July 16, 1929. J. VAN ACKEREN ET AL 1,720,805

LEVELER BAR FOR COKE OVENS

Filed April 15, 1927 3 Sheets-Sheet 1

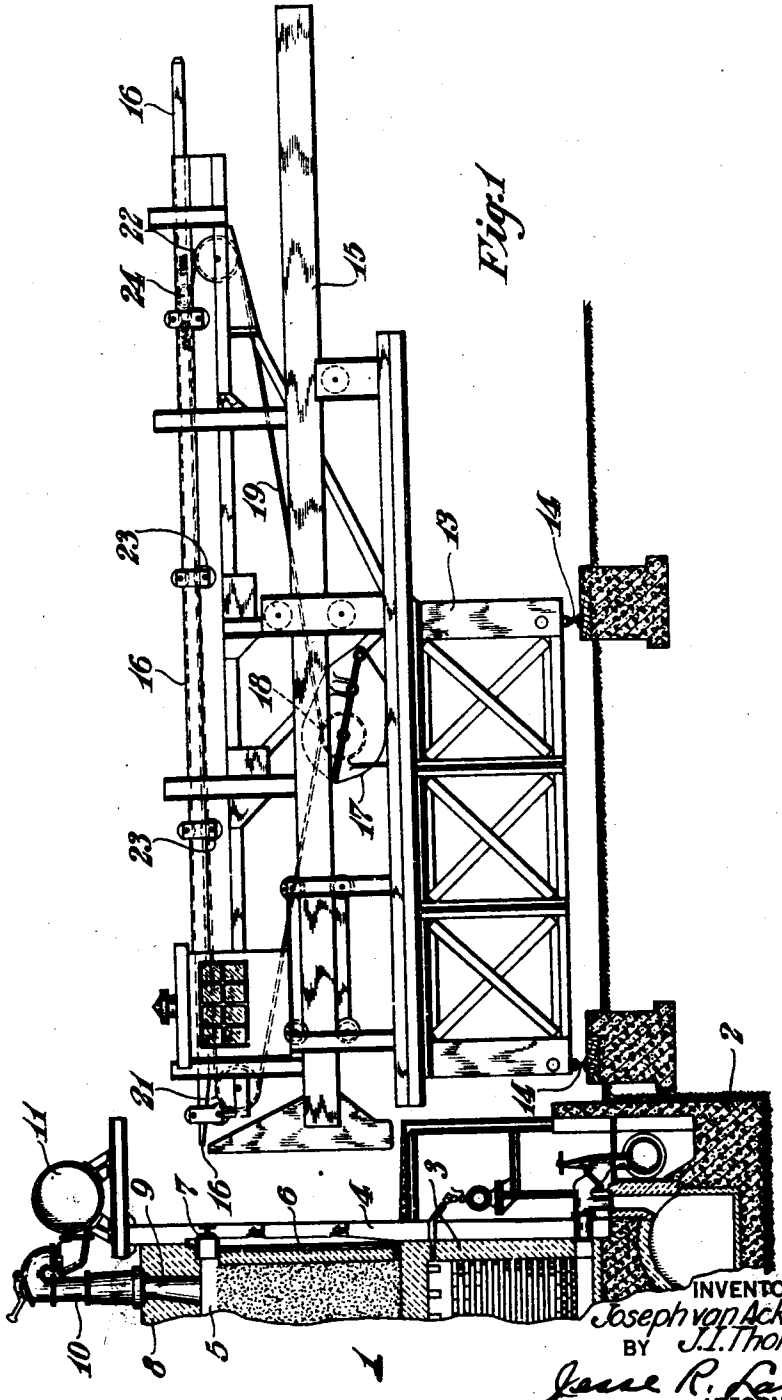

Fig. 1

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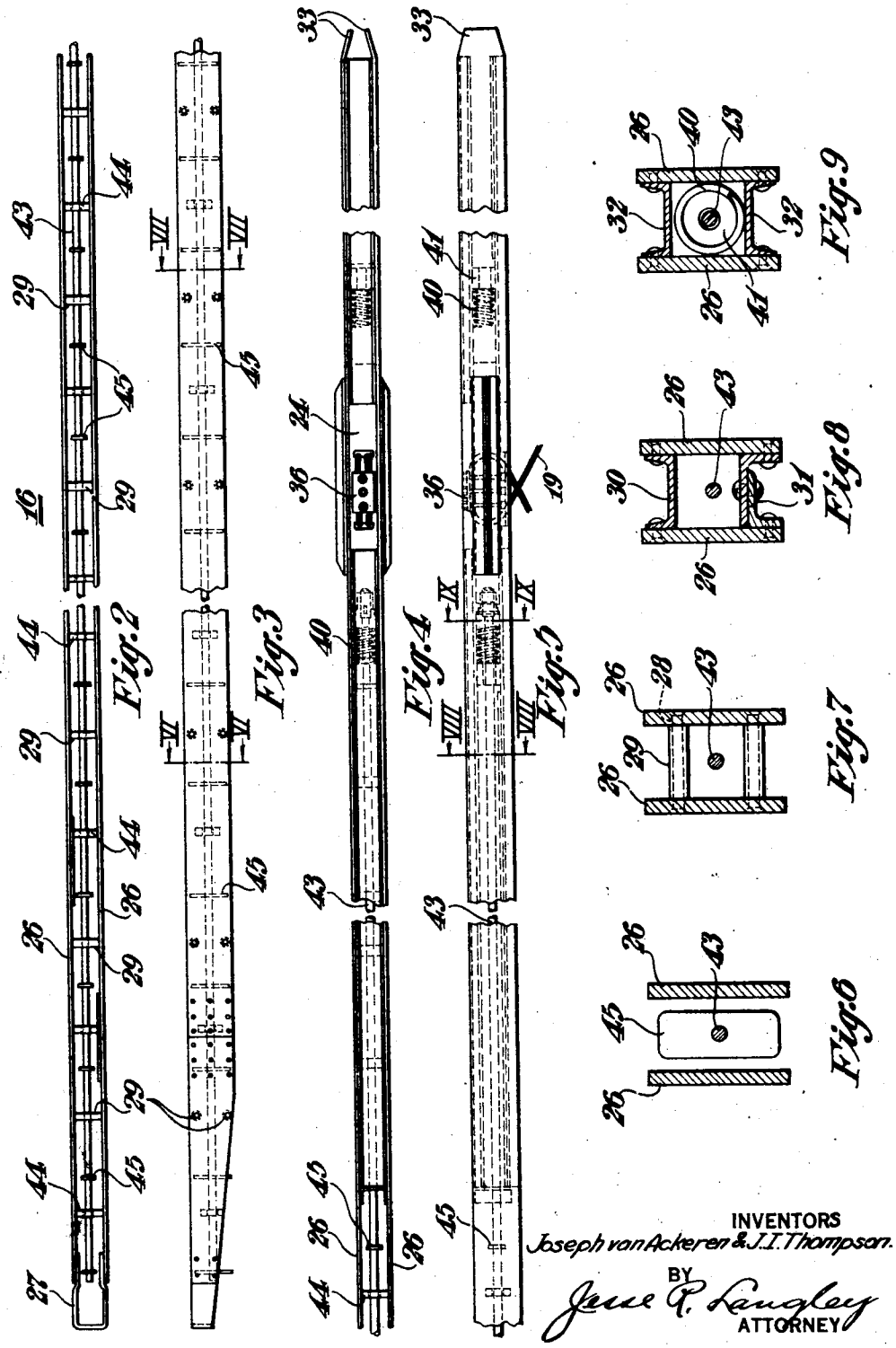

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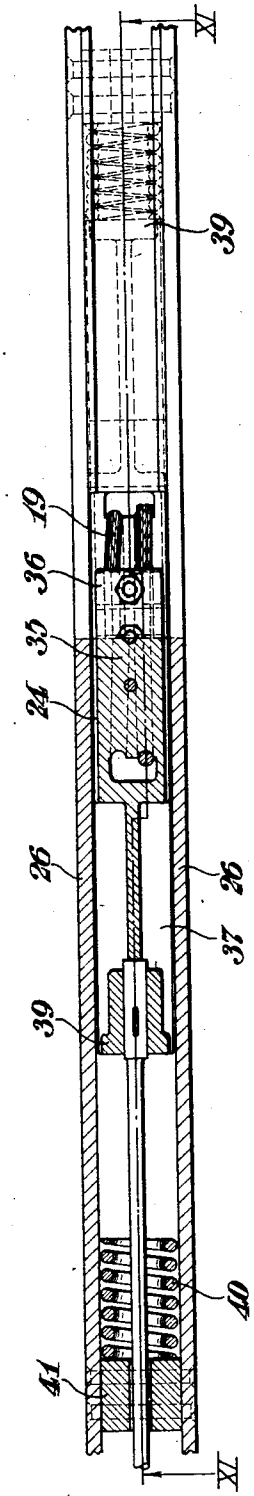

Fig. 10

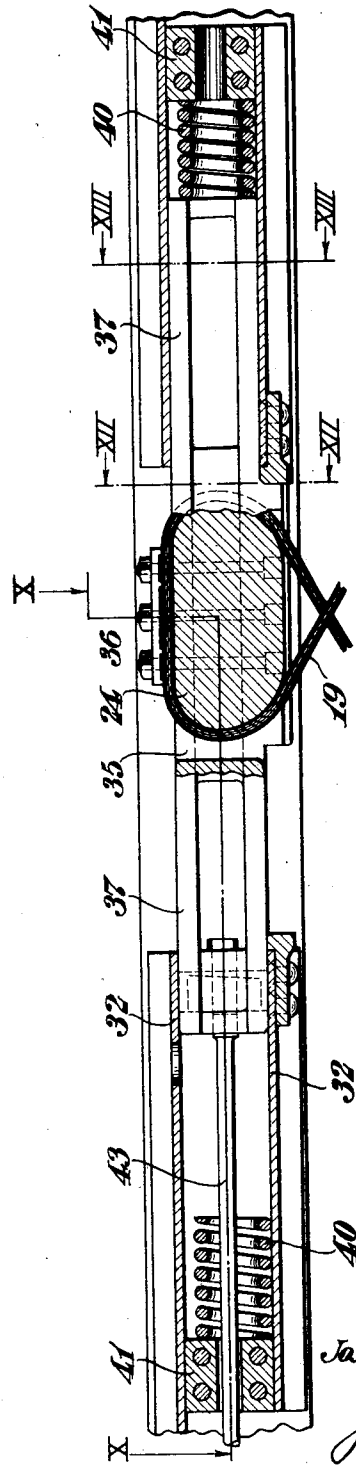

Fig. 11

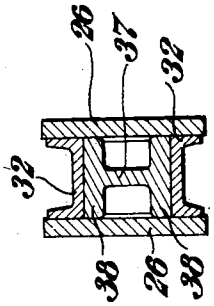

Fig. 13

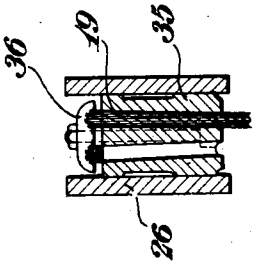

Fig. 12

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UNITED STATES PATENT OFFICE.

JOSEPH VAN ACKEREN, OF PITTSBURGH, AND JOHN I. THOMPSON, OF BEN AVON, PENNSYLVANIA, ASSIGNORS TO THE KOPPERS COMPANY, A CORPORATION OF DELAWARE.

LEVELER BAR FOR COKE OVENS.

Application filed April 15, 1927. Serial No. 184,052.

Our invention relates to leveler bars for coke ovens, and it has particular relation to constructional features thereof and operating means therefor.

Our invention has, for one of its objects, to provide a leveler bar of such construction that it may be quickly started, stopped or reversed in its operation without shock or jar.

A further object of our invention is to provide a leveler bar that is self-cleaning in that it removes any material that may lodge in the openings therein.

A still further object of our invention is to provide a leveler bar that operates automatically to dislodge any coal that may become wedged in open spaces therein.

Leveler bars for leveling the charges of coal in coke ovens consist ordinarily of a framework of structural steel. In general, the structure consists of side members with spacing members that operate to distribute the charge of coal along the length of the oven.

It sometimes occurs that the finely pulverized coal becomes wedged or lodged between the several spacing members and the side members. Under these circumstances, the leveler bar does not operate efficiently to level the charge in the oven and the surface of the charge may be irregular or uneven because of improper distribution. Also, a longer period of time may be required to level the charge because of the inability of the leveler bar to properly perform its functions.

Leveler bars as previously constructed have been substantially rigidly connected to a cable through which the leveler bar is driven by an electric motor or other reversible power device. By reason of the rigid driving connection and the inertia of the bar, reversal of direction of the bar has been attended with considerable shock or jar.

In accordance with our invention, a leveler bar of structural framework having open spaces between the side bars and the spacing members is provided with a longitudinally movable member having transverse paddles or plate members in the open spaces. The longitudinally movable member or rod is connected to a sliding cross-head having a lost-motion connection to the leveler bar and a direct connection to the driving cable. The members are moved automatically upon each reversal of the leveler bar relatively to the spaces within which they are located and any coal that has lodged therein is effectually removed.

In the leveler bar constituting our invention, we provide buffer springs for absorbing the shocks of the relatively movable cross-head during the starting, stopping and reversing of the bar, with the result that there is much less likelihood of damage to the apparatus.

In the accompanying drawings,

Figure 1 is a view, in transverse vertical section, of a portion of a coke oven battery and a pusher machine associated therewith;

Figs. 2 and 3 are respectively plan and side elevational views of the forward portion of a leveler bar constructed in accordance with our invention, parts being broken away;

Figs. 4 and 5 are corresponding views of the rear portion of the leveler bar;

Figs. 6 and 7 are enlarged transverse sectional views, taken on lines VI—VI and VII—VII, respectively, of Fig. 3;

Figs. 8 and 9 are similar views, taken on lines VIII—VIII and IX—IX, respectively, of Fig. 5;

Fig. 10 is an enlarged view, partially in section, along the line X—X of Fig. 11, and partially in elevation of the portion of the leveler bar comprising the cross-head;

Fig. 11 is a view, in longitudinal section, taken on line XI—XI of Fig. 10, parts being broken away;

Figs. 12 and 13 are transverse sectional views taken on lines XII—XII and XIII—XIII, respectively, of Fig. 11.

Referring particularly to Fig. 1, a coke oven battery 1, only a portion of which is shown, comprises a foundation 2, a side wall 3 and buck-stays 4, that are adjacent to the side wall 3. A coking chamber 5, only one of which appears in the drawing, is provided with a removable door 6, which comprises, also a leveler door 7. The oven top 8 is provided with an offtake opening 9, from which an ascension pipe 10 conducts gas to a main 11. The details of the coke oven will not be described further as they constitute no part of the present invention.

A pusher machine 13, which operates on rails 14 that extend along the side of the

battery, carries the usual pusher ram 15 and the leveler bar 16. The leveler bar 16 is operated by a suitable power device, indicated at 17, and which may comprise, for example, an electric motor and suitable gearing for connecting it to a drum 18 upon which is wound a cable 19. The cable 19 extends over sheave wheels 21 and 22 at the forward and rear ends, respectively, of the frame for carrying the leveler bar 16. The leveler bar is supported upon rollers 23, which also support the cable 19 between the sheave wheels 21 and 22, the cable being secured at both of its ends to a crosshead 24, the details of this connection being illustrated in Figs. 4, 5, 10 and 11.

Reference may now be had to Figs. 2 to 5, inclusive, which illustrate the construction of the leveler bar 16. The leveler bar comprises two side members 26, which may be either unitary or in sections, as desired. As shown in Figs. 2 and 3, the forward ends of the side members 26 are connected by a member 27 of substantially U-shape. The side members 26 are connected and spaced from each other by rivets 28 and spacing sleeves 29, the details of which are shown in Fig. 7, and also by channel bars 30 and overlapping angle bars 31, as is best shown in Fig. 8. At certain other sections of their length, the side bars 26 are also connected by channels 32, as shown in Figs. 9 and 13. The side members 26 are provided with tapered portions 33 being bent toward each other, as best shown in Fig. 4.

Reference may now be had to Figs. 10 and 11, in which the details of the construction of the crosshead 24 and coacting devices is shown. The crosshead 24 comprises a central body portion 35, to which the cable 19 is secured by means of a clamp 36. The crosshead also comprises members 37, extending in each direction from the central portion 35. As illustrated in Fig. 13, these extending portions 37 are in the form of an I-beam, the side members 38 of which slidably engage the channels 32. Each of the members 37 is provided, at its outer end, with an abutment 39 for engaging a buffer spring 40 when the crosshead reaches approximately the end of its path in the corresponding direction. At the opposite ends of the springs is a block 41 that is secured to the side bars 26 to constitute an abutment for the springs 40.

Attached to the forward end of the crosshead 24 and movable therewith is a rod 43, which is centrally located with respect to the leveler bar 16 and is of such length that it may reciprocate with the crosshead without striking the loop member 27. The rod 43 is slidably mounted in plate members 44, shown in Figs. 2 and 3, that are secured to the side bars 26 and are each provided with a central opening through which the rod 43 is threaded. The rod 43 is provided, at intervals throughout its length, with transversely-extending paddles or plate members 45, of steel or other suitable material and which are arranged to move in the spaces between the side bars 26 that are formed by the several spacing members 29 and the plate members 44.

It may be assumed that, in the operation of the coke oven battery, coal has been discharged into the coking chamber 5 and that the leveler door 7 is open. The power device 17 is operated in such direction as to move the crosshead 24 forwardly. The abutment 39 engages the corresponding spring 40 and the leveler bar 16 is moved without shock or jar into the oven to level the coal therein. When the bar reaches approximately the coke side of the oven, the power device 17 is reversed and the crosshead 24, together with the rod 43 and the plates 45, first move rearwardly relatively to the main structure of the leveler bar 16, with the result that any coal that may be lodged in the open spaces of the bar is loosened in such manner that it may move freely and will not impair the efficiency of the bar. The rear abutment 37 of the crosshead engages the corresponding spring 40 and the leveler bar is partially withdrawn from the oven. This operation continues until the entire charge of coal has been uniformly distributed throughout the length of the oven.

The relative movement of the plates 45 within the leveler bar 16 insures that any coal that may be carried by the bar is effectually dislodged therefrom at each change of direction of the bar. This operation occurs automatically and there is, therefore, no possibility of the coal remaining in the open spaces of the bar. Accordingly, the leveler bar of our invention may be operated with greater efficiency and with substantially no loss of time by reason of the automatic or self-cleaning feature. The provision of buffer springs insures that the mechanism will have a longer life by reason of its freedom from shock or jar, such as may be caused by the reversal of members having a rigid or unyielding engagement.

We claim as our invention:

1. The combination with a reciprocable leveler bar and mounting means therefor, of a power device having a lost-motion connection to said bar and means for cushioning the driving connection between said bar and said power device for either direction of movement of said bar.

2. The combination with a reciprocable leveler bar having a member with a lost-motion connection to the main body portion thereof and having springs for cushioning the engagement of said member with said main body portion, of a power device connected to said member for actuating said

bar through said springs in opposite directions.

3. A leveler bar for coke ovens comprising a rigid frame structure mounted for reciprocation, a crosshead having a lost-motion connection to said structure and adapted to be actuated to move said bar, and buffer springs for cushioning the movement of said crosshead at the respective ends of its path of movement relative to said structure.

4. A leveler bar for coke ovens comprising side bars, spacing members for connecting said bars, and means movable relatively to said bars and between adjacent spacing members for dislodging any material from the spaces between said side bars.

5. A leveler bar for coke ovens comprising spaced side members, spacing members at intervals therebetween and fixed thereto and movable therewith, and means movable in the spaces between the several members for removing any material that may be lodged therein.

6. A leveler bar for coke ovens comprising a structure having open spaces therein, a member adapted for connection to an actuating device and having a lost-motion connection to said structure, and means movable with said member for dislodging material that may collect in said open spaces.

7. A leveler bar for coke ovens comprising a substantially rigid framework having open spaces therein, a relatively movable crosshead having a lost-motion connection to said bar and by means of which the bar may be actuated, a rod connected to said crosshead and movable therewith, and means on said rod for dislodging material that may collect in said open spaces.

8. A leveler bar for coke ovens comprising a framework of side members and spacing members, a crosshead having a lost-motion connection to said framework and adapted to actuate said framework, springs for cushioning the movements of said crosshead, a rod connected to said crosshead and extending lengthwise of said bar, and members carried by said rod for dislodging material collecting in said framework upon relative movement of said crosshead and said framework.

In testimony whereof, we have hereunto subscribed our names this 14th day of April, 1927.

JOSEPH VAN ACKEREN.
JOHN I. THOMPSON.