June 26, 1934. G. GOETZ 1,964,050

ROTARY BREAKER

Filed July 21, 1932

FIG. 1.

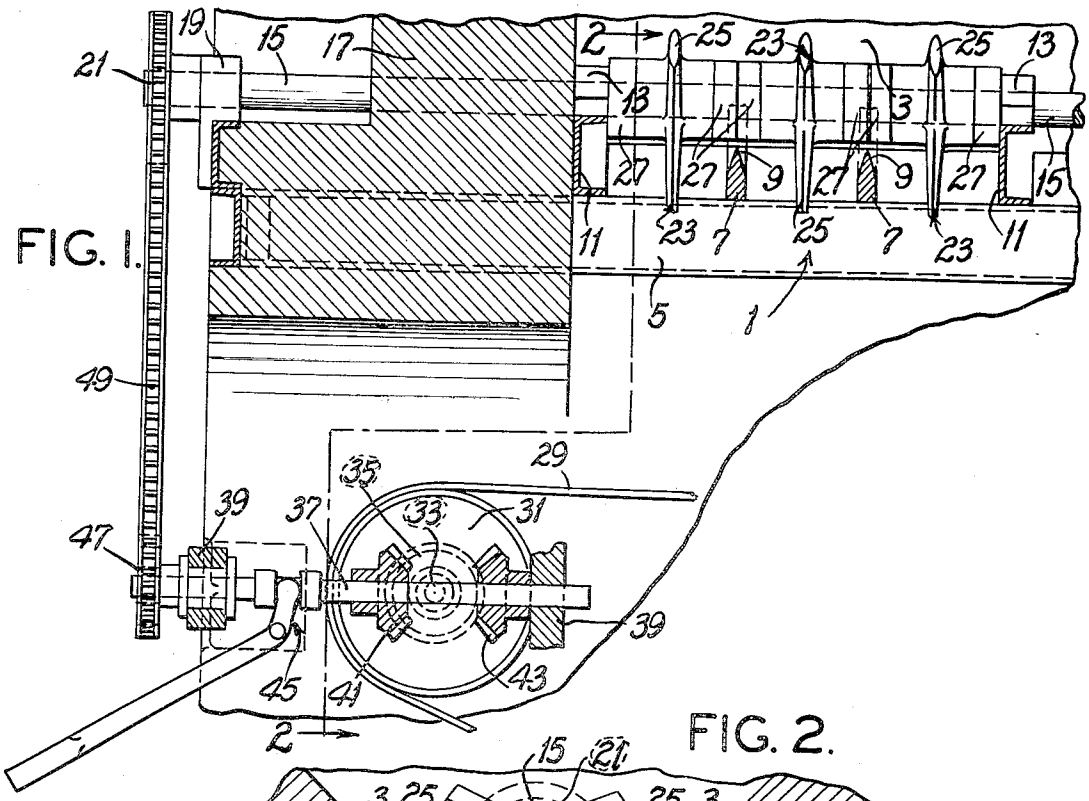
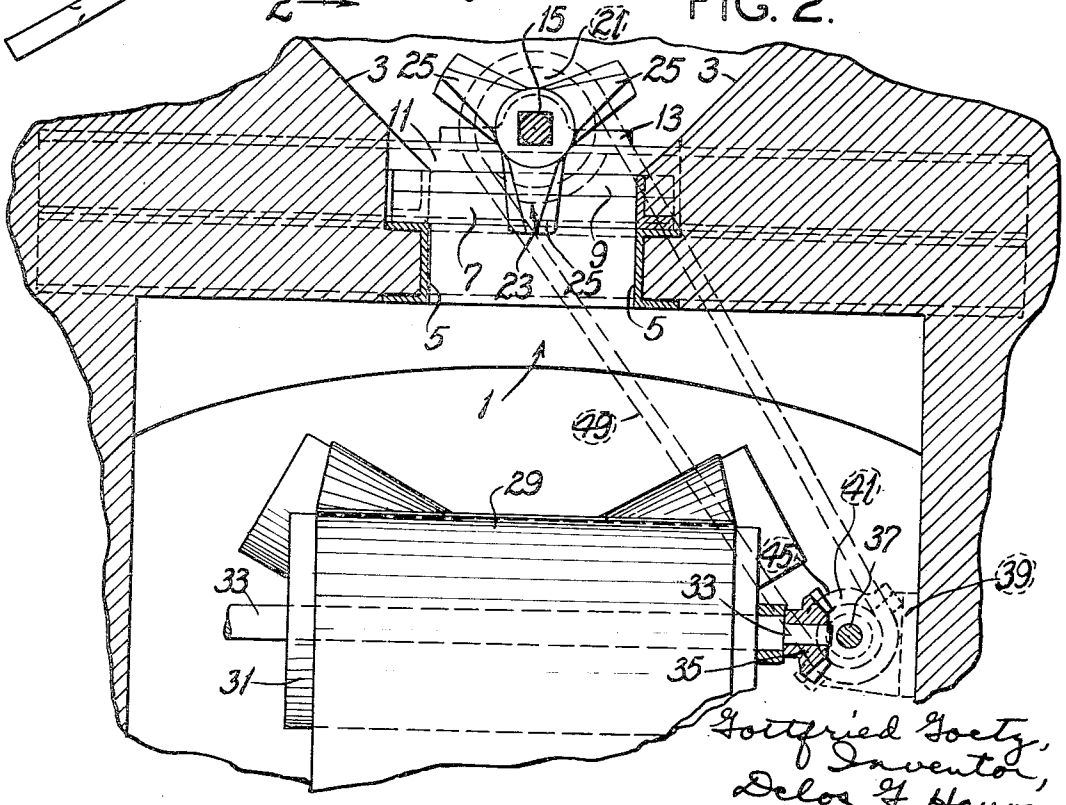


FIG. 2.



Gottfried Goetz,
Inventor,
Delos G. Haynes,
Attorney.

Patented June 26, 1934 1,964,050

UNITED STATES PATENT OFFICE

1,964,050

ROTARY BREAKER

Gottfried Goetz, Webster Groves, Mo., assignor to Ludwig Kern, Webster Groves, Mo.

Application July 21, 1932, Serial No. 623,705

1 Claim. (Cl. 214—18)

This invention relates to rotary breakers, and with regard to certain more specific features, to rotary breakers particularly adapted for use in connection with coking retorts, to break the large coke lumps, as they issue from the retort, into lumps of an easily handled, useful size.

Among the several objects of the invention may be noted the provision of a rotary breaker which operates in conjunction with the discharge outlet of a material hopper, thereby to subject all material to the action of the breaker before it is discharged from the hopper; a rotary breaker of the class described which, while relatively small in size, is efficacious and positive in action; a rotary breaker which is so operated in conjunction with a discharge conveyor that operation of the two are interdependent; and the provision of a rotary breaker of the class described which is simple and economical in construction and operation. Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly comprises the elements and combinations of elements, features of construction, and arrangements of parts which will be exemplified in the structures hereinafter described, and the scope of the application of which will be indicated in the following claim.

In the accompanying drawing, in which is illustrated one of various possible embodiments of the invention,

Fig. 1 is a longitudinal section through a rotary breaker embodying the present invention; and,

Fig. 2 is a cross-section taken substantially on line 2—2 of Fig. 1.

Similar reference characters indicate corresponding parts throughout the several views of the drawing.

The present invention is particularly adapted for use in conjunction with, and as a part of, the vertical coking retort bench described and claimed in my copending patent application, Serial No. 623,701, filed July 21, 1932. In said copending application, the retort bench is divided into groups of three retorts each, the three retorts in each group discharging into a common hopper-shaped quenching chamber. As is well known, the coke blocks issuing from such vertical retorts are immense, sometimes approximating the size of the retort itself, and it is necessary that they be crushed or broken to a considerable extent before the coke is available for commercial distribution.

In said copending application, means are provided near the top of the said quenching chamber for breaking the retort-size coke blocks into lumps of a considerably smaller size. This breaking means forms no part of the present invention, but is of interest as showing the size of the lumps entering the breaking means constituting the present invention. Commercial coke, it will be understood, should be of a relatively small lump size.

Referring now more particularly to the drawing, numeral 1 indicates the lower end, or discharge mouth, of the quenching chamber hereinbefore mentioned. Sloping walls 3 conduct the coke lumps to the mouth of the chamber. The mouth 1 is reinforced by longitudinal channel beams 5.

Supported on the beams 5, in fixed, spaced arrangement, are a plurality of grate bars 7. The bars 7, it will be understood, extend transversely across the mouth 1. The cross-sectional shape of the bars 7 is shown in Fig. 1, and will be seen to comprise an upper doubly beveled edge 9.

Likewise supported upon the beams 5, in parallel arrangement to the bars 7, are a plurality of cross channel beams 11. Mounted on the cross beams 11 are bearings 13, which supports the shaft 15 of the rotary breaker assembly per se. The shaft 15 varies in cross-section; in the regions at which it is supported in the bearings 13, it is round, while in the intermediate regions it is square or otherwise polygonal (see Fig. 2). The shaft 15 extends through the end wall 17 of the quenching chamber, is exteriorly supported in a bearing 19, and has a driving sprocket wheel 21 mounted on its end.

On the intermediate, square regions of the shaft 15 are mounted a plurality of rotary breakers 23, each comprising a three-armed star wheel. The arms 25 are just short enough to clear the side walls 3, and are beveled to present sharp edges on each side thereof. It will be understood that the number, three, of arms shown and described is not limiting, as the breaker may comprise any suitable number of arms. Three has, however, been found to be the most practical number as regards speed and efficacy of crushing.

Between the breakers 23 are spacing collars 27. The breakers 23 and collars 27 are both rotationally immovable relative to the shaft 15.

The spacing of the breakers 23 and grate bars 7 is such that in each group there are three breakers meshing with two bars. The groups are separated by the cross-beams 11 and bearings 13. It is apparent that these numbers might be varied, within the scope of the invention, but the number

shown has been found advantageous for most purposes.

Numeral 29 indicates a discharge belt conveyor, which carries the crushed coke after it falls through the rotary breaker assembly to the desired storage means. The construction of the conveyor is not of importance to the present invention, aside from the fact that it is supported, at its end, upon a driven drum 31, in turn supported on a shaft 33.

Exteriorly of the drum 31 (see Fig. 2) there is mounted upon the shaft 33 a bevel gear 35.

A shaft 37 is supported in bearings 39 at a right angle to the shaft 33. On the shaft 37 are mounted a pair of spaced, oppositely facing bevel gears 41 and 43. The gears 41 and 43 are suitable in construction, and in spacing, to engage the gear 35 separately, but not at the same time. A mechanism 45 is provided for longitudinally shifting the shaft 37, in its bearings, to selectively bring either gear 41 or gear 43 into mesh with gear 35. On the outer end of shaft 37 is splined a sprocket wheel 47, such that it is forced to rotate with the shaft 37, but is not axially moved when said shaft 37 is moved to shift gears 41 and 43. A chain belt 49 connects the sprocket 47 to the sprocket 21 on the breaker shaft 15, and thus completes the drive for the rotary breaker assembly.

It will be seen that the direction of rotation of the rotary breaker may be reversed by manipulation of the lever or mechanism 45. This is advantageous in the event that an unusually large lump of coke jams or tends to jam the breaker assembly.

The crushing of the coke lumps is accomplished between the advancing edges of the arms 25 and the top edges 9 of the grate bars 7. After they are thus broken into smaller lumps, the smaller lumps fall through the grate bars 7 on to the conveyor 29. Inasmuch as the drive of the conveyor and breaker is unitary, one cannot operate without the other. This is particularly advantageous, in that it positively prevents either piling up of coke on one region of the conveyor, which would occur if the breaker was running and the conveyor was stationary, or unnecessary, non-charge-carrying operation of the conveyor when the breaker was not operating.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As many changes could be made in carrying out the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

I claim:

In combination with the discharge mouth of a hopper, a breaker comprising spaced grate bars extending across the mouth of the hopper, a driven shaft extending the length of the hopper, and rotating breaker arms carried on said shaft and spaced between said grate bars, and a discharge conveyor positioned beneath said mouth, said discharge conveyor and said shaft being provided with a unitary drive, whereby the one is positively prevented from operating independently of the other, and means for reversing the direction of rotation of said shaft without affecting the last-mentioned relationship.

GOTTFRIED GOETZ.