

United States Patent [19]

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Schulte

[45] Oct. 29, 1974

[54] COKING INSTALLATION

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[30] Foreign Application Priority Data

Oct. 16, 1972 Germany..... 2250636

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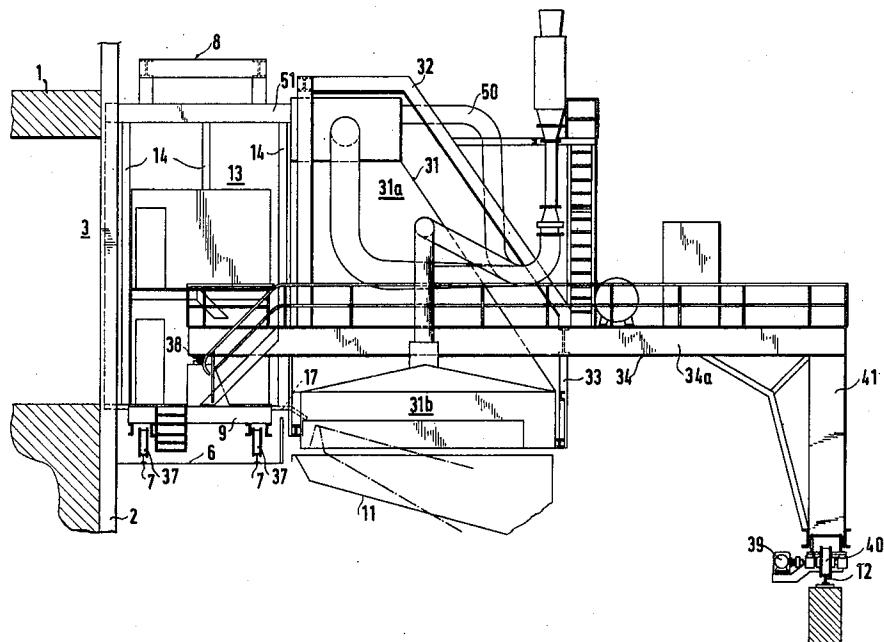
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ABSTRACT

In a coking installation having a horizontal-chamber coke oven battery, first rails extend along this battery and a coke guide car is mounted on these rails for movement along the battery and adapted to receive incandescent coke from the respective ovens. A quenching car is mounted for movement along the battery also, and is adapted to receive coke from the coke guide car for the purpose of transferring the coke to a quenching station. Second rails extend along the first rails at a side of the quenching car which faces away from the coke oven battery. A supporting frame is rollably mounted on the rails and has at least one arm portion which passes freely around one end of the coke guide car, as seen in the longitudinal direction of the rails, and which can be releasably coupled with the coke guide car so that the frame and coke guide car can move together along the battery of coke ovens. A hood is carried by the supporting frame and extends at least in part over the quenching car to intercept dust and gases which become liberated from the coke.

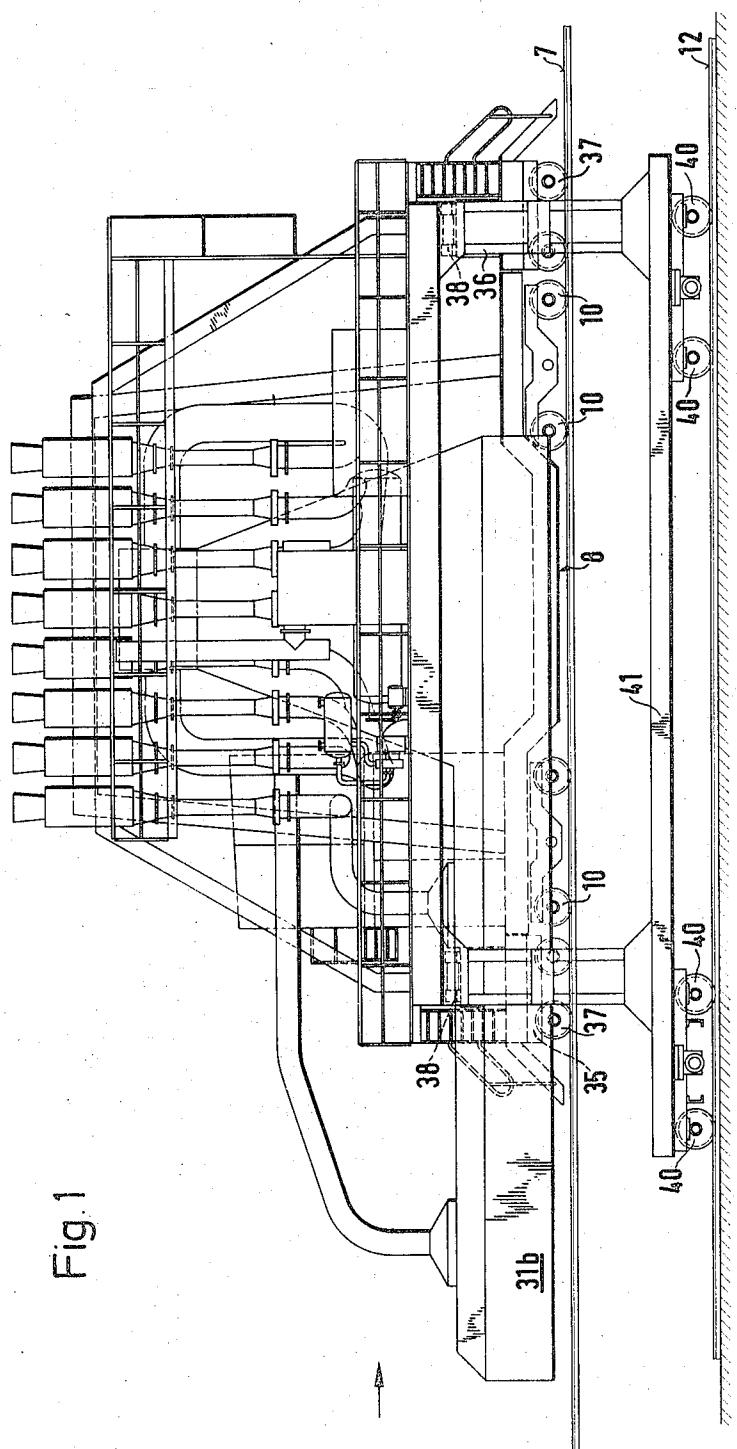
17 Claims, 19 Drawing Figures



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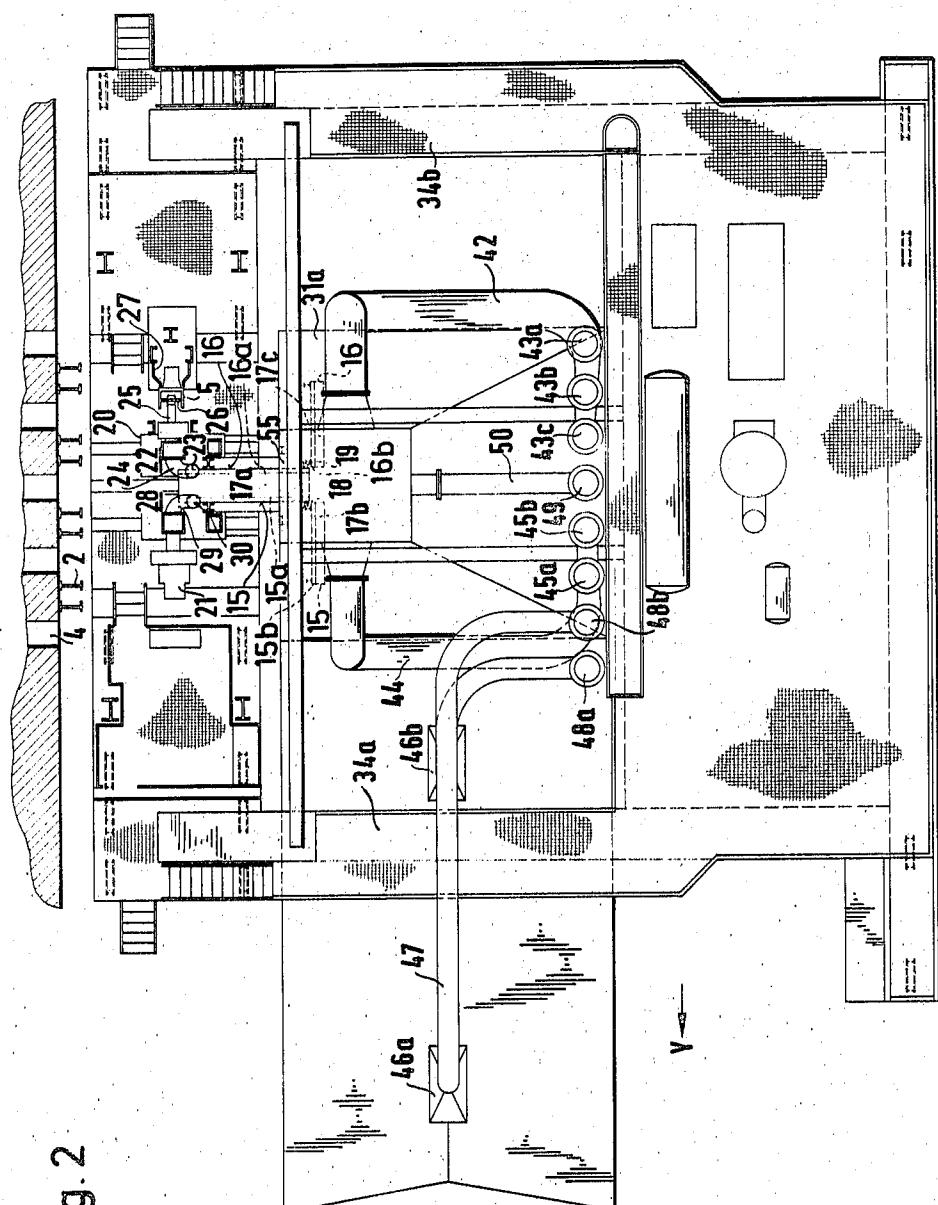


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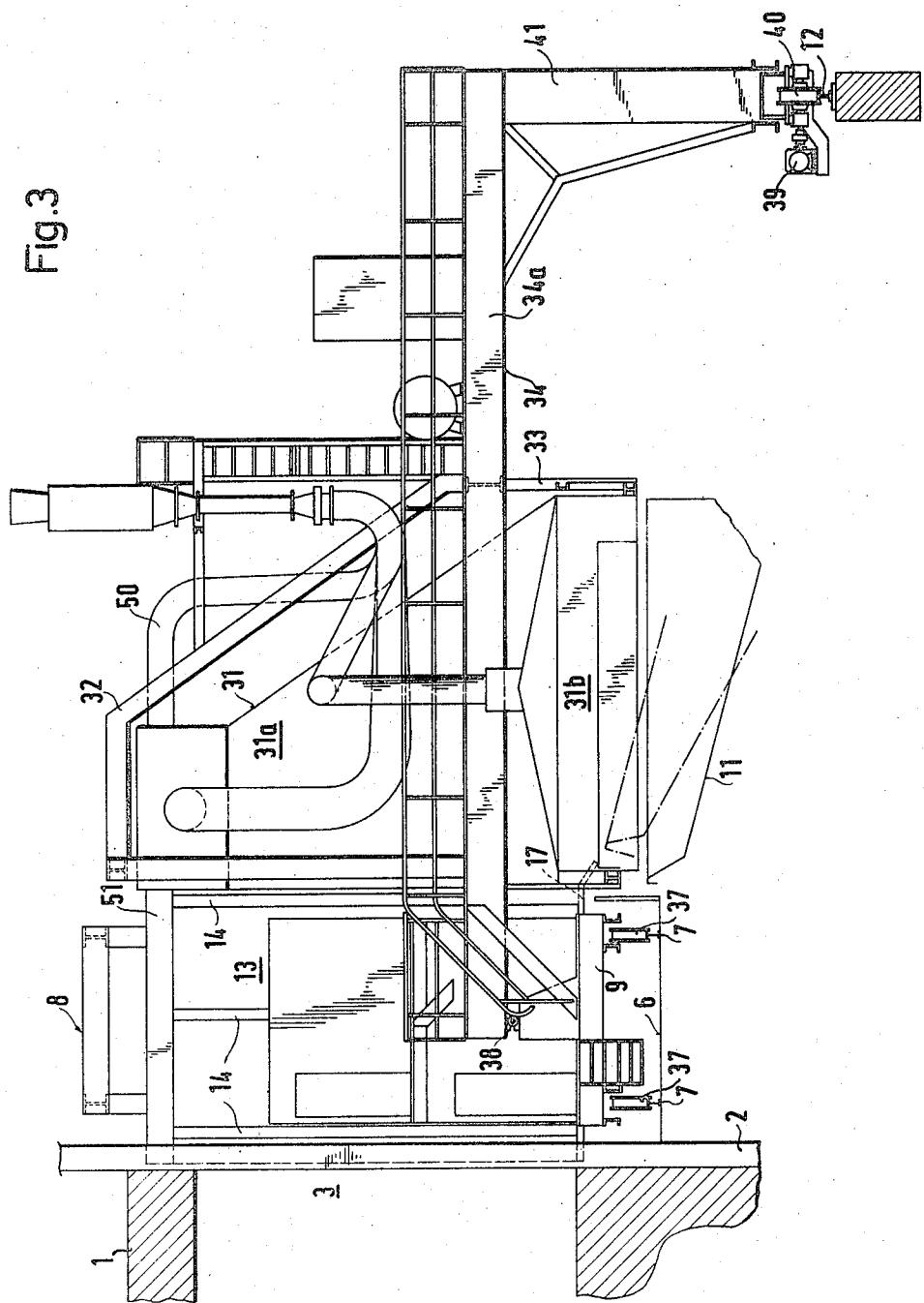
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Fig. 3



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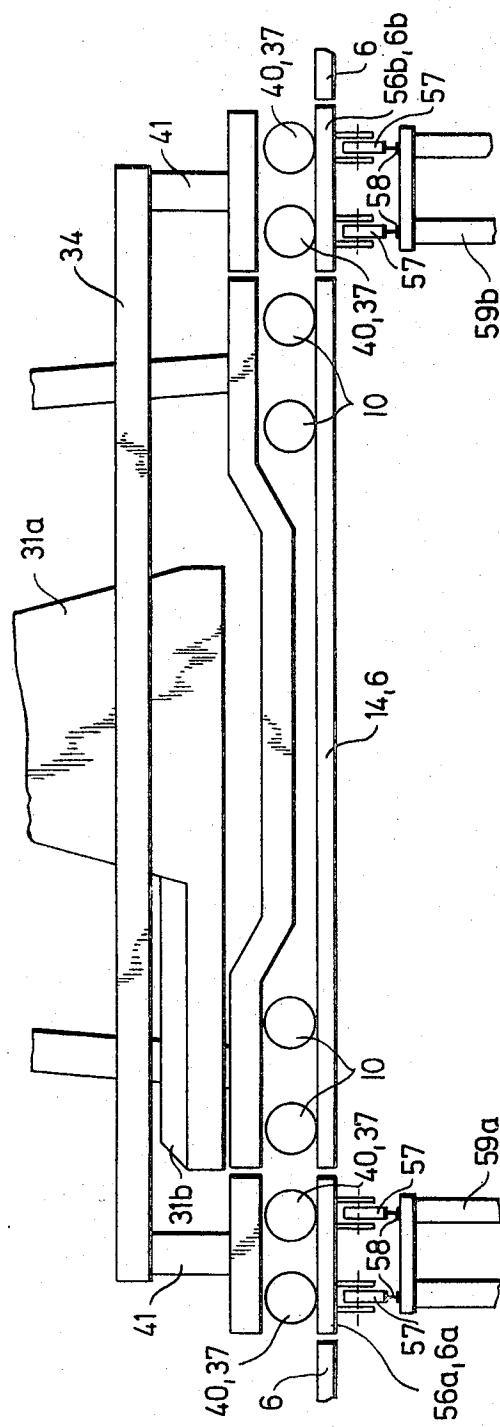


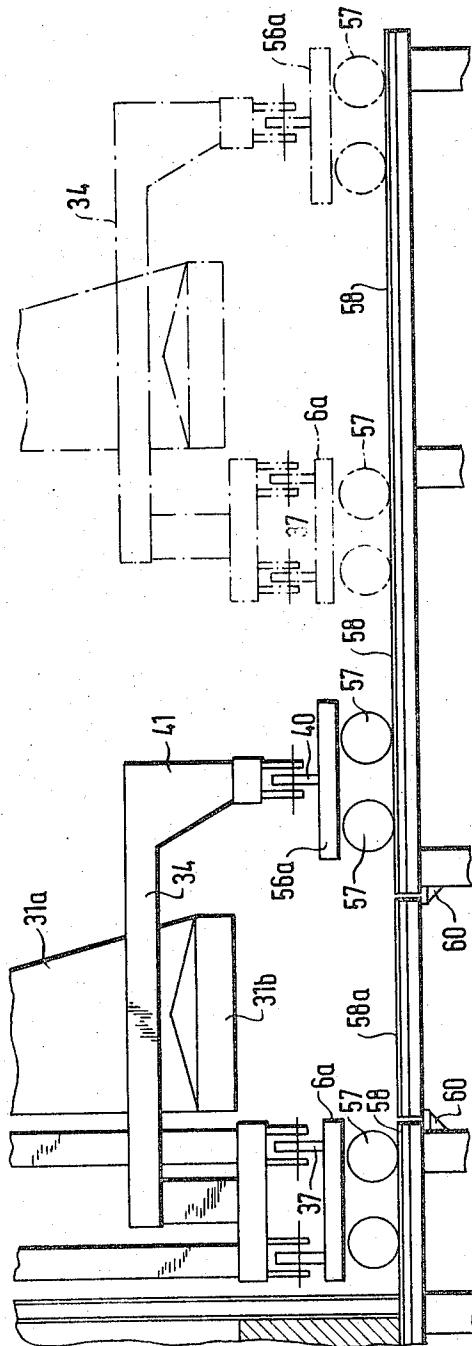
FIG. 4

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Fig. 5



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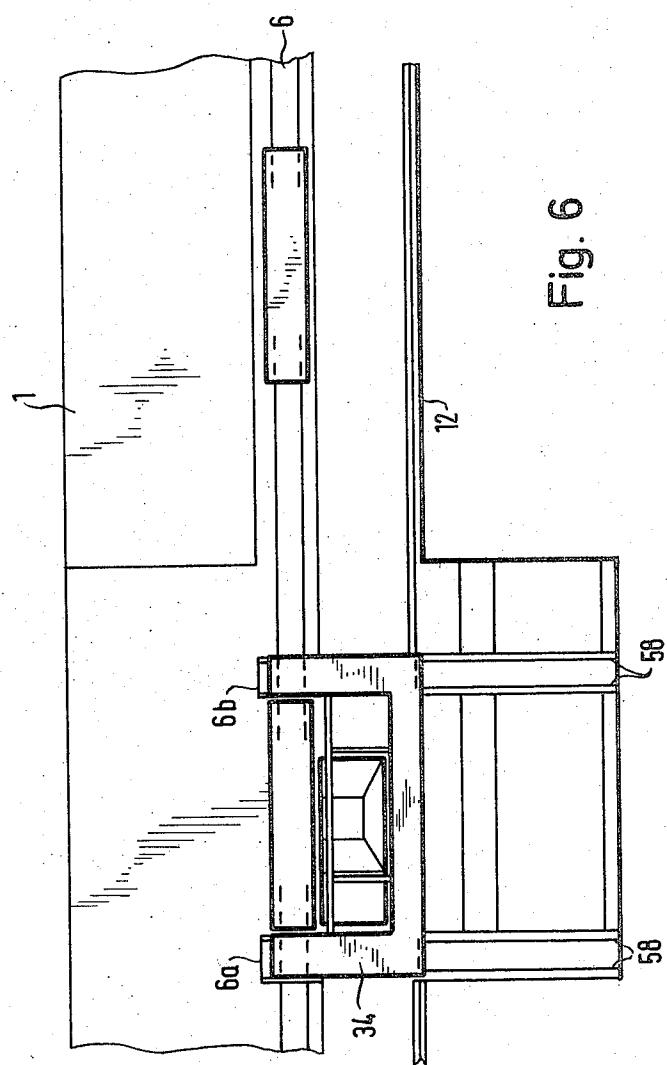
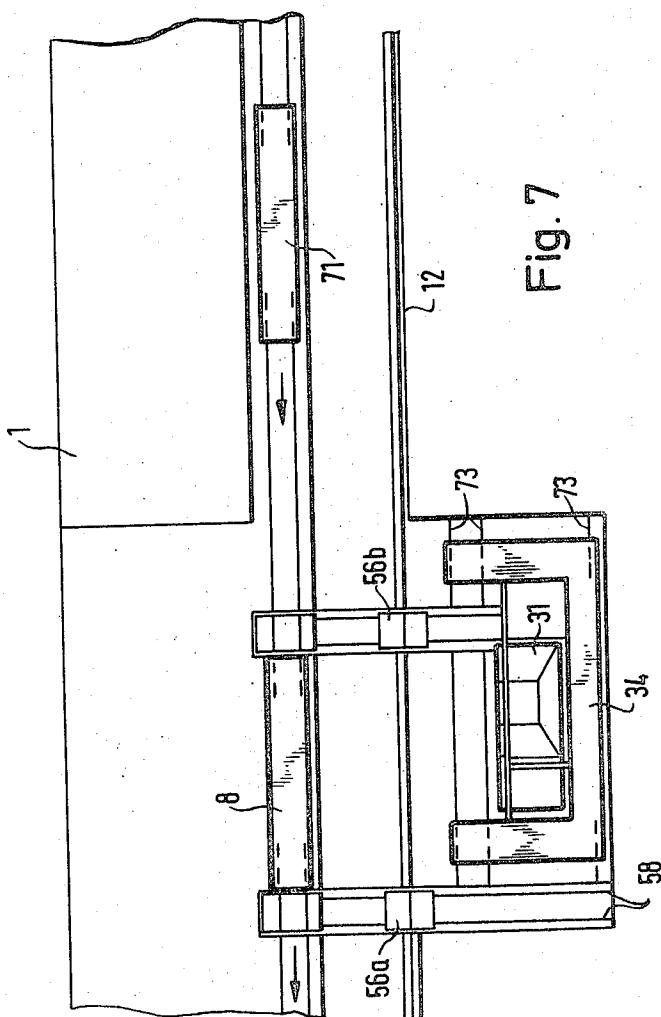


Fig. 6

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Fig.

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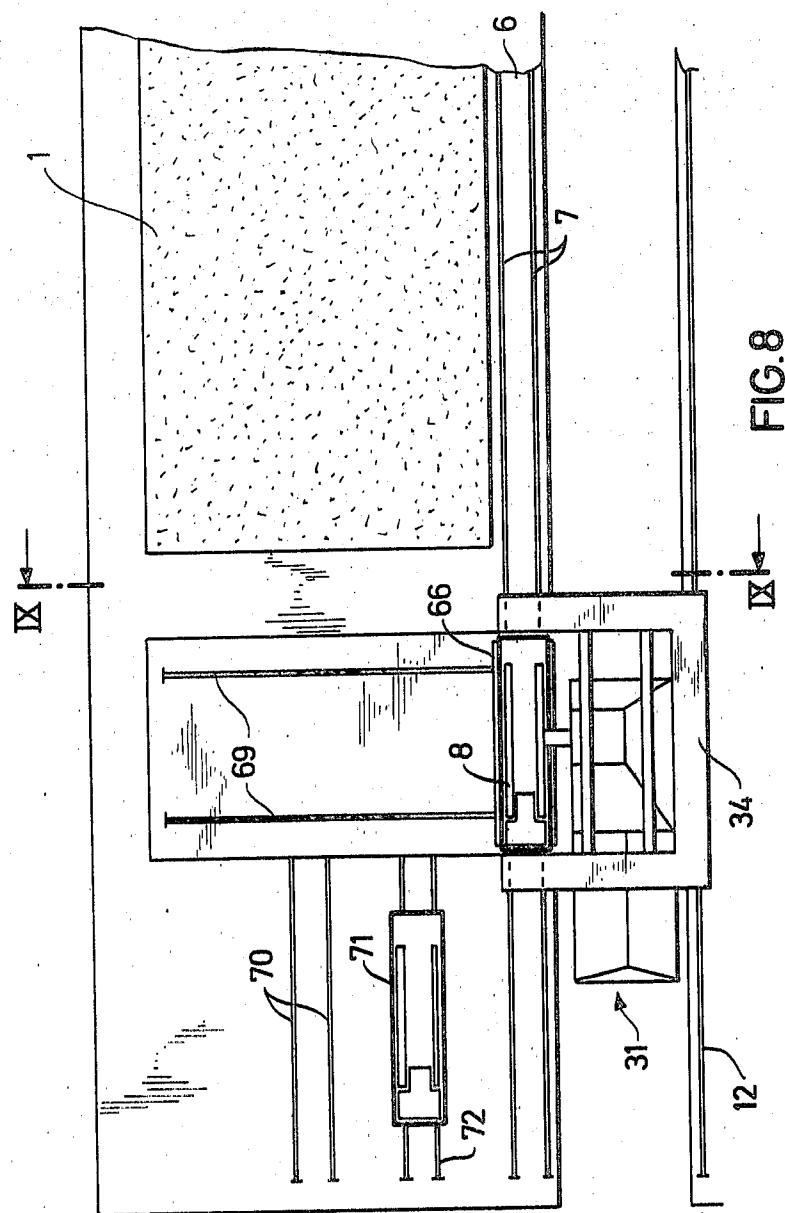


FIG. 8

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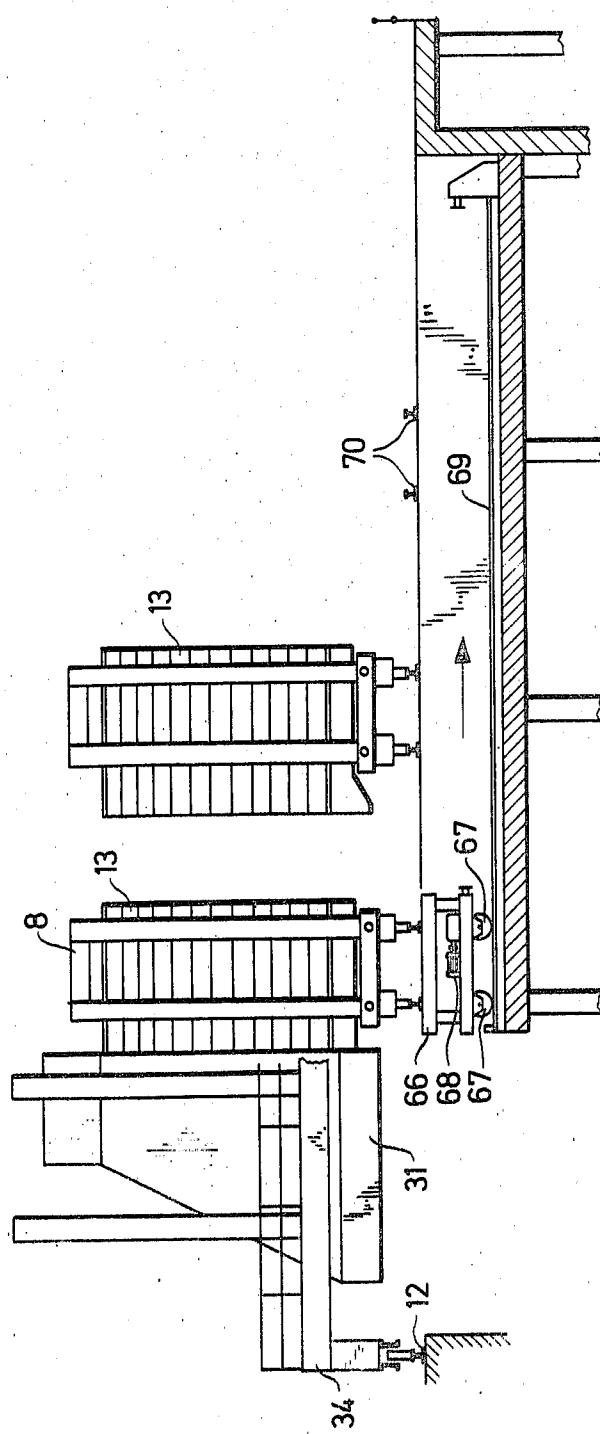


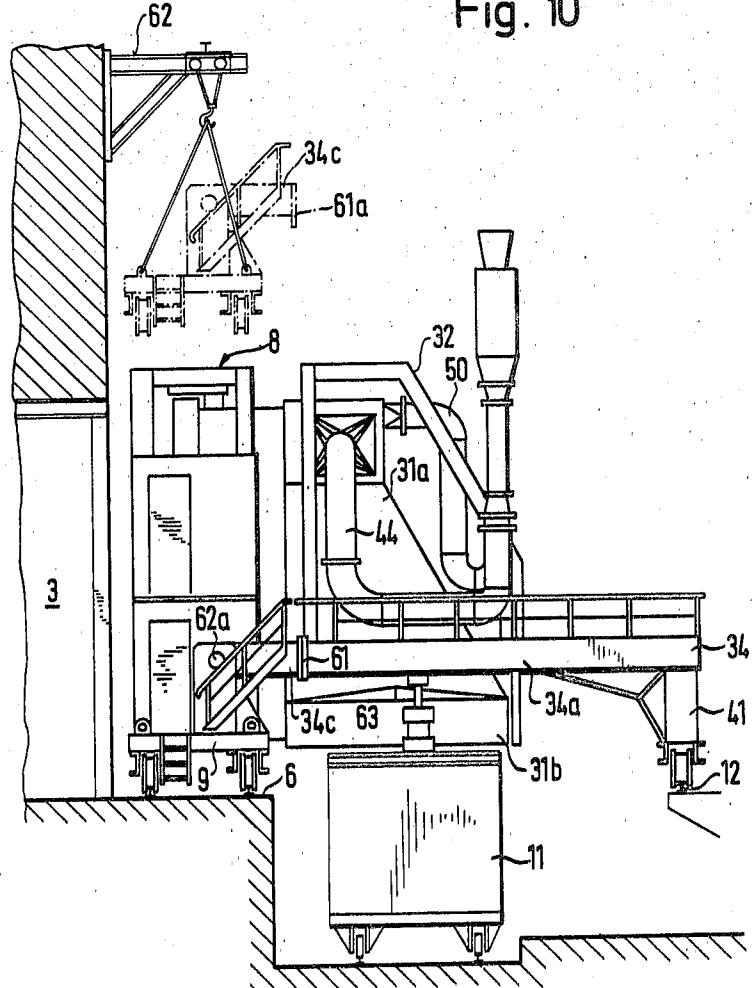
FIG. 9

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Fig. 10

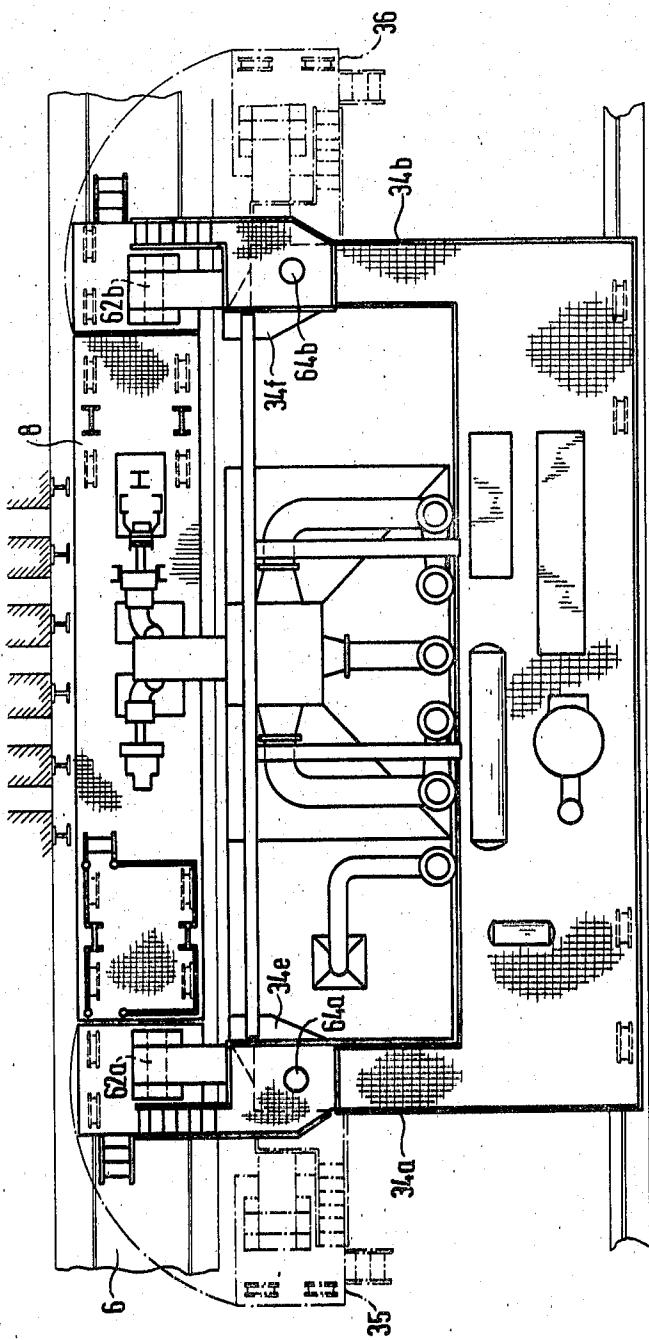


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Fig. 11

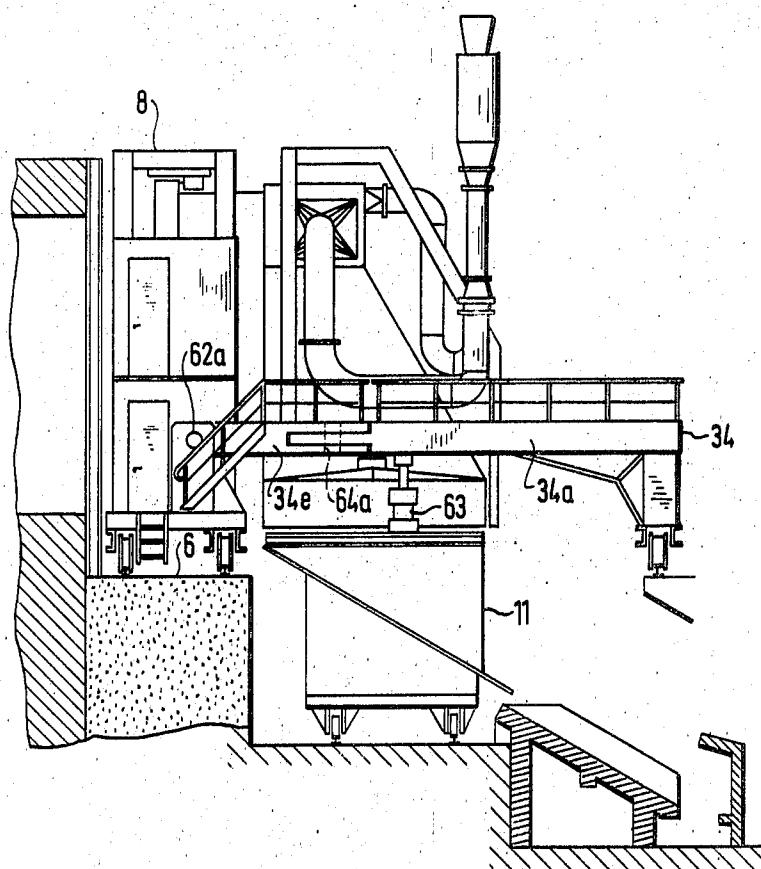


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Fig. 12

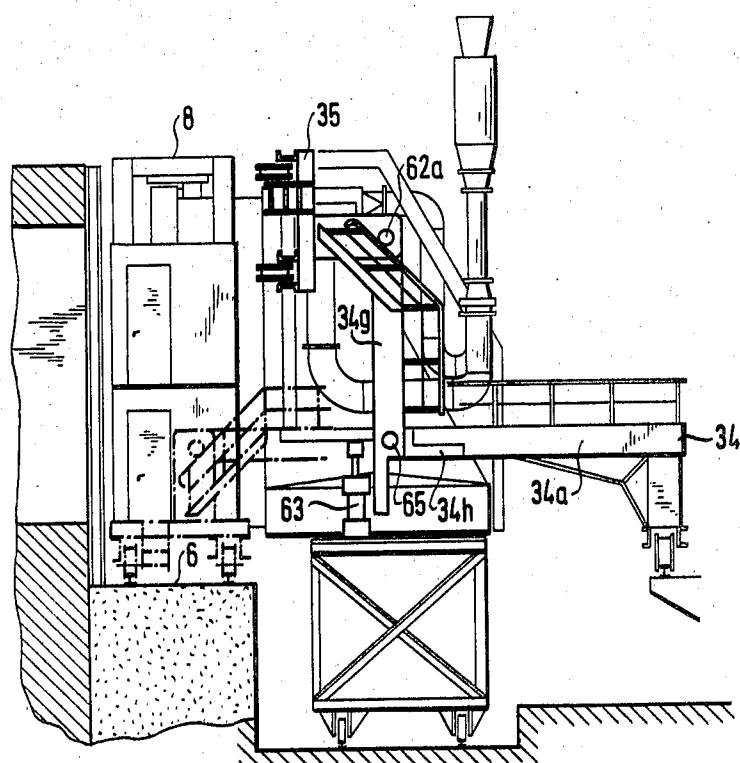


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Fig. 13



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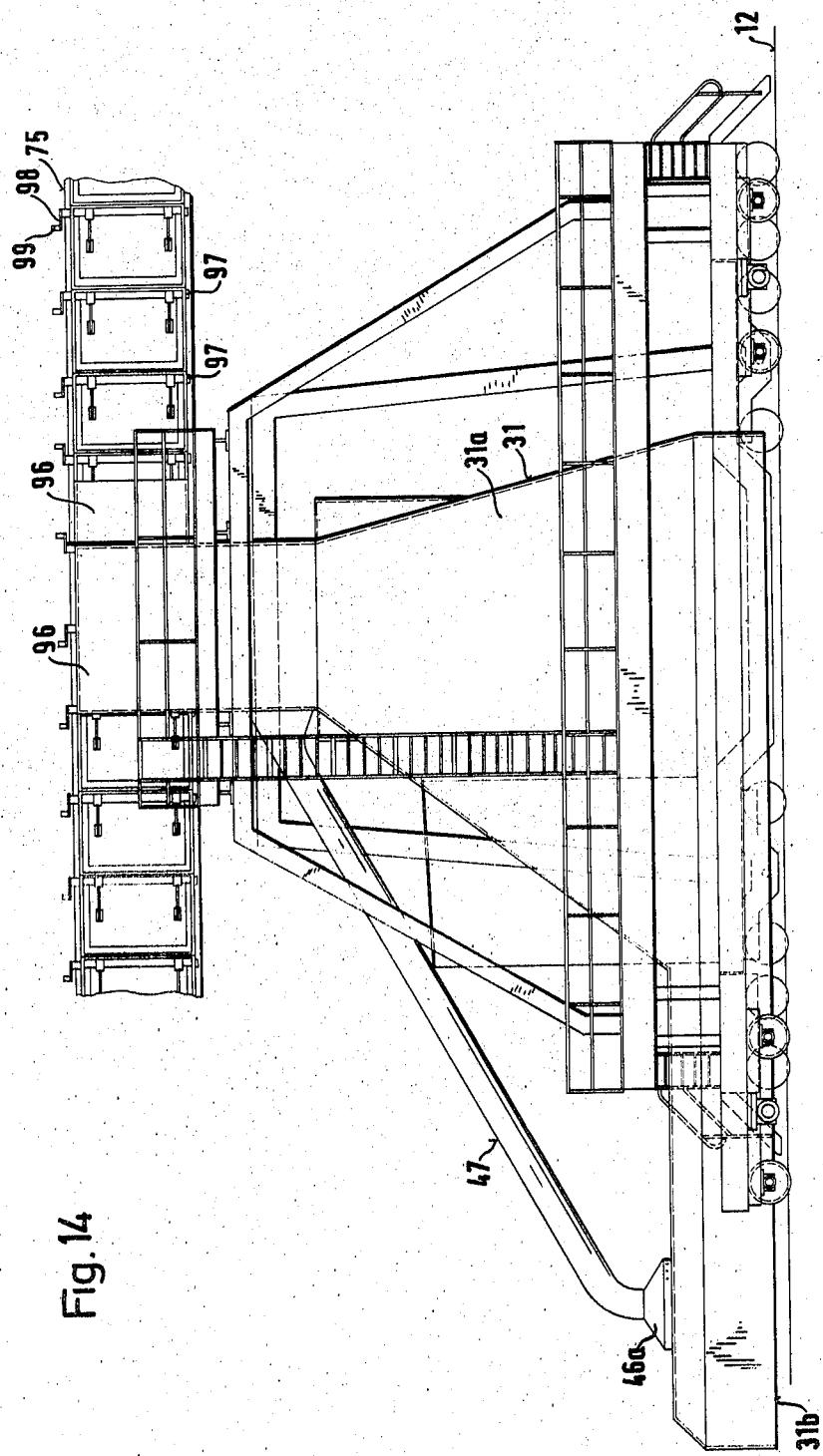
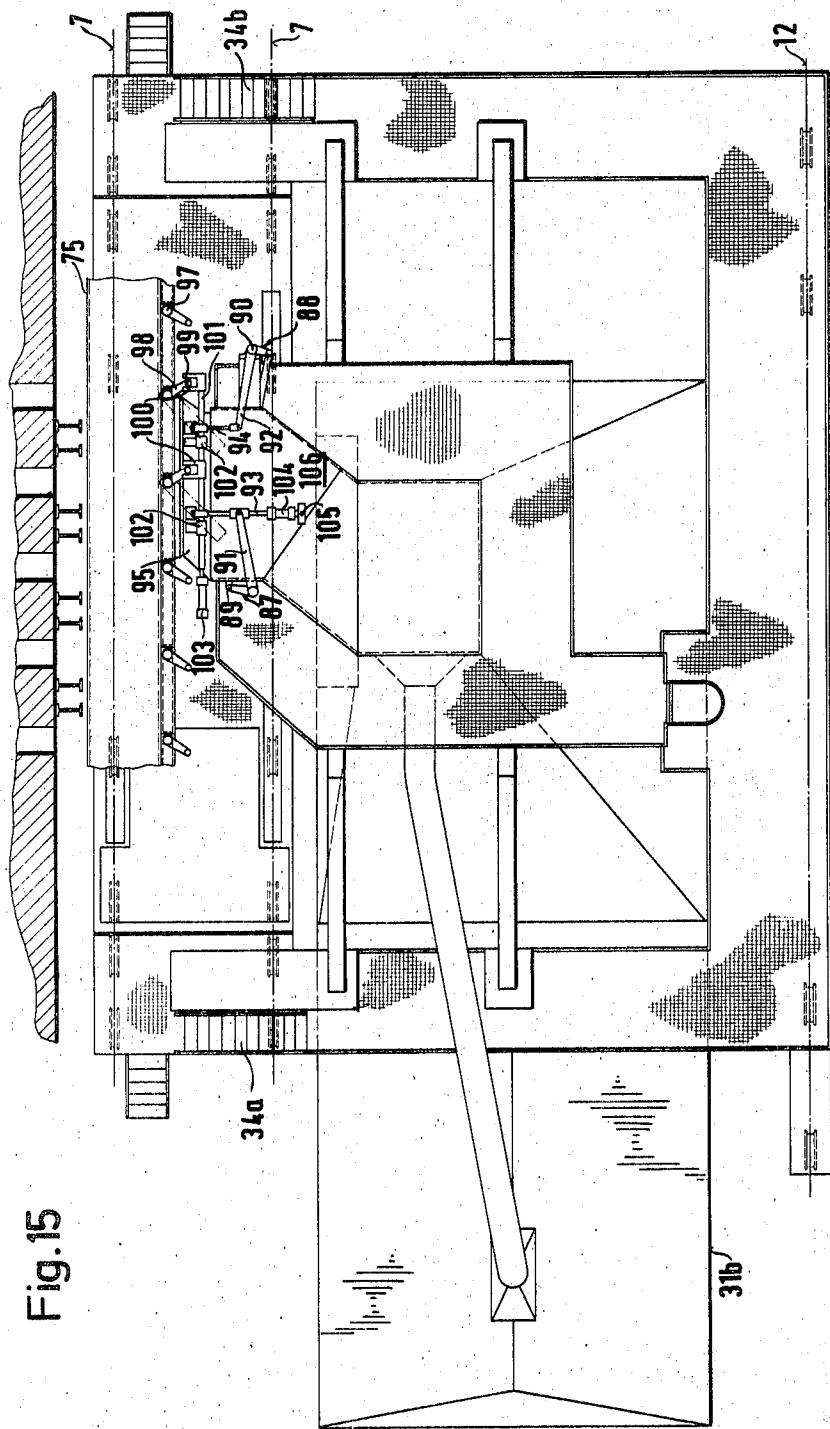


Fig. 14

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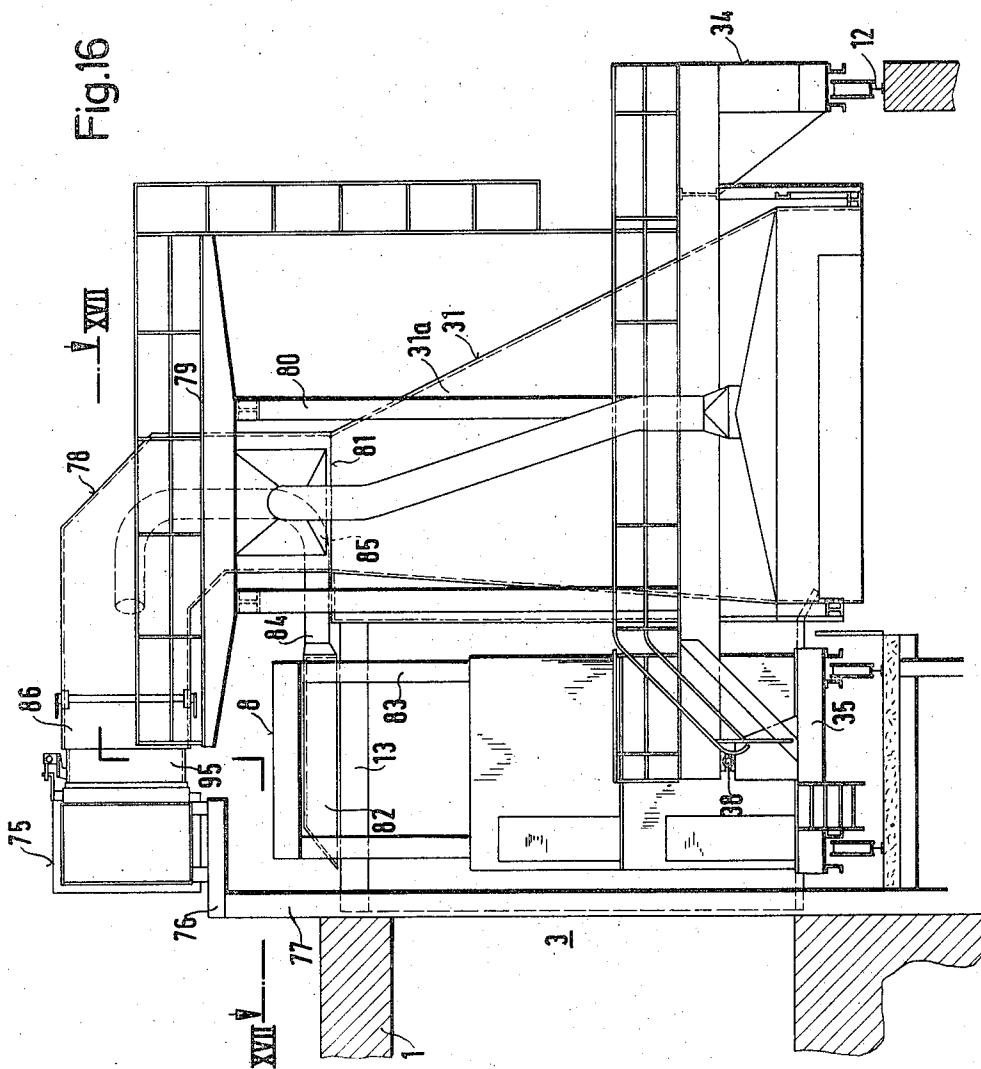
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Fig.16



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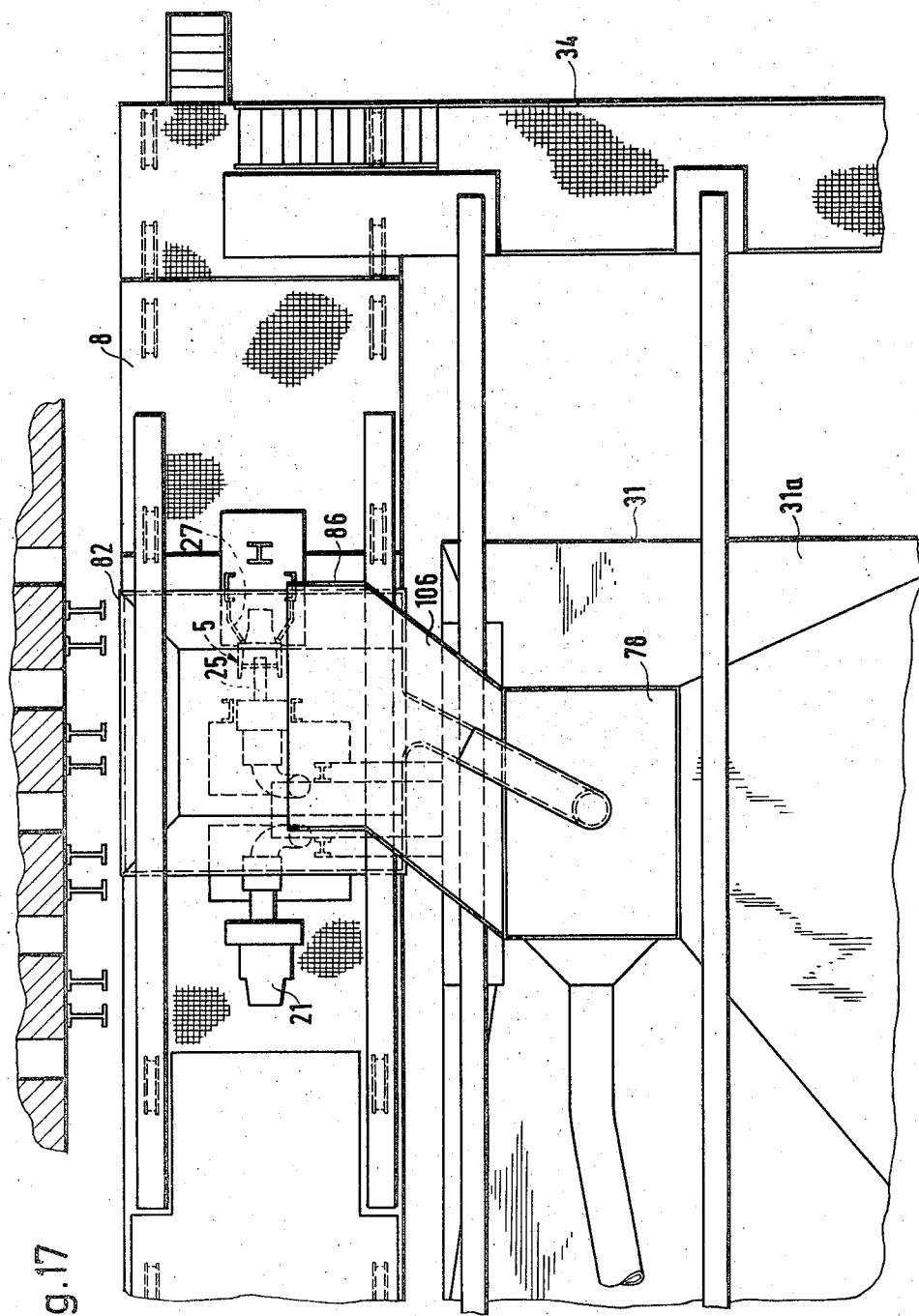


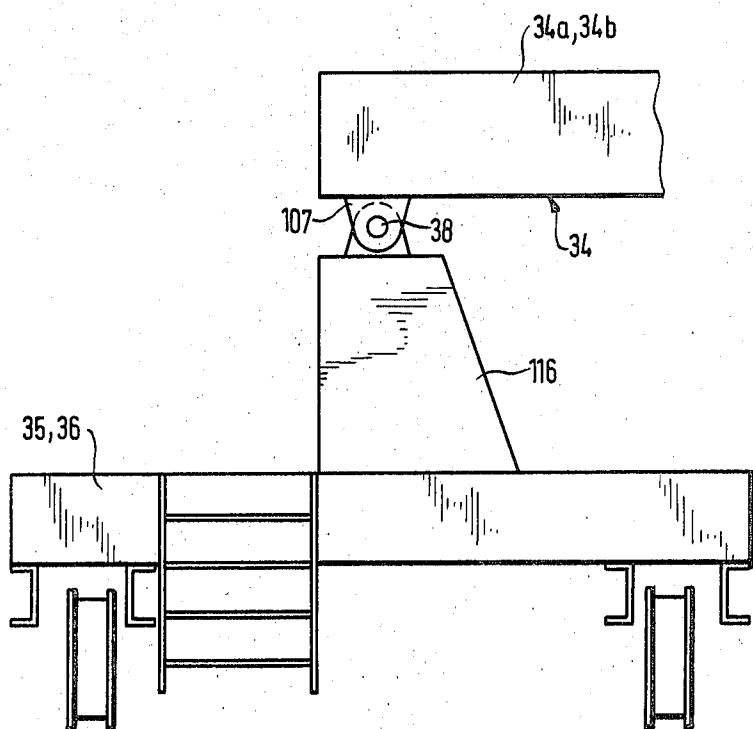
Fig. 17

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Fig. 18

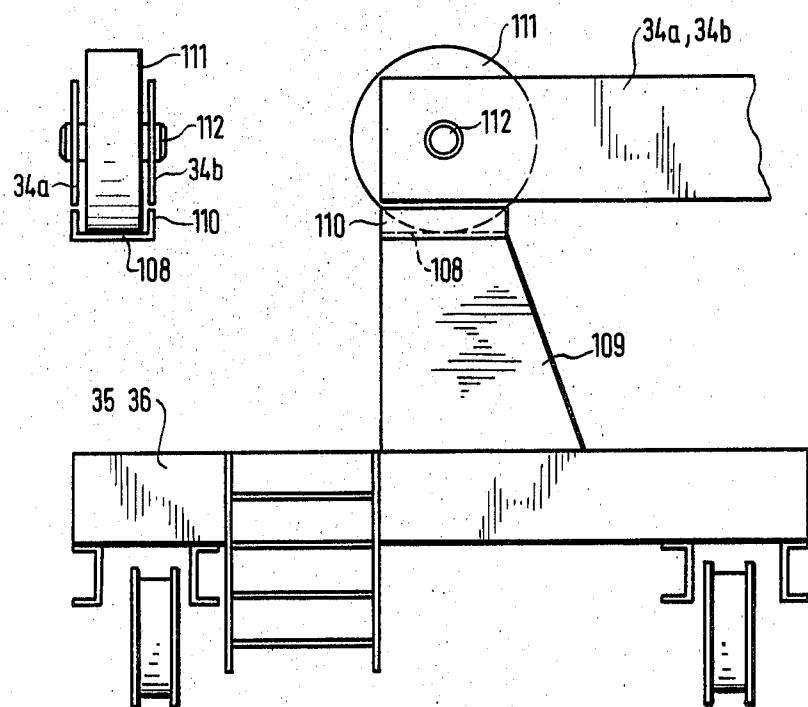


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Fig. 19



COKING INSTALLATION

BACKGROUND OF THE INVENTION

The present invention relates generally to a coking installation, and more particularly to a coking installation having a coke oven battery wherein the individual coke ovens have horizontal coke chambers.

It is already known from the prior art in coking installations having horizontal-chamber coke oven batteries, to provide a coke guide car and a hood which extends over at least part of the quenching car which cooperates with the coke guide car, with both the hood and the coke guide car being movable along the coke oven battery so that the coke guide car can receive incandescent coke from different ones of the horizontal chambers of the coke oven battery. The purpose of the hood is to collect and render harmless the substantial quantities of dust and gases which are liberated as the coke is expelled from the respective chamber and transferred via the coke guide car to the quenching car. It is, of course, these quantities of dust and gas which are largely responsible for polluting the open atmosphere at the coking side of coke oven installations. Particularly the dust becomes liberated as the incandescent coke cakes are pushed into the quenching car through the coke guide which is provided on the coke guide car.

The prior art has not provided satisfactory solutions in this respect, and in particular it has not provided any constructions capable of preventing the escape of liberated dust and gases into the ambient atmosphere.

SUMMARY OF THE INVENTION

It is, accordingly, an object of the present invention to overcome the disadvantages of the prior art.

More particularly, it is an object of the present invention to provide, in a coking installation having a horizontal-chamber coke oven battery, an apparatus which avoids the aforementioned disadvantages.

Still more particularly, it is an object of the invention to provide such an apparatus which is capable of intercepting the liberated dust and gases and of preventing them from escaping into the ambient atmosphere.

Another object of the invention is to provide such an improved apparatus wherein the weight of the various elements, such as the coke guide car, the quenching car, the hood and the hood supporting frame, are more evenly distributed.

A further important object of the invention is to provide such an apparatus wherein it is possible to utilize the hood independently of the coke guide car, or to utilize the coke guide car independently of the hood, if and when this becomes necessary, for instance if one or the other of these components must be repaired or inspected.

In keeping with the above objects, and with others which will become apparent hereafter, one feature of the invention recites, in a coking installation having a horizontal-chamber coke oven battery, an apparatus which comprises first rail means extending along the battery, and a coke guide car mounted on the first rail means for movement along the battery and adapted to receive incandescent coke from the respective ovens. A quenching car is mounted for movement along the battery and adapted to receive coke to be quenched from the coke guide car. Second rail means extend along the first rail means but at a side of the quenching

car which faces away from the coke oven battery. A supporting frame is rollably mounted on the first and second rail means and has at least one arm portion which at least in part passes freely around one end of the coke guide car, as seen with respect to the elongation of the rail means, and which supporting frame is releasably coupled to the coke guide car for movement with the same along the battery. A hood is carried by the supporting frame and extends at least in part over the quenching car in order to intercept dust and gases which become liberated from the coke.

To permit a ready disengagement of the supporting frame and the coke guide car from one another, it is advantageous if the frame and/or the guide car are movable at right angles to the elongation of the coke oven battery, in a horizontal plane, together with certain portions of the rail means on which they are supported. This makes it possible for the supporting frame to be used independently of the coke guide car, or for the latter to be used independently of the supporting frame, while the other one is being inspected or overhauled for maintenance.

Coke guide cars are known from experience to require maintenance at shorter intervals than the mobile hood which is carried on the supporting frame. For this reason it is generally satisfactory to provide only a single hood for every two coke guide cars. Thus, while one of the cars is out of service the other can be used in conjunction with the hood and the supporting frame therefor. It is advantageous to provide separate supports for the supporting frame on the gallery associated with the coke oven battery, because this permits a load distribution enabling the novel apparatus to be used both in new coke batteries and to be added to existing batteries without increasing the load-bearing capacity of the gallery. Another advantage of the possibility of separating the supporting frame from the coke guide car is the fact that both of these components (including, of course, the hood which is mounted on the supporting frame) become more readily accessible and more easier to maintain than is otherwise the case.

According to one embodiment of the invention it is possible to provide lengths of rails which extend at right angles to the elongation of the coke oven battery and which can be mounted so that they are removable but can be put in place extending at right angles to the elongation of the battery when it is desired for the coke guide car and/or the supporting frame to be moved toward or away from the coke oven battery.

The supporting frame may be mounted on the rails by means of trolleys, and the latter may be made movable out of the path of the coke guide car, together with parts of the supporting frame. The arm portion or arm portions which at least in part pass freely around one or both ends of the coke guide car, may have that part which overlaps the respective end of the coke guide car releasably connected with the remainder of the respective arm portion. In this case it is advantageous to provide at the coke side of the battery at least one crane or similar lifting instrumentality, in order to lift up the trolleys off the rails.

Another way of removing the trolleys out of the path of the coke guide car involves pivotably connecting parts of the one or two arm portions overlapping the opposite ends of the coke guide car, with the remaining parts of the respective arm portions. The ends of these arm portions may advantageously be pivotably sup-

ported on the trolleys themselves, and this may be done by means of respective pivot pins extending horizontally and in parallelism with the elongation of the coke oven battery. The free ends of these arm portions may be supported on two trolleys, each being supported on a respective trolley by horizontal bearing rollers extending in parallelism with the elongation of the coke oven battery, and the arm portions may be horizontally movable in parallelism with the elongation of the oven chambers, that is in direction substantially normal to the elongation of the coke oven battery.

In the aforementioned instances, where the trolleys themselves are to be moved out of the path of the coke guide car together with parts of the arm portions, it is advantageous if fluid pressure operated jacks are provided for the supporting frame, being themselves supported on a carriage that is movable along the track on which the quenching car travels.

It is also advantageous to make the hood connectable with an extraction and dust precipitation device. The latter may be mounted directly on the supporting frame which also supports the hood. However, it is also possible to arrange the extraction device remote from or in the general vicinity of the apparatus, and to connect it with a fixed conduit which extends in parallelism with the elongation of the coke oven battery and with which the hood can be connected. The cross section between the hood and the conduit can be made considerably larger than would otherwise be possible if, according to a feature of the invention, the hood is connectable with the conduit in each of its operating positions (in which it is located adjacent one of the horizontal chambers) with at least two apertures of the conduit. These apertures are normally closed and are spaced from one another in the direction of elongation of the conduit. It is advantageous if they are of right-angular cross section and provided with covers which open externally in one and the same direction. The opening angle included by the covers with the longitudinal axis of the conduit is preferably about 70°, because such a position of the covers is most favorable to the flow of extracted gases and dust.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a side view of an apparatus according to the present invention, as seen from a side remote from the coke oven battery which should be understood to be located behind the apparatus in this Figure;

FIG. 2 is a plan view of the apparatus shown in FIG. 1, illustrating a U-shaped supporting frame;

FIG. 3 is an end elevational view of the apparatus in FIGS. 1 and 2, as seen in the direction of the arrow in FIG. 1, showing a part of the coke oven battery in cross section;

FIG. 4 is a partially broken-away elevational view of a further embodiment of the invention;

FIG. 5 is a side view of the apparatus shown in FIG. 4;

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now firstly to the embodiment illustrated in FIGS. 1-3, it will be seen that FIG. 3 shows a portion of a coke oven 1 having end frames 2 which, as shown in FIG. 2, flank a horizontal coke oven chamber 3. The latter is provided at each end with a gate of which only the gate 4 on the coke side is shown in FIG. 2. A door 5 is provided which can be removed from the gate 4 to open it, or can be put in place to close it.

Reference numeral 6 identifies a conventional inspection gallery which extends parallel to and in front of the coke oven and which is provided with a pair of rails 7. A coke guide car 8, which is also shown in FIG. 7, is provided with a chassis 9 and with wheels 10 which, as shown in FIG. 1, are supported on the rails 7 so that the coke guide car 8 can move along the rails 7 at right angles to the axis of the oven chamber 3. In other words, the coke guide car can move along the battery of coke ovens, of which a number are arranged side by side with the axes of their respective oven chambers 3 extending parallel to one another. A quenching car 11 can move in parallelism with the elongation of the coke oven battery in front of the gallery 6, to receive hot coke from the coke guide car 8 through which it is in turn expelled from the respective chambers 3, and to convey this coke to the non-illustrated quenching station. FIGS. 1 and 2 show that an additional rail 12 extends along the rails 7, at a side of the quenching car 11 which faces away from the coke oven battery. A supporting frame 34 for an extraction hood 31 is supported on the rails 7 and on the rail 12.

FIG. 6 is a plan view of the apparatus in FIGS. 4 and 5, showing it in its starting position;

FIG. 7 is a further plan view of the apparatus in FIG. 4, with a mobile platform shown in its initial position;

FIG. 8 is a plan view of the apparatus according to the present invention, showing the coke guide car on a mobile platform;

FIG. 9 is a section taken on line IX-IX of FIG. 8;

FIG. 10 is a side view of a further embodiment of the invention;

FIG. 11 is a plan view illustrating an additional embodiment of the invention;

FIG. 12 is a side view of FIG. 11;

FIG. 13 is a side view of still an additional embodiment of the invention;

FIG. 14 is an elevational view, as seen from a side remote from the coke oven battery, of a further embodiment of the apparatus;

FIG. 15 is a plan view of the apparatus shown in FIG. 14;

FIG. 16 is an end elevational view of the apparatus in FIGS. 14 and 15, illustrating part of the coke oven battery in section;

FIG. 17 is a section taken on line XVII-XVII of FIG. 16;

FIG. 18 is an enlarged-scale elevational view, showing a joint between the supporting frame and the trolleys in the apparatus of FIGS. 14 and 15; and

FIG. 19 is an enlarged-scale elevational view, illustrating a further embodiment of the invention, namely a pivotable support for the supporting frame on the trolleys.

FIG. 3 shows a coke guide 13 mounted on the coke guide car 8 and composed of stiffening sections 14 to which horizontally extending U-shaped beams are attached one above the other, forming spaced parallel side walls 15 and 16 which are seen in FIG. 2 to extend from the long sides of a guide trough 17 which is most clearly evident in FIG. 3. Portions 15a and 16a of the side walls 15 and 16 face the coke ovens 1, with a guide trough portion 17a connecting the portions 15a and 16a. These portions 15a and 16a can be moved backwards and forwards only parallel to the axis of the oven chamber 3. The front side wall portions 15a and 16a are connected pivotably with rear side wall portions 15b and 16b by means of vertically aligned pivot bearings 18 and 19. In the cross-sectional plane containing the pivot bearings, the guide trough 17 is also divided so that the front trough portion 17a extends over the same length as the front side wall portions 15a and 16a, whereas the separate rear guide trough portion is divided along its central longitudinal axis so that respective longitudinal halves 17b and 17c of the same length as the rear guide wall portions 15b and 16b can be pivoted with the latter out of direction parallel to the oven chamber axis into planes extending in the direction of the guide car travel, as shown in FIG. 2.

FIG. 2 shows the coke guide in its retracted idle position, in which its front edge is clear of the space in front of the oven chamber 3 approximately half way across the coke guide car 8. This permits operators to walk safely over the gallery 6 from one side of the coke guide car 8 to the other.

A carriage 22 is movable backwards and forwards in parallelism with the ovens 1 and is provided with a pivot 23 to permit horizontal turning of a door handling arm 24. The carriage 22 is part of a door handling mechanism 20 and the outside of the arm 24 is provided with hooks 24 capable of engaging, when operated by means of a non-illustrated jack, under cross pieces 26 which are provided on the respective doors 5. In this manner, the doors can be carried to a cleaning device 27 provided on the coke guide car 8, as shown in FIG. 2. Such cleaning devices are themselves known, as is the manner of making them movable parallel to the direction of advancement of the coke guide car 8, so that for instance scrapers on chains can clean the seating surfaces on the doors 5 with which the doors engage the frame bounding the respective opening.

The door frame bounding the opening must itself also be cleaned of carbon deposits and the like. For this purpose the apparatus includes a door frame cleaner 21 which in itself is already known from the prior art and which includes a carriage 28 on which an arm 29 having L-shaped horizontal cross section is pivotable about mutually vertically aligned pivot pins 30. The cleaner 31 can be pushed forward to its working position after the arm 29 has been pivoted to operative position, in which it is directed towards the door frame of the open oven chamber 3. By means of the guide car 8 described, therefore, all of the work required on one oven chamber 3 can be carried out in a single operative position of the guide car 8.

The drawing shows in FIGS. 1-3 that a hood 31 is provided which is located slightly above the upper edge of the quenching car 11. The hood 31 includes a pyramid-shaped portion 31a and a second portion 31b which extends from the portion 31a in substantially horizontal direction towards the non-illustrated

quenching station. A framework 32 and 33 connects the hood 31 with a supporting frame 34 which, as seen in FIGS. 2 and 6, has in these embodiments a U-shaped outline. In other words, in horizontal direction and seen in top plan view, the supporting frame 34 is U-shaped. It has arm portions 34a and 34b which pass freely around the ends of the coke guide car 8, which is to say that they overlap these ends, and the ends of course being those which extend in the direction of elongation of the coke oven battery and of the rails. The arm portions 34a and 34b can be engaged with these ends of the coke guide car 8, so that the frame 34 and the car 8 can move in unison, but the engagement is separable so that the frame 34 and/or the car 8 can also be permitted to move independently of one another.

The ends of the arm portions 34a and 34b are supported in this embodiment on respective trolleys 35 and 36 which are provided with wheels 37 on which they can roll on the rails 6. FIG. 1 shows that pivots 38 are provided, the elongation of which is parallel to the elongation of the coke oven battery and which provide a connection between the trolleys 35 and 36 and the free ends of the arm portions 34a and 34b, respectively. The trolleys 35 and 36 are provided with electric motors (not shown) which are synchronized with drive motors 39 driving the wheels 40 of the frame 34, with which the latter is supported on the rail 12. The wheels 40 are fixed to the bottom end of a vertical frame part 41 which supports the end of the frame 34 remote from the coke oven battery and which assures that the frame 34 is in a horizontal position. Thus, the motion of the frame 34 longitudinally of the coke oven battery 1 is synchronized with that of the guide car 8 which is located between the arm portions 34a and 34b and moves with the frame 34 due to its engagement with the respective arm portions.

FIG. 4 shows a further possibility according to the present invention, wherein the wheels 40 of the frame 34 are aligned with the wheels 37 of the trolleys 35 and 36, so that only the wheels 40 are visible. In this embodiment, of which FIG. 5 shows a side view, the pairs of wheels 37 are supported on two gallery portions which are separated from one another by a distance corresponding to the spacing between the two trolleys 35 and 36. The gallery portions are configurated as mobile platforms 6a and 6b. There are further provided mobile platforms 56a and 56b which support the wheels 40 of the frame 34. The platforms 56a and 56b are aligned with the platforms 6a and 6b, respectively, and run on tracks 58 by means of wheels 57. The tracks are located horizontally and extend normal to the longitudinal axis of the coke oven battery. This means that they extend in parallelism with the axes of the respective oven chambers 3. The tracks 58 are supported on uprights 59a and 59b, and track lengths 58a of the tracks 58 cross the path of the quenching car 11. These are removably mounted on brackets 60.

In this embodiment, when the coke guide car 8 requires changing, repairing or inspection, the frame 34 is moved from the position shown in FIG. 6 and at right angles to the longitudinal direction of the coke oven battery, into the position shown in FIG. 7 on a shunting siding 73 extending in parallel with the elongation of the coke oven battery. After the coke guide car 8 has been removed, a replacement guide car 71 can be moved into its place after the mobile platform has previously been returned to its initial position with respect

to the frame 34. After the mobile platforms which have been moved out of the path of the car 8 have been bridged with suitable lengths of rail, the guide car 8 can be run out beyond one end of the battery of coke ovens, and another guide car substituted for it. The lateral movement of the frame 34 which is possible in this embodiment, makes it also possible for the frame 34 to be moved away in this manner for maintenance, inspection or possibly replacement by another frame 34.

The position of the frame 34 when the latter is separated from the guide car 8, is shown in chain lines in FIG. 5. The elements belonging to the coke guide car 8 have been omitted in this Figure from the chain line portion for clarity. Shifting of the mobile platforms may be carried by means of fluid-pressure operated actuators, racks, cables or the like, to name some possible examples of means which are already known and therefore not illustrated.

Coming to FIGS. 8 and 9 it will be seen that these show a mobile platform 66 for the coke guide car 8, located outside one end of the coke oven battery as part of the gallery track. This platform 66 is supported on wheels 67 which are driven by a motor 68 and roll on a track 69, paralleling the elongation of the coke oven battery. Thus, the platform 66 can be moved to a position in front of the end of the coke oven battery, so that the guide car 8 can be shunted along a track 70 extending parallel to the gallery track and onto a siding platform. Thereafter, a replacement coke guide car 71 can be brought from a shunting siding 72 which parallels the track 70 and be moved into line with the gallery track by means of the platform 66.

A further embodiment of the invention is illustrated in FIG. 10 which shows that the ends of the arms of the frame 34 may be pivotably supported on the trolleys. The free end 34c of the arm 34a is flanged to the trolleys at 61 at a location spaced outwardly from the gallery, so that when the flange connection is disengaged a crane 62 provided on the coke oven battery or adjacent to it can lift the trolley 35, with one half 61a of the flange connection and with the end 34c of the arm 34a, into the position shown in FIG. 10. Previous to this, the supporting frame 34 is supported on the top edge of the quenching car by means of a fluid-pressure operated jack 63. This means that after one or both of the arms 34a, 34b with the associated trolley has been removed, the coke guide car 8 can be moved out of the embrace of the frame 34 for repair, inspection or replacement.

A further possibility is shown in the embodiment illustrated in FIGS. 11 and 12. Here, the trolleys are pivotably connected with the ends of the arms 34a, 34b by means of spaced pivots 62a and 62b which extend parallel to the elongation of the coke oven battery. The ends 34e and 34f of the arms are pivoted on vertical pivots 64a and 64b which are far enough outside the gallery 6 for the trolleys 35 and 36 to clear the path of movement of the guide car 8 when they are in their inoperative positions parallel to the longitudinal axis of the gallery 6 which is shown in chain lines in FIG. 11. A jack 63 is again provided for performing the necessary pivoting movement after the trolleys have been uncoupled from the guide car 8. FIG. 12 shows that the free end 34e is forked and extends over part of the arm 34a, to which it is connected by the pivot 64a in such a manner as to allow only outward pivoting of the trolley and of the free end of the arm.

In FIG. 13 I have shown an embodiment wherein one end 34g of the arm 34a of the supporting frame 34 can pivot about a horizontal pivot 65 which is parallel to and spaced with reference to the coke oven battery.

5 The free end 34g is again pivotably connected to the trolley 35 by means of horizontal pivot 62a. It is shown in chain lines in its normal position in which it is supported on the gallery 6. Here, again, the pivoting can be carried out after the frame 34 has been supported

10 by the jack 63. The pivot 65 is far enough spaced from the coke oven battery to prevent the trolley 35, when pivoted upwardly, from interfering with the free motion of the guide car 8 along the rails 7 on the gallery 6. In the normal operative position, that end of the portion 15 34g which is remote from the trolley 35 engages in an L-shaped recess 34h which is formed in the arm 34a. In this manner, the free end 34g can be anchored as an example by means of screws, bolts or the like.

20 In the preceding embodiments the pyramid-shaped portion 31a of the hood 31 is somewhat higher than the coke guide 13, and its upper portion is provided with an extraction aperture on the side remote from the extension portion 31b. This aperture is connected via a conduit 42, shown in FIG. 2, to three steam jet dust precipitators 43a, 43b and 43c. Such precipitators are already known, and are clearly described in German Offenlegungsschrift 2,021,863 to which reference may be had for details of their construction.

25 30 The hood 31 is provided with an additional extraction aperture on the side facing the portion 31b, namely in the upper portion of the pyramid-shaped portion 31a, and this additional aperture is connected by means of conduit 34 to two steam jet dust precipitators 45a and 45b similar to the previously mentioned ones.

35 30 Two extraction apertures 46a and 46b which are arranged one behind the other as seen in the direction of the arrow y shown in FIG. 2, are connected one behind 40 the other by an extraction conduit 47 to two steam jet dust precipitators 48a and 48b. The portion 41b of the hood 31 is only about one-quarter as high at the coke guide, but is high enough to collect the lower dust concentrations which are still released from the coke 45 charge after the same has been lying on the quenching car for some time already, and to be able to remove them by means of the extraction conduit 47. This makes it possible to move the hood as well as the quenching car towards the quenching tower, and to 50 collect, extract and clean all dust and gas which is subsequently released.

55 A steam jet dust precipitator 49 shown in FIGS. 1-3 is connected by way of an extraction conduit 50, which enters the upper portion of the hood portion 31a on a side remote from the coke guide car, and by way of another extraction duct 51 which seal off the top of the coke guide, to an annular duct which is described in detail in the aforementioned Offenlegungsschrift, when the apparatus is in operative position. FIG. 2 shows that 60 when the coke guide 13 is in its idle position, the portions 15b and 16b or 17b and 17c remote from the coke oven battery are retained inside the hood 31 in their position parallel to the battery, together with the rear end of the front portion 17a of the coke guide. In the 65 operative position of the coke guide which is shown in FIG. 3, the coke guide forms a closed duct for the incandescent coke cake in which the latter can move be-

tween the oven chamber 3 and the hood 31 and the quenching car.

In the embodiment in FIGS. 14-17, the hood 31 can be connected to a stationary extraction conduit 75 which is laid on and fixed to cross beams 76 on top of the coke oven battery. This is in contrast to the arrangement shown in FIGS. 1-3. The cross beams 76 are attached to upwardly extending vertical sections 77 which may be formed on or by the end frames 2 of the respective ovens 1.

Since the hood must be connected in communication with this fixed conduit 75, the hood is formed as an irregular truncated pyramid portion 31a having an upward extension 78, as shown in FIG. 16, and has a sloping vertical section and a rectangular cross section. The extension 78 is supported level with an upper platform 79 by a scaffold 80. At the height of the horizontal joint 81 of this upward extension 78 and the pyramid-shaped portion 31a of the hood 31, a shallow and downwardly open hood 82 extends in front of the hood 31 towards the coke oven battery. The width of the hood 82 corresponds approximately to the width of two laterally adjacent ones of the coke ovens 1. The shallow hood 82 is releasably but rigidly connected (means for this are not shown, but are conventional) to a scaffold 83 of the coke guide; it is telescopically movable by means of a tubular rear extension 84 which permits its movement relative to a pipe 85 of the upper extension 78. This means that when the coke guide 13 is pushed against an oven gate, the front edge parallel to the oven battery comes to bear above the oven gates and, as a result, the dust-containing gases produced when the incandescent coke cake is pushed from the chamber 3 into the coke guide 13, and possibly also as it is pushed out of the coke guide, are extracted through the shallow hood 82 into the upper extension 78.

FIGS. 14-17 also show that the extension 78 is formed with a horizontal offset mouth 86 which is of rectangular cross section and open towards the conduit 75. Parallel linkages 78 and 88 at the sides of the mouth 86 can be pivoted by vertical pivots 89 and 90 which are attached to opposite sides of the mouth and are articulated at the ends of guide levers 91 and 92 on spaced guide rods 93 and 94 which parallel one another and the oven chambers and which are articulated at their front ends on a telescopic member 95. The latter can be moved backwards and forwards parallel to the oven chambers in the mouth 86 by means of the parallel linkages 87 and 88. It can therefore be pushed forward onto the fixed conduit 75.

In each operative position of the apparatus, the mouth 86 extends over two of the lids or covers 96 which are associated with the conduit 75 and are all arranged side-by-side at the same height and can all turn on vertical pivots 97 on their same sides, the right ones in the illustrated embodiment. The upper end of each pivot 97 is provided with a lever 98 and with a member 99 which projects from the end of the lever 98 and is gripped from the side by forks 100 mounted on a parallel operating rod 101 when the parallel linkages 87 and 88 are in their forward position. The rod 101 is mounted horizontally in two members 102 on the telescopic member 95 and can be adjusted parallel to the coke oven battery by means of a hydraulic cylinder 103. The rear end of the guide rod 93 is connected to the piston of a hydraulic cylinder 104 whose rear end in turn is articulated to the upper extension 78 by

means of a pivot 105, permitting it to swivel horizontally.

It will be appreciated that when the hydraulic cylinder 103 is operated, two of the lids 96 on the conduit 75 will swing in unison through approximately 70° into the telescopic member 95 and mouth 86, so that they extend approximately parallel to the lateral surfaces of the mouth 86. Because the latter is horizontally offset relative to the extension portion 106 immediately above the hood portion 31a, the dustcarrying gases which are extracted will thus be able to satisfactorily flow without interference. The remaining lids of the conduit 75 are, of course, closed at this time, as FIG. 15 shows, so that there is no risk of suction losses. The relatively large rectangular cross section of the conduit 75, which is clearly shown in FIG. 16, also assures sufficient suction.

The joint between the trolley 35 and the arms 34a, 34b of the supporting frame 34 is more clearly shown in an enlarged-scale view in FIG. 18. It will be seen to comprise in this embodiment a horizontal pivot pin 38 which extends parallel to the elongation of the coke oven battery and which connects the upper end of a support block 116 to lugs 107 which project around the two sides of the block 116 and are attached to the underside of the outer end of each arm 34a and 34b, respectively.

FIG. 19, finally, shows a somewhat modified embodiment analogous to that of FIG. 18. In FIG. 19, a guide 108 of U-shaped cross section is arranged parallel to the axis of the oven chambers 3 on top of a support block 109. Laterally, there are provided upwardly projecting guides plates 110 and a bearing roll 111 in the recess in the guide 108 is freely rotatable about a horizontal axle 112 paralleling the elongation of the coke oven battery and extending through the outer ends of the arms 34a, 34b of the frame 34. With this construction, the trolleys can be lifted out from under the frame 34 independently of the frame, for example for purposes of maintenance or inspection, as soon as jacks 63 have been actuated to raise the free ends of the frame 34 far enough so that the bearing rails 111 can be lifted out of the guide 108.

It will be appreciated that in the various descriptions of the preceding embodiments it should be understood that any components which have the same reference numerals as those in FIGS. 1-3, correspond to the analogous components shown in FIGS. 1-3. Insofar as any components which have been shown in FIGS. 1-3 have been omitted in the succeeding embodiments, and are not replaced by other different components, they should be understood to be present in the succeeding embodiments also.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of constructions differing from the type described above.

While the invention has been illustrated and described as embodied in a coking installation, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from

the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be protected by Letters Patent is set forth in the appended claims.

1. In a coking installation having a horizontal-chamber coke oven battery, an apparatus comprising first rail means extending along said battery; a coke guide car mounted on said first rail means for movement along said battery and adapted to receive incandescent coke from the respective ovens; a quenching car mounted for movement along said battery and adapted to receive coke to be quenched from said coke guide car; second rail means extending along said first rail means at a side of said quenching car which faces away from said battery; a supporting frame rollably mounted on said first and second rail means and having at least one arm portion which at least in part passes freely around one end of said coke guide car, said supporting frame being releasably coupled to said coke guide car for movement with the same along said battery; and a hood carried by said supporting frame and extending at least in part over said quenching car for intercepting dust and gases which become liberated from said coke.

2. An apparatus as defined in claim 1, wherein portions of said first and second rail means are horizontally movable at right angles with reference to the remainder of said rail means, so that said coke guide car and/or said supporting frame can be moved relative to and become uncoupled from one another when supported on said portions and being moved with the same.

3. An apparatus as defined in claim 1; further comprising rail lengths extending normal to the elongation of said rail means and removably intersecting the path of movement of said quenching car and said supporting frame.

4. An apparatus as defined in claim 1; further comprising trolleys mounting said supporting frame rollably on said rail means; and wherein said trolleys and arm portion are movable out of the path of movement of said coke guide car.

5. An apparatus as defined in claim 4, said arm portion having a first part and a second part, the latter of which passes around said one end of said coke guide car; and connecting means releasably connecting said second part with said first part.

6. An apparatus as defined in claim 4; and further comprising at least one crane adjacent said battery and positioned for lifting said trolleys off said rail means.

7. An apparatus as defined in claim 1; further comprising trolley means mounting said supporting frame rollably on said rail means; and wherein said arm portion comprises one part which passes freely around said one end of said coke guide car, another part which is mounted on said trolley means, and pivot means connecting said one part pivotably with said other part.

8. An apparatus as defined in claim 1, said coke guide car having opposite ends which are spaced longitudinally of said rail means; said supporting frame having an additional arm portion which passes freely around the other of said ends, and both of said arm portions having free end sections; trolley means rollably supported on said rail means; and journalling means connecting said free end sections with said trolley means.

10 9. An apparatus as defined in claim 8, wherein said journalling means comprises pivot elements each connecting one of said free end sections with said trolley means for pivotal movement about a horizontal pivot axis which parallels said rail means.

15 10. An apparatus as defined in claim 8, said trolley means comprising a pair of trolleys each associated with one of said end sections; and wherein said pivot means comprises rollers having rolling axes which extend in parallelism with said rail means, each of said end sections being supported on one of said rollers for horizontal movement transverse to the rolling axis of the same.

11. An apparatus as defined in claim 1; further comprising a carriage movable in the same path as said quenching car; and fluid-pressure jacks engaging said supporting frame and engageable with said carriage for lifting said supporting frame with reference to said coke guide car.

25 12. An apparatus as defined in claim 7; and further comprising means on said hood for connecting the interior of the same to a dust precipitator.

13. An apparatus as defined in claim 12; and further comprising a dust precipitator mounted on said supporting frame and connected with said means.

30 14. An apparatus as defined in claim 12; further comprising a stationary dust precipitator remote from said supporting frame; and a stationary conduit connected with said dust precipitator and extending parallel to said rail means, said hood being connectable with said conduit in a plurality of positions which said hood can assume relative to said battery.

15. An apparatus as defined in claim 14, said conduit having at least two longitudinally spaced connecting openings which are communicable with the interior of said hood in respective ones of said positions thereof.

45 16. An apparatus as defined in claim 15, wherein said openings are of right-angular outline; and further comprising covers for closing said openings when the same are not in communication with said interior of said hood.

50 17. An apparatus as defined in claim 16, wherein said covers are mounted on said conduit for displacement between a first position overlying and closing said openings, and a second position in which they include an angle of substantially 70° with the longitudinal axis of said conduit.

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