers 47, to which the links 51 are connected, will have a tangential velocity twice that of the pins 53. The tangential velocity of the latter is, of course, equal to that of the forward speed of the abutment brackets 54, 55. Therefore, the lower or closure portion of the hopper door 40, to which the links 51 are connected, will undergo a closing movement at twice the speed of the brackets 54, 55 and the frame B, and hence equal to the speed of the upper run 32 of the belt 18.

It will be understood that by a suitable selection of the various proportions of the elements making up the quadrilateral linkage, other relative rates of speed of the hopper closure 40 and the upper run 32 of the belt 18 may be selected if desired. However, in the present embodiment, and with the particular type of solid fuel employed, it has been found experimentally that when the hopper closure 40 moves during its

closing movement at the same speed as the upper run 32 of the belt 18, the trailing or final edge of the layer of fuel deposited on the upper run will have the proper slope. This avoids both a thinned-out trailing edge or light sprinkling of fuel as will be the case when the hopper closure 40 closes too slowly in relation to the speed of the upper run 32 and also a "humped-up" ridge along the trailing edge of the layer, as will be the case if the hopper closure 40 closes too quickly so as to push the final portion of the discharging fuel forwardly at a speed greater than the moving layer of fuel being deposited.

A suitable mechanism is provided for opening the hopper closure 40 when the frame B has returned rearwardly back to the initial position shown in Figure 4. As disclosed above, the upper abutment sections 56, 57, of the brackets 54, 55, are hinged about horizontal axes at their forward edges by means of the hinges 58, thereby enabling the segments 56, 57 to pivot forwardly to a downwardly-depending position or rearwardly to an upright abutting position shown in Figure 1. As the frame B moves rearwardly, the segments 56, 57 will about the pins 53, but will not move the latter since the segments 56, 57 will merely flap over forwardly about the hinges 58 in a ratchet type of action and pass beneath the pins 53. A conventional spring arrangement (not shown) may be employed to pivot the segments 56, 57, upwardly to the upright position after they have ratcheted past the pins 53, as will be obvious to those skilled in the art.

A pair of brackets 59 are secured to the brackets 54, 55, and support a pair of rotatable reels 60, each having a flexible wire or cord 61 wound thereon. The forward ends of the wires 61 are secured to the pins 53. The reels 60 are suitably spring biased so as to tend to rotate in the winding direction and thereby take up the slack in the wires 61. As the frame B moves rearwardly after the segments 56, 57 have ratcheted beneath the pins 53, the tension on the wires 61 will react against the spring tension means of the reels 60, whereby the wires 61 will unwind therefrom without exerting sufficient pull on the pins 53 to move the levers 47. However, when the frame B has moved rearwardly so as to approach its rear initial position, the wires 61 will have become completely unwound from the reels 60. Since the rear ends of the wires 61 are secured to the respective reels 60, and the forward ends of the wires 61 are secured to the pins 53, a continued rearward movement of the frame B results in the wires 61 pulling on the pins 53 so as to rotate the arms 47 in a clockwise direction as viewed in Figure 3. This will result in an actuation of the quadrilateral linkage mechanism so as to pivot the hopper closure 40 toward the open position.

A suitable mold-board means, indicated generally at 63 in Figure 1, is secured at the forward ends of the longitudinal members 16 of the frame B. The mold-board means 63 is provided at its outer ends with arcuate portions 64 which are adapted to displace the longitudinal lateral ridges 37, 38 of the coal layer L laterally outwardly, whereby the layer of fuel being discharged over the forward end of the belt 18 will be deposited along the surface S of the fuel bed of the furnace C in an evenly distributed flat layer extending up to the side walls of the furnace C. Since the width of the belt 18 must obviously be less than the distance between the side walls of the furnace C in order to enable the belt 18 to enter the interior of the furnace C, and also in view of the fact that the width of the layer of fuel L deposited on the belt 18 must be less than the width of the latter to prevent the fuel from falling off the sides of the belt 18, the expedient of providing the longitudinal ridges 37, 38 on the layer of fuel L and then flattening the ridges out laterally by the portions 64 of the mold-board means 63, enables the sides D' of the deposited layer D, to abut against the side walls of the furnace C, and also to have a proper slope.

Referring now to Figures 4, 5 and 7, it will be seen that the forward wall 34 of the hopper H is provided with a bracket support 65 on which is rotatably mounted a roller 66. A heat resistant curtain 67 is rolled on the roller 66 and its forward end is secured to the mold-board means 63. It will thus be seen that as the frame B "caterpillars" forwardly into the interior of the furnace C, the curtain 67 will be unwound so as to extend above the fuel layer L deposited on the upper run 32 of the belt 18, thereby protecting the layer L from the wind. Furthermore, it will be noted that one of the major advantages of the invention resides in the fact that the frame B is protected from the intense heat of the furnace C by both the layer of fuel L on the upper run 32 and also the layer D deposited on the surface of the fuel bed S. However, after the layer L has been discharged over the forward end of the belt 18 and deposited in the form of the layer D, it will no longer serve to protect the upper run 32 from the intense radiant heat of the furnace C. Therefore, the curtain 67 provides another function in that it serves to shield the upper run 32 of the belt 18 from the furnace heat during the retracting or rearward movement of the frame B.

A suitable mechanism is provided for varying the height or thickness of the layer D of the fuel deposited on the fuel bed of the furnace. This is accomplished by providing that the height of the plate 11 of the platform A be vertically adjustable and also by providing that the height of the hopper H above the upper run 32 of the belt 18 be vertically adjustable.

Referring to Figs. 4 and 5, the height of the plate 11 is varied by a suitable mechanism for increasing or decreasing the lengths of the legs 12 and indicated generally by the reference numeral 101.

In more detail, and as best seen in Fig. 8, each of the legs 12 is segmented and comprises an upper leg portion 12' and a lower leg portion 12''. An internally threaded nut 102 is secured to the lower end of the upper leg portion 12' as by welding at 103. The upper end of the lower leg portion 12'' is provided with a suitable bearing means 104 within which the lower end of an externally threaded shaft 105 is rotatably mounted. A thrust collar 106 is secured to the shaft 105 and abuts against the bearing 104 so as to support the shaft 105 against downward movement. The shaft 105 extends through the threaded nut 102 and is in threaded engagement therewith. An aperture 107 extends through the shaft 105 and is adapted to receive an actuating lever 108.

It will thus be seen that when an operator grasps the lever 108 and actuates same so as to rotate the threaded shaft 105, the nut 102 and hence also the upper leg portion 12' will be raised or lowered as desired, thereby raising or lowering the plate 11 of the platform A with respect to the fuel bed S of the furnace C.

Referring to Fig. 7, the mechanism for adjusting the height of the hopper H with respect to the upper run 32 of the belt 18 is indicated generally by the reference numeral 109. In more detail, and as best seen in Fig. 9, a suitable bracket or other supporting structure 110 is provided with a threaded shaft 111 rotatably mounted thereon at the upper end of the latter by means of a suitable bearing 112. A U-shaped channel member 113 is fixed to the hopper H and is provided with a pair of vertically spaced internally threaded nuts 114, 115 between the flanges of the channel member 113 and secured thereto by welding at 116. A hand lever 117 is secured to the threaded shaft 111 whereby the latter may be rotated.

Upon the actuation of the hand lever 117 so as to rotate the threaded shaft 111 the nuts 114, 115, and hence also the channel member 113 and the hopper H will be moved vertically upwardly or downwardly depending upon the direction of rotation of the shaft 111. It will thus be seen that the height of the hopper H with respect to the upper run 32 of the belt 18 may be adjusted so as to control the height or thickness of the layer L deposited on the upper run 32, and hence also the height or thickness of the layer D of fuel deposited on the fuel bed S of the furnace C.

Having described my invention, what I claim and desire to secure by Letters Patent is as follows:

1. A belt charging apparatus for charging a layer of coal onto a furnace floor comprising a vertically movable longitudinal platform having a front end adjacent said furnace, a longitudinal frame adapted to rest on said platform and having a plurality of transverse rollers, a flexible fixed end belt circumferentially disposed about said rollers on said frame and having its ends located below the movable frame and fixed to the front end of said platform, means for pushing said frame into a furnace, and means for charging a measured amount of coal onto the top portion of said belt, whereby the layer of coal on said belt is discharged onto the furnace floor during forward movement of the frame into the furnace.

2. A belt charging apparatus for charging a layer of coal onto a furnace floor comprising a vertically movable longitudinal platform having a front end adjacent said furnace, a longitudinal frame adapted to rest on said platform and having a plurality of transverse rollers, a flexible fixed end belt circumferentially disposed about said rollers on said frame and having its ends located below the movable frame and fixed to the front end of said platform, propulsion means secured to said frame and adapted to engage a propelling chain for pushing said frame and moving said belt into a furnace in spaced relation to the bed of said furnace, and hopper means disposed above said belt for charging a patterned layer of coal onto the top portion of said moving belt, whereby the layer of coal on said belt is discharged onto the furnace floor during forward movement of the frame into the furnace.

3. A belt charging apparatus for charging a layer of coal onto a furnace floor comprising a vertically movable longitudinal platform having a front end adjacent said furnace, a longitudinal frame adapted to rest on said platform and having a plurality of transverse rollers, a flexible fixed end belt circumferentially disposed about said rollers on said frame and having its ends fixed to the front end of said platform, propulsion means secured to said frame and adapted to engage a propelling chain for pushing said frame and moving said belt into a furnace in spaced relation to the bed of said furnace, and hopper means disposed above said belt for charging a patterned layer of coal onto the top portion of said moving belt, and means for automatically opening said hopper on forward movement of said belt and for automatically closing said hopper after the discharge of a measured linear layer of coal onto said moving belt.

4. A belt charging apparatus for charging a layer of coal onto a furnace floor comprising a vertically movable longitudinal platform having a front end adjacent a furnace, roller means mounted on said platform for wheeling said platform in juxtaposition before a selected furnace mouth, a longitudinal frame disposed on top of said platform and having spaced apart longitudinal frame members with a plurality of transversely disposed rollers disposed between said frame members, a flexible belt having fixed ends and circumferentially disposed about said rollers on said frame and having both of its ends disposed beneath said frame and fixed to the front of said platform, drive means for propelling said frame into the selected furnace, a hopper disposed over the frame at the front thereof and adapted to spread a measured patterned layer of coal onto the top run of said belt, means for automatically starting the hopper feed with forward movement of the belt into the furnace, said automatic means being adapted to automatically close said hopper after a measured linear spread of coal has been deposited onto the top run of said movable belt, and a flexible extensible curtain secured to the front of said frame and adapted to insulate the top run of the belt and its load of coal from the furnace heat, whereby horizontal movement of the frame into the furnace causes the belt to transfer the layer of coal spread on the upper run as a layer of coal deposited on the furnace floor and of substantially the same thickness as that initially spread onto the upper run.

HENRY SUCH SMITH.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
2,617,574	Burke	Nov. 11, 1952

FOREIGN PATENTS

Number	Country	Date
233,321	Germany	Apr. 6, 1911