Nov. 22, 1949 L. WILPUTTE ET AL 2,488,952

COKE OVEN BATTERY AND OPERATION THEREOF

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Fig. 1.

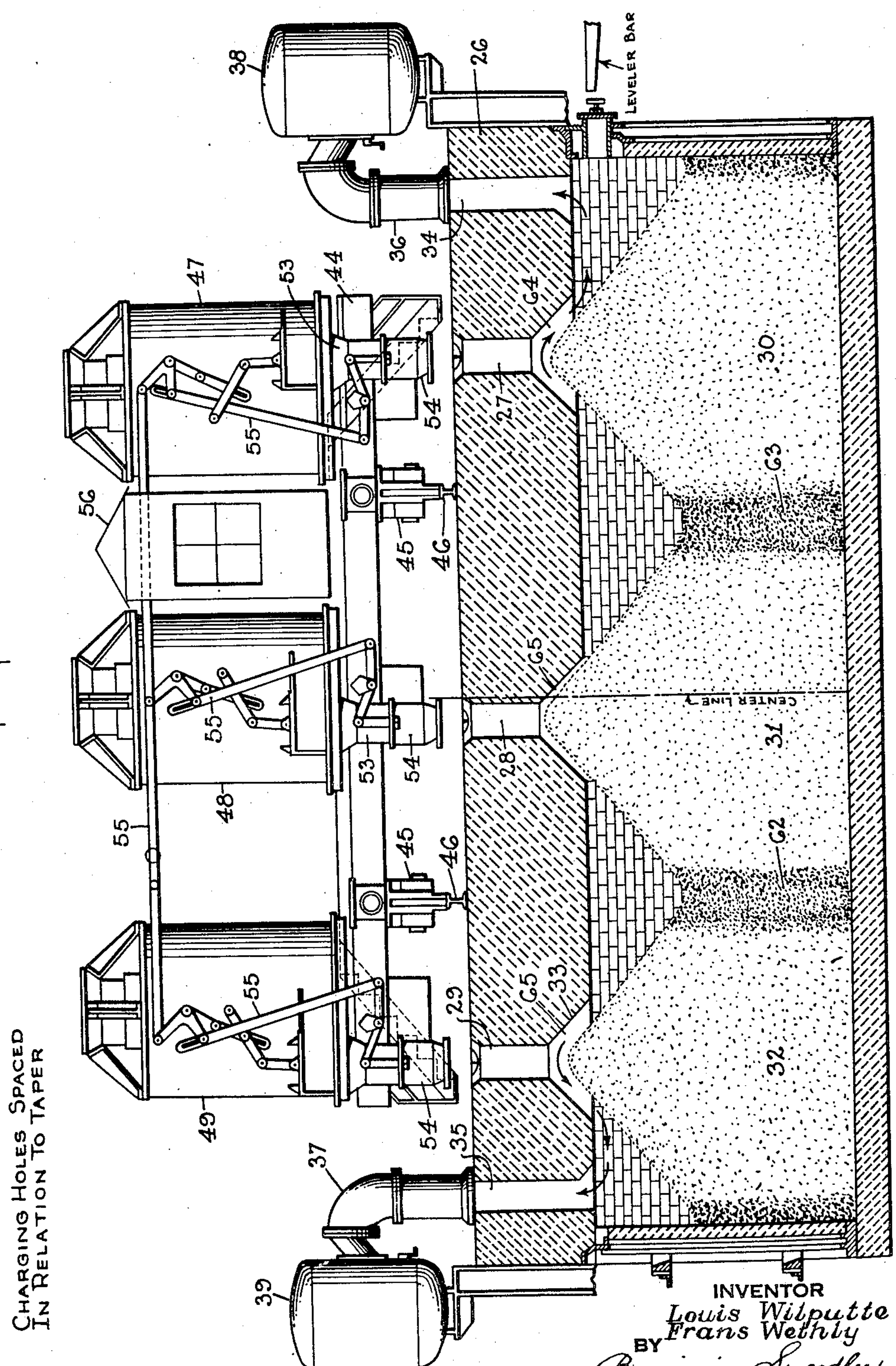

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Fig. 2.

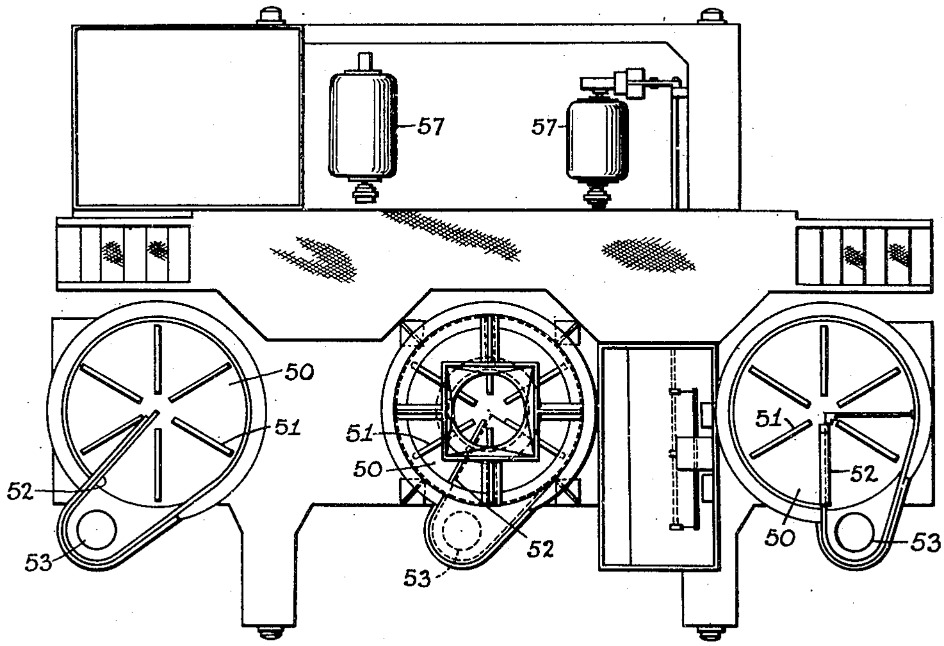
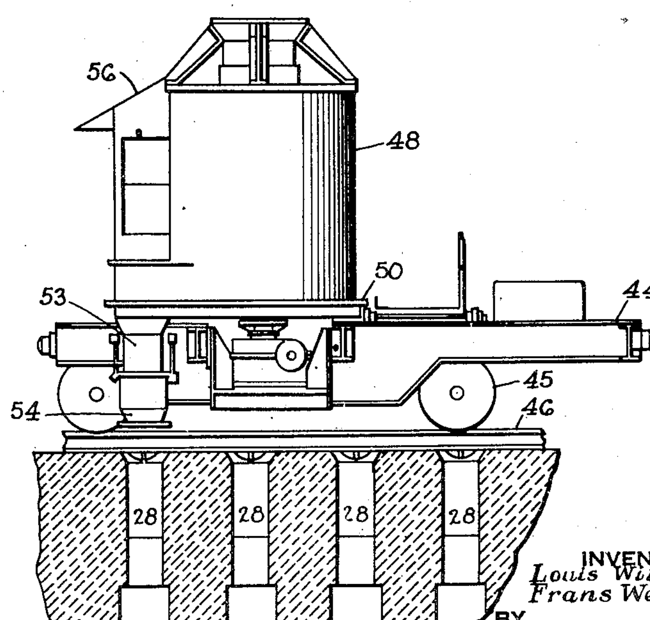


Fig. 3.



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COKE OVEN BATTERY AND OPERATION THEREOF

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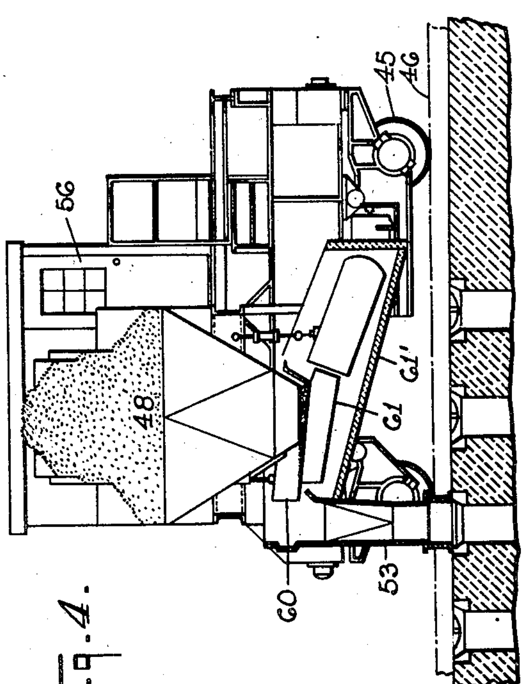

Fig. 4.

Charging Holes Spaced In Relation To Taper.

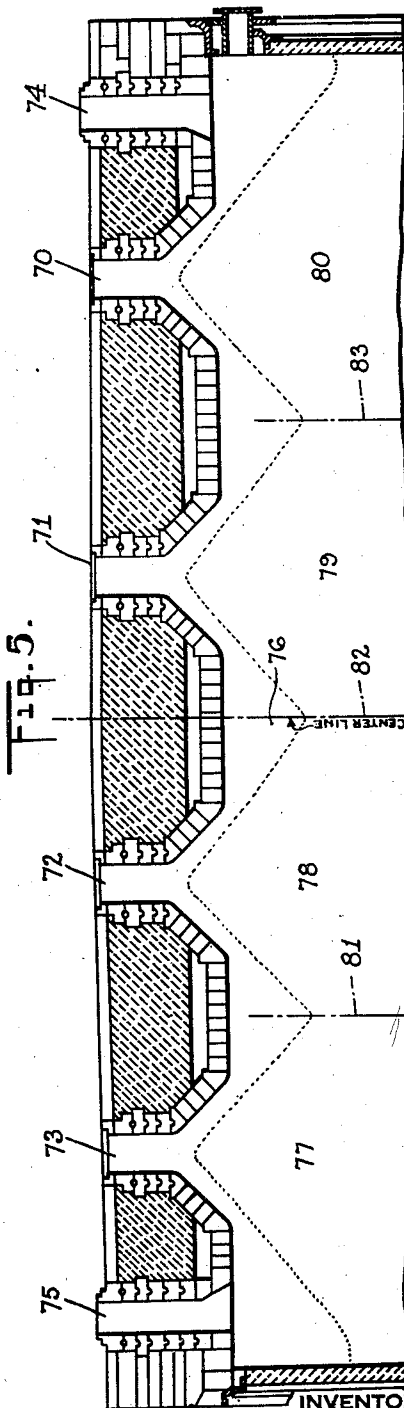

Fig. 5.

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Fig. 6.

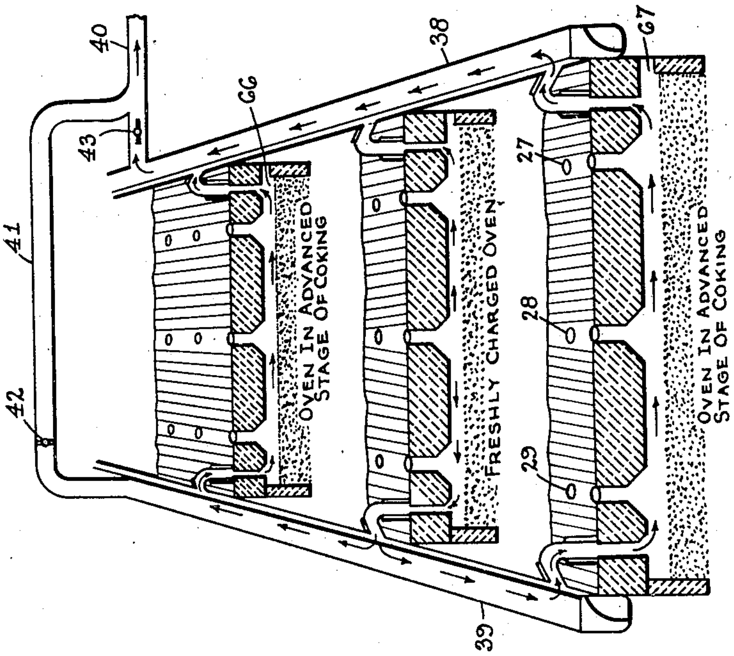
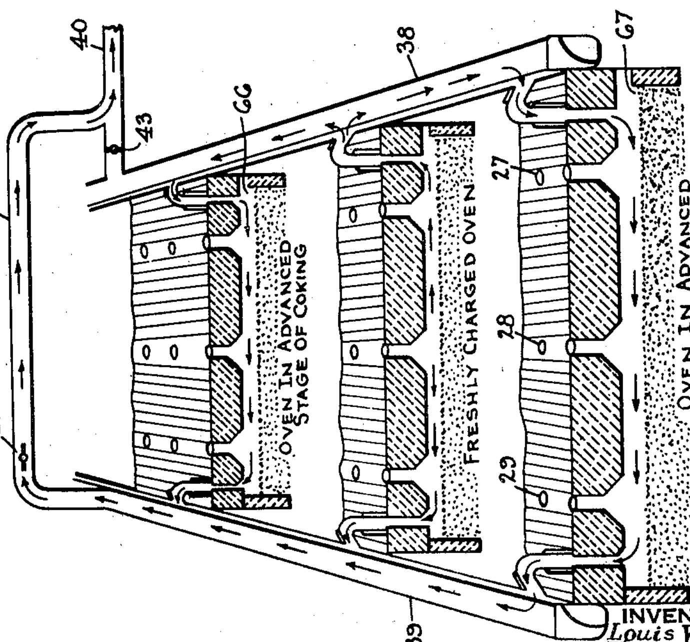


Fig. 7.



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2,488,952

UNITED STATES PATENT OFFICE

2,488,952

COKE OVEN BATTERY AND OPERATION THEREOF

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Application March 19, 1946, Serial No. 655,398

2 Claims. (Cl. 202—36)

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This invention relates to a process of charging and coking coal in a coke oven battery.

Among the objects of this invention is to provide a process for coking coal in a coke oven battery, in the practice of which process:

(1) Difficulties heretofore encountered due to the formation of carbon in the roof of the battery, including carbon forming on the walls of the charging hole openings, are eliminated; by eliminating roof carbon, the coking capacity of the battery is increased, as will be explained more fully hereinafter;

(2) A balanced pressure between the coking chambers and the flues is maintained, thereby reducing to a minimum the loss of gas and by-products and the dilution of gas with the products of combustion;

(3) The charge is completely coked, i. e., semi-coked tops do not result;

(4) An increase in the yield of gas and by-products and an improvement in the quality of the by-products results;

(5) Smoke nuisance during charging is eliminated, i. e., throughout the period a coking chamber is charged with coal, the volatiles evolved during charging have an unobstructed escape path in both directions along the top of the chamber into the collector mains, and, hence, do not escape into the atmosphere;

(6) Charging of the coking chambers without spillage of coal on the top of the battery is effected;

(7) Fewer strokes of the leveler bar to level a charge of coal are required, thereby resulting in a substantial saving in the time necessary for effecting such charging operation;

(8) More uniform coke results; and

(9) Better working conditions, particularly for the persons working on the top of the battery, results.

In the accompanying drawings forming a part of this specification and showing, for purposes of exemplification, preferred forms of this invention without limiting the claimed invention to such illustrative instances:

Fig. 1 is a vertical section through a coking chamber of a coke oven battery embodying this invention and showing the disposition of the coal in this coking chamber during charging;

Fig. 2 is a plan view of the mechanical charger shown in elevation in Fig. 1;

Fig. 3 is a fragmentary vertical section through the battery of Fig. 1, the section being taken in a plane disposed longitudinally of the battery;

Fig. 4 is a fragmentary longitudinal section

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through the battery showing a modified form of mechanical charger which may be employed for charging coal to the coking chambers;

Fig. 5 is a vertical section taken in a plane extending crosswise of the battery through the top portion of a coking chamber having four charging holes therein and showing the disposition of coal in the coking chamber when charged into the chamber and before leveling;

Fig. 6 is a diagrammatic view of the top portion of a coke oven battery illustrating the manner in which the gas collector spaces at the top of the coking chambers are cooled to prevent the formation of roof carbon, and the path of flow of gas to the by-product recovery main during one cycle of operation of the battery; and

Fig. 7 is a diagrammatic view similar to Fig. 6 but showing the path of flow of the gases to the by-product recovery main during a succeeding cycle of operation.

In accordance with the present invention, the charging holes are disposed at spaced points in the top of the coking chamber relative to the taper of the coking chamber, so that the volumetric capacities of the portions or sections of the coking chamber communicating with the charging holes are substantially the same. These charging holes are provided with cut-backs or flared outlets at an angle of from 40° to 50°, preferably 40° to 45°, to the vertical, thereby increasing the spaces in the coking chambers where the coal may accumulate without reaching the top of the chamber, so as to form an obstruction to flow along the top of the chamber. Substantially equal volumes of the coal are fed from a location not below the coking chamber room simultaneously from at least three substantially equal volumetric masses of the coal positioned above the coking chamber at a rate in excess of gravity flow to form piles in the coking chamber which are more uniform in density than the piles produced by gravity flow chargers, and the meeting lines of which always occur in substantially vertical planes and in the same places. It will be appreciated the piles will necessarily vary in density from bottom to top, the denser portion being at the base of the coking chamber, but this variation in density is compensated for in the heating of the charge since combustion of the gas commences at a level at or near the base of the charge. Each of the hoppers of the mechanical charger contains an amount of coal such that all the coal will flow into the coking chamber from the hoppers without forming any trapped gas pockets and without requiring the operation of the leveler bar to bull-doze or otherwise move a portion of the coal charged in to the chamber, to permit all the coal from the hoppers to flow into the coking chamber. Two collector mains are employed, one at each side of the battery, which mains are connected with the coking chambers and with the by-product gas main so as to permit circulation of gas from the newly charged ovens through one main where the gas is cooled and then along the tops of the ovens which are near the ends of their coking periods, into the other main and thence to the by-product recovery system. The flow through the two collector mains is periodically reversed. Cooling of the tops of the coking chambers in this manner prevents roof carbon formation which, if formed, would accumulate in the charging holes, including the cut-back portions thereof interfering with the proper charging. Further, this mode of operation equalizes the pressure conditions throughout the coking chamber, so that there is neither excessive high pressures in the newly charged ovens nor unusually low pressures in the ovens in the advanced stages of coking, thereby making it possible to operate under such a pressure balance that leakages through the brick-work from the flues to the oven or from the oven to the flues are eliminated. Moreover, the use of two mains with the ovens being charged as hereinabove described produces an unobstructed escape path in both directions along the top of the chamber for flow of volatiles evolved during charging into the collector mains and hence eliminates the smoke nuisance.

Referring to Fig. 1, **25** indicates a coking chamber of a coke oven battery consisting of alternate horizontal tapered coking chambers and heating walls having regenerators and supported on a suitable foundation above a basement space, as shown, for example, in Pavitt Patent No. 2,155,954 of April 25, 1939. Since the present invention is concerned chiefly with the design, construction and operation of the upper portion of the battery, the disclosure herein will be confined to this portion of the battery. It will be understood the lower portion of the battery may be of any known construction such as the under-jet type shown, for example, in the aforesaid Patent No. 2,155,954. Each coking chamber **25** of the battery has in the roof **26** thereof, three charging holes **27**, **28** and **29**. These charging holes are spaced apart distances such that the volumetric capacities of the portions or sections **30**, **31** and **32** of the coking chamber therebeneath are substantially equal. To accomplish this, the spacing of these charging holes takes into account the taper of the coking chamber. For a chamber having the following dimensions:

Overall length, 42′ 1¾″
Length between doors, 39′ 5″
Height, 10′ 1⅞″
Pusher side width, 16⅝″
Coke side width, 20⅝″

the optimum spacing of the charging holes to compensate for oven taper is as follows: The axis of charging hole **27** spaced 8′ 6″ from the pusher side of the battery; the axis of charging hole **28** spaced 13′ 6¼″ from the axis of the charging hole **27**; and the axis of charging hole **29** spaced 12′ 7½″ from the axis of charging hole **28** and 7′ 6″ from the coke side of the battery. This spacing results in portions **30**, **31** and **32** of the coking chamber communicating with each of the charging holes **27**, **28** and **29**, respectively, being of substantially equal volumetric capacities.

The invention herein disclosed is applicable to any coke oven battery having three or more charging holes. As a practical matter, it has been found most economical to construct the battery so that each coking chamber has either 3 or 4 charging holes. The formula:

$$\frac{hwl}{n}$$

in which:

h=height of coking chamber in feet
w=average width of coking chamber in feet
l=length of coking chamber in feet
n=number of charging holes,

gives the volumetric capacity of each portion of a coking chamber communicating with a charging hole of a battery embodying this invention. The charging holes should be so located that planes parallel to the sides of the coke oven battery and passing in a longitudinal direction through the battery mid way between adjacent charging openings divide the coking chambers into portions each having a capacity in cubic feet equal to approximately equal to approximately the capacity calculated in accordance with this formula. It will be understood that the advantages of this invention may be obtained, but to a somewhat lesser extent, by having relatively small variations in the capacities of the respective portions of each coking chamber communicating with each charging hole, for example, as contrasted with present coke oven design, in which one such portion has a 25% greater volumetric capacity than another, this invention includes a spacing of charging holes in relation to the taper, which results in a maximum variation of 10%, preferably not more than 5% in the volumetric capacities of the portions of the coking chamber communicating with the charging holes. The expressions "substantially equal capacity" or "substantially like amount" used herein and in the claims are intended to include variations in capacities and amounts which may differ by as much as 10%.

Each charging hole **27**, **28** and **29** has its lower portion undercut in a direction parallel to the length of the coking chamber, i. e. crosswise of the battery, as indicated by the reference character **33**, to form a flared discharge outlet and to materially increase the effective height of the coking chamber for receiving coal during charging. The angle of the wall defining the undercut portion to the vertical should be within the range of 40° to 50°, preferably 40° to 45°. Thus the capacity of the coking chamber for piles of coal without the piles reaching the top of the chamber and forming gas pockets is increased substantially. By having the angle of the undercut portion within the range stated, it has been found no material weakening of the roof of the battery takes place.

Disposed at the opposite ends of each coking chamber are gas off-takes **34**, **35** which lead into the uptake pipes **36**, **37** communicating with the collector mains **38**, **39** disposed at opposite sides of the battery. The collector mains **38**, **39** lead to the by-product recovery main **40** (Figs. 6 and 7) and are interconnected at one end of the battery by a cross-over main **40**. Butterfly valves **42**, **43** as hereinafter more fully described, are employed to place one or the other collector mains **38**, **39** in direct communication with the by-product recovery main **40**.

As conventional, the ends of the coking chambers are provided with door closures, one of the doors having a leveler door opening adapted to be closed by a leveler door. A leveler bar, which is fragmentarily shown in Fig. 1, may be moved through this opening to level the charge, as more fully explained hereinafter, and thereafter withdrawn from the coking chamber.

The charging of the coking chambers should be effected by a mechanical charger, which feeds the coal from each hopper at a controlled rate to form a charge of more uniform density except for the meeting lines of the piles, which meeting lines should always occur at the same place. Two types of such mechanical chargers are shown, but it will be understood that any other type of mechanical charger may be used. In the modification shown in Figs. 1 to 3, a mechanical charger is employed consisting of a carriage **44** provided with wheels **45** arranged to travel on tracks **46** disposed on the roof of the battery. Mounted on the carriage are three hoppers **47**, **48** and **49** as shown in Fig. 1, each of which hoppers contains a mass of coal. These three hoppers, thus, establish substantially equal volumetric masses of coal above the coke oven chamber when the carriage **44** is in charging position. At the bottom of each hopper is disposed a rotating plate **50** having ribs **51** (Fig. 2) thereon, which causes the coal to travel with the rotating plate **50** so that it is brought into contact with the plow **52**. This plow effects discharge of the coal through a chute **53** leading into a retractible sleeve **54** arranged to be lowered into position to bridge the space between chute **53** and a charging hole when it is desired to charge a coking chamber and arranged to be raised to the position shown in Fig. 1 after the charging has been completed. Operation of the chutes may be effected by the lever mechanism indicated collectively by the reference character **55**. A cab **56** is mounted on the carriage **44**; the operating mechanism for actuating the motors **57** (Fig. 2) which drive the carriage and actuate the lever and other mechanism of the larry is disposed in this cab. Since this type of mechanical feeder, as above indicated, represents but one well-known type of larry, it is believed further description thereof is unnecessary.

In Fig. 4, a modified form of mechanical charging or force feeding device which may be employed is shown. Parts of Fig. 4 which function in the same manner as those of the larry shown in Figs. 1, 2 and 3 have been given the same reference characters. The modification of Fig. 4 differs from that shown in Figs. 1, 2 and 3 chiefly in that instead of a rotating plate for effecting feed of coal to and through the discharge chute, the modification of Fig. 4 involves a vibrating pan-type of feeder. In this modification, a vibrating pan **60** is mounted beneath each hopper so that it acts as a closure for the hopper. This pan communicates with the discharge chute **53**. An electrical vibrator **61** is associated with the pan **60**; when the vibrator **61** is energized, coal is fed at a uniform controlled rate from the hopper with which the pan **60** is associated through the pan into the discharge chute **53** from which it is delivered to the coking chamber. A heat insulating shield **61′** is disposed beneath vibrator **61** to protect it from the heat emanating from the coking chamber when the charging hole covers are removed.

Each of the hoppers of the larry contain charges of coal equal to that amount of coal formed beneath the charging hole with which the hopper may be placed in communication. The amounts in each hopper, when charging a three-charging hole opening, as shown in Fig. 1, preferably are substantially equal. The invention, however, includes a construction and operation in which the hoppers contain unlike amounts of coal, but not exceeding variations in excess of 10% by weight, provided, however, the amounts are such that (*a*) when the hoppers are empty, piles are formed which leave a gas space in the coking chamber communicating with one or the other of the gas collecting mains, which gas space provides an unobstructed escape path for gas into one or the other of the collecting mains, and (*b*) all the hoppers may be emptied during the same time interval.

This coal is fed from these hoppers by the rotating plate **50**, or vibrating pan **60**, as the case may be, at a controlled rate in excess of gravity flow, so that the hoppers are simultaneously emptied. With the charging holes undercut or flared and positioned as shown, it has been found that the complete charge may be introduced, forming three piles in the case of a three-charging hole coking chamber, without requiring use of the leveler bar to bulldoze portions of the coal from beneath the charging hole openings.

The meeting planes of the three piles of coal thus formed is indicated by the reference characters **62**, **63** and will be found to occur in a vertical plane, and always in the same places. This mode of charging results in a saving of time in filling the coking chamber and in that less leveling is required. When charging with the usual types of charging cars, six strokes of the leveler bar have been required to level the charge, whereas only two strokes have been found necessary to level the coal charged as hereinabove described. It is believed that the four additional strokes detrimentally affected the density of the coal in the coking chamber, resulting in non-uniform coking. Since the meeting lines between contiguous piles of coal occur always in the same position, the flues in the heating walls, opposite where these meeting lines occur, may be supplied with an increased quantity of heating gas to compensate for the increase in density of the coal in the areas indicated by the meeting lines **62**, **63**, thus resulting in more uniform coking of the charge. Likewise, the end flues may be supplied with an increased amount of heating gas to compensate for the increased density of the coal at the ends of the coking chamber.

Each of the hoppers **47**, **48** and **49** of the larry, as above indicated, carries an amount of coal to form the desired pile of coal in the coking chamber, and the entire amount of coal in these hoppers is required to form the coal charge in the coking chamber. Since once the larry is spotted in position over the charging holes and the sleeves **54** dropped to bridge the space between the charging chute **53** of the larry and the charging holes, the entire coal charge flows into the coking chamber and no spillage of coal on the top of the battery takes place. In prior charging procedures, on the other hand, coal remains in the charging hoppers after commencement of the charging and fills the charging holes. Volatiles evolved during charging collect in the spaces between the charging holes near the top of the chamber, and as the charging continues a pressure builds up in these spaces sufficient to cause these volatiles to flow through the charging holes with consequent spillage of coal on the top of the battery.

It will be noted from Fig. 1 that when the hoppers have been emptied, the piles of coal formed in the portions 30, 32 of the coking chamber do not reach the roof of the coking chamber, but gas spaces 64, 65 are formed about the top of the piles of coal. At no time during the charging are there any obstructions in the top of the coking chamber to hinder the flow of gas evolved during charging into one or the other of the collector mains 38, 39. In other words, no trapped gas pockets are formed; the undercut portions of the charging holes 27, 28 and 29 permit the entry of the full charge of coal without leveling and also the undercut or flared portions associated with charging holes 27, 29 provide free passages 64, 65, respectively, for the escape of gas into the collector mains 38, 39.

In a freshly charged coking chamber, the gas forms so quickly that there is a decided rise in pressure in the chamber. As the coking period progresses, this pressure subsides and disappears near the end of the coking period, when a pressure below atmospheric (suction) may occur. The high initial pressure and the final suction makes it difficult to maintain balanced pressure conditions between the coking chambers and the adjoining heating flues, so that there will be a minimum of leakage of coke oven gas into the flues, and conversely of products of combustion into the coking chambers. The pair of collector mains 38, 39, when operated as hereinafter described, not only result in smokeless operation during charging, as hereinabove described, but also permit operation under balanced pressure conditions.

Referring to Figs. 6 and 7, gas evolved in an oven freshly charged will seek its path of least resistance and flow either into main 38 or 39. With the butterfly valves in the position shown in Fig. 7, gas from the coking chambers in the early stages of coking flows into main 38, as indicated by the arrows in Fig. 7, and then along this main until it reaches the coking chambers nearing the ends of their coking periods, and in which the pressures are lower than average, which coking chambers are indicated by the reference characters 66, 67 in Fig. 7. The gas will flow into these coking chambers along the gas spaces above the charges and pass into main 39, thence into main 41 and into and through the by-product recovery main 40, all as indicated by the arrows in Fig. 7.

On reversing these butterfly valves to the position shown in Fig. 6, which reversal may take place whenever desired to obtain optimum temperature conditions in the tops of the coking chambers, the gas evolved in freshly charged ovens will go into either collector mains 38 or 39. The gas flowing in the collector main 39, as indicated by the arrows on Fig. 6, will seek its path of least resistance and will flow through the gas spaces of the ovens in the advanced stage of coking which are, therefore, at lower pressures, into main 38 from which it flows to by-product recovery main 40. Thus the pressures in the newly charged coking chambers are equalized with those in the advanced stages of coking, equalizing the pressures throughout the battery. This results in the advantage that there are neither excessively high pressures in newly charged coking chambers, nor suction in the coking chambers in the advanced stages of coking, making it possible to operate under such a pressure balance that leakages through the brick-work from the flues to the coking chamber or from the coking chamber to the flues are eliminated.

Gas leaving a freshly charged coking chamber entering either collecting main 38 or 39 is sprayed and cooled by the conventional sprays employed in the collector main system, so that when this gas enters the gas space of an oven in the later or advanced stage of coking, it is at a temperature of 175° to 200° F. As this saturated gas sweeps through the gas spaces at the top of the coking chambers, it keeps the brick-work and the gas-collecting spaces relatively cool. This prevents formation of roof carbon; also improves the quality of the by-products in that over-cracking thereof in the gas-collecting space is avoided. Moreover, as compared with prior operation in which in order to preserve the by-products by sacrificing a certain amount of good coke, the top portion of the coal charge was not completely coked-out, the present invention results in complete coking of the charge and this without detrimentally affecting the by-products.

Fig. 5 shows a modification having in the top portion of each coking chamber, four charging holes 70, 71, 72 and 73, the gas off-takes 74, 75 communicating with collector mains such as mains 38, 39 shown in Fig. 1 of the drawings. The longitudinal centerline of the battery is indicated by 76. Fig. 5 shows the preferred spacing of four charging holes, to compensate for the taper of the coking chamber and to form portions of substantially equal volumetric capacity. By so spacing the charging holes and having them undercut or flared, as shown, four piles 77, 78, 79 and 80, of coal of substantially like amount are formed without requiring any leveling, none of which piles is of height to obstruct the gas space at the top of the coking chamber, the total amount of coal thus introduced forming the desired charge, without sacrifice to the amount of coal coked in each chamber. The meeting line 81 between the piles 77, 78, the meeting line 82 between the piles 78, 79 and the meeting line 83 between th piles 79, 80, when the coking chamber is charged in accordance with this invention, as hereinabove described, using a mechanical charger, the hoppers of which contain amounts of coal just sufficient to produce the piles indicated, always occur at the same relative positions within the coking chamber, so that more heating gas may be supplied to the flues in the localities of these meeting lines, to compensate for the increased density of the coal in these localities. It will be noted the tops of the piles of coal are spaced from the undercut portions of the charging holes, providing a free escape path for gas evolved during charging to the offtakes 74, 75.

Either wet or dry coal may be coked in the coke oven battery, hereinabove described. By "wet coal" is meant coal containing in excess of about 5% by weight of moisture. Wet coal usually contains from 6% to 8% moisture; in some cases, the moisture content may be as high as 10%. Dry coal, i. e. coal containing less than about 5% moisture, the charging of which has heretofore presented a serious smoke problem, can be efficiently coked in a battery embodying this invention with complete elimination of the smoke nuisance.

In operation, each of the hoppers of the larry is provided with a charge of coal of substantially like amount, required to form the desired piles in the coking chamber, as shown in Figs. 1 and 5, which piles are formed by emptying the hoppers. The piles, it will be noted, leave a free space at the top of the chamber through which volatiles evolved during charging may escape into the collector mains **38** and **39**. The larry containing such charges of coal is spotted over the coking chamber to be charged, the charging hole covers removed, the sleeves **54** lowered into position, and the mechanical charger actuated to deliver the charges at a controlled rate so that all hoppers are emptied during the same time interval, usually of the order of one minute or less. The sleeves **54** are then elevated and charging hole covers replaced. The leveler bar is passed through the top of the coking chamber, making the necessary pass or passes, usually two passes, to level the charge.

Gas evolved in the coking chamber, thus charged, passes into the collector main **38** or **39**. If the butterfly valves **42**, **43** are positioned as shown in Fig. 7, the gas flowing through main **38** from the freshly charged coking chamber, as well as from other coking chambers in the early stages of coking, flow through this main **38** until they reach coking chambers in advanced stages of coking, and which are, therefore, at lower pressures. The gas cooled in the collector main **38** flows through the gas collecting spaces of the coking chambers in advanced stages of coking, cooling these spaces, and then into the collector main **39**, through the cross-over main **41** to the by-product recovery main **40**. Whenever it is found necessary to reverse the flow of gas through the gas collecting spaces of the coking chambers in the advanced stages of coking to obtain desired temperature conditions therein, butterfly valves **42**, **43** are moved to the position shown in Fig. 6 so that cool gas from main **39** flows through the gas collecting spaces of the coking chambers **66**, **67** in the advanced stages of coking in the direction shown by the arrows in Fig. 6, into the gas collecting main **38**, and thence to the by-product recovery main **40**.

From the above description of the invention, it will be appreciated that when operating in accordance with this invention, formation of roof carbon is eliminated. This increases the capacity of the battery since without roof carbon there is no need to interrupt the operation of one or more of the coking chambers to burn-out the carbon; hence, more coking chambers can be pushed per day on the same net coking time. Furthermore, without carbon formation on the roof, and on the slopes of the charging hole cut-backs, the gas evolved during charging has an escape path unobstructed in both directions along the top, resulting in smokeless charging. The balanced pressure maintained between the ovens and flues, as hereinabove described, reduces to a minimum the loss of gas and by-products through the chimney flue and the dilution of the coke oven gas with products of combustion. The feature of employing the double collector main with circulation of cool gas through the gas-collecting spaces at the top of the coking chambers in the advanced stages of coking improves the yield and the quality of the gas and by-products, and permits operation so as to completely coke the charge, including the top portion thereof, without detrimentally affecting the by-products.

It will be further noted that fewer strokes of the leveler bar are required in leveling a charge, resulting in a substantial saving of time in effecting each charging operation. Since the charging is effected without any spillage of coal and without creating a smoke nuisance, the working

conditions for the men at the top of the battery are substantially improved. Furthermore, since a coal charge is produced of more uniform density throughout, except (*a*) in the locality of the lines where the piles of coal meet, which lines always occur in substantially the same place, and (*b*) at the ends of the coking chamber, by compensating for the increased density of the coal in these areas by supplying more heating gas to the flues heating these areas, more uniform coke results.

By the expression "force feeding" used in the claims, is meant the feeding of coal by a charger which delivers the coal to the charging openings at a controlled rate, dependent upon the rate of movement of the feeding device, such, for example, as the rotating plate **50** or the vibrating pan **60** of the mechanical chargers of Figs. 2 and 4, respectively, and as distinguished from charging the coal by causing it to flow by gravity from the hoppers through the charging openings.

This application is related to our copending application Serial No. 656,748, filed March 23, 1946, which contains generic claims to the invention disclosed and claimed herein and that disclosed and claimed in said copending application.

Since changes may be made without departing from the scope of the invention, it is intended that the above description should be interpreted in an illustrative and not in a limiting sense.

What is claimed is:

1. A method of charging a coke oven chamber, which comprises, establishing at least three substantially equal volumetric masses of coal above said coke oven chamber, force feeding from a location not below said coke oven chamber roof substantially equal volumes of coal simultaneously from each of said masses at a rate in excess of gravity flow into said coke oven chamber at a plurality of points selected to divide said coke oven chamber into substantially equal volumetric sections, each of said sections being individual to and fed from one of said masses, the total volume of the masses of coal thus fed forming the complete charge introduced into said coke oven chamber, being sufficient to substantially completely fill said coke oven chamber except for a gas collecting space extending the full length of said coke oven chamber and always permitting the free passage of gas across the entire upper portion of said coke oven chamber, and thereafter leveling the piles of coal thus fed with not more than about two strokes of a leveler bar.

2. A method of charging a coke oven chamber as defined in claim 1, in which gas is withdrawn from the opposite ends of the gas collecting space at the top of said coke oven chamber during charging, and the leveling of the piles of coal fed into the coke oven chamber is accomplished by not more than two strokes of the leveler bar.

LOUIS WILPUTTE.
FRANS WETHLY.

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