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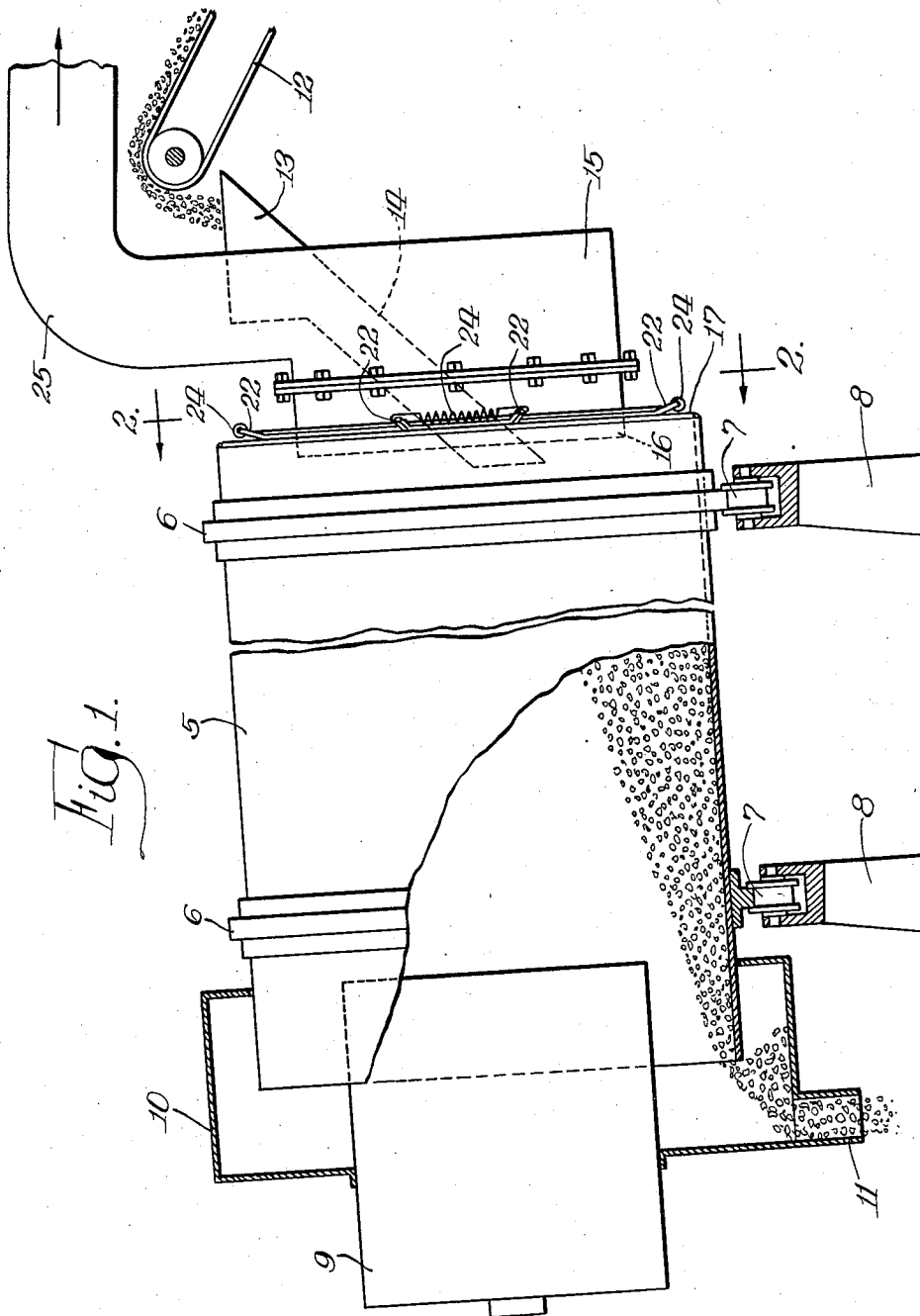
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**2,882,613**

# ROTARY DRUM SEALING MEANS

Filed June 24, 1957

2 Sheets-Sheet 1



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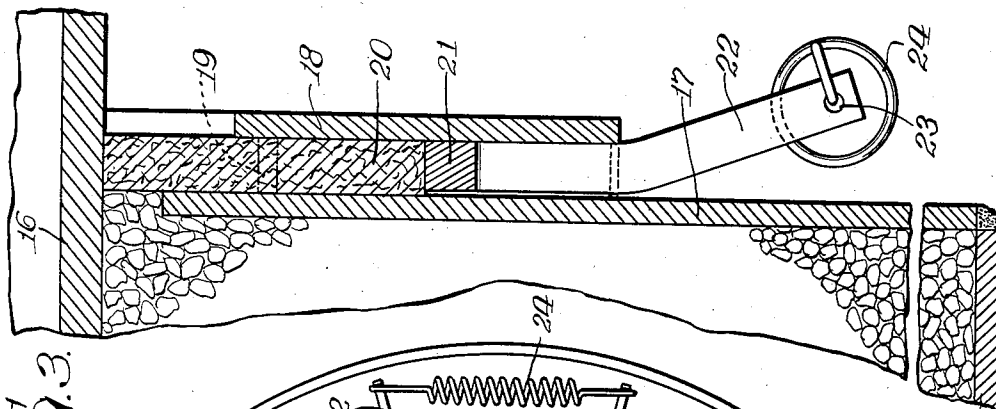


Fig. 3.

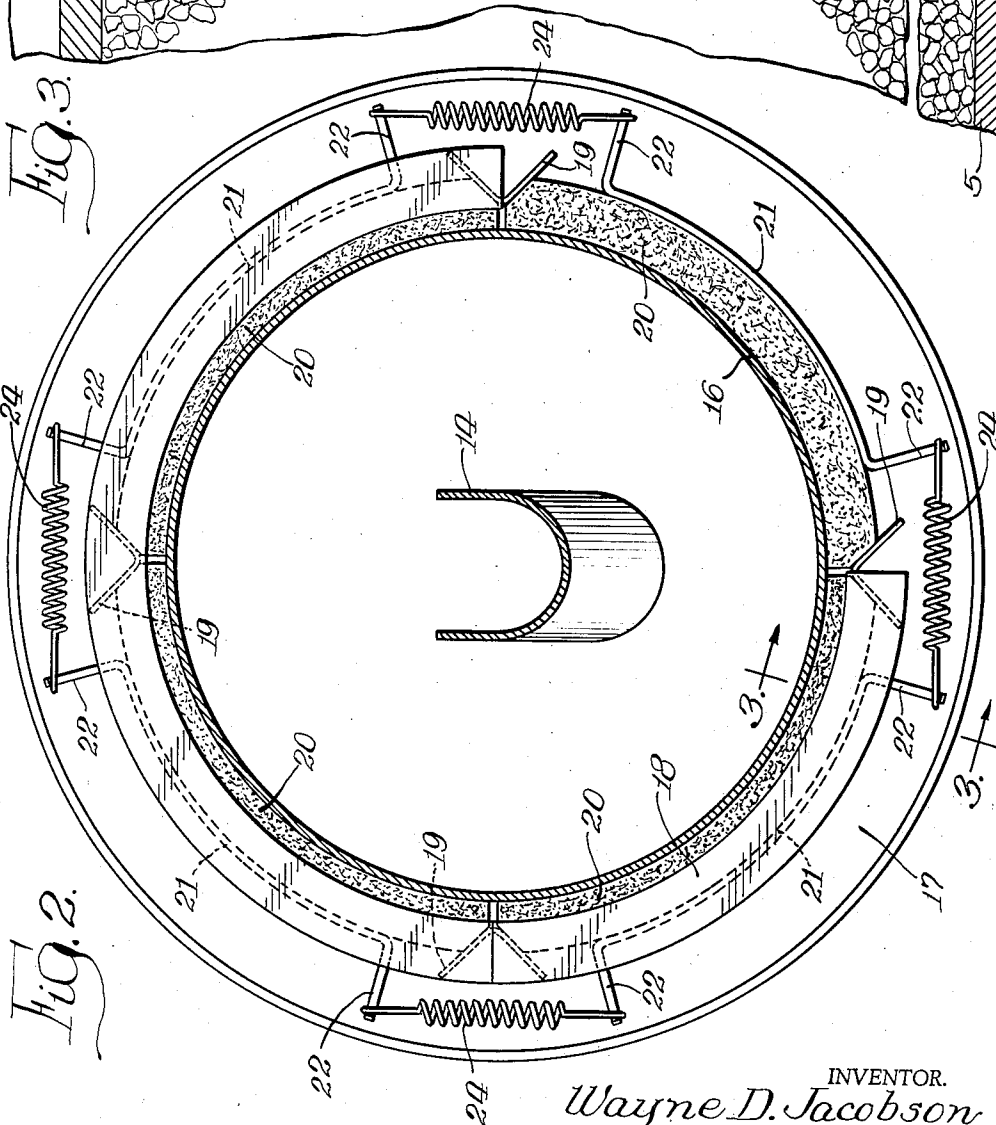


Fig. 2.

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## ROTARY DRUM SEALING MEANS

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6 Claims. (Cl. 34—137)

This invention relates to sealing means for rotary drums and analogous structures.

Rotary drums are used rather extensively in the treatment of various materials for different purposes. The sealing means of my invention is particularly suitable for use with a drier for materials used in road surfacing operations and is disclosed, by way of example, as used for that purpose, though it may be used to advantage for other purposes. In the drying of road surfacing materials in a rotary drum it is desirable that the feed end of the drum be effectively sealed so as to prevent leakage in objectionable amount of air into the drum while guarding against escape from the drum of hot products of combustion and fine particles or dust from the materials under treatment. It is desirable, and in some cases important, that the operation of the drum be not interrupted for substantial periods of time and the sealing means of my invention is, therefore, such that the sealing elements thereof may be replaced, when required, with expedition and facility without appreciable, if any, interruption in the operation of the drum. Further objects and advantages of my invention will appear from the detail description.

In the drawings:

Figure 1 is a side view of a rotary drum and associated parts of a drier embodying my invention, the drum and certain other parts of the drier being partly broken away;

Figure 2 is a sectional view, on an enlarged scale and partly broken away, taken substantially on line 2—2 of Figure 1; and

Figure 3 is a fragmentary sectional view taken substantially on line 3—3 of Figure 2.

In Figure 1 I have shown a drier including a drum provided with sealing means embodying my invention. The drier comprises a drum 5 having suitably mounted thereon exterior circumferential tires 6 resting upon rollers 7 carried by standards 8 and, in conjunction with tires 6, supporting drum 5 for rotation about its axis. Any suitable known means (not shown) may be provided for rotating the drum. Drum 5 is inclined lengthwise, in accordance with usual practice, and receives at its lower end a furnace or heating means 9. The furnace 9, which may be of any suitable known type and provided with one or more suitable known burners, extends into the lower end of drum 5 and through a hood 10 surrounding that end of the drum and provided with a lower discharge spout 11 through which the treated or dried material may be delivered to a suitable conveyor and carried thereby to screens or other suitable apparatus. It is assumed, for purposes of description, that the drier is used for treating aggregate to be used in road surfacing operations. The aggregate is delivered by a conveyor 12 to a hopper 13 at the upper end of a chute 14 extending through a smoke box 15 at the upper end of drum 5 for delivering the aggregate to the latter. The smoke box 15 is provided with a cylindrical extension 16 removably secured thereto, conveniently by bolting, which is concentric with and extends a short distance into the

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upper end of drum 5. An annular cover plate 17 is suitably secured, conveniently by welding, to the upper end of drum 5 and extends radially inward thereof to within a short distance of extension 16 of smoke box 15 concentric therewith. The drum so far described is, in general, of known construction.

An annular retainer plate 18 is mounted on the outer face of cover plate 17 in spaced parallel relation thereto by a plurality of spacers 19 of substantially V-shape in cross section disposed with their vertices directed radially inward of drum 5 substantially radially thereof. The retainer plate 18 preferably is formed in four arcuate segments seating adjacent their ends on the spacers 19, there being four spacers. Obviously the number of spacers used may be varied and the retainer plate 18 may be formed in any desired number of segments or sections or, if desired, may be formed in one piece.

Seal members 20 are slidably mounted between cover plate 17 and retainer 18, the radially inner edges of members 20 conforming to and seating snugly on the outer face of extension 16 of smoke box 15. The seal members 20 extend between the spacers 19 in endwise contact with the inwardly inclined sides thereof, the ends of the seal members 20 being inclined for a substantial portion of their extent similarly to the sides of spacers 19 so as to maintain close contact therewith. Preferably, though not necessarily, the radially outer edges of the seal members 20 are concentric with the inner edges thereof, such members being of uniform radial extent for substantially their full length, except at their end portions which are shaped to fit snugly against the spacers, as above described. The width or radial extent of the seal members 20 is substantially less than the radial extent or width of the retainer 18, providing space for reception of followers 21 also slidably mounted between cover plate 17 and retainer 18. The followers 21 are of less length than the seal members 20 and preferably are formed to seat for substantially their full length on the outer edges of seal members 20 for exerting uniform pressure thereon. Each of the followers is provided, at each end thereof, with an arm 22 extending radially outward a substantial distance beyond the retainer 18, arms 22 also preferably being bent outwardly at an angle away from the cover plate 17 so as to extend away from the latter and outwardly beyond the outer face of retainer 18. Each of the arms 22 is provided with an opening 23 through which is hooked one end of a tension spring 24, the springs 24 connecting together the adjacent arms 22 of followers 21.

The followers 21 urge the seal members 20 radially inward so as to maintain them in sealing contact with extension 16 of the smoke box 15. As the seal members 20 move in radially they also move closer together circumferentially so as to maintain sealing contact with the sides of the spacers 19. The smoke box 15 is connected by a conduit 25 to a suitable source of suction, such as an exhaust fan, for taking off from the drum 5 the products of combustion and fine particles of material or dust entrained thereby. That, in conjunction with the sealing contact between the seal members 20 and extension 16 of smoke box 15, supplemented by the sealing contact between the spacers 19 and the ends of the seal members 20, effectually eliminates any objectionable leakage about the smoke box extension 16. In that connection, it will be recalled that the seal members 20 have a snug fit between cover plate 17 and retainer 18, effective for preventing objectionable leakage therebetween, the suction produced in smoke box 15 serving to prevent escape to atmosphere of products of combustion or dust at that end of the drum. When it becomes necessary or desirable to replace a seal member 20, that may be accomplished by moving the corresponding follower 21 radially outward

beyond the retainer 18, without detaching the tension springs 24. The seal member 20 may then readily be removed and replaced, after which the follower is returned to operating position. In that manner, replacement of the seal members as may be necessary or desired is quickly accomplished with a minimum or delay. Interruption of the treating operation to any appreciable extent, if at all, is thus avoided, which may be of considerable importance in many treating operations.

The seal members 20 may be formed of any suitable material resistant to wear. If the apparatus which includes the drum or analogous structure is used for heat treatment of materials, the seal members may be formed of an asbestos composition which is heat and wear resistant. The particular material of which the seal members 20 are formed may be varied to suit conditions, as will be understood.

As above indicated, it will be understood that changes in detail may be resorted to without departing from the field and scope of my invention, and I intend to include all such variations, as fall within the scope of the appended claims, in this application in which the preferred form only of my invention has been disclosed.

I claim:

1. In sealing means of the character described, a rotary drum having at one end an annular cover plate, a smoke box having an extension projecting through said plate substantially concentric therewith, spacers mounted on said plate extending outwardly therefrom lengthwise of said drum, a retainer mounted on said spacers, the latter bridging the space between said plate and said retainer and supporting said retainer in position substantially parallel with said plate and spaced outwardly therefrom axially of said drum in concentric relation to said smoke box extension, seal members slidably mounted between said plate and retainer with their radially inner edges substantially conforming to and seating on said smoke box extension in sealing contact therewith, and means yieldingly urging said seal members toward said smoke box extension.

2. In sealing means of the character described, a rotary drum having at one end an annular cover plate, a smoke box having an extension projecting through said plate substantially concentric therewith, spacers mounted on the outer face of said plate, a retainer mounted on said spacers, the latter bridging the space between said plate and said retainer and supporting said retainer in position substantially parallel with said plate and spaced outwardly therefrom axially of said drum in concentric relation to said smoke box extension, arcuate seal members slidably mounted between said plate and retainer in end contact with said spacers and with their radially inner edges substantially conforming to and seating on said smoke box extension in sealing contact therewith, said seal members being restrained by said spacers against endwise movement, and means yieldingly urging said seal members toward said smoke box extension.

3. In sealing means of the character described, a rotary drum having at one end an annular cover plate, a smoke box having an extension projecting through said plate substantially concentric therewith, spacers mounted on said plate extending outwardly therefrom, a retainer mounted on said spacers, the latter bridging the space between said plate and said retainer and supporting said retainer in position substantially parallel with said plate and spaced outwardly therefrom axially of said drum in concentric relation to said smoke box extension, seal members slidably mounted between said plate and retainer with their radially inner edges substantially conforming to and seating on said smoke box extension in sealing contact therewith, followers slidably mounted between said plate and retainer seating on the radially outer faces of said seal members and free therefrom, and means yieldingly urging said followers inward radially of said smoke box extension.

4. In sealing means of the character described, a rotary drum having at one end an annular cover plate, a smoke box having an extension projecting through said plate substantially concentric therewith, spacers mounted on said plate within the circumference of said drum and extending outwardly from said plate lengthwise of said drum, a retainer mounted on said spacers, the latter bridging the space between said plate and said retainer and supporting said retainer in position substantially parallel with said plate and spaced outwardly therefrom axially of said drum in concentric relation to said smoke box extension, seal members slidably mounted between said plate and retainer in sealing end contact with said spacers and with their radially inner edges substantially conforming to and seating on said smoke box extension in sealing contact therewith, followers slidably mounted between said plate and retainer seating on the radially outer faces of said seal members and free therefrom, said followers having terminal extensions projecting radially outward beyond said retainer and spaced from said spacers circumferentially of said retainer, and tension springs connecting adjacent terminal extensions of said followers yieldingly urging them radially inward toward each other effective for maintaining said seal members in pressure contact with said smoke box extension.

5. In sealing means of the character described, a rotary drum having at one end an annular cover plate, a smoke box having an extension projecting through said plate substantially concentric therewith, spacers mounted on the outer face of said plate spaced apart circumferentially thereof and extending outward therefrom lengthwise of said drum, said spacers being disposed within the circumference of said drum, a retainer mounted on said spacers, the latter bridging the space between said plate and said retainer and supporting said retainer in position substantially parallel with said plate and spaced outwardly therefrom axially of said drum in concentric relation to said smoke box extension, arcuate seal members slidably mounted between said plate and retainer in sealing end contact with said spacers and with their radially inner edges substantially conforming to and seating on said smoke box extension in sealing contact therewith, arcuate followers slidably mounted between said plate and retainer conforming to and seating on the radially outer faces of said seal members and free therefrom, said followers having terminal extensions projecting radially outward beyond said retainer and spaced from said spacers circumferentially of said retainer, and tension springs connecting adjacent terminal extensions of said followers yieldingly urging them radially inward toward each other effective for maintaining said seal members in pressure contact with said smoke box extension.

6. In sealing means of the character described, a rotary drum having at one end an annular cover plate, a smoke box having an extension projecting through said plate substantially concentric therewith, spacers substantially V shape in cross section mounted on said plate extending outward therefrom lengthwise of said drum and spaced apart circumferentially of said plate, said spacers being within the circumference of said drum, and disposed with their vertices extending radially inward of said plate, a retainer mounted on said spacers, the latter bridging the space between said plate and said retainer and supporting said retainer in position substantially parallel with said plate and spaced outwardly therefrom axially of said drum in concentric relation to said smoke box extension, arcuate seal members slidably mounted between said plate and retainer with their ends inclined similarly to and in sealing contact with said spacers and with their radially inner edges substantially conforming to and seating on said smoke box extension in sealing contact therewith, arcuate followers slidably mounted between said plate and retainer conforming to and seating on the radially outer faces of said seal members and

free therefrom, said followers having terminal extensions projecting radially outward beyond said retainer and spaced from said spacers circumferentially of said retainer, and tension springs connecting adjacent terminal extensions of said followers yieldingly urging them radially inward toward each other effective for maintaining said seal members in pressure contact with said smoke box extension.

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