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J. & W. REAGAN.

FUEL FEEDING DEVICE FOR BOILER FURNACES.

APPLICATION FILED FEB. 12, 1904.

NO MODEL.

FIG 3

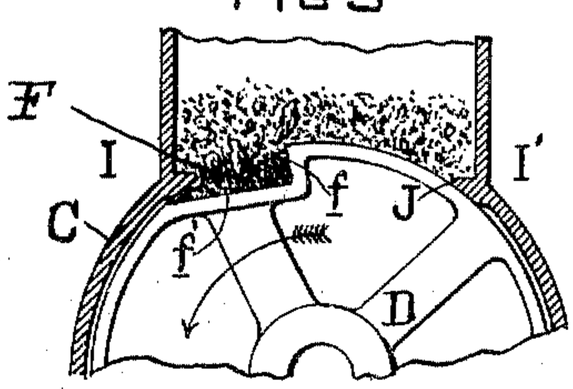


FIG 1

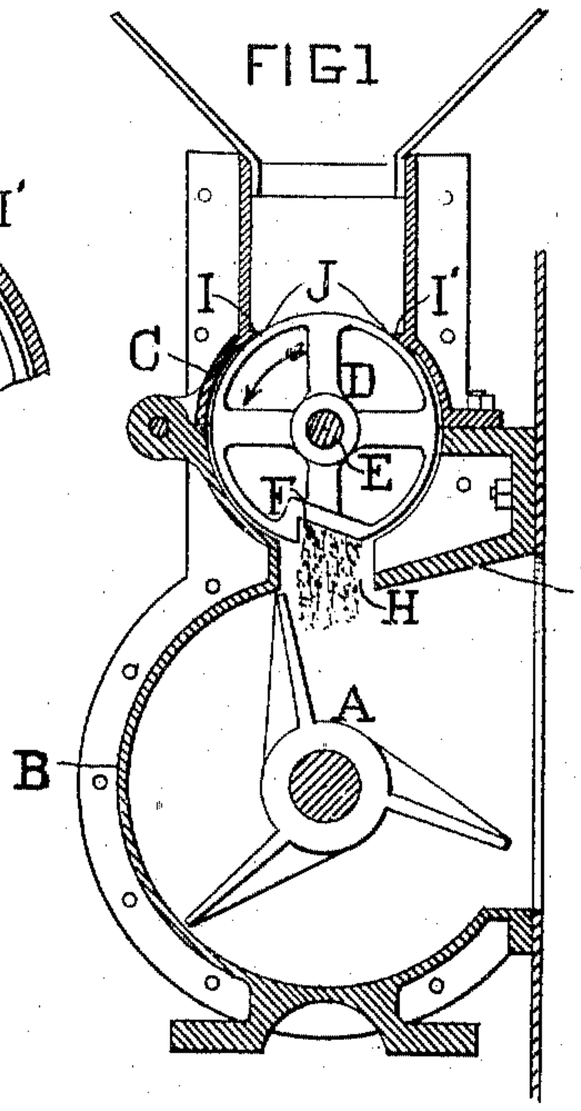


FIG 4

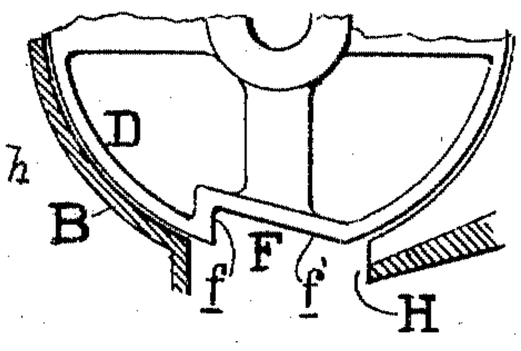
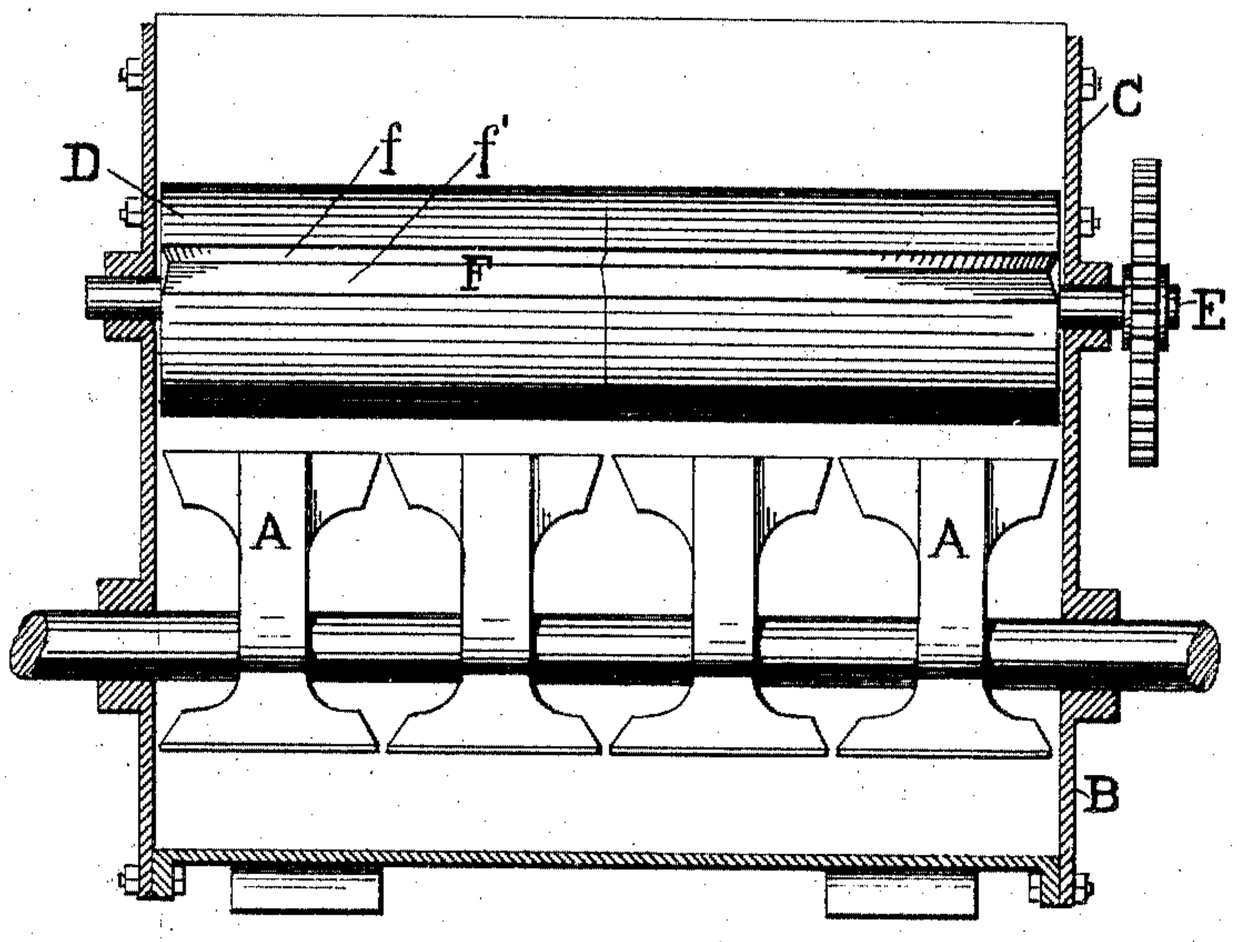


FIG 2



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UNITED STATES PATENT OFFICE.

JAMES REAGAN AND WILLIAM REAGAN, OF PHILADELPHIA, PENNSYLVANIA.

FUEL-FEEDING DEVICE FOR BOILER-FURNACES.

SPECIFICATION forming part of Letters Patent No. 767,083, dated August 9, 1904.

Application filed February 12, 1904. Serial No. 193,249. (No model.)

To all whom it may concern:

Be it known that we, JAMES REAGAN and WILLIAM REAGAN, citizens of the United States of America, and residents of the city and county of Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Fuel-Feeding Devices for Boiler-Furnaces, of which the following is a specification.

The object of the invention is to cause the fuel to be spread or distributed over the entire fire-bed of a furnace with substantial uniformity and in such quantities as may be desired or the condition of the furnace may demand.

The invention consists in the parts and combinations of parts hereinafter described and claimed.

Reference is had to the accompanying drawings, in which—

Figure 1 is a vertical section of our invention. Fig. 2 is a longitudinal vertical section through the casing of the machine, showing the distributers and the feed-cylinder turned into position to exhibit the groove or channel in the same. Fig. 3 is an end view of the upper portion of the feed-cylinder and section of casing. Fig. 4 is an end view of the lower portion of same.

The distributers or spreaders A, Figs. 1 and 2, which consist of any number of blades having widened ends, are located and rotate within a cylindrical casing B, secured to the boiler-front. Immediately above the said distributers and inclosed within a bisected casing C is the feed-cylinder D, which is mounted upon a shaft E, having its bearings in the flanges at each end of the casing. The feed-cylinder D may be made in sections of any desired length, and the groove or channel F on its periphery for conveying the coal to the distributers is made angular or flaring in shape, the substantially radial side of edge *f* of which, Figs. 3 and 4, gathers up the coal at each revolution, and the side *f'*, which inclines inward from the circumference, permits it to drop freely after it reaches its destination. Fuel which is wet or damp will become choked or packed within if the sides of the grooves are of even depth and will not deliver freely.

The wall of the casing C at the top of the feed-cylinder D is contracted to cover about one-fifth of the circumference of the cylinder and is provided on the inner surfaces with ribs or projections I and I', extending the full length of same in close contact with the curved surface of the cylinder. The open space between the ribs forms a port or slot J, which communicates with the groove F to allow a charge of coal to pass from the hopper during the revolutions of the cylinder, which also acts as a cut-off to the port and opens and closes it at intervals, thus admitting and cutting off for the time being a supply of coal. As the feed-cylinder revolves and the groove F becomes uncovered as it reaches the opening H at the junction of the casings B and C the coal will drop out and will be forcibly thrown by the distributers into the furnace and spread over the entire fire-surface, maintaining a bed of any desired thickness. The opening H is wider than the groove F, so as not to impede the falling fuel. The opening being unobstructed by any regulator or damper allows the fuel to freely fall upon the distributer.

The edges of the port or slot J, (shown in Fig. 3,) which are in contact with the surface of the feed-cylinder D, are made sharp or knife-like, so that when the substantially radial edge *f* of the groove passes them a shear-like action will be produced, and any large lumps of coal, slate or any other hard foreign substances caught between them will be crushed, broken, or sheared off to such size as will pass into the groove.

The feed-cylinder may be provided with a plurality of grooves or channels, provided said grooves or channels are not situated so close together as to produce a substantially continuous feed. It will be observed that the feed-cylinder is exteriorly of less diameter than the internal diameter of its casing. The object of this construction is to allow the fuel within the pocket of the feed-cylinder to be-

come loosened while it is passing to the opening H. In this way provision is made for releasing all of the fuel within the fuel-pocket at the proper time.

The upper portion of the distributer-cylinder is provided with an upwardly-inclined deflector *h*, which when the distributer-wheel is in operation deflects certain portions of the fuel upon the contiguous parts of the fire-surface.

Motion is communicated to the shaft E, carrying the feed-cylinder D, from a driving-shaft or other suitable mechanism located in any convenient position, and the speed may be increased or diminished, according to the amount of fuel it is desired to burn.

When the device is in operation, the fuel in the hopper will be supported by the feed-cylinder. As this cylinder revolves the groove F thereof will at each revolution of the cylinder receive a measured quantity of the fuel and deliver the same to the opening H, through which it will fall upon the distributer or spreader A. The blades of this distributer, which is to be run at a very high rate of speed, strike the fuel while falling and scatter each successive increment thereof over substantially all parts of the fire-bed. Certain portions of the fuel will, however, be driven against the deflector *h*, which, as already indicated, will cause the same to be deflected upon those portions of the fire-bed which are contiguous to the distributer. It will be noted that the passage H is unobstructed by any damper or other similar device and that the fuel which is delivered from the groove of the feed-cylinder is for this reason allowed to freely fall into the path of the blades of the distributer. This is important, for the particles of fuel in falling through the passage H become separated to some extent, so that the successive charges are better distributed when acted upon by the blades of the distributer.

We do not wish to confine or restrict ourselves to the exact angle shown in the groove or channel of the feed-cylinder, as it is obvious that this may be changed to suit different classes of coal. Our main object is to construct the groove or pocket so as to allow the fuel to drop out freely at the proper time, and thus avoid any packing or choking up of same within the groove.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. A fuel measuring and distributing device including in combination means for measuring and freely dropping the fuel and means for uniformly spreading the successive portions of the freely-falling fuel over substantially all parts of a fire-surface, substantially as described.

2. A fuel measuring and distributing device including in combination means for measuring and freely dropping the fuel and means adapted to be operated independently of said measuring means for uniformly spreading the freely-falling fuel over substantially all parts of a fire-surface, substantially as described.

3. A fuel measuring and distributing device including in combination means for measuring and separating the fuel into charges, and means for spreading each of the successive separated charges while falling over substantially all parts of a fire-surface, substantially as described.

4. A fuel measuring and distributing device including in combination means for measuring and separating the fuel into charges, and continuously-acting means for spreading each of the separate charges while falling over substantially all parts of a fire-surface, substantially as described.

5. A fuel measuring and distributing device including in combination means for crushing the fuel and for separating the crushed fuel into independent charges, and means for spreading the successive charges over substantially all parts of a fire-surface, substantially as described.

6. The combination of a fuel-holder, a fuel-measuring device having a fuel-pocket therein and adapted to be moved in operative relation to said fuel-holder, receive fuel therefrom and intermittently drop the same, and a fuel-spreading device adapted to deliver the fuel while falling from said fuel-measuring device over substantially all parts of a fire-surface, substantially as described.

7. The combination of a fuel-holder, a rotary fuel-measuring device having a horizontal axis and a fuel-pocket therein and adapted to be moved in operative relation to said fuel-holder, receive fuel therefrom and intermittently drop the same, and a fuel-spreading device adapted to deliver the falling fuel over substantially all parts of a fire-surface, substantially as described.

8. The combination of a fuel-holder, a cutter for the fuel, a fuel-measuring device having a fuel-pocket therein and adapted to move in operative relation to said fuel-holder and receive separated charges of fuel, and a fuel-spreading device for delivering the fuel while falling substantially over all parts of a fire-surface, substantially as described.

9. The combination of a fuel-holder, a cylindrical casing, a rotary fuel-measuring device therein having a fuel-pocket and adapted to move in operative relation to said fuel-holder and receive fuel therefrom, and a fuel-spreading device for distributing independent charges of the fuel over substantially all parts of a fire-surface, substantially as described.

10. The combination of a fuel-holder, a cylindrical casing, a rotary fuel cutting and measuring device therein having a fuel-pocket and adapted to move in operative relation to said fuel-holder and receive fuel therefrom,

and a fuel-spreading device for distributing independent charges of the fuel over substantially all parts of a fire-surface, substantially as described.

11. The combination of a fuel-holder, a cylindrical casing, a rotary fuel-measuring device therein having a horizontal axis and a fuel-pocket, and a fuel-spreading device for distributing independent charges of the fuel over substantially all parts of a fire-surface, substantially as described.

12. The combination of a fuel-holder, a cylindrical casing, a rotary fuel-measuring device therein having a horizontal axis and a fuel-pocket, and a rotary fuel-spreading device for distributing independent charges of the fuel over substantially all parts of a fire-surface, substantially as described.

13. The combination of a fuel-holder, a cylindrical casing, a rotary fuel-measuring device therein having a horizontal axis and a fuel-pocket, and a rotary fuel-spreading device having a horizontal axis for distributing independent charges of the fuel over substantially all parts of a fire-surface, substantially as described.

14. The combination of a fuel-holder, a cylindrical casing, a rotary fuel-measuring device therein having a horizontal axis and a fuel-pocket, and a rotary fuel-spreading device having blades for distributing independent charges of the fuel over substantially all parts of a fire-surface, substantially as described.

15. A fuel measuring and distributing device including in combination rotary means for measuring and dropping the fuel having a pocket therein, rotary means for uniformly spreading the falling fuel over substantially all parts of a fire-surface and casings for said measuring and spreading means having an opening between them which is of greater width than the pocket of the measurer, substantially as described.

16. A fuel measuring and distributing device including in combination rotary means for measuring and dropping the fuel having a pocket therein provided with a flaring mouth, rotary means for uniformly spreading the falling fuel over substantially all parts of a fire-surface and casings for said measuring and spreading means having an opening between them which is of greater width than the pocket of the measurer, substantially as described.

17. A fuel-measuring device having in combination a cylindrical casing provided with a cutter at its mouth and a revoluble cylinder of less external diameter than the internal diameter of said casing and provided with a fuel-pocket adapted to coöperate with said cutter, substantially as described.

18. A fuel measuring and distributing device including in combination means for measuring and freely dropping the fuel, means for uniformly spreading the successive portions of the freely-falling fuel over substantially all parts of a fire-surface, and a deflector for portions of the fuel, substantially as described.

19. A fuel measuring and distributing device including in combination means for measuring and freely dropping the fuel, means for uniformly spreading the successive portions of the freely-falling fuel over substantially all parts of a fire-surface, and an upwardly-inclined deflector for portions of the fuel substantially as described.

20. A fuel measuring and distributing device including in combination means for dropping the fuel in independent charges, means for spreading the falling fuel over substantially all parts of a fire-surface and means for deflecting portions of the fuel upon a portion of the fire-bed, substantially as described.

21. The combination with a fuel-measuring device of a rotary fuel-distributing device adapted to distribute the individual portions of the fuel while falling over substantially all parts of a fire-surface, said distributing device having an independent axis whereby said measuring device and said distributing device may be run at different rates of speed, substantially as described.

22. The combination with a fuel-measuring device of a rotary fuel-distributing device having a plurality of blades adapted to distribute the individual portions of the fuel while falling over substantially all parts of a fire-surface, said distributing device having an independent axis whereby said measuring device and said distributing device may be run at different rates of speed, substantially as described.

23. The combination of a fuel-measuring device having a horizontal axis, a fuel-distributing device having a horizontal axis and provided with blades having widened ends and a casing having an open mouth and surrounding and substantially fitting the distributing device, substantially as described.

24. The combination of a fuel-measuring device having a horizontal axis, a fuel-distributing device having a horizontal axis and provided with blades having widened ends, a casing having an open mouth and an inclined deflector surrounding and substantially fitting the distributing device, substantially as described.

25. A fuel measuring and distributing device including in combination a rotary cylinder having a fuel-pocket therein, a rotary spreader having blades provided with widened ends and casings for said elements, the casing for said spreader substantially fitting the same and provided with an inlet-opening in its top leading from the casing of the rotary cylinder and with an open discharge-mouth at one side thereof, a portion of said spreader-casing being inclined so as to act as a deflector for portions of the fuel, substantially as described.

26. In combination with the revolving distributers or spreaders of a fuel-feeding device, a feed-cylinder having one or more angular grooves or channels adapted to receive coal and discharge the same freely to the distributers, a casing for same provided with an interior port or slot with cutting edges to act in conjunction with the vertical side or edge of the groove in the feed-cylinder to shear off, crush or break large pieces of coal or other hard foreign substances, substantially as described.

Signed by us at Philadelphia, Pennsylvania, this 11th day of February, 1904.

JAMES REAGAN.
WILLIAM REAGAN.

Witnesses:
RICHARD MCELROY,
ROBERT OSBORNE, Jr.