Oct. 31, 1961 M. VAN UYE PIETERSE 3,006,293

FUEL FEEDER

Filed Sept. 25, 1957

FIG. 1

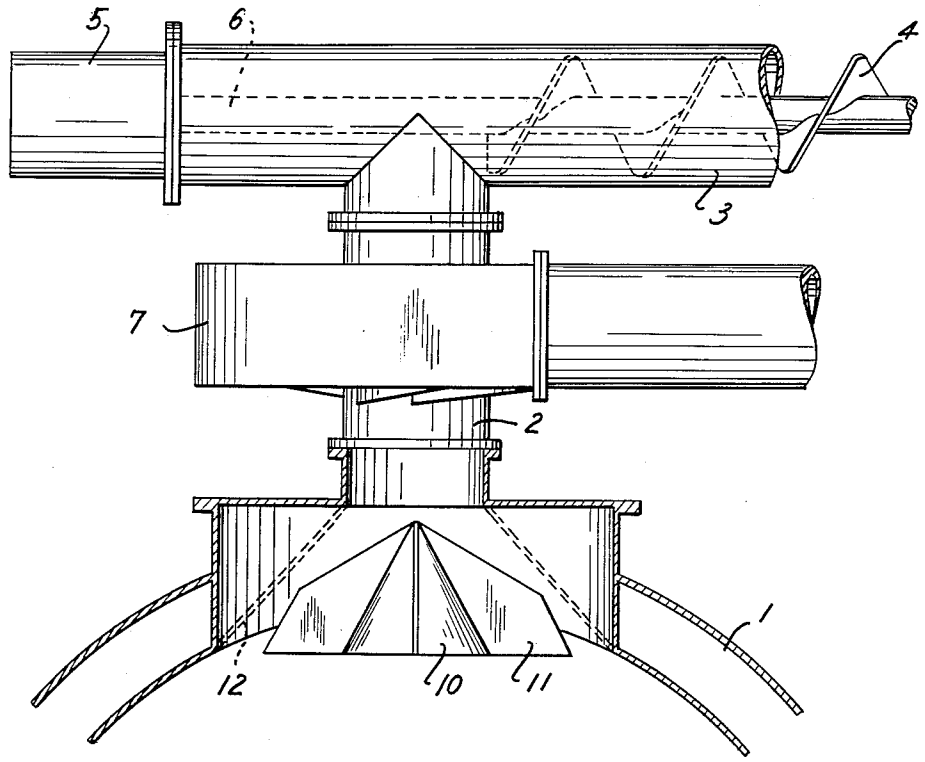
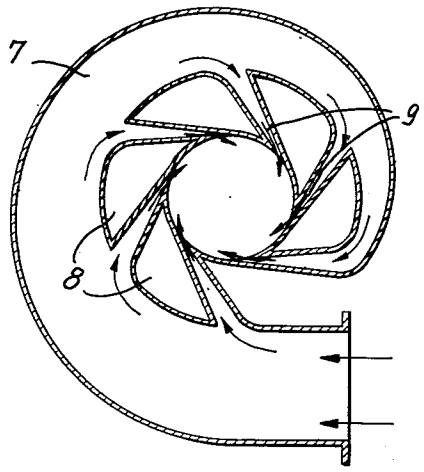


FIG. 2



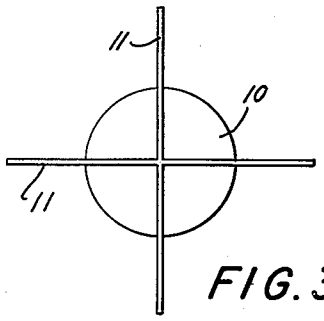


FIG. 3

INVENTOR.
Maurice Van Uye Pieterse
BY
Michael S. Striker
Attorney

United States Patent Office 3,006,293 Patented Oct. 31, 1961

3,006,293

FUEL FEEDER

Marius Van Uye Pieterse, The Hague, Netherlands, assignor to N.V. Stookwerk, Rijswijk, Netherlands

Filed Sept. 25, 1957, Ser. No. 686,086
4 Claims. (Cl. 110—104)

This invention relates to a device for distributing lumpy combustibles, such as fat coals, over the grate surfaces of fireplaces by making use of mechanical devices such as feed screws, etc., which bring the combustible to the fireplace.

The invention has for its object the problem of providing devices by means of which lumpy combustibles, such as coals of various sizes and widely mixed, are distributed automatically uniformally over the grate surface of a fireplace, in such a way that they form in the fireplace layers of uniform depth. This is obtained essentially, according to the invention, by associating with the combustible coming from above in the fireplace projecting or throwing devices which distribute it over the grate surface. The devices according to the invention may work according to different principles, whereby there might be provided either a purely mechanical working or a pneumatic working. Both kinds of devices might eventually be used in combination.

The devices according to the invention work with simple and handy means. It is thereby advantageous that the combustible might travel, in the feeding from the fireplace crown, while free falling, a relatively long way the course of which may easily be influenced in such a way that the desired uniform distributing over the grate surface is provided.

The feeding tubing bringing the combustible to the fireplace from the crown thereof is thus advantageously arranged over the center of the grate surface and has advantageously an upright course. The projecting devices distributing the combustible may be provided in the tubing or may be placed in front thereof. With pneumatical projecting devices, there may be obtained in the tubing a rotating air current which imparts to the combustile falling in the tubing a rotating movement, which is limited inside the tubing by the walls therefrom and which shows itself, on leaving the tubing, as centrifugal force throwing the combustible sidewise over the tubing projection and thus causes the desired distributing of the combustible over all of the grate surface.

The rotating air current may be a compressed air current which discharges tangentially in the feeding tubing. It is however better in some cases to divide the compressed air current in part currents which are admitted approximately tangentially in the feeding tubing. A suitable device for this purpose provides a chamber surrounding the feeding tubing in the upper part thereof and into which guiding members are arranged in spaced relationship, the free spaces forming channels introducing the compressed air tangentially in the tubing. With such devices, there is obtained an air current rotating particularly uniformly, which gives thereby also a uniform distributing of the combustible falling through the tubing. To improve the working of such devices, it may be useful to arrange in front of the tubing outlet an advantageously conical guiding member. The tubing may then moreover be conically widened in the neighborhood of the outlet thereof. Such guiding members support a relatively wide projecting of the combustible lumps, so that large grate surfaces may also be adequately fed.

Instead of pneumatically-working projecting devices, there might also be provided purely mechanically-working arrangements. These arrangements are advantageously provided with a projecting member, arranged in front of the feeding tubing outlet, which may be motor-driven and which may be provided with projections catching the combustible along, such as ribs. With such arrangements, the projecting working may be adapted to particular conditions, for example by selecting the angular speed of the projecting member. It may be useful, in some cases, to add to the projecting members cooling devices or thermal screens. Such cooling devices may also be advantageous for the fixed guiding member.

Another advantageous possibility for putting the invention to use is to arrange in the feeding tubing projecting guiding surfaces extending helically, which either so influence mechanically the coals, etc., falling through the tubing that they cause a rotating movement thereof or impart to a compressed air stream fed to the tubing a rotating movement, which then acts in its turn on the lumps of combustible. It is advantageous in most cases to realize such devices so that they influence the lumps of combustible both mechanically by direct guiding and pneumatically. With feeding devices according to the invention, it has moreover been found advantageous, according to another feature of the invention, to divide the grate in several zones arranged in angular relationship. A preferred embodiment comprises a grate with two areas arranged in angular relationship to one another and having an arcuate-like curved cross-section. This arrangement offers the advantages that the individual grate areas influence one another, by radiating, so as to cause a rapid ignition of the combustible fed.

In order that the invention may be readily carried inot effect, it will now be described with reference to the accompanying drawings, in which:

FIG. 1 is a side elevation view, partially in section, of an embodiment of a pneumatic feeding device of the present invention;

FIG. 2 is a view from above of the essential part of the embodiment of FIG. 1; and

FIG. 3 is a view from above of a detail of the device according to FIG. 1.

The double wall of the fireplace is designated by reference numeral **1**. The combustible is fed to the fireplace through an upright feeding tubing **2**, to which the coal, etc., may for example be brought by a feed screw **4** arranged in a tube **3**. A motor **5** is used for driving the feed screw **4**. In the embodiment of FIGS. 1–3, there is arranged around the feeding tubing **2** a housing **7**, which is closed with respect to the outside and which is connected with compressed air generators or tanks (not shown). In the housing **7** are arranged guiding members **8** in spaced relationship, the free spaces forming air guide channels **9** which enter substantially tangentially the feeding tubing **2**. Thereby, a continuously rotating air current is generated in the feeding tubing **2**. In front of the outlet of the feeding tubing **10** is arranged a guiding member, advantageously of conical shape, which is provided with ribs **11**. Instead of providing for such a guiding member **10**, or in addition thereto, the free end of the feeding tubing **2** might also be of conical shape, as shown by the dotted lines **12**. The upright rotating air current obtained in the feeding tubing **2** takes the coal or other combustible along, which is continuously fed by the screw **4**, so that it moves downwards while following helical courses along the tubing walls. After leaving the tubing outlet, the lumps of combustible are thrown more or less outwards according to their respective rotating movements, so that the grate surface of the fireplace is covered approximately uniformly. FIG. 3 shows moreover an embodiment of the guiding member **10**, which shows that on a conical base member are arranged ribs **11** projecting relatively far. These ribs might however, in some cases, extend along non-radial directions.

The free end of the tube 2 may be of conical configuration, as mentioned and as shown by the dotted lines 12 in FIG. 1, and in such case its inner wall may be provided with a plurality of laterally positioned guide plates secured thereto.

The embodiments shown are only given by way of example. Many variations are possible. For instance, the feeding device may also be carried into effect in vertical cylindrical fireplaces. The grate surface could also be formed by a single, eventually plane grate. The arrangement of the present invention is particularly suitable for firing with good efficiency strong coking coals, because it prevents the accumulation of the combustible in some places and its resultant failure to burn completely.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be secured by Letters Patent is:

1. In an arrangement for feeding solid fuel to a furnace or the like, in combination, a combustion chamber having a top wall; a conduit in said top wall forming an elongated passage through said wall, said passage having an axis extending in a vertical direction, said conduit having an upper orifice, a lower orifice, and a wall portion of arcuate cross section intermediate said orifices; means for feeding solid fuel particles into said conduit at said upper orifice in such a manner that the same pass in straight axial direction as a continuous stream of solid fuel particles through said conduit from said upper orifice thereof downwardly past said wall portion of arcuate cross section, leaving said conduit through said lower orifice thereof; a supply of compressed air; and means for admitting said compressed air to said conduit intermediate said orifices thereof into said continuous stream of solid fuel particles passing downwardly through said conduit in a substantially horizontal plane and in substantially tangential direction, all of said air admitting means being directed in the same direction so as to force said solid fuel particles to descend in said conduit along a substantially helical path whereby said solid fuel particles spread outwardly upon leaving said lower orifice and are discharged into said combustion chamber over an area greater than said lower orifice.

2. In an arrangement for feeding solid fuel to a furnace or the like, in combination, a combustion chamber having a top wall; a conduit in said top wall forming an elongated passage through said wall, said passage having an axis extending in a vertical direction, said conduit having an upper orifice, a lower orifice, and a wall portion of arcuate cross section intermediate said orifices; means for feeding solid fuel particles into said conduit at said upper orifice in such a manner that the same pass in straight axial direction as a continuous stream of solid fuel particles through said conduit from said upper orifice thereof downwardly past said wall portion of arcuate cross section, leaving said conduit through said lower orifice thereof; a supply of compressed air; and a plurality of air admitting channels for admitting said compressed air to said conduit intermediate said orifices thereof into said continuous stream of solid fuel particles passing downwardly through said conduit in a substantially horizontal plane and in substantially tangential direction, all of said air admitting channels being directed in the same direction so as to force said solid fuel particles to descend in said conduit along a substantially helical path whereby said solid fuel particles spread outwardly upon leaving said lower orifice and are discharged into said combustion chamber over an area greater than said lower orifice, said air admitting channels communicating with said conduit at a plurality of respective points thereof spaced substantially equiangularly about said axis intermediate said orifices of said conduit.

3. In an arrangement for feeding solid fuel to a furnace or the like, in combination, a combustion chamber having a top wall; a conduit in said top wall forming an elongated passage through said wall, said passage having an axis extending in a vertical direction, said conduit having an upper orifice, a lower orifice, and a wall portion of arcuate cross-section intermediate said orifices; means for feeding solid fuel particles into said conduit at said upper orifice in such a manner that the same pass in straight axial direction as a continuous stream of solid fuel particles through said conduit from said upper orifice thereof downwardly past said wall portion of arcuate cross section, leaving said conduit through said lower orifice thereof; a supply of compressed air; and a plurality of air admitting channels for admitting said compressed air to said conduit intermediate said orifices thereof into said continuous stream of solid fuel particles passing downwardly through said conduit in a substantially horizontal plane and in substantially tangential direction, all of said air admitting channels being directed in the same direction so as to force said solid fuel particles to descend in said conduit along a substantially helical path whereby said solid fuel particles spread outwardly upon leaving said lower orifice and are discharged into said combustion chamber over an area greater than said lower orifice, said air admitting channels communicating with said conduit at a plurality of respective points thereof spaced substantially equiangularly about said axis intermediate said orifices of said conduit, each of said air admitting channels having two ends and a cross sectional area at an end in said conduit which is small relative to the cross sectional area at an end spaced from said conduit.

4. In an arrangement for feeding solid fuel to a furnace or the like, in combination, a combustion chamber having a top wall; a conduit in said top wall forming an elongated passage through said wall, said passage having an axis extending in a vertical direction, said conduit having an upper orifice, a lower orifice, and a wall portion of arcuate cross-section intermediate said orifices, said conduit having a lower portion conically increasing in cross-section toward said lower orifice; a plurality of laterally positioned guide plate means secured to the inside face of the conically increasing portion of said conduit, said guide plate means being positioned in spaced relation to each other; means for feeding solid fuel particles into said conduit at said upper orifice in such a manner that the same pass in straight axial direction as a continuous stream of solid fuel particles through said conduit from said upper orifice thereof downwardly past said wall portion of arcuate cross section, leaving said conduit through said lower orifice thereof; a supply of compressed air; and a plurality of air admitting channels for admitting said compressed air to said conduit intermediate said orifices thereof into said continuous stream of solid fuel particles passing downwardly through said conduit in a substantially horizontal plane and in substantially tangential direction, all of said air admitting channels being directed in the same direction so as to force said solid fuel particles to descend in said conduit along a substantially helical path whereby said solid fuel particles spread outwardly upon leaving said lower orifice and are discharged into said combustion chamber over an area greater than said lower orifice, said air admitting channels communicating with said conduit at a plurality of respective points thereof spaced substantially equiangularly about said axis intermediate said orifices of said conduit, each of said air admitting channels having two ends and a cross sectional area at an end in said

conduit which is small relative to the cross sectional area at an end spaced from said conduit.

References Cited in the file of this patent

UNITED STATES PATENTS

1,676,511	Wood	July 10, 1928
1,697,048	Cox	Jan. 1, 1929
2,055,331	Bredtschneider	Sept. 22, 1936
2,275,394	Hardgrove	Mar. 3, 1942
2,361,681	Gordon	Oct. 31, 1944
2,615,407	Raguson	Oct. 28, 1952

FOREIGN PATENTS

472,262	Great Britain	Sept. 20, 1937