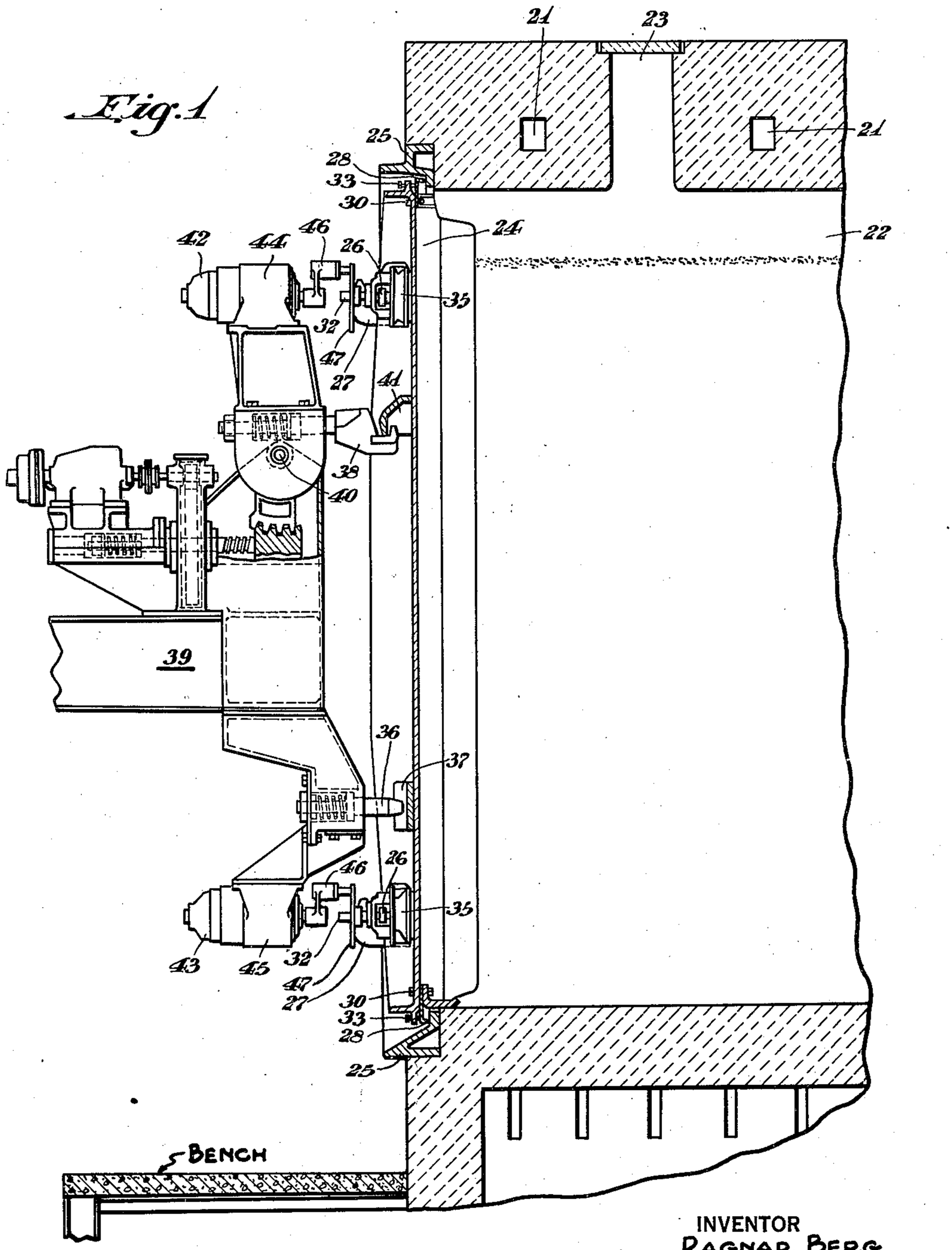
July 12, 1938. R. BERG 2,123,521

COKE OVEN DOOR OPERATING MECHANISM

Filed May 1, 1936 4 Sheets-Sheet 1

Fig. 1



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COKE OVEN DOOR OPERATING MECHANISM

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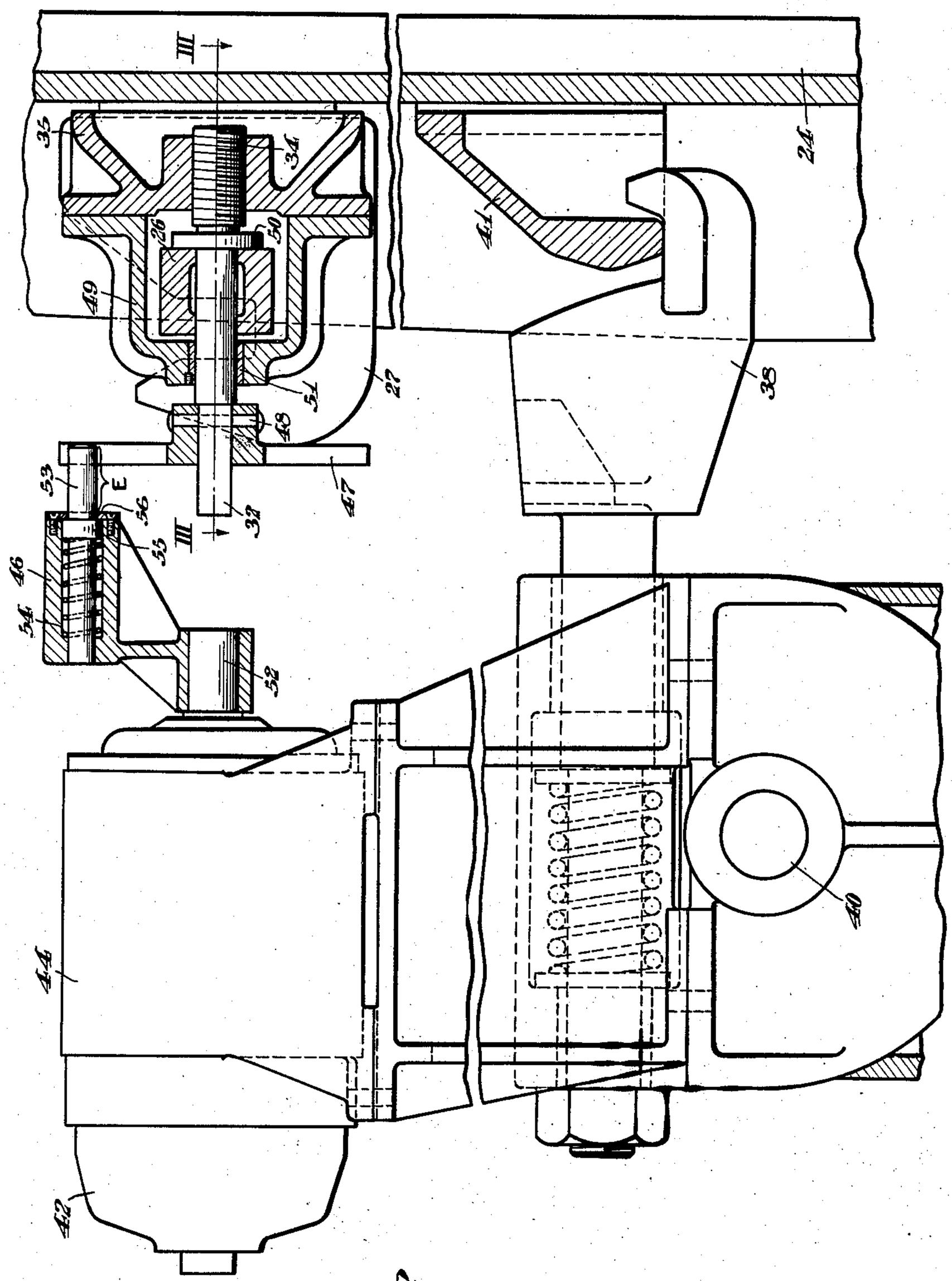

Fig. 2

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COKE OVEN DOOR OPERATING MECHANISM

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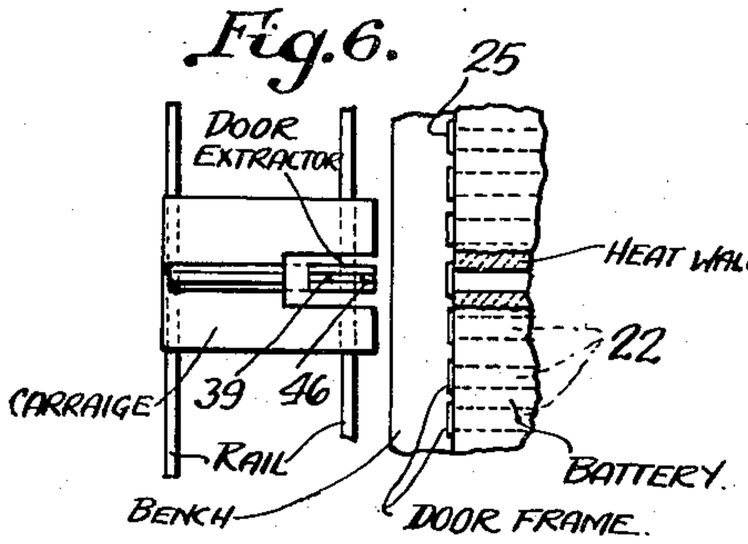
Fig. 6.



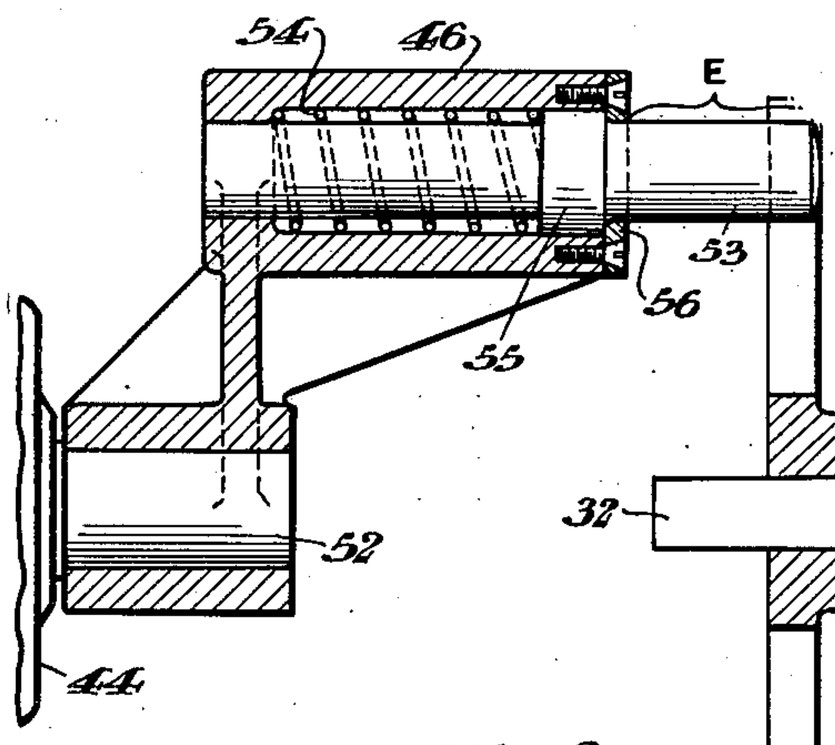
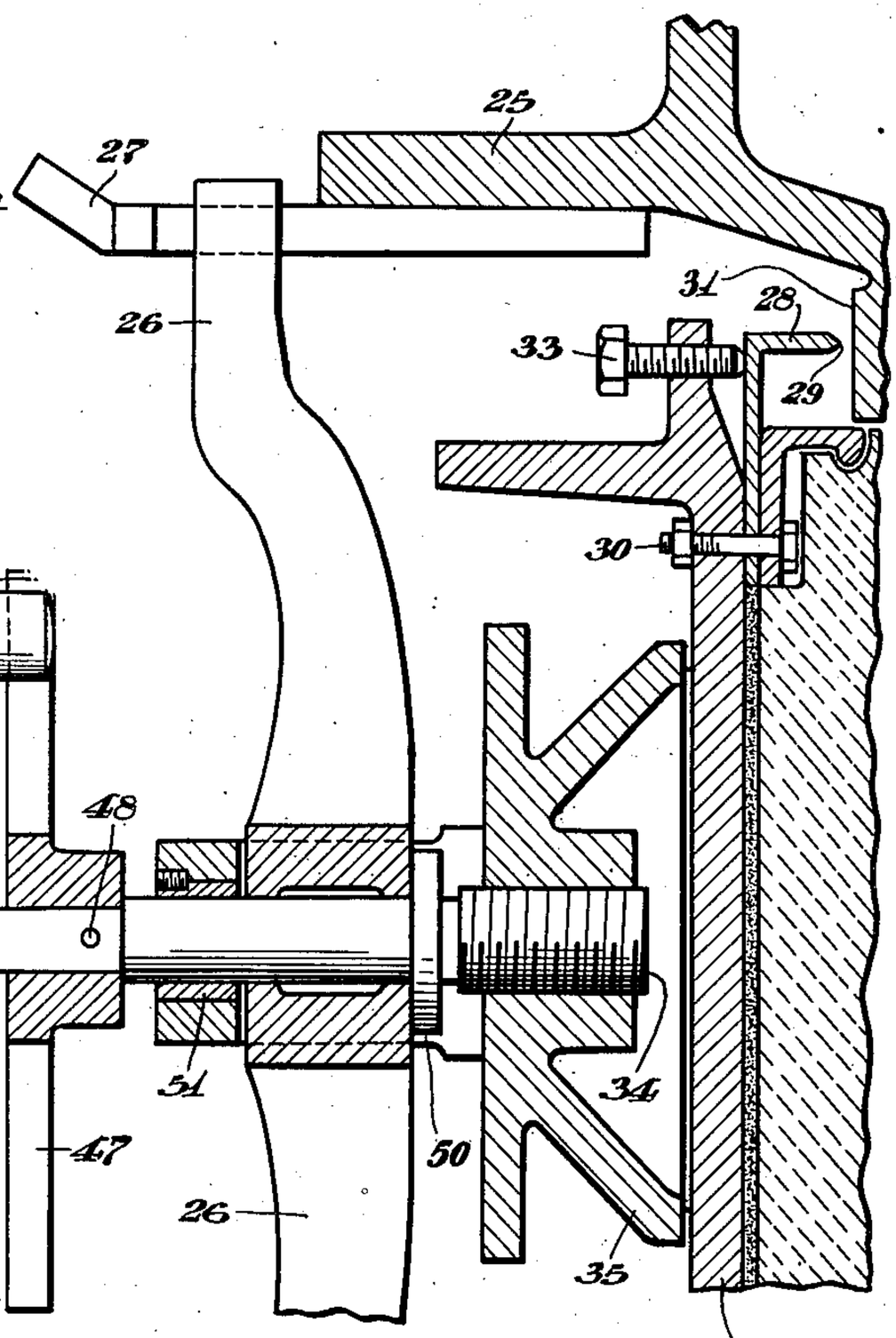


Fig. 3



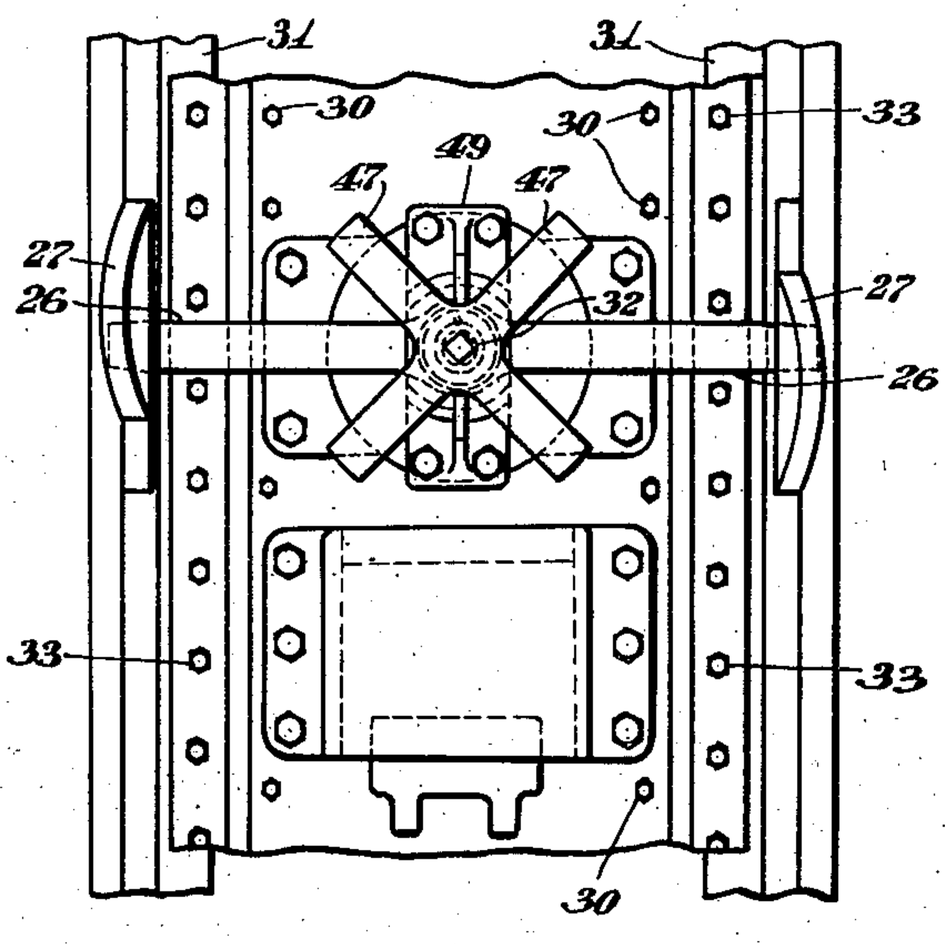


Fig. 4

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COKE OVEN DOOR OPERATING MECHANISM

Filed May 1, 1936 4 Sheets-Sheet 4

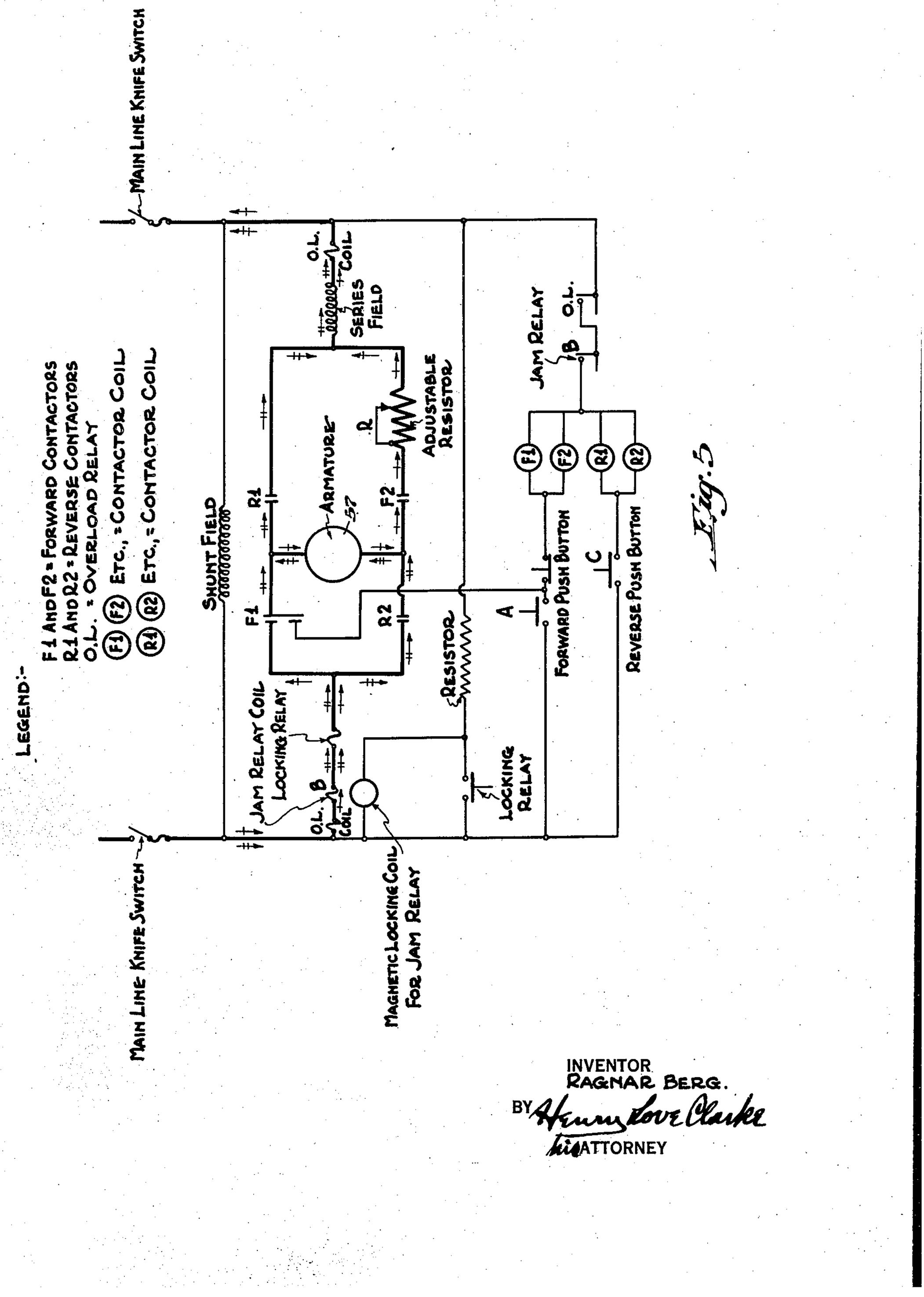

Fig. 5

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Patented July 12, 1938 2,123,521

UNITED STATES PATENT OFFICE

2,123,521

COKE OVEN DOOR OPERATING MECHANISM

Ragnar Berg, Pittsburgh, Pa., assignor to Koppers Company, a corporation of Delaware

Application May 1, 1936, Serial No. 77,311

7 Claims. (Cl. 212—4)

My present invention relates in general to the oven doors that rest in the mouths of horizontal coking retort ovens during the coal carbonization period, and more specifically to doors of the self-sealing type as are exemplified in U. S. Patents 1,908,467 and 1,908,501 granted Ernst Wolff on May 9, 1933. Oven doors of the therein described design employ as a sealing means, to prevent the escape of coal distillation gases into the atmosphere, a flexible metal frame which is attached to and extends beyond the periphery of the refractory lining of the door and supports a knife-edge or fin that rests in close contact against a co-operating plane near the inner edge of the flanged door frame, when the oven door is seated in proper operating position. Successful operating results with a metal-to-metal door sealing means of this type depend upon the maintenance of a gas tight contact between the knife-edge on the door and the plane surface near the inner edge of the door frame, and it is obvious to those experienced in the art that a high degree of accuracy in the adjustment of the contact between these metal parts is necessary to provide a proper seal.

The contact between an oven door and its co-operating door frame is periodically broken when the door is removed from the oven mouth to permit the pushing of the carbonized coal charge. Subsequent to the discharging operation, the door is returned to its former operating position. The doors are heavy and massive, and mechanical devices are required for their manipulation. Such devices are insufficiently accurate in their operation to replace the doors with such precision of adjustment that a gas tight contact between the sealing means and the door frame would be directly established. It is accordingly, the general practice to place the oven door loosely in the mouth of the oven and then effect its final seating in the desired position by means of a manually operated ratchet-wrench applied to the adjustable pin, threaded at one end, that supports the door-latches. In this manner the door is eased into final position, and contact between the knife-edge and the door-frame is carefully and precisely adjusted to reestablish the sealing of the oven mouth.

It is apparent that the value of a sealing device of this type depends upon the ease and accuracy with which an oven door, so equipped, can be returned to the precise position it had occupied before its removal from the oven chamber, and also that relatively small discrepancies in its adjustment may be responsible for the difference between a tight or leaky seal. If the torque applied to the latch-sealing screws is too great, the knife-edge may be unduly distorted and bowed; if the pressure established between the latches and the latch-hooks is insufficient, the sealing edge may be too remote from its seat at the edge of the door frame to be effective for sealing purposes. Manual adjustment of the oven door-latches, in consequence of the individual strength of the different operators, also occasions differences in the pressure applied to the same.

It becomes, therefore, obvious that the elimination of the personal element in the adjusting of the self-sealing doors of a coking chamber will be attended by more satisfactory operating results, and that the provision of a mechanical device which will always apply the same torque to the latch screws and which can be operated from the pusher or door machine, will be highly desirable in the art. Such device will reduce the labor requirement, be time saving and promote uniformity of operation.

The object of my instant invention is the provision of mechanical means, for loosening and tightening the door-latches of horizontal coke ovens, which will accurately adjust the pressure between the door-latches and latch-hooks so that the oven door may be always returned to the same operating position and the sealing frame of a self-sealing door thereby repeatedly be restored with comparative precision to a position from which it is intermittently removed.

A further object of my invention is the development of a door-latch operating device that may be attached to the pusher machine on the one side of a battery and the door-machine on the opposite side, and will be equally efficiently operative within such departures from precision of alignment as are normally found to exist, between the oven door and the door-lifting machine, in consequence of minor deflections from the average position the pusher and door-lifting machine assumes relative to the door, when brought into operating position. These variations in the position of the machine in relation to the door result from, the play between the door-hook and the hook-plate, the compressibility of the door-hook bumper-springs, small inaccuracies in the expansion of the battery, irregularities in the tracks supporting the pusher and door machines, play in the bumper plate situated at the lower part of the oven door for retaining the door handling machine in proper position

while in operation, carbon accumulations under the door, and the like.

In the accompanying drawings forming a part of this specification and showing for the purpose of exemplification a preferred apparatus in which the invention may be embodied and practised but without limiting the claimed invention specifically to such illustrative instance or instances:

Figure 1 is a fragmentary elevational section taken longitudinally of a coking chamber equipped with an oven door of the self-sealing type showing a section of a combination pusher machine and door machine, which is provided with a latch tightening device constructed in accordance with the present invention;

Figure 2 is an enlarged side elevation of an upper part of an oven door showing the door-hook, the hook-plate and the latch-screw in section as well as the latch-tightening device of my invention;

Figure 3 is a fragmentary horizontal section, through the door-latch and tightening screw showing the relative operating positions of the door-latch and the tightening device, taken along the line III—III of Figure 2;

Figure 4 is a front elevational fragment of an oven door showing one latch and the means, in position on the latch-pin, for engaging the latch-tightening device of my invention;

Figure 5 is a schematic wiring diagram adapted to actuate the latch-operating device of the present invention.

Fig. 6 is a schematic view illustrating diagrammatically a bank of coke ovens.

The same characters of reference indicate the same parts throughout the several views.

In its present embodiment, the invention is employed in connection with a coke oven battery of the by-product type embodying in its construction a plurality of elongated coking chambers arranged side-by-side with crosswise extending heating walls equipped with the usual heating flues, the heating flues in any wall being communicably connected with those in the alternate wall by means of the cross-overs **21**, in the well-known manner embodied in U. S. Patent 1,374,546 granted to Joseph Becker, April 12, 1921. The coal to be carbonized is charged into the ovens **22** through the charging holes **23**. The ends of the ovens are closed by doors during the carbonization process, each door comprising a refractory lined member **24** which reposes loosely in the oven mouth, where it is supported at the bottom by gravity on the adjacent portion of the door frame **25** that entirely surrounds the periphery of said openings. The top and sides of the door member **24** are out of contact with and unsupported by the door frame. The interstitial space between the door and its receiving frame is sealed from the exterior by means of a flexible metal frame **28**, that projects beyond the margin of the refractory lining and is affixed to the door by the bolts **30**. The flexible frame supports at its outer edge the sharp-edge **29** that is substantially normally disposed to the flanged rim **31** of the door frame.

When sealing an oven by means of a door of this type, the door is placed loosely within the oven-mouth by the door machine, and the latches **26** which are rotatably mounted on the pin **32** are turned in such manner as to loosely engage the latch hooks **27** that are bolted to the door frame **25**. The pin **32** is then turned on the threads **34**, provided at its inner end, and by which means it is supported in the bracket **35** that is attached to the door member **24**. As the pin moves horizontally outward, carrying with it the latch rod, the latter comes in contact with the inclined surfaces provided on the hooks **27**, and the pressure thereby created causes the door member **24** to move forward into the oven to establish a tight contact between the sharp-edge **29** and the flanged surface **31**, thereby sealing the oven mouth, at its entire periphery, against the escape of the products distilled from the coal. The frame **28** is designed with sufficient flexibility that it can be made to conform to irregularities and distortions of the surface **31** through pressure applied by the adjusting screws **33**, so that the sealing edge can be brought into contact with said surface at all points. After such adjustments are once established for the individual doors, any readjustment is normally required only infrequently.

At the end of a carbonization period, the oven doors must be extracted from the mouths of the coking chambers to permit of the pushing of the coke therefrom. In performing this operation, the pressure on the latch-rods is relieved by turning the pin **32** so that it travels inwardly on its threads **34** to remove the latch-rods from contact with the latch-hooks, thus leaving them free to be disengaged therefrom by a rotary movement around the pin **32**. A door-extracting machine is then brought into position in front of the doors at each end of the coking chamber and adjusted into preferred alignment in respect of the doors by means of the bumper pin **36** which is inserted into the recess of the bumper plate **37** mounted on the oven door. The door-hook **38**, of the door-machine **39**, which can be raised or lowered by rotation of the shaft **40** and which in non-operation position inclines downwardly, is actuated to slowly rise and engage the hook-plate **41** on the door. Further raising of the door-hook breaks the seal and lifts the door from contact with the door frame at its lower part. The door is then ready to be removed from the mouth of the oven by moving the mechanism supporting the door-hook and bumper-pin horizontally and outwardly from the oven mouth. Following the removal of the oven doors from the coking chamber and their transfer to a point where they will not interfere with the pushing operation, the distilled coal charge may be pushed from the oven into a coke-car provided for the purpose. The doors are then returned to the coking chamber by executing the above-delineated operations in reverse order.

From the above-recited operating details, it will be apparent to those experienced in the art that a door, provided with the above-described metal-to-metal sealing means, requires that it be returned and adjusted into operating position with greater accuracy and refinement than in those instances where more yielding and conformable materials are used for sealing purposes, and that relatively precise adjustment of the contact between the metal parts comprising the seal is important or the seal established will be inadequate. That is to say, if the pressure of the latches on the latch-hooks is too great, the flexible frame may be bowed and distorted and its contact with the door frame be discontinuous, thereby providing opportunities for leaks; if the pressure is inadequate, a leaky seal will also result; and in both cases tedious and time consuming adjustments of the adjusting screws **33** may be required with each return of the door to the oven.

It is also further apparent that the provision of means whereby a self-sealing door may be repeatedly readjusted into the mouth of an oven so that it will occupy the same position it occupied prior to its removal therefrom, and in such manner that the sealing edge **29** and its co-functioning frame-flange **31** will have the same relative positions and stress between them as before their contact was interrupted, will be a highly desirable contribution to the art, and tend to promote the elimination of time-consuming adjustments.

According to the present invention, I provide a simple and effective mechanical device for operating the screws that provide the door-latches with horizontal movement and cause them to be either brought into or removed from contact with the latch-hooks. This operation has been previously carried out manually by means of a wrench applied at the square-shaped outer end of the threaded pin **32**.

Manual adjustment of the pressure exerted by the door-latches to retain the doors in position in the oven is not entirely satisfactory, and elimination of the personal element in carrying out this operation will expedite its performance and provide for more accurate adjustment of the pressure between the metal sealing edge **29** and the co-acting frame flange **31**.

In the following description of my improvement, I provide electric motors **42**, **43**, as a source of the power required to actuate the door-latch tightening device of my invention, although it should be understood that I do not intend to restrict its actuation to such source of energy exclusively, since it is obvious that other means for example, a steam, hydraulic or air-pressure motor-driven means, are available for inducing operation thereof without departing from the spirit and intent of the hereinafter described device.

Two electric motors **42**, **43**, are stationarily supported on both the door machine and pusher machine at their respective sides of the battery, and so disposed on said machines as to be directly in front of the heads of the latch-screws when they are positioned before the doors. Attached to the shafts of the motors are respectively speed reducers **44**, **45**, of the herring-bone type, which have cranks **46** mounted on their low speed shafts **52**. At the outer end of each pin **32**, which rotatably supports the latch-rods **26**, is mounted a member **47** formed in the shape of a plus-sign and rigidly attached to the pin **32** by through pin **48**. At the inner end of said pin are threads **34** by which it is rotatably supported in the bracket **35**.

The curved and vertically disposed bracket supports **49**, are attached at their ends to the bracket **35** and at their elevated portions are disposed to form an aperture through which the pin **32** extends, so as to provide additional rigidity to the pin near its outer extremity and additional support for the latch-rod that is supported on said pin between the bracket aperture and the pin-collar **50**. A bushing **51** facilitates movement of the latch pin in the aperture of the brackets **49**.

The crank **46**, as it is rotated around the electrically driven shaft **52**, is adapted to engage an arm of the member **47** causing said member to turn about its axis and rotate the pin **32** that carries the latch rods **26**. Depending upon the direction of rotation, the threads **34** migrate inwardly or outwardly in relation to the bracket **35** and respectively move the latch-rods farther from or near to contact with the inclined surfaces of the latch-hooks.

When the door or pusher-machine is placed in position to remove the oven doors, the spatial relationships of the working parts involved in that operation are not always precisely the same for each door. As examples of the factors that may occasion variation in the position these machines may assume in relation to the door the following are cited; the play of the door-hook in the hook-plate, the compressibility of the door-hook and the bumper-springs, scoring of the latch-hooks, and unevenness and mis-alignment of the tracks on which the pusher-ram and door machines travel. The sidewise variation in alignment is limited to the clearance allowed for the bumper pin in the recessed bumper plate, and in the vertical direction, inequalities in expansion and accumulations of carbon will account for minor variations in addition to those above-cited. These deflections from precise alignment are relatively minor and are normally unimportant when only the removal of the door is considered.

However, for my instant invention these factors take on importance. The latch-tightening device is attached to the door-machine and must be so designed that it is operative within the range of these possible variations in door and door-machine alignment; that is to say, the latch-tightening device must be adapted to function effectively within those variations from an average position that the door-machine may assume with respect to the door and still be operative. The crank **46** and the member **47** must therefore be proportioned accordingly. The greatest horizontal and vertical variation in position that must be allowed for is of the order of about two inches, and the proximity of the latch-crank to the latch-pin engagement means will not deviate more than the play of the door-hook in the hook-plate plus the maximum compressibility of the door-hook spring, or a total of about 3¼". Consequently, the arms of the member **47** must be at least two inches long and that part of the crank marked "E" must measure at least 3½" long.

For those instances where the end of the latch-crank does not engage an arm of the member **47** as the door machine is brought into position but abuts the outer surface thereof, I have provided for horizontal movement of the engaging element **53** of the crank **46**, by providing the crank with a tube-like hole extending longitudinally thereof, said hole being of slightly less diameter nearer the end removed from the door latch. Within said hole and concentrically disposed thereof is the spring **54**. The engaging member **53** of the crank is fashioned with collar **55** which is of such diameter as to be slidably movable within the crank arm. The plate **56** is held by set-screws and is likewise perforated with an orifice of sufficient diameter to allow the element **53** to slide therethrough but insufficient to allow the collar **55** to pass. At such times, therefore, as an arm of the member **47** and the element **53** coincide during the bringing of the door-machine into operating position, the element **53** will be forced back into the crank-arm tube and the collar **55** will compress the spring **54**. Rotation of the crank **46** will carry the end of element **53** from out of contact with the surface of the arm **47** and the spring **54** will force said element outward and into position to engage the next radius-like arm of **47** and thereby turn the pin **32**.

When adjusting a self-sealing door of the

above-described type in the mouth of an oven, the flexible sealing frame must be forced against the door-frame with sufficient pressure to adequately seal that opening without distorting the sealing frame unnecessarily or producing a permanent warping thereof. The required pressure is provided by creating stress between the latch-bars and the latch-hooks through the agency of rotatable pin **32**. The magnitude of that stress is governed by the length of travel of the threads at **34** in the bracket **35**, and it is obvious that provision must be made to arrest the progress outwardly of the pin **32** at such moment as the sealing-frame is in proper contact with the door-frame; and, similarly, when loosening said latches to check the rotation of said pin before it jams against the surface of the door member **24**. In the present embodiment of my invention, I provide for this requirement by taking advantage of pressures created, in the latch operating system, to open contactors in the electrical circuits to the motors that actuate the crank arms **46**. The pressure of the flexible sealing edge against the door frame and the contact of the latch-pin with the door member **24**, will both be reflected in the greater resistance to turning of the member **47**. This resistance is encountered by the crank-arm **46**. Therefore, in the electrical circuits, I place jam relays that open when the member **47** offers a predetermined resistance to its further rotation, thereby opening the motor circuits so that further flow of current is impossible and the motors will be stopped.

In the accompanying Figure 5 a simple wiring diagram is illustrated that is suitably adapted for my present purpose. It is realized, however, that the same operating results can be obtained by an almost unlimited number of electrical circuits and devices without departing from the spirit of this improvement. For example, limit switches, that will limit the distance traveled by the latch-bearing pin **32** in any one direction, may be used to stop, at a preferred point, the motors or relays operated by time, current, light sensitive cells or combinations thereof can be employed to effect the same result. Furthermore, the crank **46** can be equally effectively actuated to rotate around the shaft **52** by other sources of power such as steam, or hydraulic or air pressure and I do not intend to limit myself to the herein-disclosed means of actuating the latch-tightening device of the present invention.

Referring now to Figure 5, the electrical motor **57** is included within two electrical circuits, which are used to effect rotation of said motor in opposite directions, so that the same motor can be used to rotate a latch pin either clock or counter-clockwise. The control push buttons "A" and "C" are positioned in any preferred location conveniently accessible to the operator, as for example, the cab of the pusher-machine on that side of an oven and a position adjacent the operating platform of the door-machine on the oven coke-side. When the main line switches to the source of current are closed and the push button "A" is in position to complete the circuit the coils associated with the contactors **F1** and **F2** will act to close said contactors, and current will flow through the motor in the direction indicated by the single-barred arrows and cause the motor to rotate in such direction as to bring the door-latches into contact with the latch-hooks and force the over-door forward into the oven mouth. When the pressure exerted by the flexible sealing frame against the door-frame has reached a preferred and predetermined amount and the resistance to the transfer of current through the electrical circuit becomes greater than that provided for by the adjustable resistor R, the jam relay B in said circuit will be opened by its associated jam relay coil B, to break the circuit and stop the motor. When it is desired to loosen the door latches, the reverse push-button C is depressed into operating position and current will flow through **57** in the reverse direction as indicated by the double-barred arrows, following the closing of the contactors R1 and R2 by their respective contactor coils. The push button C is preferably of the type that can be held manually in position by the operator so that the motor may be started with full torque, which amount may be required to start the latch pin from the closed door position. When the pressure on button C is released, the motor stops, or as an emergency measure, if the latch pin travels so far, in loosening the latches, that it comes into contact with the door member **24**, the jam relay B will open the circuit and stop the motor.

The latch operating device of my present invention provides protection to the sealing edge of a self-sealing door since it is adapted to limit the sealing pressure employed for that purpose to an amount which said frame is designed to successfully withstand. It facilitates the removal of the doors from the coking chambers and reduces the time required for that operation by providing the operator with means to operate the door latches and door-lifting machines from the same switch-board.

The invention as hereinabove set forth is embodied in particular form and manner but may be variously embodied within the scope of the claims hereinafter made.

I claim:

1. Apparatus for actuating rotatable tightening devices for door latches of the end doors of a battery of horizontal coke ovens comprising: a carriage movable along the side of the battery from oven to oven into position to severally manipulate the tightening devices for the door latches of the respective ovens; a power driven reversible motor, a driven shaft therefor; speed reducing gearing attached to the motor driven shaft; a low speed shaft driven by the reducing gearing; a crank directly connected with the low speed shaft for rotation thereby, and an arm on said crank fixed for rotation therewith for cooperatively engaging the tightening devices of the respective doors, said elements being so stationarily mounted in fixed position on an advanceable portion of the carriage that when the portion of the carriage is positioned in place in front of the respective doors and advanced relative to the carriage into position for cooperative engagement with other parts of the door to open or close the same the crank arm is thereby automatically positioned for cooperative rotary engagement of the arm with the tightening devices of the latches upon starting of the motor.

2. Apparatus for actuating rotatable tightening devices for door latches of the end doors of a battery of horizontal coke ovens comprising: a carriage movable along the side of the battery from oven to oven into position to severally manipulate the tightening devices for the door latches of the respective ovens; a power driven reversible motor; a driven shaft therefor; speed reducing gearing attached to the motor

driven shaft; a low speed shaft driven by the reducing gearing; a crank directly connected with the low speed shaft for rotation thereby, and an arm on said crank fixed for rotation therewith for cooperatively engaging the tightening devices of the respective doors, said elements being so mounted on the carriage that when positioned in place in front of the respective doors they may be advanced relative to the carriage into position for cooperative rotary engagement of the arm with the tightening devices of the latches upon starting of the motor; and said arm being mounted on the crank for reciprocal receding movement relative to the crank against the tension of spring means normally urging it outwardly from the crank to accommodate incidental abutting but non-rotative engagement of the arm and the tightening devices of the doors with subsequent rotative engagement under the action of the spring means.

3. Apparatus for actuating rotatable tightening devices for door latches of the end doors of a battery of horizontal coke ovens comprising: a carriage movable along the side of the battery from oven to oven into position to severally manipulate the tightening devices for the door latches of the respective ovens; a power driven reversible motor; a driven shaft therefor; speed reducing gearing attached to the motor driven shaft; a low speed shaft driven by the reducing gearing; a crank directly connected with the low speed shaft for rotation thereby, and an arm on said crank fixed for rotation therewith for cooperatively engaging the tightening devices of the respective doors, said elements being so mounted on the carriage that when positioned in place in front of the respective doors they may be advanced relative to the carriage into position for cooperative rotary engagement of the arm with the tightening devices of the latches upon starting of the motor; and power means on the carriage for supplying power to the power driven motor, said power means comprising regulable means adapted to be pre-set to operate to interrupt the flow of power to the motor in the event of predetermined conditions occurring, the entire regulating means being wholly contained on the carriage and regulable therefrom.

4. Apparatus for actuating rotatable tightening devices for door latches of the end doors of a battery of horizontal coke ovens comprising: a carriage movable along the side of the battery from oven to oven into position to severally manipulate the tightening devices for the door latches of the respective ovens; a reversible electric motor, a driven shaft therefor; speed reducing gearing attached to the motor driven shaft; a low speed shaft driven by the reducing gearing; a crank directly connected with the low speed shaft for rotation thereby; and an arm on said crank fixed for rotation therewith for cooperatively engaging the tightening devices of the respective doors, said elements being so mounted on the carriage that when positioned in place in front of the respective doors they may be advanced relative to the carriage into position for cooperative rotary engagement of the arm with the tightening devices of the latches upon starting of the motor; electrical circuit means on the carriage for operating the motor forwardly and also reversely; and jam relays in said electrical circuit contained on the carriage and having its setting means on the carriage and settable therefrom to interrupt the circuit upon the occasion of resistance predetermined by its setting.

5. Apparatus for actuating rotatable tightening devices for door latches of the end doors of a battery of horizontal coke ovens comprising: a carriage movable along the side of the battery from oven to oven into position to severally manipulate the tightening devices for the door latches of the respective ovens; a reversible electric motor; a driven shaft therefor; speed reducing gearing attached to the motor driven shaft; a low speed shaft driven by the reducing gearing; a crank directly connected with the low speed shaft for rotation thereby; and an arm on said crank fixed for rotation therewith for cooperatively engaging the tightening devices of the respective doors, said elements being so mounted on the carriage that when positioned in place in front of the respective doors they may be advanced relative to the carriage into position for cooperative rotary engagement of the arm with the tightening devices of the latches upon starting of the motor; electrical circuit means on the carriage for operating the motor forwardly and reversely and limit switch means in the electrical circuit contained on the carriage and having its setting means on the carriage and adapted to be set for predetermined values in advance of rotation of the crank arm by the motor at each operation thereof and to limit the subsequent rotation of the arm by the motor to the value for which the limit switch means may have been pre-set.

6. Apparatus for actuating rotatable tightening devices for door latches of the ends of a battery of horizontal coke ovens comprising: a carriage movable along the side of the battery from oven to oven into position to severally manipulate rotatable tightening devices for the door latches of the respective ovens, a power driven reversible motor and a driven shaft therefor, and a crank arm for cooperatively engaging the rotatable devices of the respective doors, said crank arm being operatively connected with the aforesaid motor driven shaft by gearing for rotation thereby, said elements being so mounted on the carriage that when positioned in place in front of the respective doors the crank arm may be advanced relative to the carriage into position for cooperative rotary engagement of the arm with the tightening devices of the latches upon actuation of the gearing, and said crank arm being slidable for reciprocal receding movement relative to the tightening devices against the tension of spring means normally urging the crank arm outwardly into the path of the tightening devices to accommodate incidental abutting but non-rotative engagement of the arm and the tightening devices of the doors with subsequent rotative engagement of the arm and the tightening devices of the doors under the action of the spring means.

7. Apparatus for actuating rotatable tightening devices for door latches of the ends of a battery of horizontal coke ovens comprising: a carriage movable along the side of the battery from oven to oven into position to severally manipulate rotatable tightening devices for the door latches of the respective ovens, and a crank arm for cooperatively engaging the rotatable devices of the respective doors, said crank arm being operatively connected with gearing for rotation thereby, said elements being so mounted on the carriage that when positioned in place in front of the respective doors the crank arm may be

advanced relative to the carriage into position for cooperative rotary engagement of the arm with the tightening devices of the latches upon actuation of the gearing, and said crank arm being slidable for reciprocal receding movement relative to the tightening devices against the tension of spring means normally urging the crank arm outwardly into the path of the tightening devices to accommodate incidental abutting but non-rotative engagement of the arm and the tightening devices of the doors with subsequent rotative engagement of the arm and the tightening devices of the doors under the action of the spring means.

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