April 11, 1950 K. A. RAYPHOLTZ 2,503,686

AGGREGATE DRIER

Filed June 5, 1946

FIG. 1

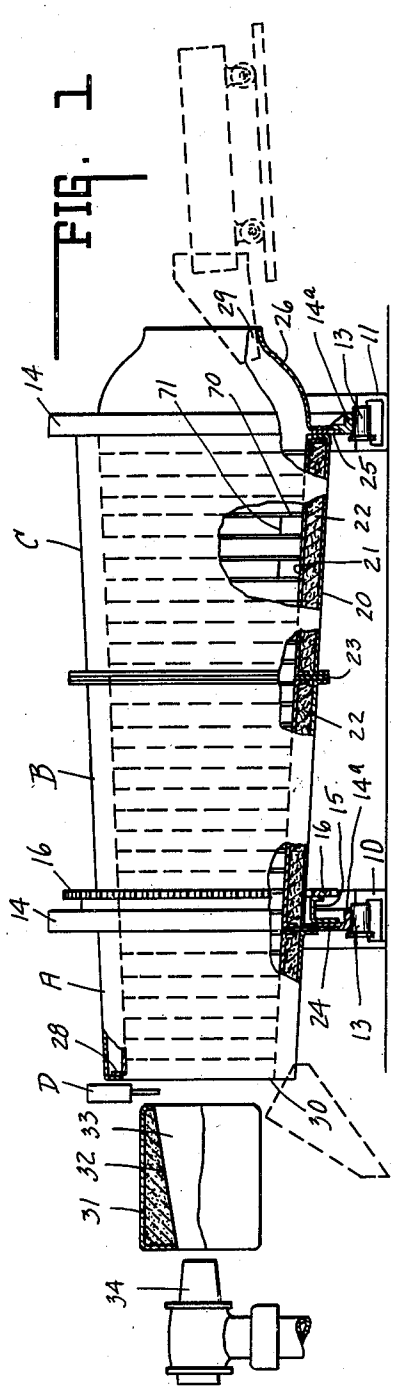


FIG. 4

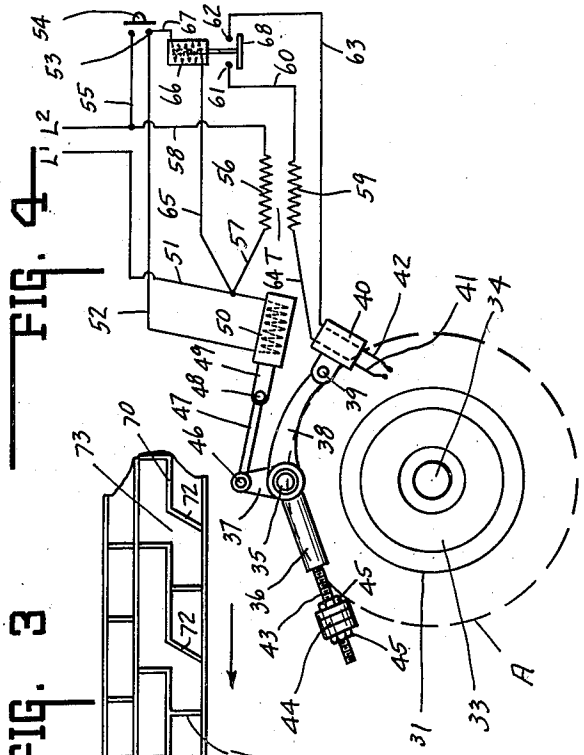
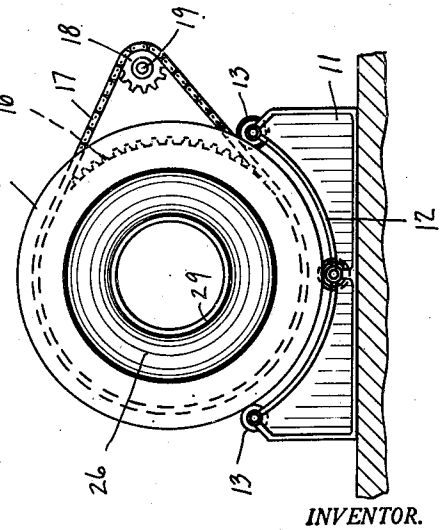


FIG. 3

FIG. 2



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Patented Apr. 11, 1950

2,503,686

UNITED STATES PATENT OFFICE

2,503,686

AGGREGATE DRIER

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Application June 5, 1946, Serial No. 674,423

8 Claims. (Cl. 263—22)

1

This invention relates to a drier structure for aggregates and the like.

The chief object of this invention is to provide a drier of extreme simplicity and one which is capable of disassembly for interior access for repair and replacement purposes and one wherein the aggregate is tumbled by reason of rotation of the drier drum and is advanced from the inlet to the discharge end thereof by what might be termed generally a helical like series of transfer pockets associated with diametrically positioned dams.

The chief feature of the invention resides in providing a structure including the aforesaid and associating the same with a flame unit, the latter discharging to a combustion chamber juxtapositioned to the discharge end of the drier, the intake end being suitably muffled, and associating therewith between the combustion chamber and the discharge chamber an igniter.

One specific feature of the invention resides in the circular offset successive transfer pockets upon the drier interior, and associating with each in diametrically opposed relation an interior dam.

Other objects and features of the invention will be set forth more fully hereinafter.

The full nature of the invention will be understood from the accompanying drawings and the following description and claims:

In the drawings—

Fig. 1 is a side elevation of a drier unit embodying the invention, parts being broken away to show the same and other parts in section.

Fig. 2 is an end view of the drier.

Fig. 3 is a developed plan view of a portion of the drum interior showing the transfer pockets.

Fig. 4 is an end elevational view of the igniter mechanism and the combustion chamber together with the associated control circuit.

In Figs. 1 and 2 of the drawings, 10 and 11 indicate suitable supports in spaced relation that terminate in an arcuate cradle 12, and associated therewith is a plurality of rolls 13 by which the circular rings 14 are rotatably supported.

These circular rings are herein shown as of angle section, see 14a. One of the rings carries, by means of brackets 15 a sprocket 16, and meshing therewith is a chain 17 driven by a sprocket pinion 18 carried by a shaft 19, see Fig. 2, this shaft being suitably driven.

Herein the drum proper includes three sections, A, B, and C, for convenience, and the

2

same have an exterior shell portion 20 and an interior shell 21. Therebetween preferably is included insulation 22.

The shells are maintained in spaced relation by means of annular discs 23 and 24 and the intake end includes the disc 25. The flange structures 14a are carried between discs 24 and 25, as shown.

It will be noted that at the intake end, which is the larger end of the drier, the shells 20 and 21 have inwardly directed flanges, same being suitably secured to the disc 25, and to the same also is secured a muffled structure 26. The discharge end of the drier is similarly formed by inwardly directed flanges, as indicated at 28.

If desired, the several sections, A, B and C, may be detachably associated together so that access may be had from either end of each section, when disassociated, for removal of damaged parts within the drier and replacement of parts for renewal purposes.

It is to be understood that the aggregate is supplied at the open mouth 29 of the muffle structure and by any suitable means, see dotted lines.

The discharge is effected at the opposite end 30 of the drier, which is of lesser diameter than the intake end of the drier, although the muffle intake 29 is of lesser diameter.

Adjacent the discharge end of the drier is any suitable discharge means, or the same may be omitted whenever desired or required. However, in spaced relation to and coaxial with the drum, which although of conical type is mounted for rotation on the horizontal axis, is a refractory ignition tile element 31 suitably supported and having an oppositely directed conical interior 32 providing a combustion chamber 33.

At the more remote and smaller end of this combustion chamber there is provided an oil and gas burner unit having the nozzle 34 into the combustion chamber and preferably axially lined therewith but longitudinally spaced from that chamber to permit air entrance for combustion purposes.

Interposed between the discharge end of the drier and the discharge end of the combustion chamber and movable into the gap therebetween is an igniter structure indicated generally by the letter D in Fig. 1 and shown more particularly in Fig. 4.

Herein there is pivotally supported on support 35 a T-shaped lever having the arm 36, the arm 37 and the arm 38. The arm 38 adjustably supports at 39 an igniter structure 40 having the

spaced and insulated electrodes 41 and 42 projecting therefrom.

The arm 36 includes a threaded extension 43 upon which is adjustably mounted a counterbalancing weight structure 44 locked in the adjusted position as at 45. The arm 37 is connected as at 46 to a link 47 pivotally connected at 48 to the core 49 of a stationary solenoid 50.

L^1 and L^2 indicate respectively the supply lines from a supply circuit not shown. It is to be understood that the support 35 is suitably supported and that the solenoid 50 is stationarily supported by suitable means, not shown.

The solenoid 50 is connected by line 51 to line L^1 and it is also connected by line 52 to one terminal 53 of a push button switch having the actuating portion 54. The other contact of this switch is connected by line 55 to line L^2.

Therefore, whenever the push button switch is closed the solenoid 50 will be energized and the arm 37 will be rotated clockwise upon the support 35, thereby rotating clockwise the igniter 40.

Such rotation positions the igniter 40 in the gap and in partial registration with the discharge end of the drier and the discharge end of the combustion chamber so that the combustible mixture then in the chamber will be ignited, and thereafter the flame will be directed inwardly and axially of the drier structure.

In Fig. 4, primary of a transformer T is indicated by the numeral 56 and same is connected by line 57 to line L^1. The other terminal of the transformer primary is connected by line 58 to line L^2. In other words, the primary is always across the line in the present illustrated circuit.

Associated with this primary is a secondary 59, and it has one terminal connected by line 60 to a terminal 61. The other terminal 62 is connected by line 63 to one electrode, to-wit, electrode 42. The other terminal of secondary 59 is connected by line 64 to the other electrode 41.

A line 65, connected to line L^1, in turn is connected to a relay 66, the other terminal of which is connected by line 67 to the line 52 or contact 53.

This relay controls a bridging contact 68 so that when the push button 54 is closed the relay will be energized, the bridging contact 68 will be elevated and close the circuit across the contacts 61 and 62, thereby closing the circuit through the secondary and to the electrodes 41—42.

At such time the spark passes between electrodes 41 and 42. In other words, solenoid 50, relay 56 and primary 66 are all standard or low voltage units while the secondary 59 and igniter 40 are high voltage units, and the igniter is only energized for ignition purposes when the push button 54 is closed, which means the igniter is only energized for ignition purposes when the igniter is interposed between the combustion chamber and the discharge end of the drier.

Reference will now be had to certain of the cutaway portions of Fig. 1 and Fig. 3. Therein it will be noted that the interior 21 of conical drier shell or drum is provided with inwardly directed annular vanes or partitions designated by the numeral 70. These may be of any radial width and may be spaced apart longitudinally as desired or required.

Between each adjacent pair of circular vanes 70 is a longitudinally directed dam 71. Diametrically opposite the dam 71, which is radially positioned, there is provided an inclined dam 72, and the same is inclined, as shown in Fig. 3, relative to the direction of rotation of the drier.

Adjacent the junction of the inclined dam 72 and the adjacent circular vanes 70 there is a gap 73 so that as a result of the direction of rotation the aggregate engaging the dam 72 slides from one annular portion of the drier into the next succeeding portion of the drier defined by the next adjacent pair of substantially circular vanes 70. The gap and inclined dam may be termed a transfer pocket arrangement.

It is to be understood, as stated initially herein, that diametrically opposite each inclined vane 72 with the adjacent throat 73 there is provided a radial vane 71.

As the drier rotates the aggregate picked up by the vane 71 is carried upwardly until it drops downwardly from the inside shell 21. As it drops downwardly it drops into substantially the same annular portion of the drier but by reason of the inclined vane 72 is caused, in drier rotation, to advance from the intake end to the discharge end. It is to be understood that each successive circular portion of the drier is provided with at least one radial vane and a diametrically opposite transfer pocket. Preferably, however, a plurality of the aforesaid are provided as shown in Fig. 3.

It is furthermore to be understood that the radial vanes by reason of the diametrical positioning and the transfer pockets are helically offset, as it were, with respect to successive circular portions of the drier interior.

In other words, it might be said that there is a helical like series of transfer pockets and a helical like series of radially directed vanes or dams associated with circular channels, the adjacent channels successively communicating with adjacent the pockets for aggregate transfer purposes.

The foregoing description applies to one series of pockets from end to end and one series of radial dams positioned from end to end of the drier. Obviously for efficient operation there are a plurality of such series and, as shown in Fig. 3, by way of example only.

It also is to be understood that the number of such pockets and diametrically positioned radial vanes or dams need not be the same in number throughout the drier. In other words, it may, if desired, include, for example, twice as many cooperating pairs of dams and pockets at the larger intake end as may be found or utilized at the discharge end so that the term "helical like series" does not by implication require that there be the same number in each longitudinal section of the drier, considered from end to end.

While the invention has been illustrated and described in great detail in the drawings and foregoing description, the same is to be considered as illustrative and not restrictive in character.

The several modifications described herein as well as others which will readily suggest themselves to persons skilled in this art, all are considered to be within the broad scope of the invention, reference being had to the appended claims.

The invention claimed is:

1. In a drier structure having a fuel nozzle, the combination of a conical combustion chamber, and a conical drier drum, all in longitudinal alignment and spaced one from the other and substantially horizontally disposed, the chamber and drum being similarly directed with flame and aggregate flow therethrough, respectively, in opposite directions and aggregate and flame flow in the drum of counter-flow type, the larger end of

the chamber and the small end of the drum comprising the respective discharge ends, the drum discharge end exceeding in area that of the chamber discharge end and the inclination of the chamber exceeding that of the drum.

2. A drier structure as defined by claim 1 wherein muffle means of peripheral and bell-like character is provided at the large end of the drum and is centrally apertured for a combination aggregate intake and gas outlet opening of an area less than that of the drum discharge area for combustion products flow retardation towards discharge.

3. A drier structure including a multi-section conical drum comprised of successive conical sections detachably secured together, the drum being disposed for rotation upon its longitudinal axis, the smaller end comprising the discharge, bell-mouth shaped muffle means at the larger end and having a single coaxial intake opening of an area less than that of the discharge, and means only upon the interior of each section of said drum for content peripheral advancement therethrough incident to drum rotation, and readily accessible from either end of the means supporting section for replacement and repair purposes.

4. A drier structure including an elongated conical drum disposed for rotation upon a horizontal axis, the smaller end comprising the discharge, longitudinally spaced circular-like vanes in spaced relation upon the drum interior, radial like dam members between adjacent circular-like vanes, and transfer pocket means between adjacent circular-like vanes positioned substantially diametrically opposite the radial vanes for content advancement longitudinally of the drum and upwardly to the discharge end incident to drum rotation.

5. A drier structure as defined by claim 4 wherein longitudinally successive pocket means and opposed radial vanes are each progressively offset circumferentially in successive circular channels.

6. A drier structure as defined by claim 4 wherein each circular channel includes a plurality of radial dams and opposed transfer pocket means, same being alternated.

7. A drier structure as defined by claim 4 wherein longitudinally successive pocket means and opposed radial vanes are each progressively offset circumferentially in successive circular channels and each circular channel includes a plurality of radial dams and opposed transfer pocket means.

8. A drier as defined by claim 4 wherein the pocket transfer means and radial vanes from end to end of the drum, each are substantially helically disposed upon the drum interior.

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