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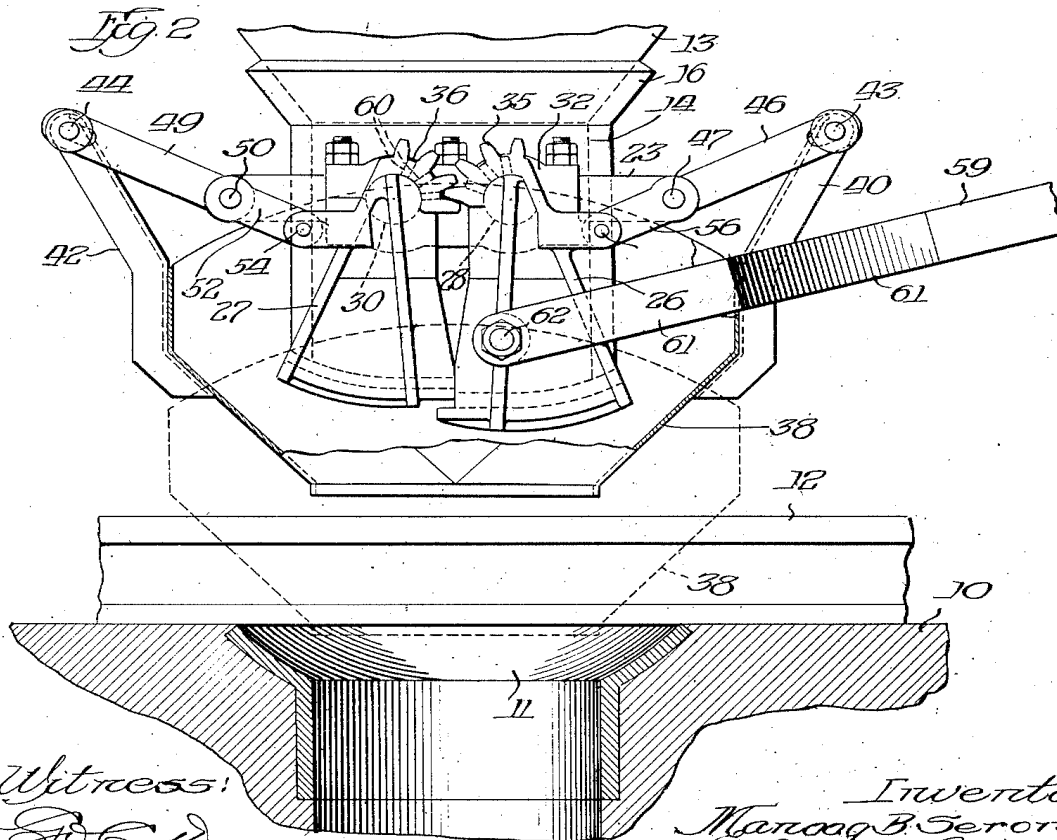
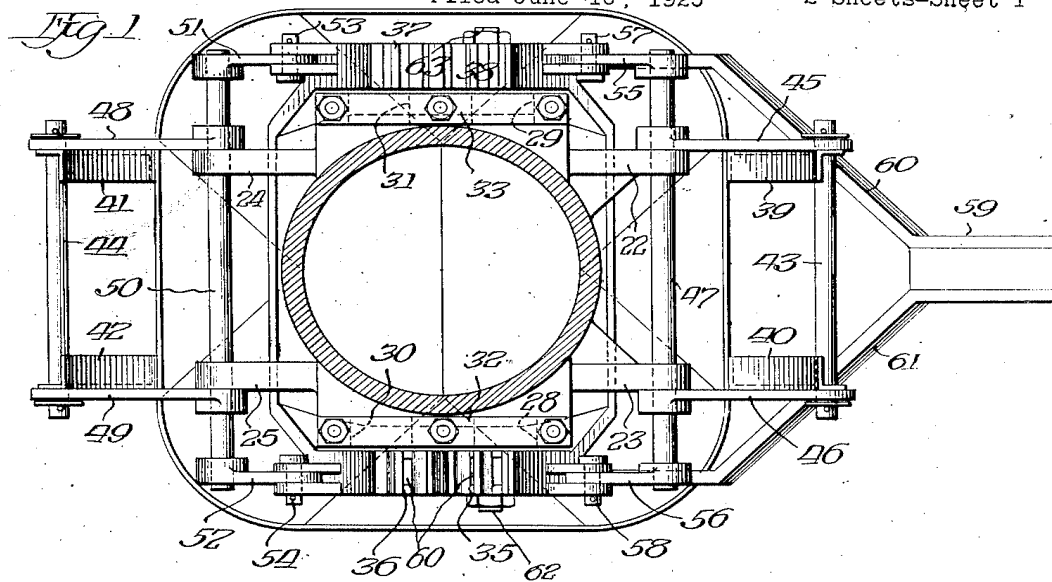
1,608,962

M. B. SERON

CHARGING DEVICE FOR COKE OVENS

Filed June 10, 1925

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 3

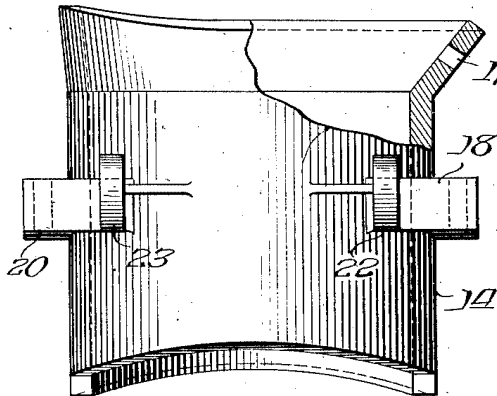


Fig. 4

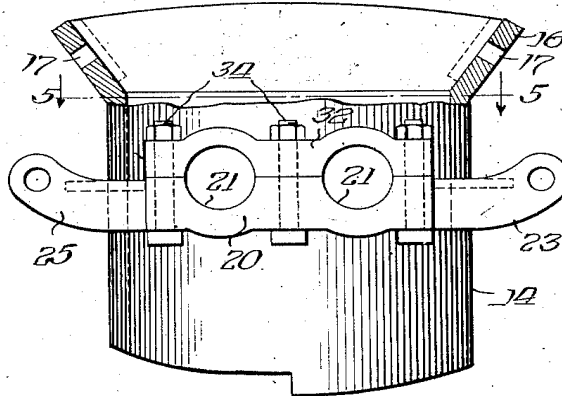
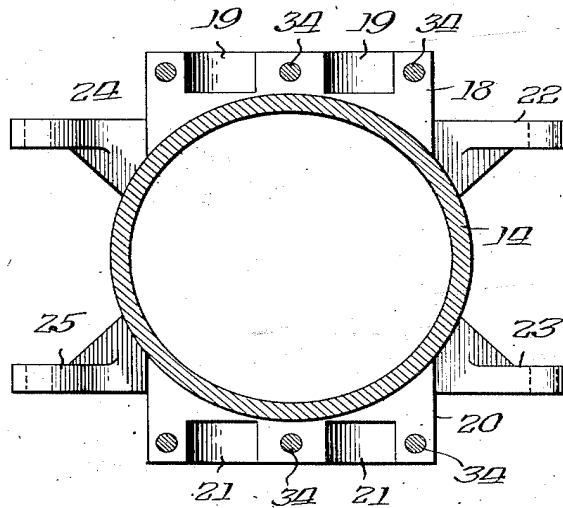


Fig. 5



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## UNITED STATES PATENT OFFICE.

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CHARGING DEVICE FOR COKE OVENS.

Application filed June 10, 1925. Serial No. 36,225.

My invention relates to charging apparatus for coke ovens and has particular reference to apparatus which is attached to the discharge hopper of larry cars used in charging coke ovens as the charging car is run along over the top of the coke oven and the charge delivered into the ovens through the charging opening in the top of the oven.

The primary object of my invention is the provision of an improved charging apparatus in which the charge of coal is directed into the charging opening of the oven without scattering the coal around the charging opening of the oven, or by having a portion of the charge blown across the top of the oven by the wind, and quantities of coal lost during the charging operation, and which forms a direct communicating spout into the charging opening in the coke oven.

Another and further object of my invention is the provision of a charging apparatus which is moved into and out of the charging opening in a coke oven by the gates controlling the discharge of material from the larry car, and without the manipulation of other mechanism to control the charging mechanism.

Another and further object of my invention is the provision of a charging apparatus which is simple and positive in its operation and which operates simultaneously with the opening and closing of the doors controlling the discharge of coal from the larry cars so that as the doors are opened the charging funnel is forced downwardly into the charging opening in the coke oven and as soon as the doors are closed the charging spout is lifted upward a sufficient distance so the car may be moved from the tracks over the coke oven and swings clear of the tracks and other projecting portions of the coke oven.

Another and further object of my invention is the provision of a movably mounted charging funnel so connected to the gates controlling the discharge of material from the cars that the funnel is forced into charging position by the force of the material pressing through the gates, and as soon as the charge is delivered, the gates tending to swing to closed position, tend to lift the charging funnel upward into clear position so that in effect the charging funnel is counterbalanced.

Another and further object of my invention is the provision of quadrant charging gates for larry cars, the gates being connect-

ed to each other by segmental gears having holes formed therein between the gear teeth so dirt and coal caked therein will be pushed through the holes by the gear teeth, thus insuring the proper operation of the gates at all times.

These and other objects of my invention will be more fully and better understood by reference to the accompanying sheet of drawings in which—

Figure 1 is a plan view of my improved invention;

Figure 2 is a side elevational view of the device shown in Figure 1;

Figure 3 is a detail view of the charging spout secured to the hopper of a larry car;

Figure 4 is a view part in elevation and part in section of the spout shown in Figure 3; and

Figure 5 is a plan view of the spout on lines 5—5 of Figure 4.

Referring now specifically to the drawings, the roof of a coke oven 10 is shown having a charging opening 11 therein, and a track thereon upon which the larry cars run, one rail 12 of which is shown in Figure 2. The discharging hopper of the larry car 13 is shown to which a discharge spout 14 is attached, the said spout 14 having an outwardly flaring upward projecting portion 16, having holes 17 therein through which rivets or bolts pass in securing the spout 14 to the hopper 13 of the larry car. On one side of the spout 14 and integral therewith is a projection 18 having a pair of seats 19—19 formed therein within which the trunnions of the gates hereinafter described are seated. At the opposite side of the spout 14 is a projecting portion 20 having seats 21—21 formed therein for the purpose of receiving the trunnions on the operating gates as will be described hereinafter. Also formed as a part of spout 14 is a plurality of projections 22, 23, 24 and 25 extending outwardly from the spout 14 at right angles to the projections 18 and 20, and upon which the charging funnel hereinafter described is mounted. Mounted upon the spout 14 is a pair of pivotally mounted gates 26 and 27, the said gate 26 having a pair of inwardly projecting trunnions 28 and 29 at its upper end which seat into one of the recesses 19 and 21 respectively formed in the projections 18 and 20, the opposite door 27 also having a pair of inwardly projecting trunnions 30 and 31

which are seated in the pair of seats 19 and 21 in the members 18 and 20 so that the gates are pivotally secured to the spout 14, and move in an arc of which the trunnions form the pivotal point. A pair of caps 32 and 33 is provided which are held in position upon the projections 18 and 20 by means of bolts 34—34, the caps having seats therein which engage the trunnions at their upper sides. The upper end of the gate 26 has a segmental gear 35 formed thereon adapted to mesh with another segmental gear 36 formed on the upper end of the gate 27, with another pair of gears 37 and 38 formed on the upper ends of these gates at the opposite sides thereof adjacent the trunnions 29 and 31 so that a movement of one gate operates the other gate to open and close the discharge opening through the spout 14. Surrounding the spout 14 is a movable funnel 38 having a pair of arms 39 and 40 mounted on one side thereof and having another pair of arms 41 and 42 mounted upon its opposite side, these arms having holes therein and being connected on the one side by a rod with a pair of arms 45 and 46 which are keyed to a shaft 47 mounted upon the brackets 22 and 23. On the opposite side of the funnel, the arms 41 and 42 are connected to another pair of arms 48 and 49 by means of a rod 44, the said arms 48 and 49 being mounted upon and keyed to a shaft 50 which, by means of a rod 44, is mounted upon the projections 24 and 25 on the spout 14. Secured to the shaft 50, at the outer ends thereof and keyed thereto, is a pair of arms 51 and 52 which are secured to the gate 27 at each of its sides by means of bolts 53 and 54. The shaft 47 has a pair of lever arms 55 and 56 keyed thereto which are secured to the gate 26 on each of its sides by means of a pair of bolts 57 and 58 so that as the gates 26 and 27 swing outward about the trunnions as a center, the inner ends of the arms 51, 52, 55 and 56 are forced upward rotating the shafts 47 and 50 and forcing the funnel 38 downward into the charging opening 11 in the roof of the coke oven 10 as shown in dotted lines in Figure 2. A gate operating lever 59 is provided leading to the cab of the larry car which has arms 60 and 61 secured thereto which are attached to the gate 26 by means of bolts 62 and 63. The operating rod 59 controls the opening and closing of the gates 26 and 27, and as the gate 26 is opened or closed thru the operation of the gears 35 and 36, the gate 27 is also opened and closed, thus raising or lowering the funnel 38 into and out of the charging opening in the upper part of the roof of the coke oven.

The segmental gears 35, 36, 37 and 38 have holes 60 cored through the rims of these gears between each pair of teeth so

that particles of coal, dirt and the like, which lodge between the gear teeth are pushed through these holes, and the gears kept free to operate properly without becoming clogged up or locked by coal crushed between the teeth of the gears.

From the foregoing description, the operation of the device will be understood in that it is entirely automatic and requires no attention on the part of the operator except opening the gates after the larry car is properly spotted over the charging opening, and the closing of the gates after the charge of coal is delivered into the oven through the charging opening 11. As the operator pulls the lever 59, the gate 26 is pulled outward and through the gear connections the opposite gate 27 is also forced outward, these gates swinging in an arc on their trunnions, and at the same time the outward and upward movement of the gates 26 and 27 force the inner ends of the arms 45, 46, 48 and 49 upward, rotating the shafts 47 and 50 and forcing the funnel 38 downward into the charging opening 11 in the coke oven. The weight of the coal resting on the gates tends to force these gates open and the force exerted by the coal passing through the gates assists in forcing the funnel down and holding it until the charge of coal has been delivered into the coke oven. As soon as the charge is delivered, the gates 26 and 27 tending to swing back to closed position, exerts a force upward in the funnel 38 so that the lifting of the funnel and the closing of the gate is easily accomplished by the operator. The charge of coal is directed into the charging opening 11 and there is no waste of coal discharged around the edges of the charging opening and neither is there loss of coal because of the wind blowing the particles of coal away from the charging portion and out over the roof of the coke oven.

While I have described more or less precisely the details of construction, I do not wish to be understood as limiting myself thereto, as I contemplate changes in form and the proportion of parts and the substitution of equivalents as circumstances may suggest or render expedient without departing from the spirit or scope of my invention.

I claim:—

1. Charging device comprising in combination a chute, a pair of pivotally mounted doors having trunnions thereon adapted to rest in recesses formed in said chute, a funnel adapted to encircle said chute, a pair of arms secured to said doors, and a pair of other arms connected to said funnel whereby when the said doors are opened the funnel is lowered and when the doors are closed the funnel is raised.

2. Charging apparatus comprising in combination a chute having a plurality of recesses in each of the sides, a pair of swinging

doors having trunnions thereon adapted to seat in said recesses, a pair of rotatable shafts connected to said chute, a pair of arms connected with said shafts at each of said doors, and a pair of arms connecting the said funnel with the said shafts whereby when the doors are opened the shafts are rotated, thereby lowering the funnel, and when the doors are closed the said funnel is raised.

10 3. Charging apparatus comprising in combination a chute having a plurality of recesses formed in the sides thereof, a pair of pivotally mounted swinging doors to open and close said chute, trunnions on said doors adapted to seat in said recesses, a funnel adapted to encircle the said doors and said chute, a pair of rotatable shafts mounted in said chute, a pair of arms connecting each of said doors with the said shafts, and a pair of other arms connecting the said shafts with the said funnel, whereby when the doors are opened the said funnel is forced downward and when the doors are closed the funnel is raised.

25 4. Charging apparatus comprising in combination a chute having a pair of recesses in each of its sides, a pair of doors adapted to

open and close said chute, trunnions on said doors adapted to seat in said recesses, segmental gears at the upper end of said doors adjacent said trunnions adapted to cooperate with each other in the opening and closing of said doors, the said gear teeth having holes extending through the said gears whereby the teeth on one gear forces material lodged between the teeth of the opposite gear out through the holes, thereby cleaning the said gears.

5. Charging apparatus comprising in combination a chute having a pair of recesses in each of its sides, a pair of doors adapted to open and close said chute, trunnions on said doors adapted to seat in said recesses, segmental gears at the upper end of said doors adjacent said trunnions adapted to cooperate with each other in the opening and closing of said doors, the said gears having radially extending openings extending through the hubs thereof between the teeth, thereby cleaning the said gears.

Signed at Joliet, Illinois, this 29th day of May, 1925.

MANOOG B. SERON.