

[54] MACHINE SPOTTING DEVICE

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[56]

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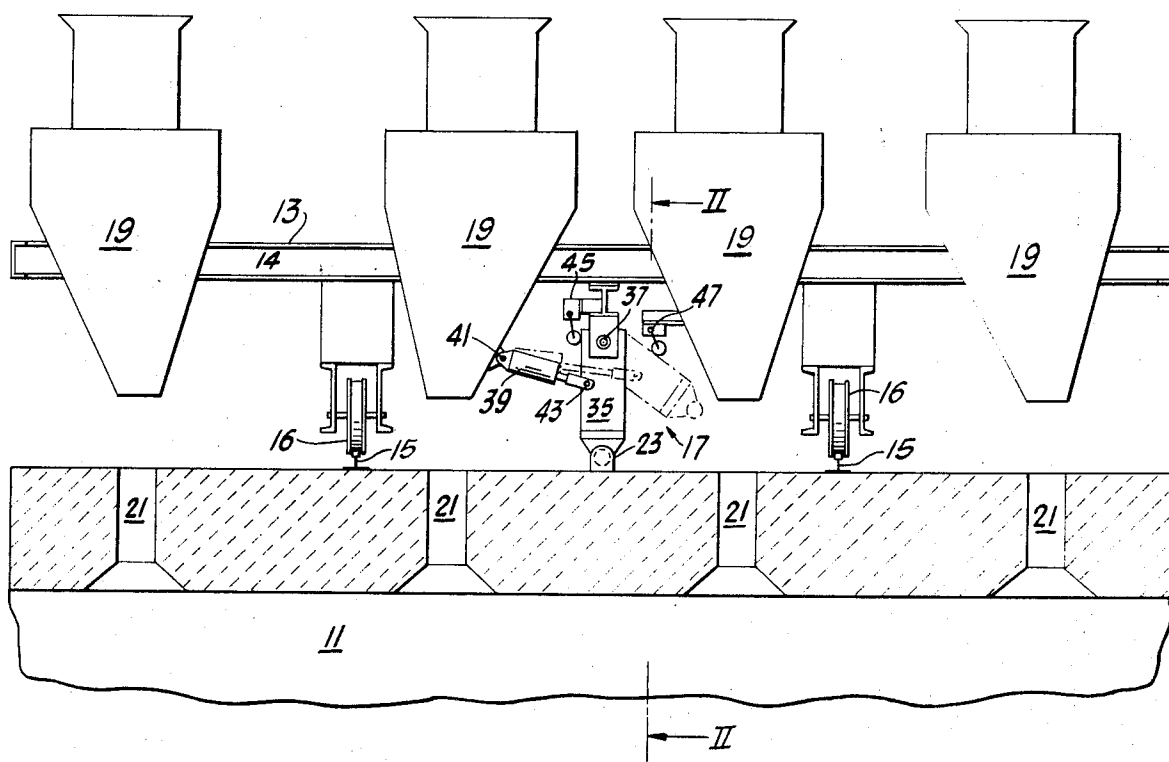
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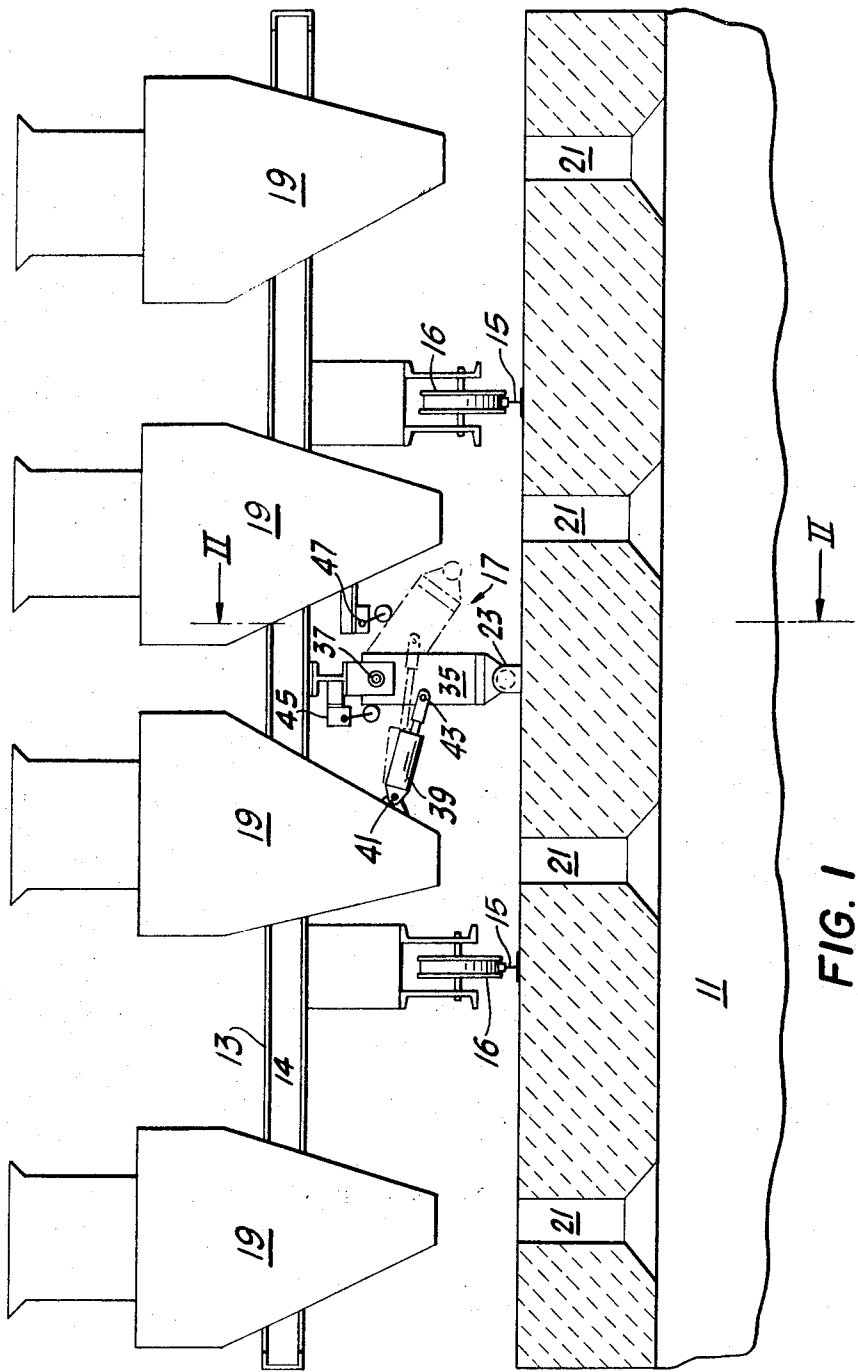
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ABSTRACT

A machine spotting device for accurately positioning a machine traveling over rails with respect to a preselected position along the rails comprises a plurality of indexing surfaces that are remote from and run along the length of the rails with an indexing surface corresponding to each position to which the machine is to be spotted, a conventional indexing cylinder for moving the machine a predetermined spaced distance from the indexing surface to the preselected position, an arm having one end pivotally mounted to the machine and having the indexing cylinder mounted to its other end, and another cylinder for moving the arm into operative association with the indexing surfaces.

5 Claims, 2 Drawing Figures





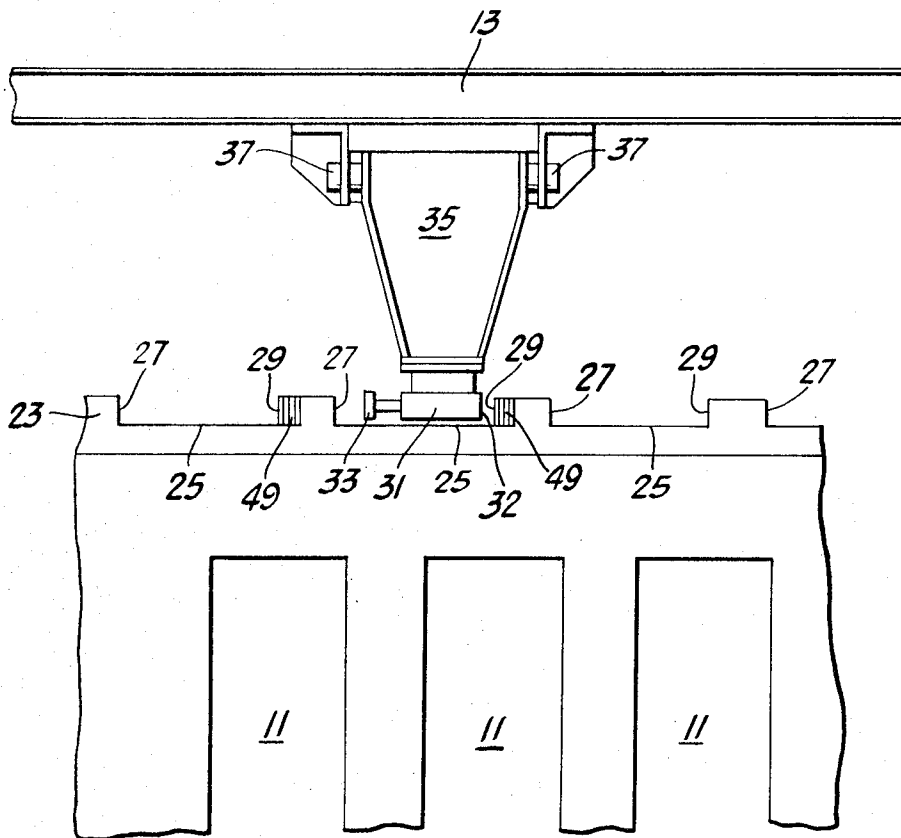


FIG. 2

MACHINE SPOTTING DEVICE

BACKGROUND OF THE INVENTION

This invention relates to a spotting device for use with rail traveling machines and, more particularly, to a spotting device for accurately positioning coke oven machines with respect to a selected coke oven of a coke oven battery.

In conventional coke oven operations some auxiliary coke oven equipment or machinery must be accurately positioned and aligned with respect to a particular coke oven of the battery for the proper functioning of such equipment. Such auxiliary coke oven equipment includes, for example, larry cars for charging coal into a coke oven and pusher machines for pushing hot coke from the coke oven.

Heretofore, operators of auxiliary coke oven machines have visually spotted the machines with respect to the selected coke oven. As would be expected, the operator frequently is unable to properly and accurately align the machine with the coke oven for various reasons; for example, the operator's vision of the coke oven may be obscured by dust, smoke or existing equipment. Consequently, there has been a long-felt need for a machine spotting device which is capable of moving a coke oven machine into an exact alignment or position with respect to the coke oven after the coke oven machine has been conveniently moved to the general vicinity of the preselected coke oven.

SUMMARY OF THE INVENTION

A machine spotting device for accurately positioning a machine that travels over rails with respect to a preselected position along such rails comprises a plurality of indexing surfaces that are remote from and run along the length of the rails. Each indexing surface corresponds to each position to which the machine is to be spotted. A machine moving means is provided for engaging the indexing surfaces and moving the machine a predetermined spaced distance from the indexing surface to the preselected position. A means being pivotally mounted to the machine is provided for carrying the machine moving means and placing the machine moving means into operative association with the indexing surfaces.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. 1 is an elevational, schematic view of an embodiment of a machine spotting device mounted to a conventional larry car made in accordance with the invention; and

FIG. 2 is a side cross-sectional view of the machine spotting device of FIG. 1 taken at line II—II.

DETAILED DESCRIPTION

In FIG. 1 a coke oven 11 which is a part of a coke oven battery has a conventional larry car 13 traveling on wheels 16 along rails 15 that extend over the roof of the coke oven battery. The larry car 13 has a spotting device 17 made in accordance with the invention that is suspended underneath the superstructure 14 of the larry car 13.

The larry car 13 moving along rails 15 receives coal from a conventional coal bunker (not shown) into its hoppers 19 and, after the larry car 13 has been aligned with the selected coke oven, discharges the coal from

the hoppers 19 into the coke oven through conventional coke oven ports 21. After the coal has been discharged into the coke oven, the larry car 13 returns to the coal bunker to receive a fresh supply of coal.

In accordance with the invention a conventional rack 23, as shown more clearly in FIG. 2, runs along the length of the battery from end to end and is fixed thereto by fasteners or the like. The rack 23 has relatively wide interdental spaces 25 at spaced intervals along the rack 23. Each interdental space 25 corresponds to each coke oven of the battery and has a width sufficient to receive the machine spotting device 17.

Each interdental space 25 provides an indexing surface 27 and an oppositely spaced backstop surface 29 as shown in FIG. 2. These surfaces 27 and 29 are planar surfaces that are generally perpendicular to the direction of travel of the larry car 13. Each indexing surface 27 and each backstop surface 29 corresponds to each coke oven of the battery, and in every case, the distance between the indexing surfaces 27 and the backstop surfaces 29 of each space 25 is equivalent.

As shown in FIG. 2 each backstop surface 29 is aligned with the centerline of each coke oven. However, the position of the indexing surface 27 or of the backstop surface 29 with respect to the coke oven will depend upon the position of the spotting device 17 with respect to the charging hoppers of the larry car.

The machine spotting device 17 includes an indexing cylinder 31, as shown in FIG. 2, which has a plunger 33 that is engageable with the indexing surface 27. The indexing cylinder 31 is mounted to one end of arm 35 which is pivotally mounted to the larry car 13 with pivots 37 at its other end. The direction in which the arm 35 pivots is substantially at right angles or perpendicular to the direction of travel of the larry car.

Intermediate the ends of the arm 35 there is provided an arm moving cylinder 39 for pivoting the arm 35 on its pivots 37 from its disengaged, carrying position (illustrated in phantom lines in FIG. 1) into its engaged, operating position (illustrated in solid lines in FIG. 1). The cylinder 39 is pivotally mounted to the larry car 13 with pivots 41 and to the arm 35 with pivots 43. The arm 35 and its indexing cylinder 31 is carried underneath the superstructure 14 of the larry car in the disengaged position without interfering with the travel of the larry car 13 to and from selected coke ovens and is dropped into the engaged position when the larry car is to be spotted with respect to a selected coke oven.

The indexing cylinder 31 and arm moving cylinder 39 illustrated herein are conventional and are commercially available. Hydraulic electrical, pneumatic cylinders and the like may be used in accordance with the invention.

When the indexing cylinder 31 is lowered into the engaged operating position (illustrated in solid lines in FIG. 1) the cylinder 31 is actuated and plunger 33 first engages the indexing surface 27. The indexing surface 27 serves as a reference point for the larry car. After the plunger engages the indexing surface, the larry car 13 begins to move away from the indexing surface due to the action of the cylinder 31 until the plunger 33 has extended its full stroke whereupon the back end 32 of cylinder 31 engages the backstop surface 29. Then the cylinder 31 engages the backstop surface 29 and the larry car is accurately aligned with the coke oven and cannot travel further with respect to the coke until the indexing cylinder 31 is raised to its disengaged position.

As an optional feature of the invention there is provided in FIG. 1 a first limit switch 45 which is actuated by the movement of arm 35 and which prevents the actuation of the indexing cylinder 31 until the arm 35 is moved to the engaged position (shown in solid lines in FIG. 1) whereupon the limit switch 45 allows the indexing cylinder 31 to be actuated. There is also provided a second limit switch 47 which is, also, actuated by the movement of arm 35 and which prevents the driving mechanism (not shown) of the larry car 13 from operating until the arm 35 is moved to its disengaged position (shown in phantom lines in FIG. 1).

In FIG. 2 there is provided shims 49 which are used to adjust the position of the backstop surface 29 due to variations and changes in the alignment of the backstop surfaces 29 with respect to the coke oven. Such changes will occur due to conventional thermal expansion and contraction of the coke oven battery.

In operation the larry car 13 is loaded with coal at coal bunker (not shown) and travels therefrom to a selected coke oven over rails 15. During this travel the arm 35 and the indexing cylinder 31 are disposed in the disengaged carrying position. The second limit switch 47 is engaged allowing the driving mechanism of the larry car to move the larry car therealong on rails 15. The driving mechanism of the larry car 13 is stopped in the near vicinity of the coke oven which is to be charged by the operator in a conventional manner. The arm moving cylinder 39 is actuated by the operator and it pivots the arm 35 and the indexing cylinder 31 into operative association with the interdental space 25 for the selected coke oven as shown in solid lines in FIG. 1 and as shown in FIG. 2. The second limit switch 47 is thereby released and prevents the driving mechanism (not shown) of the larry car 13 from operating so that only the indexing cylinder 31 may advance the larry car 13 to its preselected position in accordance with the invention. As the arm 35 and the indexing cylinder 31 move from the disengaged position (in phantom lines) to engaged position (in solid lines) the first limit switch 45 is actuated allowing the indexing cylinder 31 to be actuated at will. The indexing cylinder 31 is actuated by the operator of the larry car in a conventional manner and thereupon plunger 33 engages the indexing surface 27 in FIG. 2 and urges the larry car 13 away from the indexing surface. The indexing cylinder 31 and the larry car 13 are now moved until the back 32 of the indexing cylinder engages the backstop surface 29 whereupon the larry car 13 is perfectly aligned with its coke oven. The coal in the hoppers 19 of the larry car 13 is discharged into the coke oven in a conventional manner. The indexing cylinder 31 is released, its plunger 33 is withdrawn and the arm moving cylinder 39 returns the arm 35 to the disengaged position (in phantom lines in FIG. 1). The second limit switch 47 thereby is actuated and permits the driving mechanism (not shown) of the larry car to advance the larry car 13 along rails 15 to the coal bunker (not shown) to receive another charge of coal to be charged into another coke oven. The first limit switch 45 is released preventing the indexing cylinder 31 from being actuated.

It will be readily apparent to those skilled in the art that my invention may be practiced with the other auxiliary coke oven equipment, such as, for example, a pusher machine or a quenching car. This invention may also be practiced with other types of rail traveling equipment.

What is claimed is:

1. Apparatus for positioning a machine travelling over rails on a supporting surface with respect to a preselected location along said rails comprising:

- a. plurality of protrusions on said surface, with each protrusion having opposite indexing and back-stop surfaces, said protrusions being separated by interdental spaces; and
- b. means for positioning in one of said interdental spaces that is related to said preselected location a device that engages the indexing surface of one protrusion as said machine moves in one direction along said rails and then, as a result of such engagements, said machine reverses said direction of movement until said device engages the back-stop surface of an adjacent protrusion whereby said machine stops and is spotted at the preselected location.

2. The apparatus of claim 1 wherein said device comprises a conventional cylinder having a plunger for engagement with said indexing surface.

3. The apparatus of claim 1 including:

- a. an arm pivotally mounted to said machine and carrying said device; and
- b. means for pivoting said arm whereby in one position said device engages said protrusions and in another position it avoids engagement with said protrusions.

4. Apparatus for positioning a machine travelling over rails on a supporting surface with respect to a preselected location along said rails comprising:

- a. a plurality of protrusions on said surface with each protrusion having opposite indexing and back-stop surfaces and with said protrusions separated by interdental spaces;
- b. an arm pivotally mounted to said machine and carrying a device that is engageable with said indexing surface on one protrusion as said machine moves in one direction along said rails and then as a result of such engagement said machine reverses said direction of movement until said device engages said back-stop surface of an adjacent protrusion whereby said machine stops and is spotted at the preselected location; and
- c. means for pivoting said arm whereby in one position said device is engageable with said surfaces and in another position said device is not engageable therewith.

5. The apparatus of claim 4 wherein:

- a. said device includes a cylinder and piston assembly; and said apparatus includes
- b. limit switches that coact with said arm as it pivots and stops said pivoting when said arm is at a preselected location.

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