April 30, 1968 R. C. RIVERS 3,380,408

AIR SUPPLY TO CHAIN GRATE

Filed March 30, 1967 2 Sheets-Sheet 1

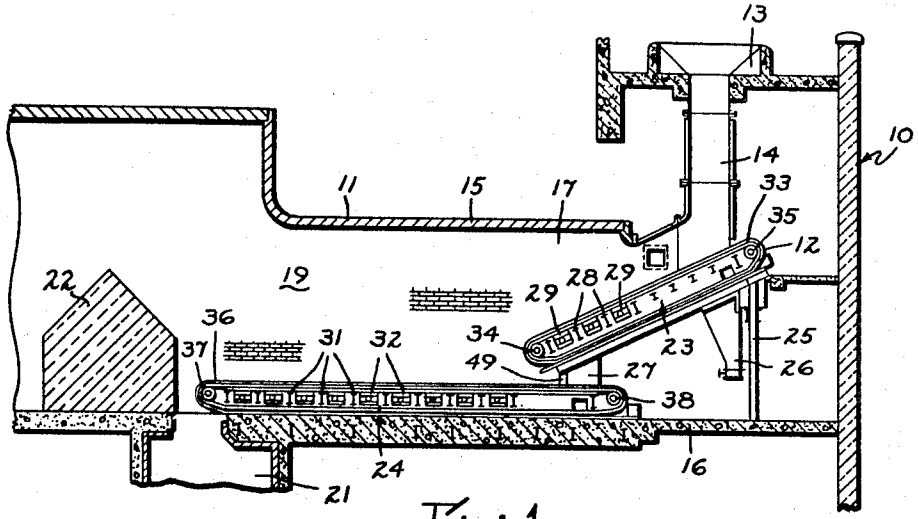


Fig. 1

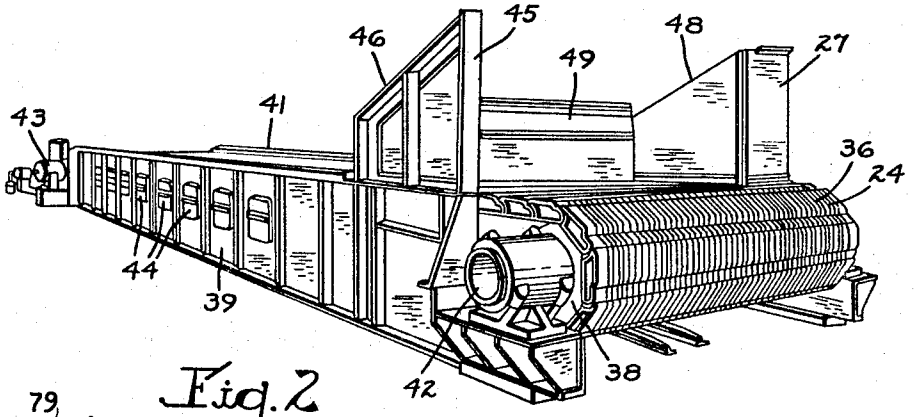


Fig. 2

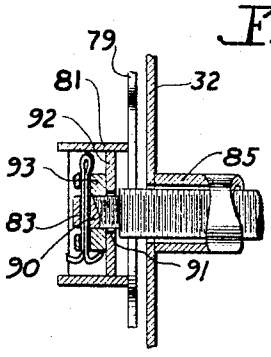


Fig. 5

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AIR SUPPLY TO CHAIN GRATE

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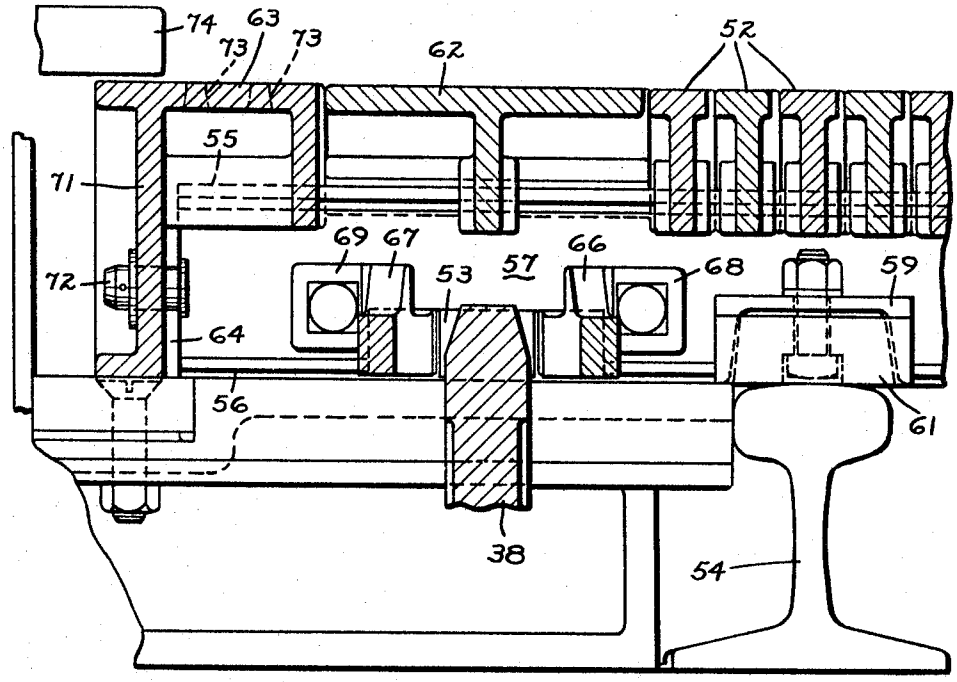


Fig. 3

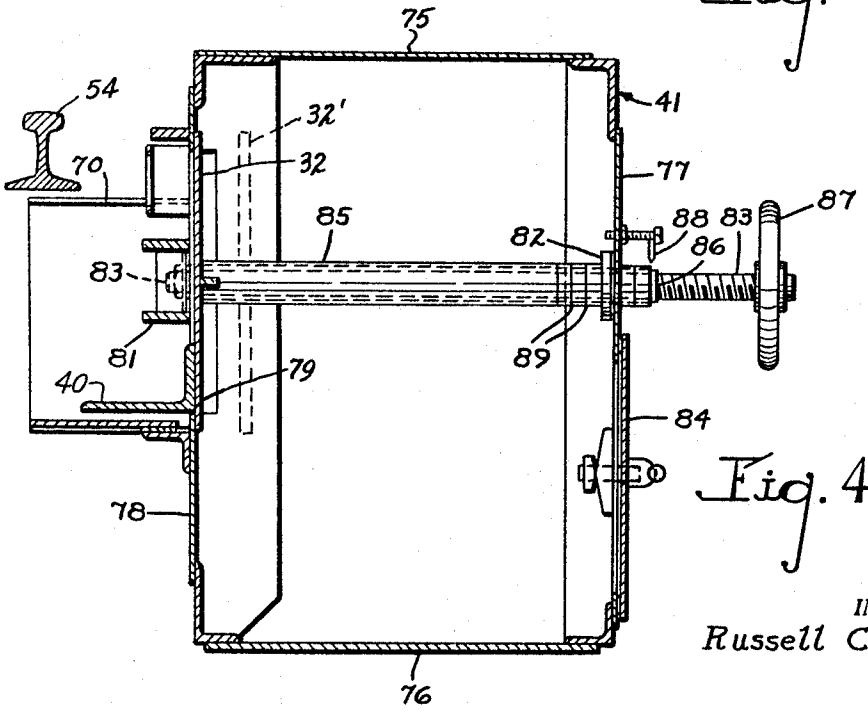


Fig. 4

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3,380,408

AIR SUPPLY TO CHAIN GRATE

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Continuation-in-part of application Ser. No. 558,195, May 31, 1966. This application Mar. 30, 1967, Ser. No. 633,343

5 Claims. (Cl. 110—40)

This is a continuation-in-part of my patent application Serial Number 558,195, filed May 31, 1966, now abanoned, which is a continuation-in-part of my patent application Serial Number 404,072, filed October 15, 1964, now abandoned, which, in turn, is a divi ion of patent application Serial Number 95,667, filed March 14, 1961, now Patent No. 3,169,498 dated February 16, 1965. This invention relates to a stoker and, more particularly, to apparatus arranged to burn solid fuel on a traveling grate.

It is common practice to dispose of refuse, such as garbage and rubbish, by burning it, and the traveling grate is ideally suited for this purpose because of its self-cleaning function. However, the burning of such material as well as other solid fuels on a traveling grate sometimes presents problems that are not encountered in the burning of ordinary fuel by this method. Among other problems, the accurate control of the division of air to the various parts of the grate is quite important. These and other difficulties experienced with the prior art devices have been obviated in a novel manner by the present invention.

It is, therefore, an outstanding object of the invention to provide a stoker of a novel unitary construction.

A still further object of this invention is the provision of a stoker having a novel ducting arrangement for air to the various zones.

With these and other objects in view, as will be apparent to those skilled in the art, the invention resides in the combination of parts set forth in the specification and covered by the claims appended hereto.

The character of the invention, however, may be best understood by reference to one of its structural forms as illustrated by the accompanying drawings in which:

FIG. 1 is a vertical sectional view of an incinerator incorporating the principles of the present invention;

FIG. 2 is a perspective view of a portion of the invention;

FIG. 3 is a vertical sectional view taken transversely of the stoker,

FIG. 4 is a vertical sectional view of a portion of the invention taken transversely of the stoker, and

FIG. 5 is an enlarged sectional view of a portion of the apparatus.

Referring first to FIG. 1, which shows the general features of the invention, the incinerator, indicated generally by the reference numeral **10**, is shown as consisting of a furnace **11** and a grate **12**. The furnace is provided with a hopper **13** into which refuse and garbage is dumped and a chute **14** extends downwardly therefrom toward the grate **12**. The furnace is provided with a roof **15** and a floor **16** joined by side walls **17** and **18**, the walls defining a combustion chamber **19** at the bottom of which lies the grate **12**. At the end of the combustion chamber opposite the chute **14** is an ash pit **21** into which the grate discharges. At the end of the combustion chamber is arranged a fire wall **22** over which gas passes on its way to a stack (not shown). The grate **12** consists of a conditioning section **23** and a burning section **24** both of which are chain grates. The burning section underlies the combustion chamber **19** and rests on the floor **16**, while the conditioning section **23** underlies the chute **14** at one end and its other end extends downwardly adjacent the upper

surface of the burning section. The upper end of the conditioning section **23** rests on a supporting structure **25** and from this end extends a dust hopper **26**. At its other end the conditioning section rests on an abutment **27** extending upwardly from the end of the burning section **24**. Three channel beams **28** extend across the conditioning section **23** and divide it into a number of air zones or chambers, each of which is provided with a damper **29**. In a similar manner, the burning section **24** is provided with deep I channels **31** dividing the chamber between the upper and lower runs of the chain grate into a series of zones or chambers, each of which is provided with its own damper **32**. The conditioning section **23** is provided with an endless grate **33** which extends around idler sprockets **34** at one end and driven sprockets **35** at the other end. In a similar manner, the burning section **24** is provided with an endless grate **36** which extends around idler sprockets **37** at one end and driven sprockets **38** at the other end.

Referring now to FIG. 2, which shows a perspective view of the burning section **24**, it can be seen that the apparatus is provided with steel side walls **39** and **41** between which the endless grate **36** lies. At one end of the wall **39** is mounted a bearing **42** carrying the shaft on which is mounted the driven sprockets **38**, while at the other end the wall supports a bearing **43** and the shaft associated with the idler sprockets **37**. Similar bearings are mounted in the other wall **41**. The wall **39** is provided with clean-out doors **44**. Mounted on top of the side wall **39** is an abutment **45** having an inclined upper surface **46** on which the conditioning section **23** rests. The side wall **41** is provided with the abutment **27** having an inclined upper surface **48** to carry the lower end of the conditioning section. The wall **41** and the abutment **27** are both constructed as hollow ducts and serve to carry air to the conditioning and burning sections. A seal **49** extends from side to side between the two abutments **45** and **27** and extends vertically between the conditioning section **23** and the surface of the burning section **24**.

FIG. 3 shows an enlarged view of a section of the grate looking in the direction of movement of the chain. It should be particularly observed the manner in which a vertically-depending web **71** of the clip **63** is attached to a plate **64** of the grate bar by means of a readily-releasable pin **72**. The presence of the apertures **73** for air flow are particularly evident in this view. The driven sprocket wheel **38** is shown as engaging chain **53** and it is particularly evident in this figure the manner in which links **66** and **67** are provided with lugs **68** and **69** which press against the rearward side of an intermediate web **57**.

FIG. 4, which is a section through the wall **41** of the apparatus, shows that the wall **41** is actually a duct having a top wall **75**, a bottom wall **76**, an outer wall **77**, and an inner wall **78**. The inner wall **78** is provided with a large aperture **79** leading into one of the chambers. Across the aperture resides the damper **32**. Across the aperture **79** extends a bridge **81** which is pivotally attached to the inner end of a control rod **83** which is also carried in a bearing **82** mounted on the outer wall **77**. Welded to the inwardly-directed surface of the damper **32** is a flange formed by an angle iron **40** which, because of engagement with the vertical wall of the air zone **70**, prevents the damper from rotating when the control rod **83** is rotated. The outer wall, incidentally, is provided with an access door **84**. Surrounding the control rod **83** and welded to the damper **32** is a tube **85** which extends through the bushing **82** in the wall **77** and is carried thereby. The control rod **83** is threaded and engages a nut **86** welded within the tube **85**. The outer end of the control rod is provided with a hand wheel **87** which is keyed to it. Fastened to the wall **77** is a pointer **88** and formed in the outer surface of the tube, particularly in

the area of the wall **77** are shallow grooves **89** which are filled with paint to give an indication to the operator of the position of the damper aided by the pointer **88**. The interior of the wall **41**, which acts as an air duct, is connected to the force draft fan (not shown) of the furnace so that the entire length of the wall **41** is provided with air under pressure and an individual damper **32** is provided for each chamber or zone of the grate. The wall **41**, in turn, is connected to the hollow abutment **27** so that air passes therethrough to the interior of the conditioning section **23**.

FIG. 5 shows the details of the manner in which the control rod **83** is pivotally attached to the bridge **81**. The rod is provided with an end portion of reduced diameter that extends loosely through an aperture **91** in the vertical wall **92** of the bridge. A castellated nut **93** is threaded on the end portion of the rod and is locked in place by a cotter pin in spaced relationship to the shoulder between the end portion and the rest of the rod, the spacing being such as to allow free pivotal motion between the rod and the bridge with little axial motion.

It is obvious that minor changes may be made in the form and construction of the invention without departing from the material spirit thereof. It is not, however, desired to confine the invention to the exact form herein shown and described, but it is desired to include all such as properly come within the scope claimed.

The invention having been thus described, what is claimed as new and desired to secure by Letters Patent is:

1. A traveling grate, comprising an endless chain, grate clips fastened to the chain to define upper and lower runs, an air chamber between the runs, a first vertical wall extending parallel to the chain and closing one side of the chamber, a second vertical wall spaced from and parallel to the first vertical wall, the two walls defining an air duct, an aperture through the first wall through which air may pass from the air duct to the air chamber, a support extending across the aperture, a control rod extending through the first wall and rotatably mounted in the said support, a tube slidably carried by the rod, a damper carried by the tube at a right angle thereto, and threaded means extending between the tube and rod so that when the rod is rotated the tube and damper move toward or away from the aperture.

2. A traveling grate as recited in claim **1**, wherein indicia are provided on the outer surface of the tube to indicate the position of the damper relative to the aperture.

3. A traveling grate as recited in claim **1**, wherein the damper is fixedly connected to the tube.

4. A traveling grate as recited in claim **1**, wherein means is provided to prevent rotation of the damper when the control rod is rotated.

5. A traveling grate as recited in claim **1**, wherein the said means consists of a flange extending at a right angle to the damper and a vertical wall forming an air zone in the air chamber.

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