Feb. 6, 1951 A. R. POWELL 2,540,138

COKE OVEN APPARATUS

Filed Oct. 14, 1948 2 Sheets-Sheet 1

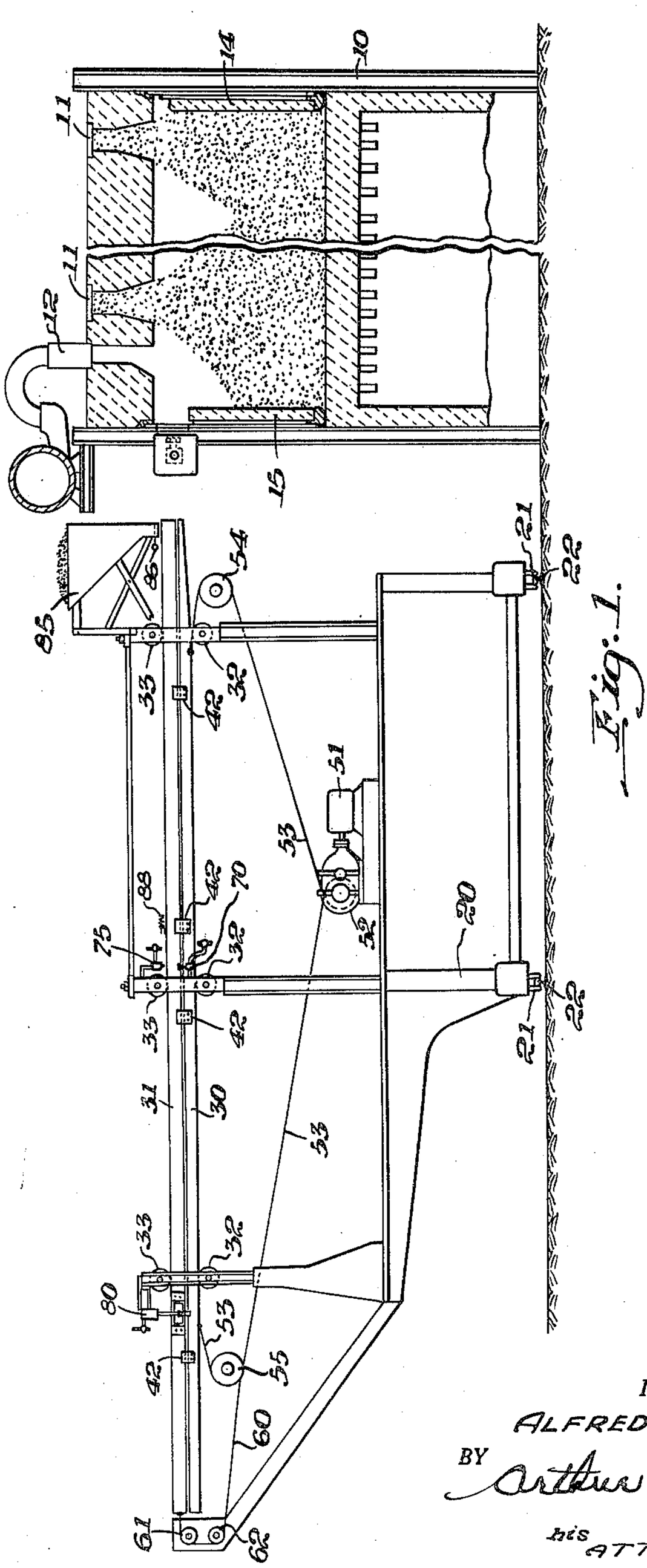

Fig. 1.

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2 Sheets-Sheet 2

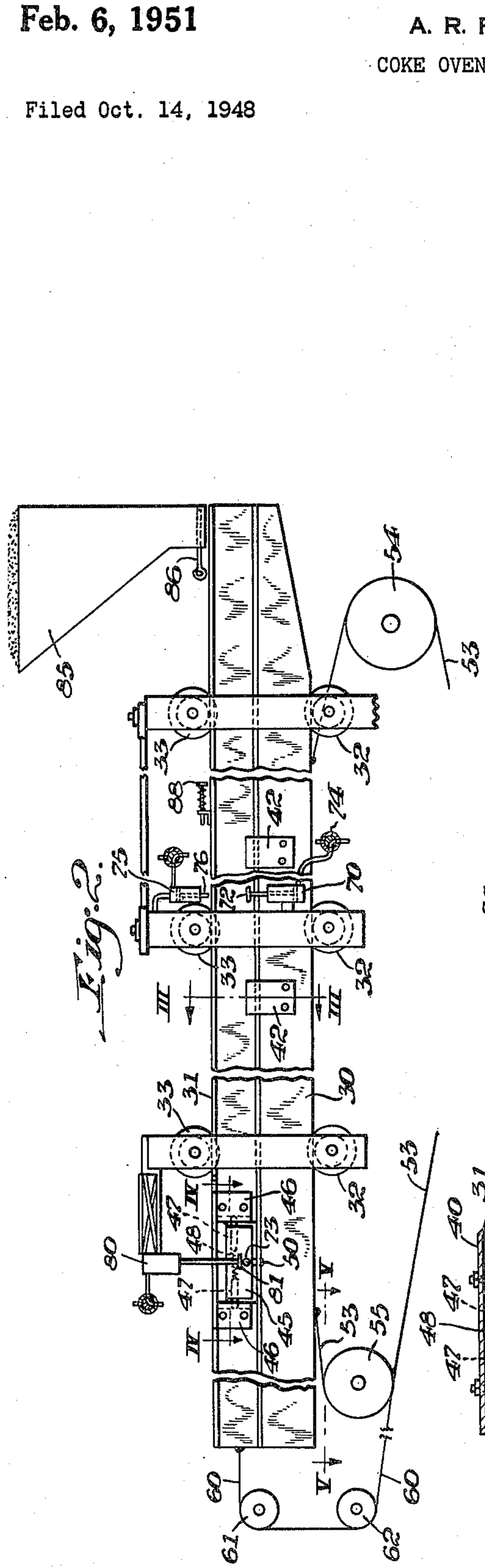

Fig. 2.

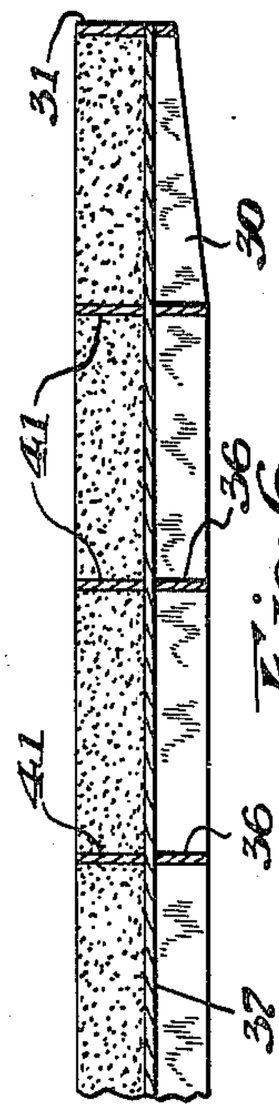

Fig. 6

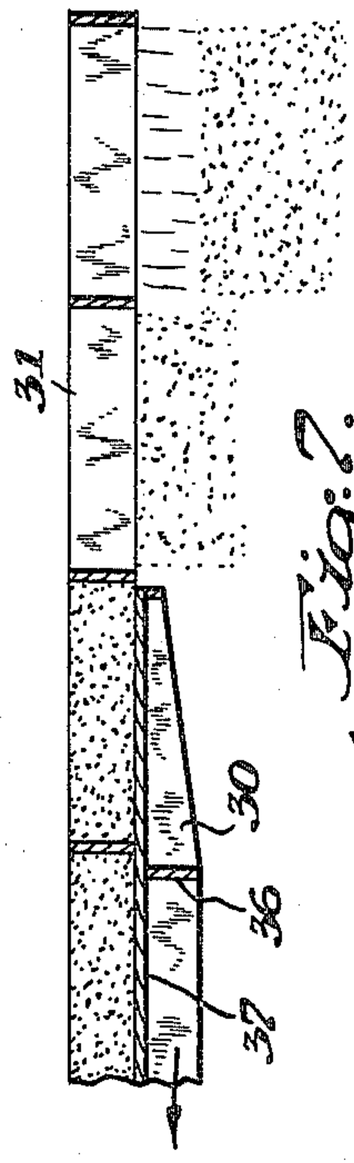

Fig. 7.

Fig. 4.

Fig. 5.

Fig. 3.

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Patented Feb. 6, 1951 2,540,138

UNITED STATES PATENT OFFICE

2,540,138

COKE OVEN APPARATUS

Alfred R. Powell, Pittsburgh, Pa., assignor to Koppers Company, Inc., Pittsburgh, Pa., a corporation of Delaware

Application October 14, 1948, Serial No. 54,534

5 Claims. (Cl. 214—23)

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This invention relates to horizontal coke ovens and particularly to improved apparatus for use therewith.

In my application, Serial No. 612,160, filed Aug. 23, 1945, and now Patent No. 2,495,763 granted January 31, 1950, there is shown a method of preventing damage to the side walls of a coking chamber while coking expanding coals. As shown in my application identified above, an oven chamber is charged with coal of a type which expands to an objectionable degree when coked in the normal manner, the charge is levelled, and is then covered with a layer of material, such as coke breeze, to prevent formation of a highly impermeable plastic zone across the top of the coal charge.

An object of this invention is to provide efficient means for carrying out the coking method shown in my application identified above.

A further object of the invention is to provide apparatus which makes it possible to charge an oven chamber with coal of a selected type, level the charge, and thereafter cover at least a substantial portion of the charge with a layer of substantial thickness of material which is different than the coal charge.

Another object of the invention is to provide improved levelling means which first operates to level the principal charge in a coking chamber, and thereafter operates to deposit thereon a layer of a different material.

A further object of the invention is to provide an improved leveller bar having principal and auxiliary sections which are movable together to level the charge in an oven chamber and to carry into an oven chamber material to cover the charge, and are movable relative to each other to deposit the material on the charge.

Another object of the invention is to provide an improved leveller bar of the type described and incorporating locking means operative at times to secure the principal and auxiliary portions of the bar together so that they move in unison, and incorporating locking means operative at other times to secure the auxiliary portion of the leveller bar with respect to a stationary member so that the principal portion of the leveller bar may be moved without moving the auxiliary portion of the bar.

A further object of the invention is to provide an improved leveller bar of the type described which is arranged so that the auxiliary portion of the bar assists in stiffening the principal portion of the bar to prevent sagging of the bar when the bar is in its fully extended position.

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Another object of the invention is to provide an improved leveller bar of the type described together with means for filling the auxiliary portion of the leveller bar with granular material, and incorporating automatic means for discontinuing the supply of granular material when the auxiliary portion of the level bar has become filled.

Other objects of the invention and features of novelty will be apparent from the following description taken in connection with the accompanying drawings in which

Fig. 1 is a view, partly in transverse vertical cross-section and partly in elevation, of a by-product horizontal coke oven battery together with a pusher machine equipped with the improved leveller bar provided by this invention;

Fig. 2 is an enlarged side elevation view of the pusher machine showing the leveller bar and related apparatus;

Fig. 3 is a sectional view taken substantially along the line III—III of Fig. 2;

Fig. 4 is a sectional view taken substantially along the line IV—IV of Fig. 2;

Fig. 5 is a sectional view taken substantially along the line V—V of Fig. 2; and

Figs. 6 and 7 are diagrammatic views illustrating the operation of the leveller bar.

As is well known, a horizontal coke oven battery comprises a series of parallel coking chambers which are separated by heating walls that are heated by combustion of fuel gas in flues in the heating walls. The ends of the coking chambers are closed by removable doors, and the coal carbonized in the coking chambers is charged through charging holes in the tops of the chambers.

The equipment associated with a battery of ovens comprises a pusher machine which is operated on tracks paralleling the pusher side of the battery, and a door machine operated on tracks paralleling the other or coke side of the battery. This invention is not concerned with the equipment on the coke side of the battery, and that equipment may be constructed in any appropriate manner well known in the art.

The pusher machine is formed of heavy structural steel and carries door handling equipment for removing and replacing the doors on the associated face of the battery. The pusher machine also carries a pusher ram which serves to push coke from the coking chambers. This invention is not concerned with the door handling equipment on the pusher machine, nor with the pusher ram, and these portions of the pusher

machine may be arranged in any appropriate manner well known in the art.

In addition, the pusher machine carries a leveller bar which serves to level the coal in each freshly charged coking chamber. This invention provides an improved leveller bar which serves not only to level the coal in a coking chamber after the chamber has been charged with coal, but which also serves to deposit on top of the levelled charge a layer of granular material.

As is well known, the leveller bar operates through openings in the doors on the pusher side of the oven chambers. These openings in the oven chamber doors are normally closed by manually controlled closures which are usually in the form of hinged doors. It is contemplated that the oven battery with which the equipment of this invention is employed will be provided with doors of the type described, but that the openings in the doors for the leveller bar will be of somewhat greater vertical extent than in the usual installation, this greater vertical size of the openings in the doors being necessary because of the larger size of the leveller bar.

Referring to Fig. 1 of the drawings, there is shown therein a conventional by-product coke oven battery indicated generally by the reference numeral 10 and having a series of coking chambers separated by heating walls. The battery may be of any suitable construction, as, for example, as shown in U. S. Patent No. 2,100,762, issued Nov. 30, 1937, to Joseph Becker.

Each of the coking chambers is provided with a plurality of charging holes 11 through the chamber roof and through which coal to be coked is supplied from a larry car, not shown, which is operated on rails supported on the top of the oven battery. Each oven chamber is also provided with at least one gas offtake located at one end of the oven chamber and connected by an ascension pipe 12 with a collecting main.

The ends of the oven chambers are sealed by removable doors 14 and 15. As explained above, the doors 14 on the right-hand or coke side of the battery are removed and replaced by a door machine, not shown, which operates on tracks on this side of the battery. Likewise, the doors 15 on the left-hand or pusher side of the battery are removed and replaced by door handling equipment, not shown, carried by the pusher machine. The finished coke is discharged from the oven chambers by pushing the finished coke out of the oven chambers from the pusher to the coke side by means of the pusher ram on the pusher machine.

After the coke in a chamber has been expelled, the doors are replaced and the oven chamber is then filled with fresh coal through the top charging holes. The coking chambers are designed to be filled with coal to a selected level, leaving a clear gas space above the coal for the flow of gas to the ascension pipe. Accordingly, after an oven is charged, the coal is levelled off by reciprocation of a leveller bar inserted at one end into the top of the oven through an opening provided in the oven door. Since this invention contemplates the deposit on the charge after levelling of a layer of granular material of substantial thickness, such as six inches, the coal charge is levelled to a somewhat lower plane than would otherwise be the case.

The pusher machine is indicated generally by the reference numeral 20 and comprises a structural steel carriage mounted on wheels 21 which run on rails 22. The pusher machine is electrically propelled on the rails 22 so as to move from chamber to chamber as required.

The leveller bar, which includes a principal or lower portion 30, and an auxiliary or upper portion 31, is of such length as to reach from one end of an oven chamber to the other. The leveller bar is somewhat narrower than the portion of an oven chamber into which the bar extends so that the leveller bar is free to reciprocate in an oven chamber.

The principal portion 30 of the leveller bar is supported and guided by rollers 32 which are rotatably supported on the framework of the pusher machine. The upper or auxiliary portion 31 of the leveller bar is guided by similar rollers 33 which are rotatably supported on the framework of the pusher machine.

As is best shown in Fig. 3, the lower or principal portion 30 of the leveller bar is formed of two spaced channel sections or beams 35, the flanges of which are located on the inner faces of the beams. The two channel sections may be secured together by a plurality of cross members 36 which may be riveted or welded in place. A smooth, flat plate 37 is secured on the upper face of the beams or sections 35 and closes the upper side of the principal portion of the leveller bar.

The upper or auxiliary portion 31 of the leveller bar comprises two spaced channel sections or beams 40, the flanges of which are located on the outer faces of the beams. The channels 40 are secured together by a plurality of cross members 41 which are of such length that the outer edges of the flanges on the channels 40 are approximately the same distance apart as the outer faces of the channels 35 of the lower or principal portion 30 of the leveller bar. The cross members 41 are preferably of substantially the same height as the channels 40.

Each of the channels 35 of the principal portion of the leveller bar has secured to the outer face thereof a plurality of angular brackets 42, each of which extends upwardly and has at its upper end an inwardly extending portion which overlies the flange on a channel 40 of the upper or auxiliary portion 31 of the leveller bar. The brackets 42 serve to keep the two portions of the leveller bar accurately positioned with respect to each other and to prevent their vertical separation, but at the same time, permit the two portions of the leveller bar to move longitudinally with respect to each other.

The two portions of the leveller bar are normally secured together so that they move as a unit. As is best shown in Figs. 2 and 4, a sliding block 45 is carried by the upper or auxiliary portion 31 of the leveller bar. The block 45 has at each side a tongue which extends into a groove in a stationary block 46 secured to the channel 40. The block 45 has a bore extending through it and in this bore are mounted plungers 47 which are urged apart by a coil spring 48. The plungers 47 have rounded ends which are adapted to extend into recesses in the stationary blocks 46 to hold the block 45 in its lower position in which it is shown, or in an upper position. The lower portions of the blocks 45 and 46 are cut away slightly to clear the upper ends of the brackets 42 on movement of the two portions of the leveller bar relative to each other.

The lower face of the movable block 45 carries a downwardly extending projection 50, which is of such length that when the block 45 is in its lower position, the projection 50 ertends through a hole in the upper flange of a channel 35 of the

lower position, the projection 50 extends through when the block 45 is in its lower position, the two portions of the leveller bar are secured against relative longitudinal movement and move as a unit. The projection 50 is also of such length that when the block 45 is in its upper position, the projection 50 is out of the path of movement of the channel 35 so that the two portions of the leveller bar may be moved longitudinally relative to each other.

As shown in Fig. 1, the principal portion of the leveller bar is reciprocated by power operated means in the form of an electric motor 51, speed reducing means 52, and a drum upon which is wound a cable 53. One end of the cable 53 passes over a pulley or sheave 54 and is secured to the principal portion 30 of the leveller bar near the end of the bar adjacent the oven battery, while the other end of the cable 53 is wound around a sheave 55 and is secured to the principal portion 30 of the leveller bar near the other end of the bar. The cable 53 passes around the sheave 55 several times so that the cable has effective driving connection with this sheave. The motor 51 is manually controlled and is reversible and provides means for driving the cable 53 to move the principal portion 30 of the leveller bar into or out of the coking chambers. Suitable limit switches may be incorporated in the control of the motor 51 to limit the extent of movement of the principal portion of the leveller bar.

The upper or auxiliary portion 31 of the leveller bar has associated therewith means for drawing this portion of the leveller bar from an oven chamber. As shown, this means comprises a cable 60 which is secured to the end of the leveller bar portion 31, passes over sheaves 61 and 62, and is wound on a drum 64. The drum 64 is mounted coaxially of the sheave 55 and is connected thereto by a clutch indicated diagrammatically at 65. The clutch 65 may be governed in any suitable manner by the operator in the cab of the pusher machine so as to at times connect the drum 64 to the sheave 55 to cause the drum 64 to rotate with the sheave 55, and so that at other times the drum 64 is disconnected from the sheave 55 and may be rotated independently of the sheave 55 by the motor 66. The drum 64 and the sheave 55 are of substantially the same diameter so that when the drum 64 is driven by the sheave 55, the cable 60 is reeled out or in at substantially the same rate as the cable 53. Accordingly, during outward movement of the two portions of the leveller bar as a unit, the cable 60 is reeled out fast enough to permit the upper portion 31 of the leveller bar to move with the lower portion 30 of the leveller bar, while during inward movement of the two portions of the leveller bar as a unit the cable 60 is reeled in rapidly enough to prevent development of excessive slack in the cable.

The pusher machine has associated therewith means for moving the block 45 to its upper position to release the two portions of the leveller bar; means for holding the upper or auxiliary portion of the leveller bar in its extended position; and means for moving the block 45 to its lower position to secure the two portions of the leveller bar together.

Referring to Fig. 2, it will be seen that an air cylinder 70 is mounted on the framework of the pusher machine with the axis of the cylinder substantially vertical. The cylinder contains a piston which carries a push rod which projects from the upper end of the cylinder and has secured thereto a head 72 which is adapted to engage the projection 73 which projects horizontally from the block 45, as is best shown in Fig. 4. The position of the cylinder 70 on the pusher machine, and the location of the block 45 on the upper portion 31 of the leveller bar, are arranged so that when the leveller bar is in its fully extended position, the projection 73 on the block 45 is directly above the head 72 carried by the piston in the cylinder 70. The piston in the cylinder 70 is urged to its lower position by a spring, not shown, within the cylinder. On the supply of air under pressure to the cylinder, the piston is moved upwardly against the spring and the head 72 engages the projection 73 to move the block 45 upwardly. At this time the plungers 47 move inwardly against the spring 48, and, upon movement of the block 45 to its upper position, the plungers 47 are forced outwardly into the upper set of recesses in the stationary blocks 46 to hold the block 45 in its upper position. On this movement of the block 45 the projection 50 is raised out of the hole in the flange of the channel 35 of the lower portion 30 of the leveller bar, and the lower portion of the leveller bar may be moved to the left to its normal position while the upper portion of the leveller bar remains in its extended position.

The supply of air under pressure to the cylinder 70 is governed by a manually controlled plug valve 74 which normally connects the cylinder to atmosphere. The valve is movable to a position in which the connection from the cylinder to the atmosphere is cut off and in which the cylinder is connected to a source of air under pressure. Each of the other air cylinders has a similar valve associated therewith. In the drawings the valves are shown adjacent the cylinders, but it is to be understood that these valves may be located in the cab of the pusher machine where they will be convenient for the operator to manipulate.

Referring to Fig. 2, it will be seen that the framework of the pusher machine has a second air cylinder mounted thereon with the axis of the cylinder substantially vertical. The cylinder 75 has a piston mounted therein and urged to its upper position by a spring, not shown, located in the cylinder. The piston carries a plunger 76, the lower end of which projects from the cylinder, is tapered, and is adapted to extend into a hole in the upper flange on one of the channels 40 of the upper portion 31 of the leveller bar to thereby prevent movement of this portion of the leveller bar. The piston in the cylinder 75 is normally held in its upper position in which the plunger 76 is out of the path of movement of the upper portion of the leveller bar. On the supply of air under pressure to the cylinder 75 when the upper portion of the leveller bar is in its fully extended position, the plunger 76 is moved downwardly so as to extend through the hole in the flange of the beam 40 and thus prevent movement of the upper portion 31 of the leveller bar. On release of the air from the cylinder 75 the plunger 76 is moved upwardly and releases the upper portion of the leveller bar.

The framework of the pusher machine has a third air cylinder 80 mounted thereon in a substantially vertical position and having therein a piston having a head 81 at its lower end. The piston in this cylinder is urged to its upper position by a spring, not shown, and is moved to its lower position on the supply of air under pressure to the cylinder. The cylinder 80 is located on the pusher machine framework so as to be

directly over the projection 73 on the block 45 when the upper portion 31 of the leveller bar is in its fully retracted position. Accordingly, on the supply of air under pressure to the cylinder 80, the head 81 engages the projection 73 and moves the block 45 downwardly so that projection 50 prevents relative movement of the two portions of the leveller bar. After movement of the block 45 to its lower position, the block is held in that position by the spring pressed plungers 47.

The pusher machine has associated therewith means for supplying to the upper portion 31 of the leveller bar, granular material to be deposited on the charge in an oven chamber. Referring to Figs. 1 and 2, it will be seen that a hopper 85 is mounted on the pusher machine above the leveller bar and near the face of the oven battery. The hopper 85 is generally funnel-shaped, having a relatively large upper portion and having a relatively narrow lower or discharge portion. The hopper 85 is mounted so that it is directly over the leveller bar and so that the hopper discharges into the leveller bar at a point near the end of the leveller bar when the leveller bar is in its fully retracted position. The lower end of the hopper 85 is slightly narrower than the distance between the inner faces of the channels 40 forming the upper portion of the leveller bar so that material discharged from the hopper 85 will flow into the upper portion of the leveller bar and will not spill over the sides of the bar. The lower end of the hopper 85 is of such extent lengthwise of the leveller bar that on outward movement of the leveller bar material can flow from the hopper 85 into the upper portion of the leveller bar fast enough to completely fill the space between the channels 40.

The flow of material from the hopper 85 is governed by a sliding door 86 near the mouth of the hopper. When the door 86 is moved to the left, it opens the hopper, and when the door 86 is moved to the right, it closes the hopper. The door 86 is located only a few inches above the upper face of the upper portion 31 of the leveller bar and is adapted to be engaged by a spring pressed buffer 88 carried by a bracket on the top of the upper portion 31 of the leveller bar. The buffer 88 is mounted on the leveller bar at such a point that on movement of the leveller bar almost to its extreme extended position, the buffer 88 engages the door 86 with the result that on further outward movement of the leveller bar the door 86 is moved to its closed position. The spring associated with the buffer 88 enables the buffer to yield in the event the leveller bar continues to move after the door 86 has moved to its closed position.

The hopper 85 may be filled in any desired manner with granular material of any suitable type, as, for example, coke breeze, coarse coal, or coal of low bulk density. The hopper 85 is preferably of such capacity that it will hold enough material to fill the leveller bar several times.

In operation, an oven chamber is charged with coal in the usual manner except that the amount of coal supplied is slightly less than normal since the coal is to be levelled to a somewhat lower point than the normal. The pusher machine is now brought to a position in alignment with the chamber in which the charge is to be levelled. The door closing the leveller opening in the oven chamber door is now opened by the pusher machine operator. These doors are manually controlled and require the operator to go to the face

of the oven chamber. At this time, the operator slides the door 86 at the base of the hopper 85 to the left to its open position so that material in the hopper flows into the upper portion of the leveller bar as the leveller bar moves beneath the hopper. This material rests on the plate 37 on the top face of the lower portion 30 of the leveller bar and fills the space between the channels 40 of the upper portion of the leveller bar.

It is assumed that at this time the block 45 is in its lower position in which the projection 50 locks the two portions of the leveller bar together so that they move as a unit. In addition, it is assumed that the clutch 65 connects the drum 64 to the sheave 55 so that the drum 64 is rotated by the sheave 55, and that the motor 66 is de-energized so that the motor armature will rotate freely with the drum 64. It is assumed also that the air cylinders 70, 75 and 80 are at atmospheric pressure so the pistons associated therewith are in their retracted positions.

The leveller bar is now moved into the oven chamber by force exerted through the cable 53. As the lower or principal portion 30 of the leveller bar moves to the right, the upper or auxiliary portion 31 of the leveller bar moves also. During this movement of the upper portion of the bar under the hopper 85 granular material from the hopper flows into the upper portion of the leveller bar and substantially completely fills it. When the leveller bar moves to its extreme extended position, the buffer 88 engages the sliding door 86 and closes it to prevent further flow of material from the hopper 85. The arrangement of the apparatus is such, therefore, that the upper portion of the leveller bar is filled with granular material during initial movement of the leveller bar into the oven chamber. The arrangement of the apparatus is also such that the supply of material from the hopper is automatically cut off when the leveller bar reaches the end of its stroke so that during subsequent movement of the leveller bar there will not be any flow of material from the hopper and hence there will be no spillage.

When the leveller bar is initially extended into the oven chamber, the free end of the bar is pushed through the piles of coal beneath each of the charging holes, but with further reciprocation of the leveller bar the coal is spread so as to fill the valleys between the piles and thus distribute the coal to a uniform level.

When the leveller bar is pushed through the piles of coal beneath the charging holes, coal rests on top of the granular material in the upper portion of the leveller bar. As the coal is levelled, this coal falls over the sides of the leveller bar or is scraped off when the leveller bar is drawn out through the oven chamber door so little coal remains on top of the leveller bar when the levelling operation is completed.

During reciprocation of the leveller bar through the piles of coal in the oven chamber, the granular material in the upper portion 31 of the leveller bar is confined by the sides 40, and by the cross braces 41, so that little of this granular material escapes from the leveller and little coal is mixed with the granular material.

After the leveller bar has been reciprocated in the oven chamber enough to level the coal charge, the operator moves the leveller bar to its fully extended position, and then supplies air under pressure to the cylinder 70 so the piston in this cylinder moves the head 72 to engage the projection 73 and move the block 45 to its upper posi-

tion to release the two portions of the leveller bar. The air is now released from cylinder 70, and air is supplied to cylinder 75 to move the plunger 76 to its lower position in which it locks the upper portion 31 of the leveller bar against movement. In addition, at this time the clutch 65 is governed to disconnect the drum 64 from the sheave 55. The operator now governs the control mechanism to drive the motor 51 to withdraw the lower or principal portion 30 of the leveller bar. At this time the lower portion of the leveller bar is free to move relative to the upper portion of the leveller bar, while the plunger 76 prevents movement of the upper portion of the leveller bar.

As the lower portion 30 of the leveller bar is withdrawn from beneath the upper portion 31 of the leveller bar, the granular material present in the upper portion of the bar falls on the top of the coal in the oven chamber. As a result, when the lower portion of the leveller bar is completely withdrawn from the oven chamber, there is a layer of granular material on top of the coal charge throughout substantially the entire length of the oven chamber. The various parts of the equipment are proportioned so that the layer of granular material deposited on the coal in the oven chamber is of the desired thickness, such as on the order of six inches thick along the longitudinal center line of the charge.

When the lower portion of the leveller bar completes its movement to its retracted position, the air is released from the cylinder 75 so the plunger 76 is retracted by the spring associated therewith, thereby releasing the upper portion of the leveller bar. The operator now energizes the motor 66 to wind the cable 60 up on the drum 64 and thus draw the upper portion of the leveller bar out of the oven chamber. The circuit of the motor 66 may be governed by a limit switch to de-energize the motor when the bar completes its return to its retracted position. The operator now temporarily supplies air under pressure to the cylinder 80 so the plunger associated therewith moves the block 45 to its lower position in which it secures the two portions of the leveller bar against relative movement. At this time the operator also restores the clutch 65 to its original condition in which it connects the drum 64 to the sheave 55, while the operator may also close the leveller bar door on the door of the oven chamber. This completes the work at this oven chamber and the pusher machine may be moved to another chamber where the cycle of operations is repeated.

Although I have herein illustrated and described in detail one form of coke oven apparatus embodying my invention, it should be understood that the invention is not limited to these details and that numerous changes and modifications may be made without departing from the spirit and scope of the following claims.

Having thus described my invention, what I claim is:

1. A mechanism for leveling a body of coal in an elongated narrow coke oven in a battery of ovens and for depositing a layer of granular material on the leveled body of coal in an oven, said mechanism comprising: a carriage movable on

tracks along the face of the oven battery, said carriage being arranged to support the leveling mechanism near the top of the ovens in a battery, said mechanism being of sufficient length to extend the entire length of an oven with an outside portion of the mechanism supported by the carriage as a cantilever to hold the mechanism within the oven at a comparatively uniform spaced position near the top of the oven, said mechanism being composed of an upper section and a lower section secured together and slidably movable longitudinally with reference to one another, said sections being made up of long channel beams connected in spaced relation by a plurality of stiffening struts secured between the beams, said struts between the beams of the upper section forming a series of material compartments, a smooth plate covering the top of the lower section arranged to form the bottom of the upper section compartments, a hopper for granular materials supported on the carriage above the upper section of the mechanism and driving means mounted on the carriage with connections between the upper and lower sections of the driving means by which the sections may be moved longitudinally in unison or independently of one another to move the mechanism into and out of an oven.

2. The leveling and depositing mechanism defined in claim 1 in which a connecting device is secured at the side of said mechanism by which the upper and lower sections may be connected for movement in unison and disconnected for movement independently of one another, and means extending from the connecting devices to an operating station by which the connecting members of the upper and lower sections of the mechanism may be controlled.

3. The leveling and depositing mechanism defined in claim 1 in which a locking device is mounted on the carriage in a position to engage the upper section of the mechanism to hold the upper section in fixed position on the carriage and manually operated means for controlling the locking device to control the operation of the upper section of the mechanism.

4. The combination defined in claim 1 in which a discharge gate is mounted in the feed hopper and a closing device is mounted on the upper section of said mechanism to close the gate when the compartments of the upper section have been filled with granular material.

5. The combination defined in claim 1 in which separate driving mechanisms are connected with the upper and lower sections and means for operating each of said sections independently of the other sections to move the sections into and out of an oven.

ALFRED R. POWELL.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
134,056	Havens	Dec. 17, 1872
985,266	Aus Der Mark	Feb. 28, 1911

Certificate of Correction

Patent No. 2,540,138 February 6, 1951

ALFRED R. POWELL

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows:

Column 4, line 74, for "ertends" read *extends*; column 5, line 1, strike out "position, the projection 50 extends through" and insert instead *portion of the leveller bar. Accordingly*,;

and that the said Letters Patent should be read as corrected above, so that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 3rd day of April, A. D. 1951.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.