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T. E. S. HORSFALL
OSCILLATORY CIRCUIT INTERLOCK OF HORIZONTAL
COKE OVEN BATTERIES

3,017,622

Filed July 14, 1959

3 Sheets-Sheet 1

Fig. 1.

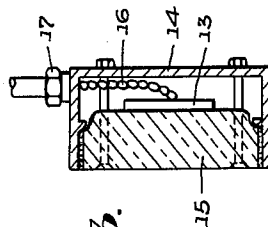
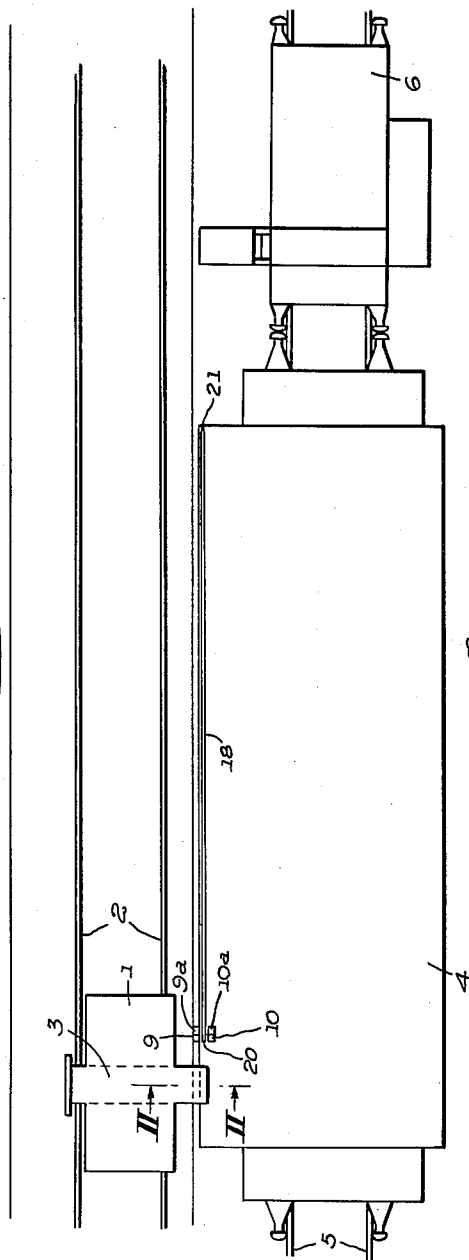


Fig. 3.

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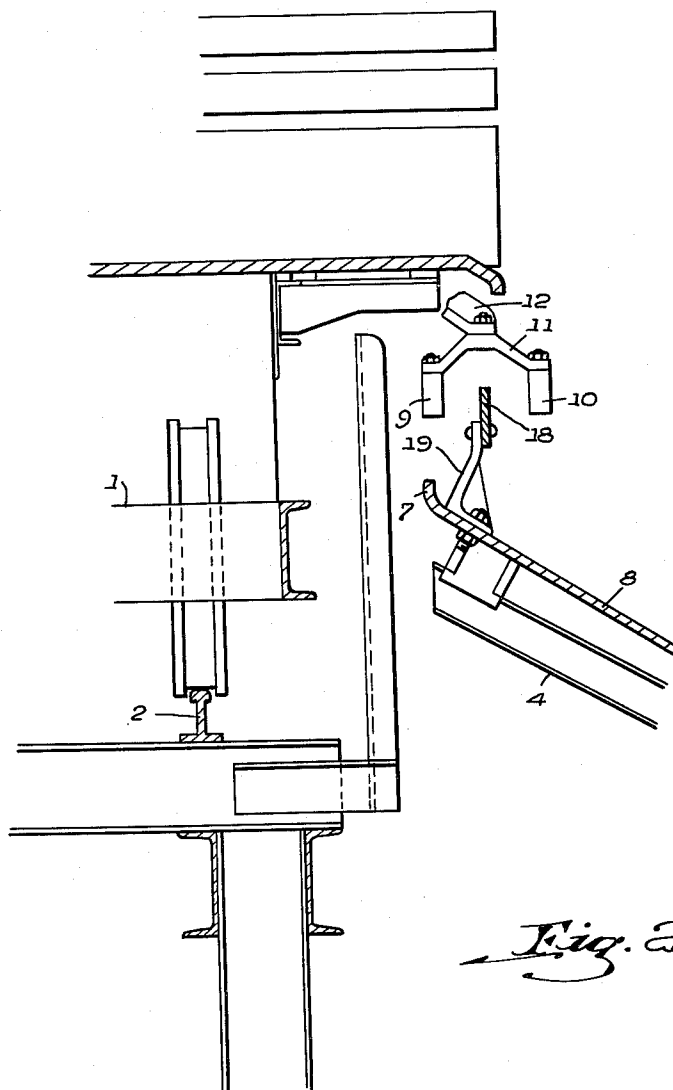


Fig. 2.

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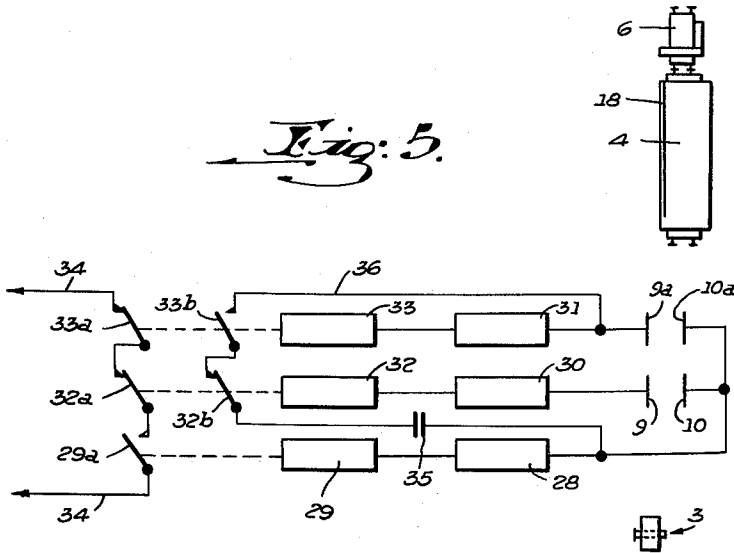
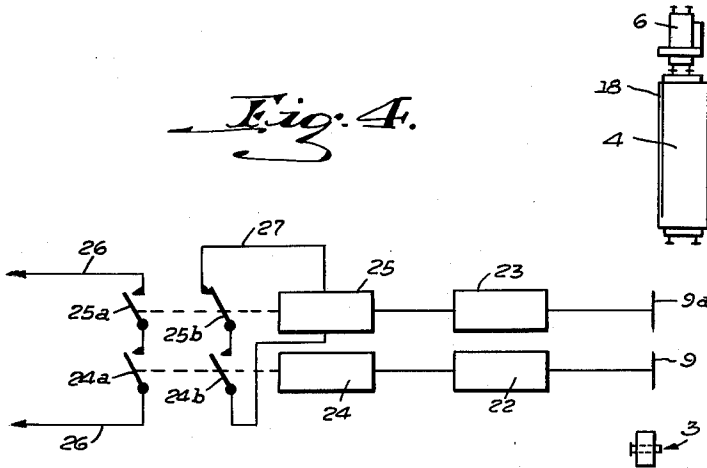
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3 Sheets-Sheet 3



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OSCILLATORY CIRCUIT INTERLOCK OF HORIZONTAL COKE OVEN BATTERIES

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13 Claims. (Cl. 340—282)

This invention relates to improvements in the operation of horizontal coke oven batteries and is particularly concerned with the operations of discharging coke produced in the ovens of such a battery.

A horizontal coke oven battery comprises a plurality of long narrow ovens arranged side by side and separated from one another by heating walls containing flues in which combustion takes place to heat the walls and thus the ovens. The opposite horizontal ends of each oven are closed by removable doors and when a charge of coal in any one oven has been converted into gas and coke these doors are removed and the coke discharged from the oven by pushing a ram through the oven from one side of the battery to the other. The coke so discharged is usually guided through a coke guide on a coke guide car into a coking quenching car which is thereafter run down to a quenching station or dry cooling plant where the hot coke is quenched with water, or cooled by means of cooled inert gas, as the case may be, before being discharged onto a coke wharf for final cooling and storage.

The said pusher ram is mounted on a "pusher" machine which moves along one side of the battery, and is usually equipped with a door-handling mechanism for removing and replacing the oven doors at the pusher side of the battery prior to and following a discharge operation. The "coke guide machine" moves along the other "coke" side of the battery and is equipped with a guide for guiding the discharged coke into the coke quenching car and is also, usually, equipped with a door-handling mechanism for removing and replacing the oven doors at the coke side of the battery. The coke quenching car is usually propelled by an electric locomotive.

The operators of the pusher machine and the coke-guide machine respectively cannot normally see one another owing to the interposition of the battery between their machines. Moreover, as there may be 100 or more ovens in the battery, it is usual to provide some form of interlocking or signalling system to ensure that both these machines are aligned with the same oven before the pusher ram can be started for discharge of coke, to avoid pushing when the two machines are not aligned with the same oven, which could cause considerable damage to the coke side door and door frame of the oven into which the ram was advanced, and to the battery structure, and could also result in several tons of incandescent coke being ejected against the door and onto the track for the coke-guide machine and possibly also against the coke guide itself and personnel on the coke side of the battery.

Many interlocking and/or signalling systems have been proposed and used for the purpose of avoiding such accidents, such systems being electrically, mechanically or fluid-pressure operated, or combinations thereof, the systems usually being arranged to prevent advance of the ram into an oven until a signal has been received from the coke-guide machine signifying that not only is the latter aligned with the same oven as the pusher machine but that also the operator of the coke-guide machine is ready for discharge to commence.

Such systems usually satisfactorily ensure alignment of the two operating machines with a single oven, but

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do not ensure that the coke-guide machine and coke quenching car are in position to receive the discharged coke and that the locomotive driver is ready to move the quenching car progressively along the latter as the coke is discharged thereby to distribute the coke along the quenching car. Thus the known systems do not provide adequate protection against coke car accidents on the coke side of the battery.

An object of the present invention is to provide means whereby such coke car accidents may be prevented or the risk thereof minimized.

Thus the present invention provides a novel coke guide car and coke car system with equipment therebetween, for operation in a horizontal coke oven battery, to indicate the accurate proximity of the coke car to the coke guide machine in the form of an oscillatory circuit which is altered by the accurate coke car proximity to the coke-guide machine for coke discharge as the coke car moves into position to receive discharged coke to produce an indication of the actual and accurate presence of the coke car in coke discharge position alongside the coke guide car.

This equipment may conveniently comprise a tuned circuit in which oscillatory currents may be sustained, such circuit being coupled to a pick-up which is sensitive to the proximity of the coke car and is adapted to vary the level of oscillatory currents in said tuned circuit to show the presence or absence of the coke car, the arrangement including indicating means for detecting the level of such oscillatory currents in the tuned circuit.

Oscillatory currents may be sustained in said tuned circuit by direct coupling to an amplifier, the level of such currents being affected by the external capacity or inductance of the pick-up, pick-up is so arranged on the coke-guide machine that its external capacity or inductance is affected by the proximity of the coke car or a part thereof to its position to receive discharged coke; alternatively, oscillatory currents may be induced in said tuned circuit by high-frequency radiation collected by the pick-up, the arrangement being such that proximity of the coke car to its said position affects the amount of energy collected by the pick-up and fed to the tuned circuit.

Thus in a first embodiment of the invention the said tuned circuit is directly coupled to an amplifier and the external capacity or inductance of a pick-up coupled to such circuit determines the presence or absence of sustained oscillatory currents in such circuit. Preferably it is arranged that the change in external capacity or inductance of the pick-up due to the presence of the coke car in position to receive discharged coke destroys oscillation in the tuned circuit, so that the oscillation occurs in such circuit only when the coke car is out of said coke discharge position; the reverse arrangement may, however, alternatively be employed.

In a second embodiment, however, a local transmitter radiates high-frequency energy at the resonant frequency of the tuned circuit and such energy is collected by the pick-up and fed to the tuned circuit at a level determined by the proximity of the coke car to its aforesaid position. Said transmitter may be mounted on the coke car (or its locomotive) so that the energy level at the pick-up increases as the coke car approaches said position, or, preferably, the transmitter may be located on the coke-guide machine and the coke car be adapted to screen the pick-up or otherwise attenuate the energy level at the pick-up as it approaches said position. A variation of the latter arrangement would involve the use of a static transmitter, the coke car attenuating the energy level at the pick-up as it approaches its aforesaid position; such arrangement would, however, require a higher radiated power.

er of the transmitter and be more susceptible to interference by external effects than the preferred arrangement.

The tuned circuit may be an IC network or a resistive-capacitive network and in the case of the first embodiment, components of the network may include the amplifier which may comprise a thermionic valve, a resonant-cavity device or a semi-conductor device, or combinations thereof.

In the case of the first embodiment, the presence or absence of oscillatory currents in said tuned circuit may be determined in any convenient manner, depending upon the actual circuit arrangement adopted. Where a thermionic valve is employed as the amplifier and the anode current of such valve differs in value in accordance with the presence or absence of oscillatory currents in said circuit, the anode current of such valve may be sensed by means of a relay in the anode circuit, which relay responds to the changes in anode current. Moreover, preferably the presence of the coke car in its position to receive discharged coke is signified by the operation of a relay, for the reason that power failure will not give a false indication; that is, with the relay in the anode circuit of an amplifying thermionic valve sustaining the oscillations in the tuned circuit, the relay will operate only if the oscillatory current in the tuned circuit is arrested and not through failure of the equipment or its power supply, thereby providing very satisfactory "fail safe" characteristics.

In the case of the second embodiment, the presence or level of oscillatory currents in the tuned circuit may be sensed in any convenient manner, the presence of the coke car in position to receive discharged coke preferably being indicated by the operation or release, as desired or convenient, of a relay: "fail safe" characteristics will preferably be achieved by appropriate circuit design, for example as hereinafter described.

During discharge of coke, the coke car is propelled slowly forward to distribute the discharged coke along its length; usually the car is pushed by the locomotive in the direction of the coke-quenching station or cooling plant so that the part of the car loaded first is the end thereof remote from the locomotive. According to a further feature of this invention, the said proximity-sensitive means may be adapted to indicate that the correct part of the coke car is positioned relatively to the coke guide of the coke-guide machine for commencement of a discharging operation.

For example, a pick-up may be so disposed that it is affected to the extent required by the presence of said part of the coke car in the position for commencement of coke discharge. Thus the said part of the coke car may be equipped with a projection or screen which enters the vicinity of the pick-up to produce the required effect thereon when the car is in said position.

Moreover, the proximity-sensitive means may be duplicated and so arranged that one such means provides an indication of correct positioning of the coke car for commencement of a discharge operation and the other provides an indication of correct positioning during such operation.

Alternatively, a pair of proximity-sensitive means may be arranged successively to sense the proximity of the coke car, the order in which such means sense the proximity of the car depending upon the direction of travel of the latter. In such case it can be arranged that an indication that the coke car is in position for commencement of discharge of coke will be provided only when the coke car approaches the coke-guide machine when travelling in the direction in which it should move during discharge.

The indication produced by the equipment of this invention may be purely supervisory, i.e. it may merely take the form of a signal, visual or audible, to the coke-guide machine operator, or it may have a controlling function and be adapted to prevent advance of the pusher machine ram unless the coke car is properly positioned. In the

latter case, any convenient means may be employed to prevent advance of the pusher ram, that is to say, the equipment may take over from the coke-guide machine operator the ultimate control of any of the known interlocking systems in which advance of the pusher ram is prevented until the said operator performs some controlling function, or the equipment may be independent of, or duplicate, the conventional interlocking systems.

For example, the equipment of the invention may exercise final control, at the coke-guide machine, of systems such as disclosed in British Patents Nos. 720,469, 729,964, 741,398, 745,509, 768,809 and 770,887; moreover, the equipment may exercise final control, at the coke-guide machine, of systems such as disclosed in the specifications of the common assignee's copending British applications numbered 801,116 and 801,117 (United States applications Serial Nos. 614,725, now abandoned, and 614,726) or of British application No. 25,686/57.

Where the equipment is to provide a controlling function it will usually be desirable to adopt an arrangement which is adapted to preclude discharge of coke being initiated unless the coke car is in the appropriate position for commencement of discharge and to arrest discharge in the event that the coke car moves out of position during discharge.

Thus duplication of the proximity-sensitive means will conveniently be adopted in such circumstances, the equipment incorporating, for example, two tuned circuits with associated pick-ups one of which pick-ups is affected by the presence of the front end portion of the car in position to receive the initially discharged coke whilst the other is affected by the presence of any part of the car in position to receive coke during a discharge operation. With such arrangement, and particularly one in which proximity is signified by operation or release of an individual relay associated with each pick-up and its tuned circuit, operation or release of both relays together could be a prerequisite for advance of the pusher ram, the relay associated with the tuned circuit being sensitive to correct positioning for commencement of discharge and having a locking circuit including contacts at the other relay so that once both relays had operated or released upon correct positioning of the car for commencement of discharge, both would remain operated or released during movement of the coke car relatively to the coke-guide during discharge, provided the car remained generally in position relative to the coke guide to receive the discharged coke.

In an alternative arrangement, the equipment may incorporate two tuned circuits with associated pick-ups disposed to sense successively the proximity of the coke car to its correct position for discharge to commence, and response of the tuned circuits to the significant movement of the car in the appropriate direction for discharge as a prerequisite for advance of the pusher ram.

The pick-up equipment, in accordance with the first above described embodiment, may take the form of a probe or plate or coil lying in a horizontal plane and sensitive to horizontal parts of, or horizontal projections or screens extending laterally of, the coke car, thereby to minimise interference from ironwork of the platform or bench along which the coke-guide machine runs, and also to prevent the locomotive, which propels the coke car but whose width is less than that of the coke car, from affecting the equipment. With the usual form of coke car, a pick-up could be arranged to extend over the side lip of the coke car to sense the presence under the pick-up of the flat metallic upper surface of such lip, to give a general indication of the car being in position to receive discharged coke, whilst a second pick-up, e.g. at a different level, could extend over a rib or plate or screen projecting from the side of the coke car near or beyond the front end of the coke car to sense the presence of the front end of the coke car in position for commencement

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of discharge of coke, such second pick-up, if desired, terminating short of the vertical plane containing the side of the coke car so as not to be affected by the coke car itself.

Alternatively, two pick-ups could be arranged to extend over the side lip of the coke car to be affected successively as the coke car approaches the coke-guide machine, the order in which such pick-ups respond to the approach of the coke car signifying the direction of travel of the latter as explained above.

In the case of an arrangement in accordance with the second above described embodiment and involving a transmitter located on the coke-guide machine, this transmitter may have a radiator in the form of a probe or plate suitably disposed with respect to the pick-up for the latter to be screened from the transmitter probe when the coke-guide machine and coke car are in desired relative positions. In this case the pick-up and radiator may be horizontally disposed or have any other disposition. Conveniently they may be vertically disposed to co-operate with one or more vertical screens on the coke car side lip.

Generally it will be undesirable for a pick-up (or radiator) to be located directly in line with the coke-guide and below the latter since the passage of incandescent coke in a stream just above the pick-up (or radiator) would result in its being subjected to very intensive heating by radiation, and the risk of physical contact with falling coke below the main stream thereof. Thus in practice it would be desirable for pick-ups (and radiators) to be located to one side of the coke guide.

Since in any location on the coke-guide machine a pick-up or radiator is exposed to the ambient atmosphere which is usually heavily contaminated with smoke, dust, and corrosive gases during coke discharge, it will usually be desirable to employ a form of pick-up or radiator which may easily be replaced or serviced (such as a probe) or a form which can withstand the effects of such atmosphere without requiring frequent servicing.

Thus a presently preferred form of pick-up or radiator comprises a plate or coil which is totally enclosed in an easily cleaned protective housing at least one side of which is non-shielding.

It will be understood that the circuits associated with the pick-up (and the radiator where required) will preferably be mounted, in a suitable protective enclosure, in a location well shielded from hot coke and/or the open end of an oven prior to or during discharge, e.g. in the operator's cab, the pick-up (and radiator) being connected to the circuits via suitable feeders e.g. co-axial cable, armoured and/or protected as required.

Convenient oscillation frequencies lie in the range 20 kcs. to 150 kcs., since frequencies within the said range may be sustained or detected in simple tuned circuits with the use of thermionic valves or semi-conductor devices, but higher frequencies could be used with more sophisticated circuit arrangements. Frequencies of the order of 100 kcs. (e.g. in the range 60 to 120 kcs.) are at present preferred.

In order that the invention may be fully understood, two embodiments thereof will now be described by way of example and with reference to the accompanying drawings in which:

FIGURE 1 is a diagrammatic plan view of the coke side of a horizontal coke oven battery showing the coke-guide machine, the coke car and its locomotive in the relative positions required for commencement of discharge of coke from an oven of the battery.

FIGURE 2 is a fragmentary part-sectional view on the line II—II of FIGURE 1;

FIGURE 3 is an enlarged part-sectional view of a preferred form of pick-up or radiator;

FIGURE 4 is a block diagram showing the electrical circuits of equipment in accordance with one embodiment of the invention; and

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FIGURE 5 is a block diagram showing the electrical circuits of equipment in accordance with a second embodiment of the invention.

FIGURES 1 and 2 of the drawings illustrate the general arrangement of equipment in accordance with the invention, this arrangement being common to both specific embodiments which differ mainly in their electrical circuits and components as will be explained with reference to FIGURES 4 and 5.

FIGURE 1 of the drawings is a diagrammatic plan view of the coke side of a horizontal coke oven battery, this figure showing the coke-guide machine 1 which runs on rails 2 on a platform extending along the coke side of the battery and is usually electrically propelled. The coke-guide machine 1 incorporates a coke-guide indicated diagrammatically at 3 in FIGURE 1 and which extends transversely across the machine and serves to guide coke discharged from an oven of the battery into a coke car 4 which is propelled along rails 5 parallel with the rails 2, but at ground level, by means of an electric locomotive 6.

FIGURE 1 shows the relative positions of the coke-guide machine, the coke car 4 and its locomotive 6 at the commencement of discharge of coke from an oven and it will be noted that the coke guide 3 is positioned near the front end of the coke car 4, that is to say, the end of the car remote from the locomotive 6. During coke discharge, the locomotive 6 propels the coke car forwardly so as to distribute the discharged coke along the length of the car 4, this forward movement of the car being continued after discharge is completed to convey the coke to a quenching station or dry cooling plant which would be located beyond the left hand side of FIGURE 1.

As will be more clearly seen from FIGURE 2, the coke car 4 has an upstanding lip 7 extending along the side nearer to the coke-guide machine and the bottom 8 of the car slopes downwardly away from this lip and eventually joins a substantially vertical wall (not shown) defining the opposite side of the car.

In accordance with the present invention the coke guide machine carries a pair of pick-ups 9, 9a; in the case of the second embodiment to be described in connection with FIGURE 5 is also carries a pair of radiators 10, 10a. The pick-ups 9, 9a, face outwardly of the coke guide machine 1 whilst the radiators 10, 10a of the second embodiment face inwardly and are disposed opposite the faces of the pick-ups 9, 9a.

The pick-ups 9, 9a are disposed to lie approximately over the lip 7 of the coke car 4 when the latter is in position to receive discharged coke. As shown in FIGURE 2, the pick-ups 9, 9a (and radiators 10, 10a where provided) are mounted on a yoke 11 carried by a bracket 12 on the structure of the coke-guide machine to the rear of the coke guide 3, i.e. to the right of the latter as seen in FIGURE 1. This disposition of the pick-ups is preferred because it avoids the pick-ups being directly adjacent to coke discharged into the coke car 4 since the movement of the car during coke discharge carries the coke continuously away from the region of the pick-up.

The pick-ups 9, 9a (and radiators 10, 10a) are of similar construction and as shown in FIGURE 3 each comprise a rectangular metal plate 13, for example about four inches long and three inches high, totally enclosed within a sealed protective housing constituted by an open-fronted metal box 14 the front of which is closed by a block 15 of a low-loss dielectric such as glazed ceramic capable of withstanding the radiant heat to which it will be exposed during coke discharge. The plate 13 is mounted on the inner face of the block 15 and is connected to a suitable feeder 16 which extends through a gland 17 in the box 14 and is led to its associated electrical equipment which is conveniently installed in the driver's cab (not shown) of the coke-guide machine.

The coke car 4 carries, adjacent to its lip 7, a continuous longitudinal metal plate or screen 18 mounted on

suitable brackets 19 at intervals along its length and positioned to pass in front of the pick-ups 9, 9a, as the coke car 4 moves past the coke-guide machine 1. In the case of the second embodiment, the screen 18 passes between the pick-ups and the radiators 10, 10a the latter being spaced from the pick-ups by about ten inches. As will be noted from FIGURE 1, the screen 18 is so positioned on the coke car 4 that its front end 20 will just overlie the pick-ups 9, 9a when, following approach of the car by forwards movement, i.e. from the right as seen in FIGURE 1, the car reaches the correct position relatively to the coke-guide machine for discharge of coke to commence. The rear end 21 of the screen 18 is positioned to clear the pick-ups 9, 9a when the rear end of the coke car is approximately aligned with the rear of the coke guide 3. Thus the arrangement is such that the screen 18 will overlie the pick-ups 9, 9a so long as the coke car 4 is in a position, relatively to the coke-guide machine 1, to receive coke discharged through the coke guide 3.

In a first embodiment of the invention, there are no radiators 10, 10a and the pick-ups 9, 9a are associated with electrical circuitry shown in block diagram form in FIGURE 4. As shown, the pick-ups 9, 9a are individually coupled to tuned circuits 22, 23 incorporating suitable amplifiers for sustaining oscillatory currents in such circuits when the external capacities of the pick-ups have a selected value. Since the external capacity of each pick-up varies in accordance with the presence or absence of the screen 18 in front of it, it can be arranged that oscillatory currents are sustained in the absence of the screen and extinguished by the presence of the screen, which is preferred, or vice versa.

The circuits 22, 23 are individually associated with relays 24, 25 which respond to the presence of oscillatory currents in the circuits by changing their condition; it is preferred that the relays shall be operated when the coke car 4 is in position to receive discharged coke, i.e. when the screen 18 overlies the pick-ups 9, 9a, since power failure will not cause a similar effect to correct positioning of the coke car for coke discharge. Such preferred arrangement is readily achieved by the use of thermionic valves as amplifiers in the circuits 22, 23 with relays 24, 25 in the anode circuits of such valves.

The relays 24, 25, have make contacts 24a, 25a in a control circuit represented by the leads 26 in FIGURE 4, these contacts being wired in series so that both relays must operate to close such control circuit.

Preferably it is arranged that the control circuit will only be closed upon approach of the coke car whilst travelling forwardly, i.e. from the right as seen in FIGURE 1, this discrimination between the directions of travel of the car being achieved, in the arrangement shown, by preventing operation of relay 25 following operation of relay 24. Thus the relay 25 is shunted by a direction-sensing circuit 27 including make contacts 24b of relay 24 and break contacts 25b of relay 25 which is thereby completed to hold relay 25 released should relay 24 operate first upon approach of the coke car 4 to the coke-guide machine 1.

In a second, preferred, embodiment of the invention utilizing radiators 10, 10a as shown in FIGURES 1 and 2, the circuitry associated with the pick-ups 9 and radiators 10, 10a is shown in FIGURE 5 and comprises local transmitter 28 which is preferably of very low power and which may conveniently be constituted by a single thermionic valve or semi-conductor device oscillator circuit which feeds R.F. energy to the plates 13 of the radiators 10, 10a. The transmitter 22 is associated with a relay 29 in such manner that the latter is operated so long as R.F. energy is being fed to the radiators.

The plates 13 of the two pick-ups 9, 9a are individually connected to a pair of detectors 30, 31 each of which incorporates a tuned circuit resonant at the frequency of the R.F. energy fed to the radiators and suitable means for detecting the presence or level of oscillatory currents

in such circuits and adapted to operate associated relays 32 and 33 when the level of oscillatory currents in such tuned circuits is of the value obtaining in the absence of the screen 18 on the coke car from the space between the pick-ups 9, 9a and radiators 10, 10a. Thus the arrangement is such that when the coke car 4 is not in position to receive discharged coke, relays 29, 32 and 33 are all operated, whilst when the coke car approaches its correct position to receive discharged coke, relays 32 and 33 will release as the screen 18 enters the space between the pickups 9, 9a and radiators 10, 10a. The relays 32 and 33 are independent and accordingly the order in which they operate is significant of the direction from which the coke car 4 approaches the coke guide machine 1 and approach of the coke car from the right as seen in FIGURE 1 results in release of relay 33 prior to release of relay 32.

The relays 29, 32 and 33 each have a set of contacts in a control circuit represented by the leads 34 in FIGURE 5, the relay 29 having a set of make contacts 29a in this circuit and the relays 32 and 33 each having a set of break contacts 32a, 33a in such circuit, the contacts 29a, 32a and 33a all being arranged in series. It will be apparent that the control circuit 34 will only be closed when relay 29 is operated and relays 32 and 33 are both released. Relay 29, with its associated contacts 29a, in the control circuit, is an optional component but is preferably incorporated since it provides "fail safe" characteristics in that a power supply failure which would cause release of relays 32 and 33 also produces release of relay 29 and prevents spurious closure of the control circuit 34.

As so far described, the control circuit 34 will be closed whenever the coke car 4 is in position to receive discharged coke. However the circuit arrangement shown in FIGURE 5 is adapted, like that of FIGURE 4, to prevent closure of the control circuit 34 unless the coke car 4 approaches the coke-guide machine whilst moving forwardly, i.e. in the direction in which it should travel during coke discharge, so that return of the coke car from the quenching station to a position to the rear of the coke-guide machine i.e. to the right of the latter as seen in FIGURE 1, will not cause closure of the control circuit 34.

Thus as shown in FIGURE 5, the transmitter 28 also feeds R.F. energy via a coupling capacitor 35 to a direction-sensing circuit 36 which extends via break contacts 32b of relay 32 and make contacts 33b of relay 33 to the input of detector 31. The contacts 32b and 33b are in series and it will be apparent that if relay 32 releases before relay 33, the circuit 36 will be completed and detector 31 will be supplied with R.F. energy from the transmitter 28 regardless of the interposition of screen 18 between the radiator 10a and pick-up 9a associated with detector 31. Thus relay 33 will be maintained operated and the control circuit 34 held open at break contacts 33a of relay 33.

On the other hand, release of relay 33 prior to release of relay 32 disables the circuit 36 at contacts 33b so that both relays 33 and 32 may release in that order as the screen 18 successively attenuates the transmission of R.F. energy from the radiators to the pick-ups 9a, 9 associated with detectors 31 and 30 respectively.

The closure of the control circuit 26 or 34 to signify that the coke car 4, whilst travelling in the proper direction, has reached the correct position relatively to the coke-guide machine 1 for commencement of coke discharge may be utilized merely to provide an indication of this fact to the coke-guide machine operator. Preferably, however, closure of the control circuit is adapted to remove an impediment to the advance of the pusher ram on the pusher machine (not shown) at the opposite side of the battery and this function may be achieved in any convenient manner. For example, the control circuit may extend directly to the pusher machine via

suitable conductors (e.g. trolley wires or conductor rails, or interconnected contact studs at the opposite end of the oven to be discharged). Preferably, however, the control circuit will be incorporated in any suitable interlocking system used for preventing advance of the pusher ram until such time as the coke-guide machine operator is ready for discharge and/or the pusher machine and the coke-guide machine are appropriately aligned with the correct oven of the battery. For example the control circuit may control the transmitter of equipment such as described in the specifications of the assignee's aforesaid copending applications numbered 614,725, now abandoned, and 614,726.

What I claim is:

1. Horizontal coke oven battery equipment comprising, the combination of a coke guide machine having a coke guide operatively associated therewith and a coke car movable relative thereto into position therewith alongside a battery of coke ovens to receive hot coke from selected ovens of the battery through the guide on the coke guide machine, with an oscillating current circuit in a position, on the coke guide machine, at which the circuit will be affected by the proximity of a part on the coke car that is totally out of direct contact with said oscillating current circuit, said coke guide, and said coke guide machine, whereby said proximity of said part on the coke car causes the oscillatory condition of the circuit to be altered in a manner to produce an indication on the coke guide machine of the accurate positioning of the coke car alongside the coke guide machine when the coke car is moved into position to receive incandescent coke to be discharged through from the coke guide; said part on the coke car affecting said alteration of said circuit conditions only when the coke car and the coke guide are in coke receiving position relative to a single one of the coke ovens of said battery, and indicating means on the coke guide machine operable by said circuit when its oscillatory conditions are altered as aforesaid by the proximity of said part on the coke car.

2. Equipment according to claim 1, wherein said oscillatory circuit comprises a tuned circuit in which oscillatory currents may be sustained, such circuit being coupled to a pick-up that is in a position on the coke guide machine to be sensitive to the proximity of said part on the coke car and that is adapted to vary the level of oscillatory currents in said tuned circuit in accordance with the presence or absence of the coke car, said circuit including indicating means for detecting the level of such oscillatory currents in the tuned circuit.

3. Equipment according to claim 2, wherein said oscillatory currents are sustained in said tuned circuit by direct coupling to an amplifier, the level of such currents being affected by the pick-up, and wherein the pick-up is so arranged on the coke guide machine that it is affected by the proximity of said part on the coke car to its position to receive discharged coke.

4. Equipment according to claim 3, wherein the pick-up coupled to said tuned circuit determines the presence or absence of sustained oscillatory currents in such circuit.

5. Equipment according to claim 4, wherein the change in the pick-up due to the presence of said part on the coke car in position to receive discharged coke destroys

oscillation in the tuned circuit, oscillation occurring in such circuit when the coke car is out of said position.

6. Equipment according to claim 5, wherein said amplifier is a thermionic valve the anode current of which increases upon extinction of oscillatory currents in said tuned circuit, the anode circuit of such valve including a relay which is released for values of anode current corresponding to the presence of oscillatory currents in the tuned circuit and which is operated by the increased anode current consequent upon extinction of such oscillatory currents.

7. Equipment according to claim 2, wherein oscillatory currents are induced in said tuned circuit by high-frequency radiation collected by the pick-up, the arrangement being such that proximity of said part on the coke car to pick up affects the amount of energy collected by the pick-up and fed to the tuned circuit.

8. Equipment according to claim 7, wherein a local transmitter radiates high-frequency energy at the resonant frequency of the tuned circuit and such energy is collected by the pick-up and fed to the tuned circuit at a level determined by the proximity of said part on the coke car to the position of said pick up.

9. Equipment according to claim 8, wherein said transmitter is located on the coke-guide machine and said part on the coke car is adapted to attenuate the energy level at the pick-up as it approaches said pick up.

10. Equipment according to claim 9, wherein said proximity-sensitive pick up is so located on the coke guide machine in relation to the guide thereon as to indicate that the correct part of the coke car is positioned relatively to the coke guide of the coke-guide machine for commencement of a discharging operation.

11. Equipment according to claim 10, wherein the aforesaid proximity-sensitive pick up mechanism is duplicated and arranged successively to sense the proximity of said part on the coke car, the order in which such pick ups senses the proximity of said part on the car depending upon the direction of travel of the latter, and the pick ups are so located on the coke guide machine in relation to the guide thereon as to provide an indication that the coke car is in position for commencement of discharge of coke only when the coke car approaches the coke-guide machine when travelling in the direction in which it should move during discharge.

12. Equipment according to claim 11, wherein each pick-up is totally enclosed in an easily cleaned protective housing at least one side of which is non-shielding.

13. Equipment according to claim 12, wherein said transmitter comprises at least one radiator which is totally enclosed in an easily cleaned protective housing at least one side of which is non-shielding.

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