

H. E. STOVER.

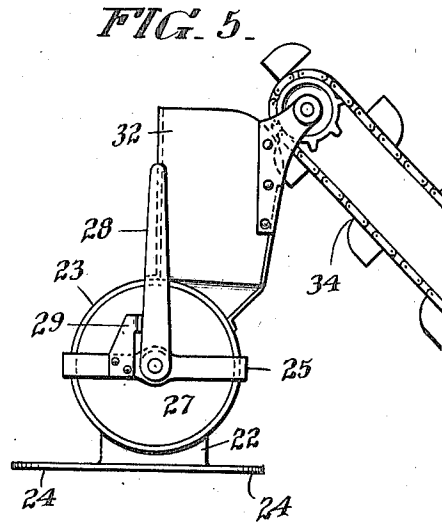
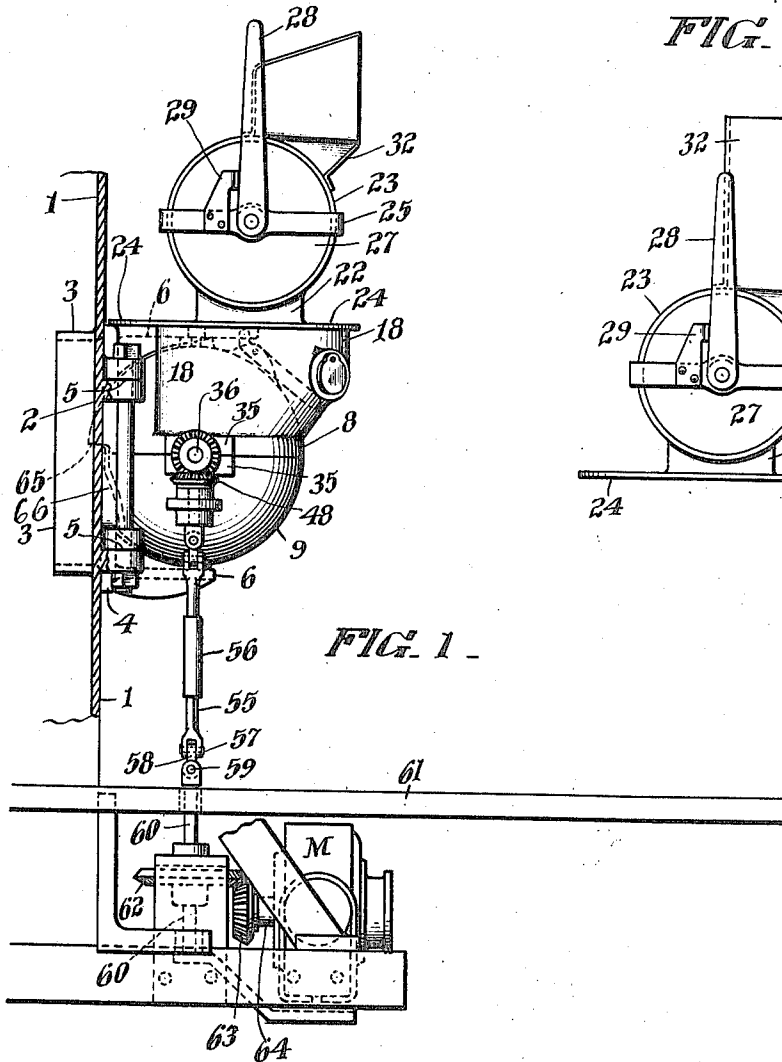
STOKER.

APPLICATION FILED MAY 22, 1912.

1,060,036.

Patented Apr. 29, 1913.

3 SHEETS—SHEET 1.



WITNESSES
Daniel Webster, Jr.
Beatrice Webster

INVENTOR
H. E. Stover
BY
Cornelius L. Chas.
his ATTORNEY

H. E. STOVER.

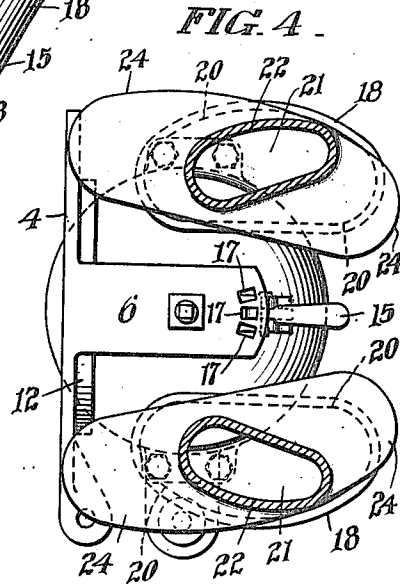
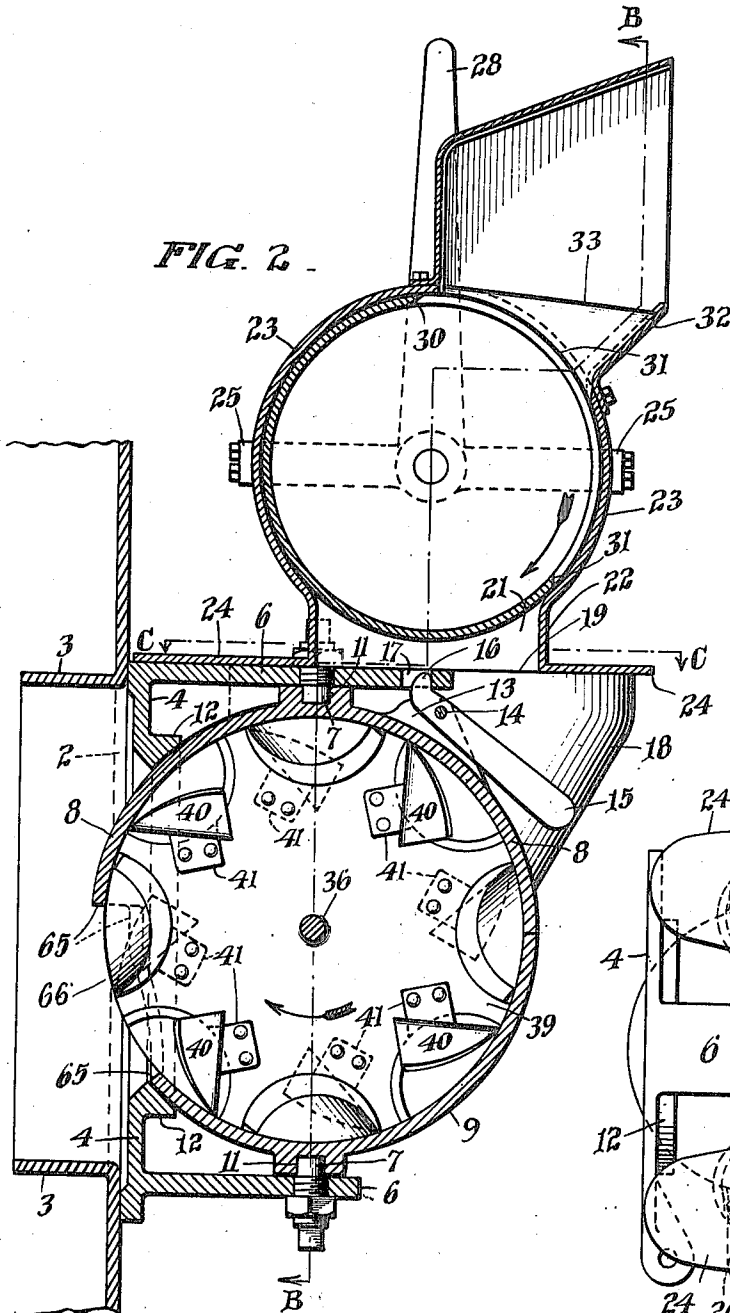
STOKER.

APPLICATION FILED MAY 22, 1912.

1,060,036.

Patented Apr. 29, 1913.

3 SHEETS—SHEET 2.



WITNESSES

Daniel Webster Jr.
Rebecca Whitney

INVENTOR
Harmon C. Stover
BY Cornelius L. Eber
his ATTORNEY

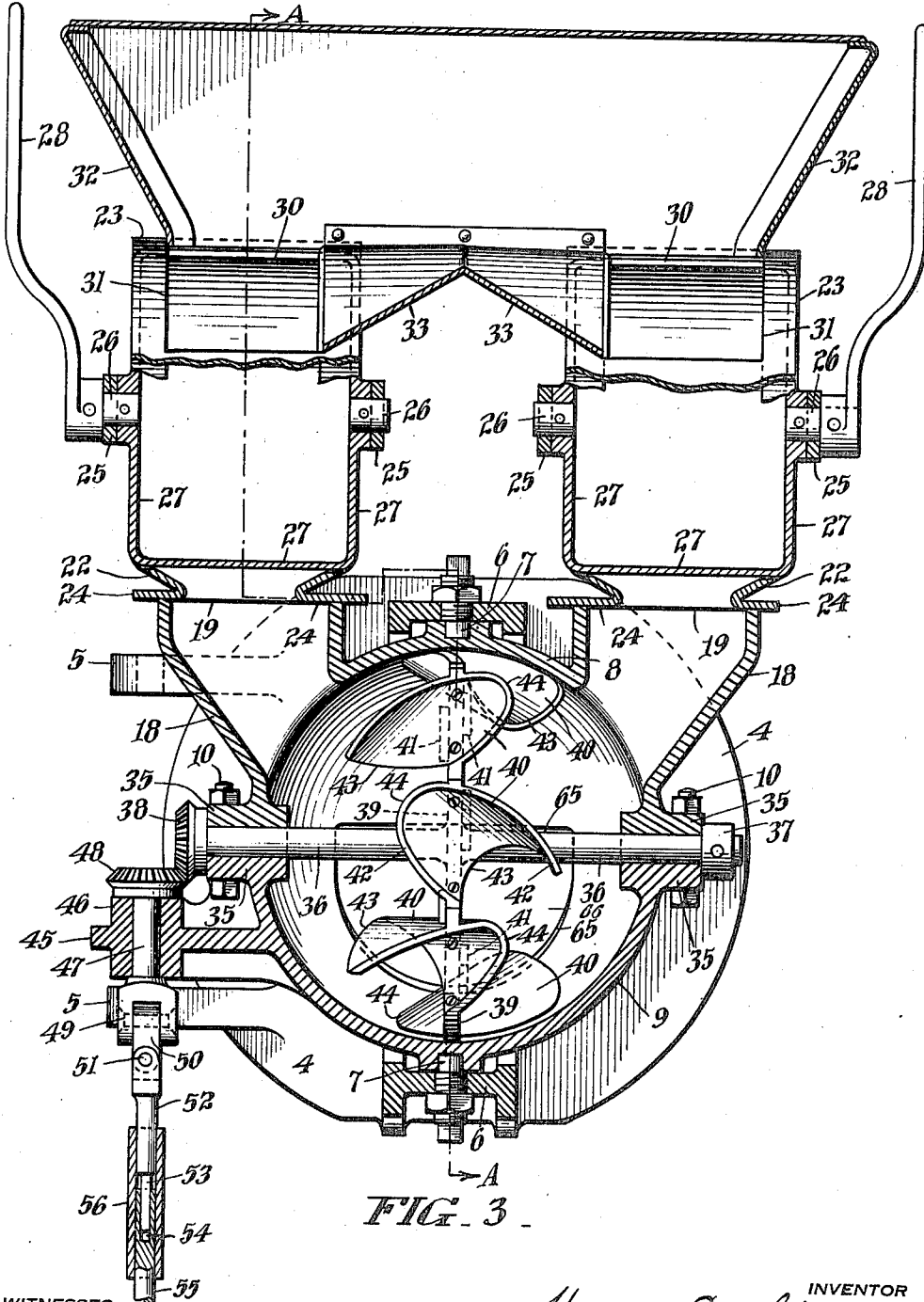
H. E. STOVER.
STOKER.

APPLICATION FILED MAY 22, 1912.

1,060,036.

Patented Apr. 29, 1913.

3 SHEETS-SHEET 3.



WITNESSES

Daniel Webster
Beatrice Whitney

BY

Harmon E. Stover
Cornelius L. Chap
his ATTORNEY

UNITED STATES PATENT OFFICE

HARMON E. STOVER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE BALDWIN LOCOMOTIVE WORKS, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

STOKER.

1,060,036.

Specification of Letters Patent.

Patented Apr. 29, 1913.

Application filed May 22, 1912. Serial No. 698,904.

To all whom it may concern:

Be it known that I, HARMON E. STOVER, a citizen of the United States, residing in the city of Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented a new and useful Stoker, of which the following is a specification.

My invention relates to mechanical stokers for use for delivering fuel, such as coal, into a furnace or fire box of a locomotive or stationary boiler or, generally, to any combustion chamber.

It is the object of my invention to provide, in a mechanical stoker, means for efficiently delivering and directing the fuel to the points required; and it is a further object of my invention to provide a mechanical stoker which, considering the amount of fuel delivered therefrom, shall be operated with low power consumption and which shall be easy of manipulation and control.

My invention resides in mechanical stoking apparatus having the features herein-after described and claimed.

For an illustration of one of the forms my invention may take reference is to be had to the accompanying drawings, in which:

Figure 1 is a side elevational view, partly in section, of one form of my stoking apparatus in operative position with respect to a fire box. Fig. 2 is a vertical sectional view, parts in elevation, to larger scale, taken on the line A—A of Fig. 3. Fig. 3 is a vertical sectional view, parts in elevation, taken on the line B—B Fig. 2. Fig. 4 is a horizontal section on the line C—C of Fig. 2, the parts below being shown in plan view. Fig. 5 is a side elevation of a modified form of fuel supplying apparatus such as may be used when the fuel is supplied by a conveyor or the like.

Referring to the drawings, the front face or wall 1 of the fire box of a locomotive boiler, or of any other fire box, furnace, or combustion chamber, is provided with the fire door 2 having the flange 3 extending around its periphery and extending toward the combustion chamber. The fire door frame 4 is hinged to the face or wall plate 1 at 5, and is therefore adapted to be swung, like an ordinary door upon these hinges to and away from the fire door opening 2. This door frame 4 carries the stoker proper

which may accordingly be swung away from the position shown in Figs. 1 and 2 upon the aforementioned hinges. Integral with or secured to the door frame 4 are the top and bottom brackets 6 each carrying a pivot pin 7, these pivots being in vertical axial alignment. The stoker casing is substantially spherical in shape though other shapes are within my invention, and comprises the upper and lower sections 8 and 9, respectively, held together by bolts 10. Each of the parts 8 and 9 has a socket 11 adapted to receive a pivot 7, upon which the parts 8 and 9, as a unit, are adapted to move or rotate about a vertical axis passing through said pivots 7. The door frame 4 has an outwardly projecting flange 12 surrounding a circular opening into which the stoker casing is adapted to partially enter. Upon a lug 13 upon the upper member 8 there is pivoted at 14 a hand lever 15 having a nose 16 adapted to enter into any one of a plurality of openings 17 in the upper bracket 6. By lifting the handle 15 the nose 16 is withdrawn from a hole 17 and then the casing 8, 9 may be rotated upon the pivots 7 through a desirable angle and locked in position by releasing the handle 15 and allowing the nose 16 to enter the adjacent opening 17.

The upper member 8 is provided with chutes or passages 18 communicating with the interior of the stoker casing and open at their upper ends 19. The upper opening 19 of each chute 18 has a contour indicated by the lines 20, Fig. 4, so that in every position to which the casing 8, 9 is rotated upon pivots 7 the opening 19 will register with the opening 21 of the throat 22 of the horizontal cylindrical casing 23 secured independently of the casing 8, 9 upon the door frame 4, or any other suitable support. The lower end of the member 22 has a horizontal flange or plate 24 of such shape and size that in every position to which the casing 8, 9 is rotated upon pivots 7 it will cover the opening 19 in the chute 18. Secured to the casing 23 and extending horizontally around the same in the form of a girdle or yoke is the member 25, extending across the open ends of the casing 23. At each open end of the casing 23 the yoke 25 forms a bearing for a short shaft 26 upon which is secured the cylindrical cage or trap member 27, dis-

posed within the casing 23. To one of the short shafts 26 is secured a handle 28 for which a stop 29 is provided on the yoke 25. The end walls of the cylinder 27 form closing end walls for the casing 23. The cylindrical wall of the member 27 is open from the points 30 to 31, Fig. 2, and, in the position shown, the opening so formed registers with the outlet opening 31 in the bottom of the hopper 32 provided with sloping bottom members 33 inclined toward the openings 31.

Where fuel, such as coal, is to be delivered manually to the hopper 32, the hopper may be open at the side as indicated in Figs. 1, 2 and 3. However, the hopper 32 may be open at the top, as indicated in Fig. 5 particularly when the fuel is to be delivered thereto as by a conveyer 34.

When the handle 28 rotates in a clockwise direction, or in the direction of the arrow in Fig. 2, the cylinder member 27 is rotated until the edge 30 entirely closes off the passage 31 and the edge 32 uncovers the passage 21.

The casing members 8 and 9 are provided with the bearing enlargements 35 fitting each other in a horizontal plane, as seen in Fig. 1, and forming bearings for the shaft 36 extending through the spherical chamber within the casing 8, 9. The shaft 36 has secured thereto at its right end, Fig. 3, a collar 37, and at its other end a beveled gear 38. This collar and the gear prevent end play of the shaft 37, or allow only a relatively small end play. Secured upon or integral with the shaft 36 and disposed within the spherical chamber is the disk 39 carrying at its periphery a plurality of scoops or buckets 40 each scoop being provided with a lug 41 extending along the face of the disk 39 and secured thereto by rivets, bolts, or otherwise. And each of these concave scoops is set into a suitably formed depression or socket in the periphery of the disk 39, and the outer edge 42 of each scoop conforms in shape with the inner spherical wall of the casing 8, 9. The disk 39 divides this spherical chamber into two compartments with each of which communicates one of the chutes 18. Preferably, alternate scoops have their receiving ends 43 opening into one compartment and their opposite ends 44 extending into the other compartment. The scoops extend across the disk 39 and are inclined toward the inner spherical wall of the casing 8, 9 so that the points 44 come quite close, as by a loose running fit, with that inner wall, preventing the passage of any substantial amount of fuel from one compartment to the other through the scoops.

The casing member 9 carries a bracket 45 having a bearing 46 for the short shaft 47 to which is secured the beveled gear 48 meshing with the gear 38. The shaft 47 is pivoted at 49 to the member 50 which is in

turn pivoted at 51, at right angles to the pivot 49, to the shaft 52 having the square shank 53 engaging in the square socket 54 in the end of the shaft 55.

56 is a sleeve extending over the longitudinally sliding coupling 53, 54. The shaft 55 is pivoted at 57 to the member 58 which is in turn pivoted at 59, at right angles to the pivot 57, to the shaft 60, extending through the deck 61 of the locomotive, by way of example. The shaft 60 has secured thereto the bevel gear 62 meshing with the bevel gear 63 secured upon the shaft 64 of the motor M, which may be any suitable type of motor, such, for example, as a rotary steam engine, here shown, for example, as supported below the floor or deck 61.

In the casing 8, 9 is provided an opening 65 past which the scoops 40 are rotated, in the direction of the arrow, Fig. 2. The opening 66 has its major extent below the shaft 36, and its upper edge 65 is substantially horizontal. It is to be understood, however, that my invention is not limited in this respect, for it is within the scope of my invention to employ an opening of different shape and differently positioned.

The operation is as follows: The motor M drives the shaft 36 through the intermediate gearing described, comprised in part by the shafting which will allow movement of the gear 48 out of alinement with the shaft 60. The shaft 36 drives the disk and the attached scoops in the direction of the arrow indicated in Fig. 2. There being a supply of coal in the hopper 32, coal may be fed into either compartment or both compartments of the casing 8, 9 by actuating either or both handles 28. When a handle 28 is rotated, as hereinbefore described, coal is admitted from hopper 32 through passage 31 into the cylindrical member 27, which when rotated, as described, discharges the coal within it into the chute 18, simultaneously closing the bottom of the hopper 32. Upon restoration of the handle 28 to the position shown the member 27 will receive a new charge of fuel. The coal or fuel delivered through chute 18 into a compartment in the spherical casing 8, 9, is picked up by the scoops whose open ends 43 project into that compartment, and the fuel is carried around at high speed until the opening 65 is reached when it leaves the scoop at high speed and passes through the door frame 4 and through the fire box opening 2 into the fire box or combustion chamber, the delivery of fuel being from substantially the entire length of the scoop from its rear edge 43 to its tip 44. With the casing locked in the position shown in Fig. 4, that is with the lever 15 in central position engaging in the central slot or aperture 17, the fuel is thrown or delivered longitudinally of the fire box or combustion chamber spreading more or

less to one or either side of the longitudinal axis thereof and distributing from the front to the far end of the combustion chamber. To direct the delivery of fuel transversely of the fire box to either side thereof, the fireman will lift the lever 15, withdrawing the nose 16 from the hole 17, leaving the casing 8, 9 free to be oscillated about a vertical axis on the pivots 7, 7 directing the opening 65 to one side or the other of the fire box, the movement being secured by moving the lever 15 to one side or the other. The delivery extends then from side to side of the fire box and from near end to the remote end, giving substantially uniform distribution throughout the entire combustion chamber. Of course coal or fuel admitted to the other compartment of the casing 8, 9 is similarly distributed and when coal is admitted to both compartments simultaneously the two sets of scoops distribute the fuel in crossed streams quite uniformly throughout the fire box. The casing 8, 9 may be returned to central position indicated in Fig. 4, or may be locked in any other position by engagement of nose 16 in the adjacent aperture 17. During this operation or partial rotation of the casing 8, 9 the shaft 36 and the disk 39 and scoops 40 continue revolving at high speed and move with the casing 8, 9. And the connection with the motor M is maintained because of the shafting and gearing hereinbefore described allowing the gear 48 to move out of alinement with the shaft 60 while continuing to drive the gear 38 secured upon the shaft 36. And irrespective of what position the casing 8, 9 may be oscillated or rotated to, the passages 21 maintain communication with the chutes 18, the chutes 18 moving with the casing 8, 9 while the casings 23, members 22 and plates 24 remain stationary. While I have herein shown the casing 8, 9 as spherical in shape, especially with respect to the interior thereof, it is to be understood that the chamber need not be completely spherical as shown, but may be more or less flattened or otherwise shaped, particularly at the ends of the diameter corresponding with the shaft axis. And it is to be further understood that my invention is not limited to a spherically shaped chamber or casing, except where so pointed out in the claims.

What I claim is:

1. In a stoker, a casing forming a hollow chamber, fuel propelling means rotatable within said chamber, a shaft in fixed relation with respect to said casing for driving said fuel propelling means, and means for shifting said casing about a vertical axis for varying the plane of rotation of said fuel propelling means.

2. The combination with a casing forming a chamber, of fuel propelling means

rotatable within said casing in fixed relation thereto, a fixed motor, means for shifting said casing and said fuel propelling means together to change the plane of rotation of said fuel propelling means, means maintaining power connection between said motor and said fuel propelling means, and a deck between said motor and said casing.

3. The combination with a casing forming a chamber, of fuel propelling means rotatable in said chamber, a chute on said chamber for delivering fuel into said chamber, said chute and chamber being movable to change the plane of rotation of said fuel propelling means, stationary means for delivering fuel into said chute, and means for maintaining register between said chute and said last named means.

4. The combination with a supporting member, of a casing provided thereon on a vertical axis, fuel propelling means within and movable with said casing rotatable upon a horizontal axis, said supporting member and casing having apertures remaining in register for the different positions of said casing.

5. The combination with a fire door having an aperture, of a casing having an aperture registering with said fire door aperture, fuel propelling means rotatable within said casing, and means for shifting said casing upon said fire door to change the plane of rotation of said fuel propelling means.

6. The combination with a fire door having an aperture, of a casing pivoted on said fire door and having an aperture registering with said fire door aperture, and fuel propelling means rotatable within said casing, said casing being movable on its pivotal axis for varying the plane of rotation of said fuel propelling means.

7. The combination with a fire door swingable upon a vertical axis, of a casing pivoted on another vertical axis on said fire door, said door and casing having registering apertures, and fuel propelling means movable with and rotatable within said casing about a horizontal axis.

8. The combination with a fire door, of a spherical casing pivoted upon said fire door and partially embraced thereby, said casing having an aperture registering with an aperture in said fire door, and rotatable fuel propelling means within said casing, said casing movable about its pivotal axis for changing the plane of rotation of said propelling means.

9. The combination with a fire door, of a casing pivoted thereon, rotatable fuel propelling means within said casing and movable therewith to change the plane of rotation of said propelling means, and means for locking said casing in different positions with respect to said fire door.

10. The combination with a casing pivoted on a vertical axis, of fuel propelling means within said casing rotatable on a horizontal axis, and means for shifting said casing about its axis to change the plane of rotation of said fuel propelling means.

11. The combination with a casing pivoted upon a vertical axis, of rotatable fuel propelling means within said casing dividing said casing into lateral compartments, a fuel chute for each of said compartments on and movable with said casing delivering into each compartment, stationary fuel supplying means for each chute, and means for maintaining register between said chute and said fuel supplying means for different positions of said casing upon its pivotal axis.

12. The combination with a casing pivoted upon a vertical axis, of rotatable fuel propelling means within said casing dividing said casing into lateral compartments, a fuel chute on and movable with said casing delivering into each compartment, stationary fuel supplying means for each chute, and means for maintaining register between said chute and said fuel supplying means for different positions of said casing upon its pivotal axis, said chutes being disposed at opposite sides of said pivotal axis of said casing.

13. The combination with a fire door, of horizontally extending brackets on said fire door, one disposed above the other, a vertical pivot for said fire door, a casing supported by vertical pivots in said brackets for movement with respect to said door, said fire door and casing pivots having different axes and fuel propelling means within and movable with said casing.

14. The combination with a pivotal casing, of rotatable fuel propelling means within said casing, a shaft driving said means, a bevel gear on said shaft outside of said casing, a bracket on said casing, a gear meshing with said first named gear rotatable on said bracket, and means for driving said last named gear.

15. The combination with a pivotal casing, of rotatable fuel propelling means within said casing, a shaft driving said means, a bevel gear on said shaft outside of said casing, a bracket on said casing, a gear meshing with said first named gear rotatable on said bracket, a stationary motor for driving said last named gear, and means for maintaining power connection between said

motor and said last named gear while said casing moves about its pivotal axis.

16. A stoker comprising a casing movable on a pivotal axis, and fuel propelling means in said casing rotatable about an axis at right angles to said pivotal axis, said casing and said propelling means movable together to change the plane of rotation of said propelling means.

17. A stoker comprising a casing movable on a pivotal axis, fuel propelling means in said casing movable with said casing and rotatable about an axis at right angles to said pivotal axis, and a supporting member for said casing movable on a pivotal axis parallel to the pivotal axis of said casing.

18. In a stoker, the combination with a pivoted casing, of a member rotatable therein in fixed position with respect to said casing and having a circular periphery extending to the inner wall of said casing, and a plurality of buckets or scoops set in the periphery of said member and transverse thereto.

19. The combination with a door frame having an aperture, a flange thereon surrounding said aperture and having a substantially spherically shaped seat, a spherical casing pivoted on said door frame and projecting into said aperture and close to said seat, said casing having an aperture registering with said first named aperture, and fuel propelling means rotatable within said casing in fixed relation with respect thereto, whereby said casing may be moved upon its pivot with respect to said flange to direct fuel through said apertures in different directions.

20. In a stoker, the combination with a pivoted casing, of a member rotatable within said casing in fixed relation thereto and a plurality of buckets or scoops carried by said member at the periphery thereof and each of them extending from one side of said member across said member to the other side thereof, whereby fuel is delivered from both sides of said member and directed by movement of said pivoted casing.

In testimony whereof I have hereunto affixed my signature in the presence of the two subscribing witnesses.

HARMON E. STOVER.

Witnesses:

ELEANOR T. McCALL,
BEATRICE WHITNEY.