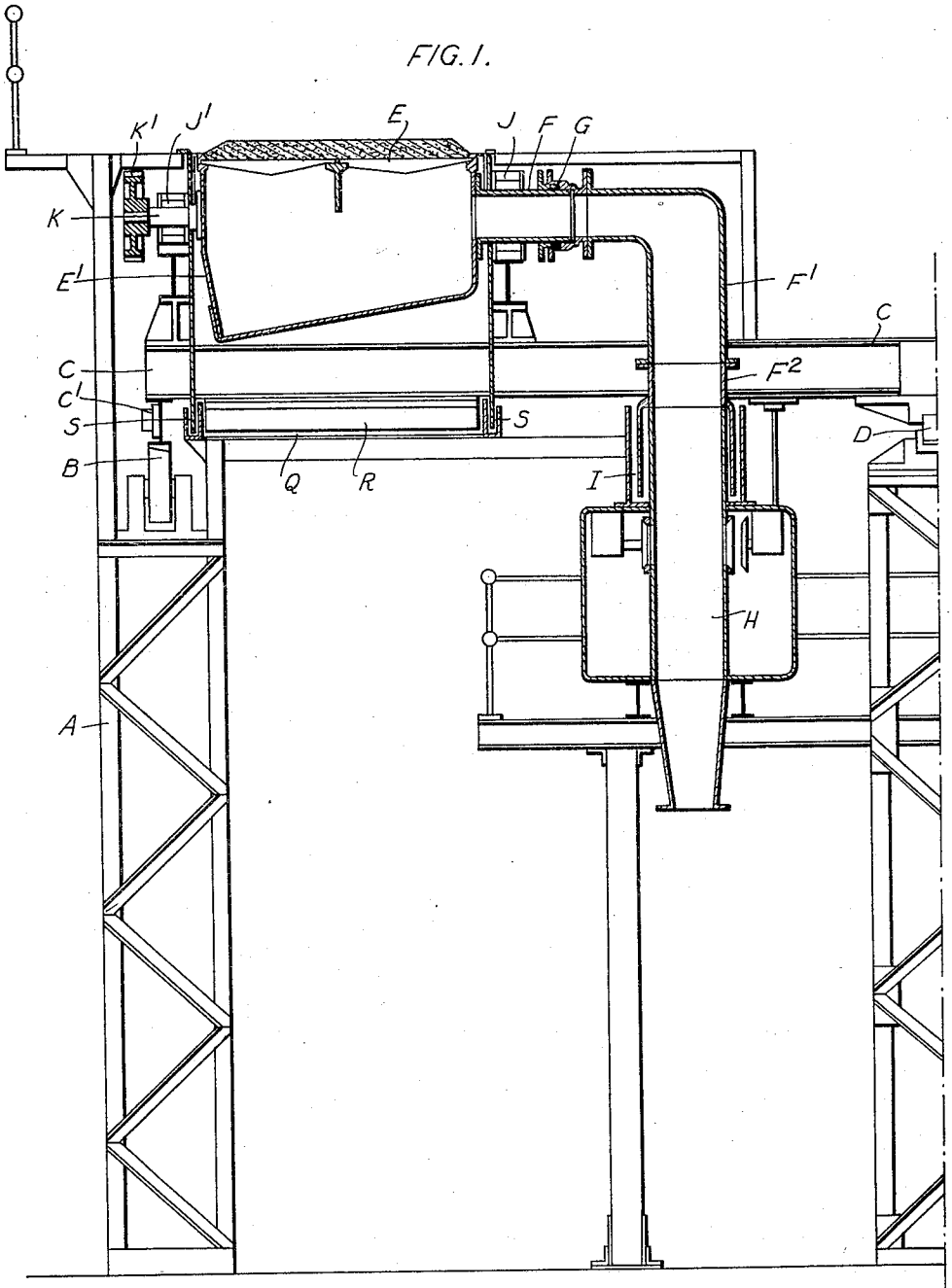
March 24, 1931. G. E. STORER 1,797,931

SINTERING MACHINE

Filed Nov. 13, 1928 3 Sheets-Sheet 1

FIG. 1.



INVENTOR

George Eric Storer

By Kidde Margeson & Hornidge

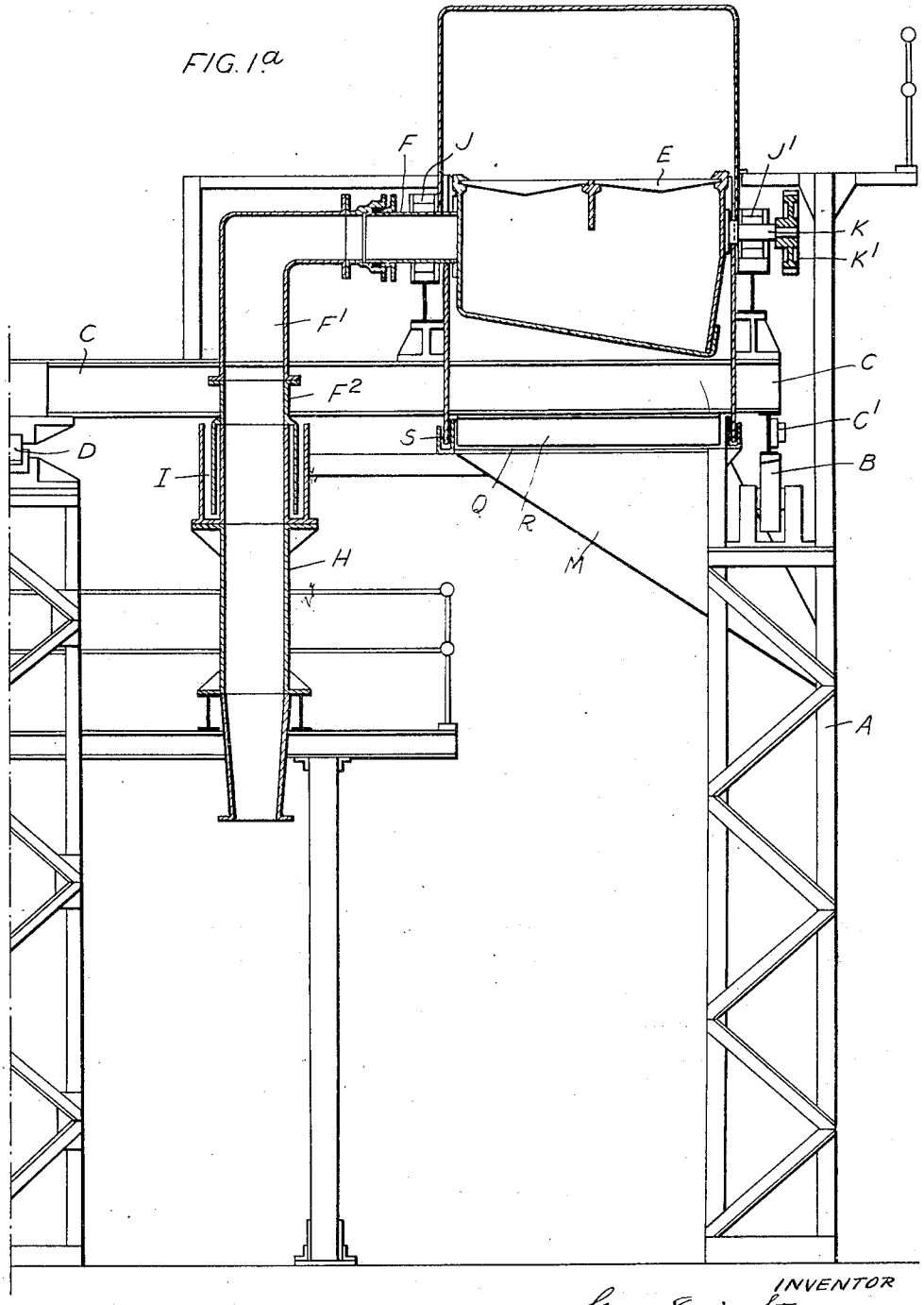
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Filed Nov. 13, 1928 3 Sheets-Sheet 2

FIG. 1a



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SINTERING MACHINE

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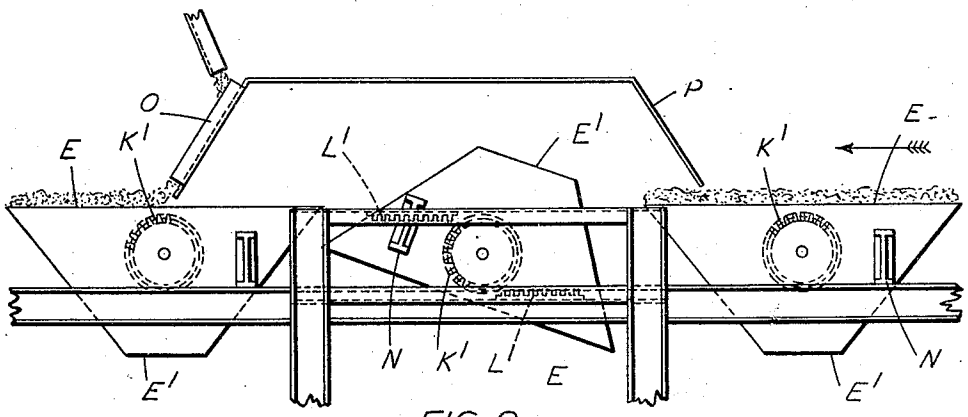


FIG. 2.

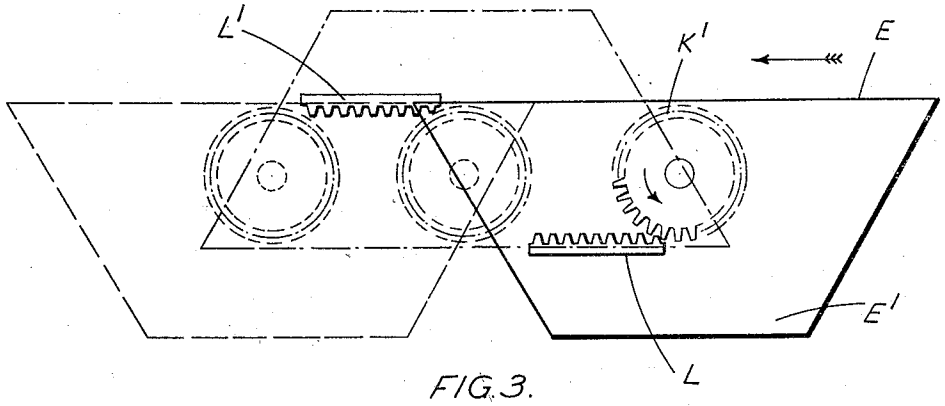


FIG. 3.

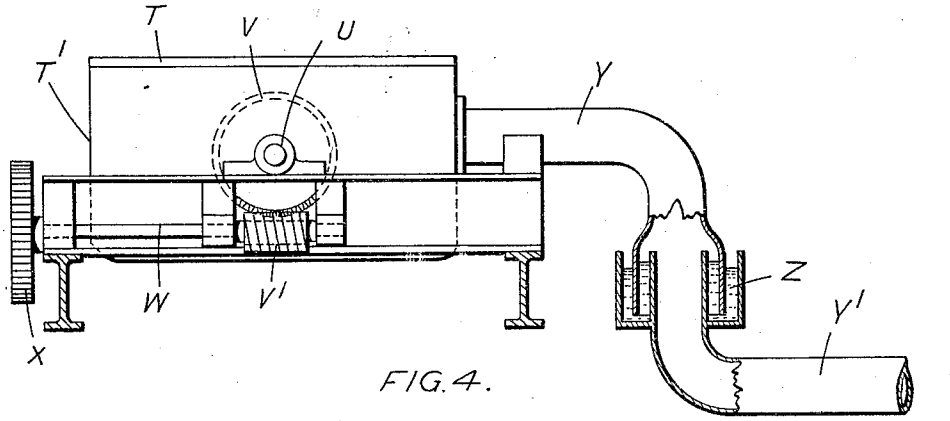


FIG. 4.

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UNITED STATES PATENT OFFICE

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SINTERING MACHINE

Application filed November 13, 1928, Serial No. 319,049, and in Great Britain January 25, 1928.

This invention relates to ore-roasting or sintering machines of the rotary "round-table" type in which an ore or other material is fed onto a grate travelling in a circular path, the ore or mixture being then ignited and kept burning by a current of air drawn down through said ore or mixture into a subjacent gas box from which the evolved gases are withdrawn.

Hitherto in machines of this type the discharge of the roasted or sintered material has been effected by a fixed scraper plate or knife arranged with its lower edge just above the surface of the grate bars, so that as the latter travel past, the material is scraped off into the appropriate receptacles. This type of discharging device has the disadvantage, especially in the sintering of zinc ores, that the grate bars become clogged with aggregations of broken or powdered sinter which instead of being removed by the scraper plate become jammed down between the bars and consolidated, interfering seriously with the draught of air. The primary object of the present invention is to provide an improved form of machine in which this defect is eliminated.

According to the present invention in a rotary ore-roasting or sintering machine of the type referred to the travelling grate is subdivided into a plurality of smaller separate grates or pallets each provided with its own integrally constructed gas-offtake or "gas box", and each unit comprising pallet and gas box is arranged to be independently tilted or overturned for the discharge of the product.

With this construction there is no device such as the scraper plate above mentioned to jam the material between the grate bars, and such aggregations as may form naturally between the bars tend to be shaken loose and to drop away when the pallet is overturned or tilted, thus leaving the grate bars clear.

The tilting or overturning of the individual pallets may take place about either radial or tangential axes. Where it takes place about axes radial to the centre of the table, the pipes connecting the gas boxes to the central gas offtake from the machine may be made in two parts one of which is fixed to the gas box and pallet while the other communicates with the central gas offtake, the joint between the two parts being provided with a suitable gland such that the outer part of the pipe may revolve freely with its gas box without admission of air or loss of sinter gas.

Various forms of mechanism may be employed to carry out the tilting or overturning motion for instance each pallet and gas box may be provided with a rigidly mounted pinion centered on the axis about which the pallet and gas box unit is to turn. This pinion is disposed so as to engage a fixed rack appropriately placed near the point of discharge. The rack is preferably made in two parts slightly spaced so that after the first part engaged by the pinion has tilted or overturned the pallet there is an interval during which the pallet remains in the tilted or reversed position until the pinion engages the second part of the rack which thereupon restores the pallet to normal position.

An arrangement of stops or other devices may be provided to cause the pallet to be jolted whilst in the tilted or reversed position, to assist in shaking loose any of the more solid aggregations of material.

In an alternative form of construction in which the pallets are arranged to tip about axes which are tangential to the round table, a water seal connection is made between the portion of gas pipe connected to the gas box and that part communicating with the central gas offtake. The tipping mechanism may comprise fixed cam surfaces which are engaged by a part of the pallet or a wheel carried thereby as the pallet approaches the discharge point where it is tipped outwardly,

other cam surfaces being provided to restore the pallet to normal position.

In place of the cam surfaces, worm and pinion or other suitable gear may be used.

Two forms of construction in accordance with the present invention are illustrated in the accompanying drawings, in which:—

Figs. 1 and 1ª are vertical longitudinal sections each of half of a complete machine in which the individual pallets and gas boxes are arranged to overturn about axes radial to the centre of the machine. Figs. 1 and 1ª placed side by side show the complete machine.

Fig. 2 is a detail view in side elevation at the discharge point.

Fig. 3 is a diagrammatic side elevation at the discharge point showing a preferred disposition of the overturning mechanism.

Fig. 4 is an elevation of a separate pallet and gas box arranged to overturn outwardly about a tangential axis.

Referring to Figs. 1, 1ª, 2 and 3:—

The machine is constructed on the usual or any convenient framework, in this case comprising a number of uprights A arranged in a circle and surmounted by a series of rollers B on which a rotative platform C is supported by means of a circular rail C^1, a central footstep bearing D being provided. E denotes a plurality of separate grates or pallets arranged around the whole machine and provided each with a separate gas box E^1 having an offtake pipe F jointed by means of a gas-tight gland G to a further section of pipe F^1 communicating at its lower end with an annular trunk F^2 rotating with the platform C. The rotating trunk F^2 opens freely into a fixed annular chamber H forming the main gas offtake from the machine, a liquid seal I being provided between the trunk F^2 and chamber H to ensure gas-tightness.

Each pallet E with its integral gas box E^1 is made revolvable about an axis radial to the centre of the machine by means of bearings J and J^1 in which turn respectively the pipe F and a shaft K carrying a pinion K^1 disposed so as to engage a fixed rack L on approaching the point of discharge (see more particularly Figs. 2 and 3). The pinion K^1, being rigid with the gas box E^1, revolves the latter together with the pallet E, thereby discharging the roasted or sintered material onto a chute M which conducts it from the machine.

On completely overturning the pallet and gas box a stop N (see Fig. 2) comes smartly into contact with the girder supporting the bearings J and J^1 and by so doing dislodges any ore or sinter which may have become wedged between the bars of the pallets E. On further travel the pinion K^1 engages a second rack L^1 which revolves the pallet and gas box back through 180° to normal position, immediately after which the pallet passes under the feed chute O and receives a fresh charge of ore. A small gap is preferably left between the end of the rack L and the beginning of the rack L^1 so that the pallet may remain reversed for a moment or two before being returned to normal position. A hood P is preferably provided over the place of discharge in order to trap dust.

A fixed annular pan Q runs right round the machine below the rotating pallets and serves to collect any ore or sinter that may fall down between said pallets, and a scraper R, rotating with the platform C, collects such material and discharges it onto the chute M. A seal S is provided around both sides of the pan Q to prevent escape of dust.

In the form of construction illustrated in Fig. 4 the pallet T and gas box T^1 are mounted in trunnions U one of which carries a worm wheel V meshing with a worm V^1 on a shaft W which at its outer end carries a pinion X adapted to engage the racks L and L^1 above referred to. In this case the pallet and gas box are swung so as to discharge outwards, the gas-offtake pipe Y being lifted at such time out of a water seal Z through which said pipe Y normally communicates with a pipe Y^1 leading to the central gas offtake from the machine.

Various alternative means for overturning the pallet outwardly in the manner last mentioned will occur to persons skilled in the art. Such means may for instance comprise suitable cam surfaces arranged in the circular path of travel at the discharge point. Although it has been found preferable to overturn the pallets completely so as to derive the full advantage from the shock or jar consequent upon the pallet coming to rest in the reversed position, it is not essential that the reversal should be complete, and in some cases merely tilting the pallets through about 90° may prove sufficient.

The improvements constituting the present invention entirely obviate the disadvantages appertaining to methods of scraping the sinter from the surface of the grate and ensure substantially complete dislodgement of any material which may have become wedged between the grate bars, thus providing for a free and even draught through the bed of material undergoing treatment.

Although the improved machine has been described as applied more particularly to the roasting or sintering of ores, said machine may be used for any operations to which it may be applicable and in which a material has to be continuously subjected to combustion with withdrawal of evolved gases.

What I claim is:—

A rotary ore-roasting or sintering machine comprising in combination a circular travelling grate sub-divided into a plurality of separate grates or pallets, an integral gas box for each grate, means for separately over-

turning said units, means whereby the grates or pallets are subjected to a blow when in overturned position for effecting thorough dislodgment of roasted or sintered material, a fixed annular pan below the grates or pallets the sides of such annular pan being provided with a seal, and a scraper rotating with the grates or pallets for clearing the said annular pan of material falling from between the grates or pallets.

GEORGE ERIC STORER.