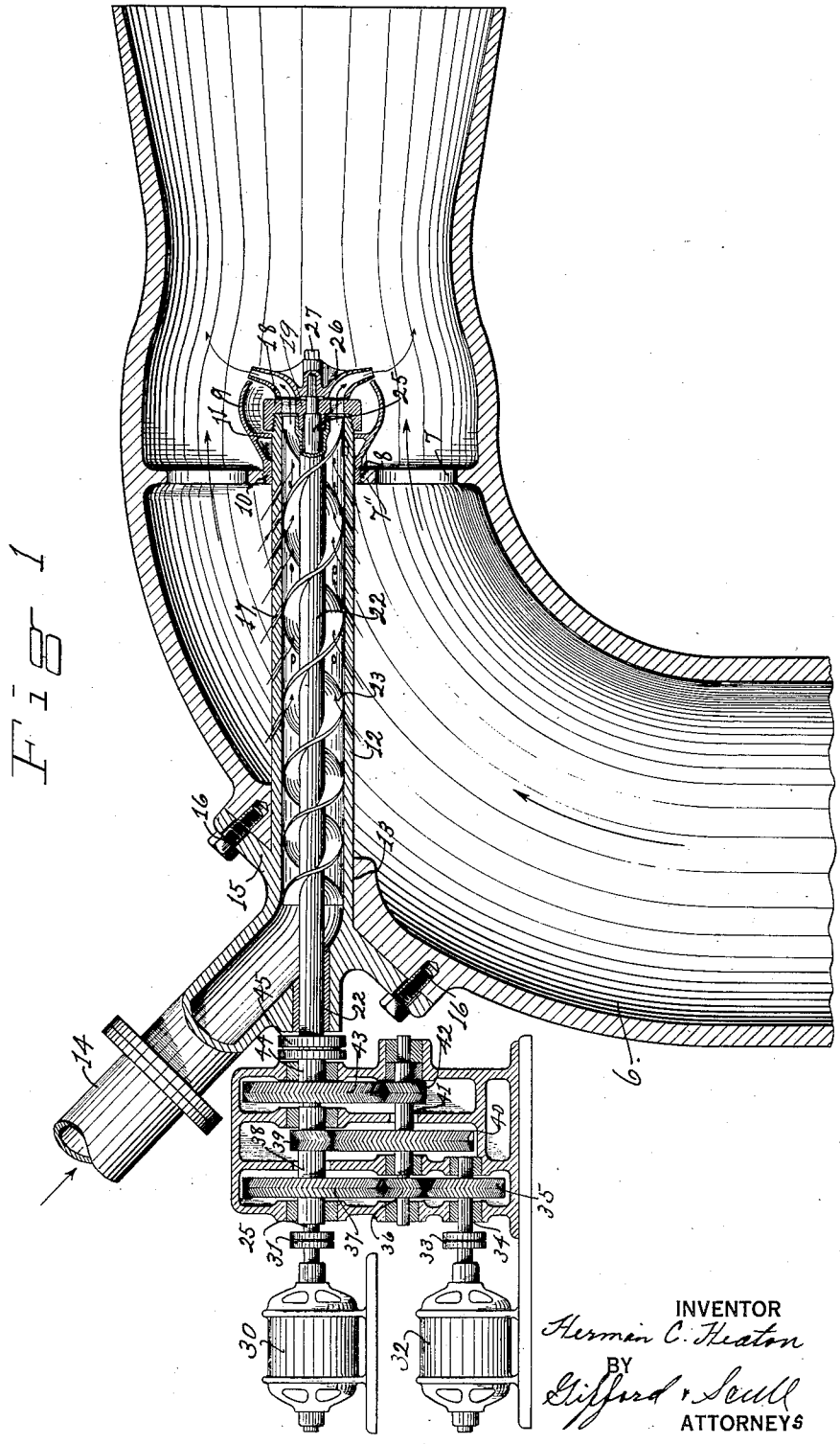
Dec. 27, 1932. H. C. HEATON 1,892,053

POWDERED FUEL BURNER

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Fig 1



INVENTOR
Herman C. Heaton
BY
Gifford & Scull
ATTORNEYS

Dec. 27, 1932. H. C. HEATON 1,892,053

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Fig. 3

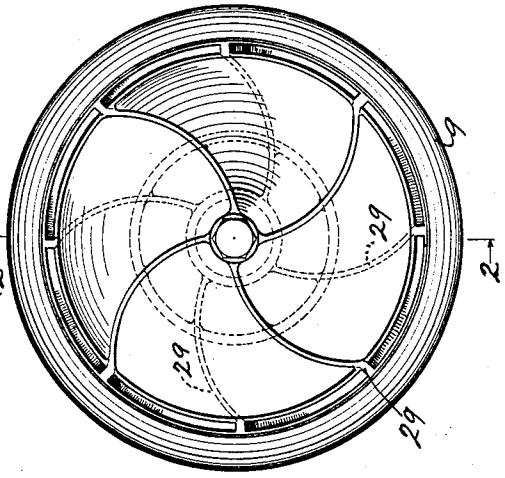


Fig. 6

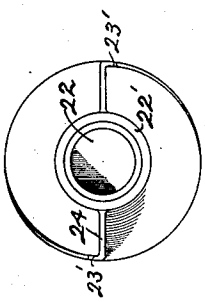


Fig. 2

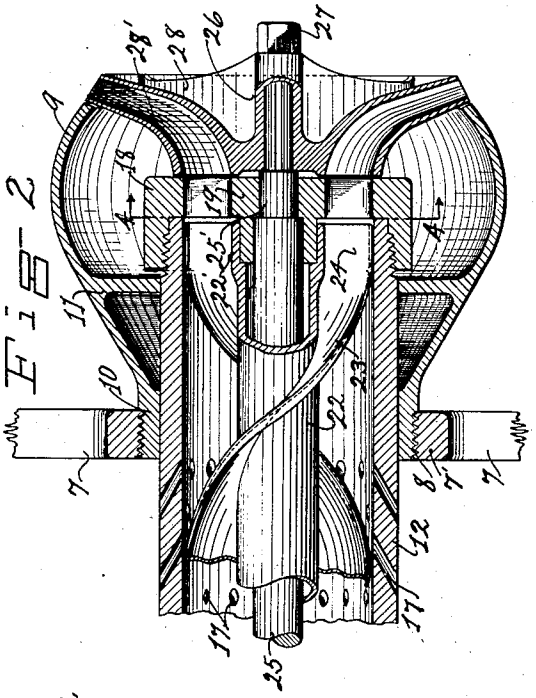


Fig. 5

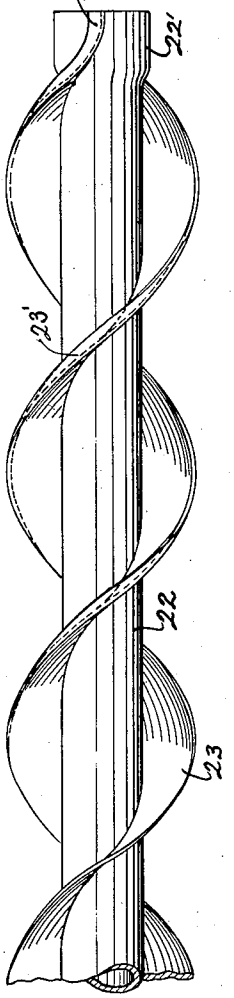
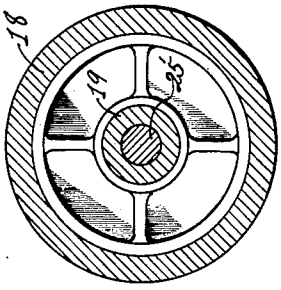


Fig. 4



Herman C. Heaton INVENTOR

BY

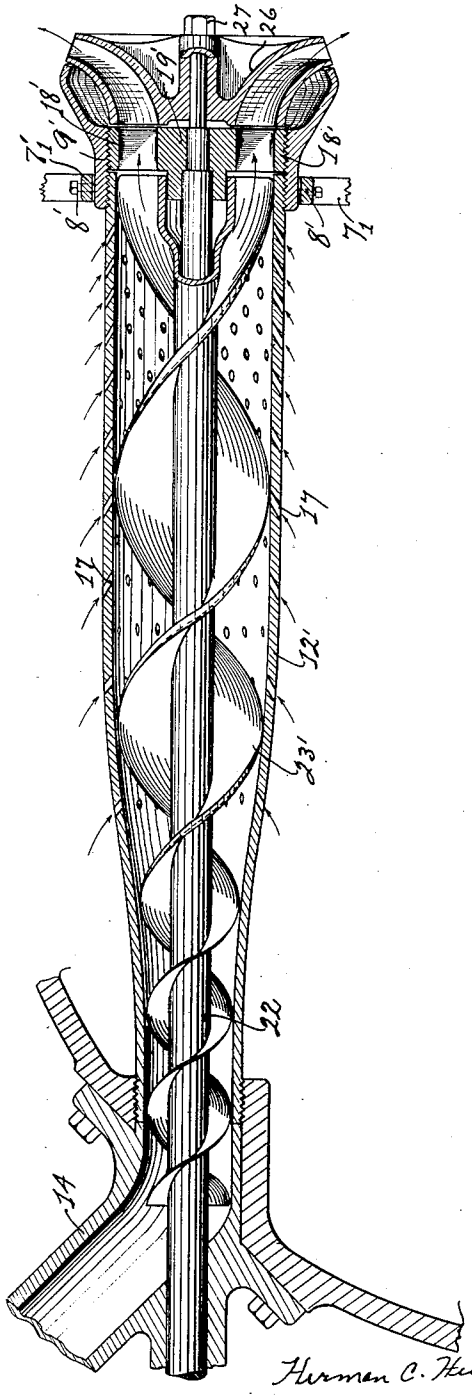
Gifford & Scull ATTORNEYS

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Fig. 7



Herman C. Heaton INVENTOR

BY

Gifford & Scull

ATTORNEYS

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UNITED STATES PATENT OFFICE

HERMAN C. HEATON, OF CHICAGO, ILLINOIS

POWDERED FUEL BURNER

Application filed February 8, 1927. Serial No. 166,644.

This invention relates to a powdered fuel burner and will be understood from the description in connection with the accompanying drawings, in which Fig. 1 is a vertical section through an illustrative embodiment of the device; Fig. 2 is a similar section on an enlarged scale partly broken away taken along the line 2—2 of Fig. 3; Fig. 3 is an end view of the structure shown in Fig. 2; Fig. 4 is a section along the line 4—4 of Fig. 2; Fig. 5 is a side elevation showing one of the details; Fig. 6 is an end view of the same, and Fig. 7 is a longitudinal section through a modification.

In the drawings reference character 6 indicates an air inlet or conduit leading from any convenient source of compressed air, the front end of the conduit extending into or being located in proximity to an opening in the furnace wall in the well known manner. The conduit is provided with a transverse spider 7 with a screw-threaded hole 8 through the central hub portion 7'. An oval-shaped housing 9 is provided with a screw-threaded extension 10 for screwing the same into the hole 8. This housing is provided with a transverse partition 11. A tubular container 12 extends through an opening 13 in the side of the air conduit, and thence through the extension 10 of the housing 9. A pipe 14 leads from a source of powdered fuel supply to the tubular container 12, and the pipe 14 is provided with a flange 15 by means of which the pipe is attached to the conduit 6 by the screws 16. The container 12 is provided with holes or perforations 17 inside the conduit 6. A threaded collar 18 is screwed upon the end of the container 12 and carries a central bearing 19.

A revoluble hollow shaft 22 extends through the container 12 and its inner end is enlarged to form a bearing member 22'. The shaft 22 carries a screw conveyor 23, the pitch of which gradually increases toward the inner end of the container 12. The ends of the conveyor flights are straight, as shown at 24. The edges of the conveyor flights are turned up, as shown at 23', to provide lifting devices for the powdered fuel to raise the same from the bottom of the container 12 for a purpose to be described below. The turned up portions 23' may extend back only a short distance from the end. A shaft 25 extends through the hollow shaft 22. Its end is reduced as shown at 25' and rests in the bearing 19 in which it revolves. An impeller 26 is splined upon the protruding reduced end of the shaft 25 and is retained in place by the nut 27, so that the impeller occupies a position in front of the inner end of the container 12. The impeller 26 comprises two approximately conically-shaped walls 28 and 28' spaced apart. The space between the walls 28 and 28' is divided into sections by means of curved partitions 29.

The shaft of a motor 30 is attached by means of the clutch 31 to the shaft 25 and drives the shaft, together with the impeller carried by it, at a high speed. A motor 32 is geared by reduction gearing to the hollow shaft 22 in the following manner: The shaft of the motor 32 is connected by means of the clutch 33 to the shaft 34 that carries a pinion 35 which meshes with an idle gear 36 which, in turn, meshes with the spur gear 37 that is mounted upon the hollow spindle shaft 38 which revolves upon the outside of the impeller shaft 25. The pinion 39 of the spindle shaft 38 meshes with the spur gear 40 on the shaft 41, and the pinion 42 on this shaft meshes with the spur gear 43 on the hollow stub shaft 44, which is connected by means of the clutch 45 to the hollow shaft 22.

The operation is as follows: The motor 30 drives the shaft 25 and the impeller 26 at a high speed, so that the centrifugal force developed at the impeller will be considerable. The motor 32 drives the hollow shaft 22 by means of the reduction gearing at a slow speed, thus causing the screw conveyor 23 to carry the powdered fuel that is introduced through the pipe 14 horizontally along the container 12, and when the fuel reaches the end of this chamber, it is picked up by means of the turned up portions 23' and the straight portions 24 of the screw conveyor and lifted and permitted to fall by gravity, whereupon the air passing from the air conduit 6 through the openings 17 and the suction caused by the impeller 26 cause the loosened

powdered fuel to pass into the spaces between the walls 28 and 28′ of the impeller 26, which causes the fuel to be projected in segregated particles into the portion of the air conduit 6 on the right hand side of the spider 7 as shown, and thence into the furnace.

In the modification shown in Fig. 7, the container 12′ increases in diameter toward the inner end, and the size of the conveyor 23′ increases correspondingly. The hub portion $7'_1$ of the spider 7_1 is connected, in this modification, to the housing 9′ by means of set screws 8′ instead of being threaded onto the housing as indicated in Fig. 2. The housing 9′, in this modification, is internally threaded and is screwed onto the externally threaded end of the casing 12′. Also, the bearing 19′ is carried by the externally threaded ring 18′ which screws into the internally threaded portion of the housing 9′. The operation is similar to that already described in connection with the other figures.

I claim:

1. In a powdered fuel burner, an air conduit, a container extending into said conduit, a conveyor in said container and an impeller at the end of said container, said impeller having diverging openings therethrough which communicate directly with the end of said container.

2. In a powdered fuel burner, an air conduit, a container extending into said conduit, a conveyor in said container comprising a screw of increasing pitch, and an impeller at the end of said container, said impeller having diverging openings therethrough which communicate directly with the end of said container.

3. In a powdered fuel burner, an air conduit, a container extending into said conduit, a conveyor in said container, said container being provided with openings for admitting air through the side of said container, and an impeller at the end of said container, said impeller having diverging openings therethrough which communicate directly with the end of said container.

4. In a powdered fuel burner, an air conduit, a container extending into said conduit, a conveyor in said container, said conveyor comprising means for lifting the fuel near the end of said container, and an impeller at the end of said container, said impeller having diverging openings therethrough which communicate directly with the end of said container.

5. In a powdered fuel burner, an air conduit, a container extending into said conduit, a conveyor in said container, and means for projecting said fuel from approximately the entire cross sectional area of the end of said container into said conduit, said means comprising an impeller having diverging openings therethrough which communicate directly with the end of said container.

6. In a powdered fuel burner, an air conduit, a container extending into said conduit, a conveyor in said container, and means for projecting said fuel from said container into said conduit, said means comprising a centrifugal impeller, an air inlet and a fuel lifting device, said impeller having diverging openings therethrough which communicate directly with the end of said container.

7. In a powdered fuel burner, an air conduit, a container extending into said conduit, a conveyor in said container and an impeller at the end of said container, said impeller having diverging openings therethrough which communicate directly with the end of said container, and coaxial shafts for said impeller and conveyor.

8. In a powdered fuel burner, an air conduit, a container extending into said conduit, a conveyor in said container and an impeller at the end of said container, said impeller having diverging openings therethrough which communicate directly with the end of said container, and coaxial shafts for said impeller and conveyor driven at different speeds.

9. In a powdered fuel burner, an air conduit, a container extending into said conduit, a conveyor in said container and an impeller at the end of said container, said impeller having diverging openings therethrough which communicate directly with the end of said container, and coaxial shafts for said impeller and conveyor extending through said container.

10. In a powdered fuel burner, an air conduit, a container extending into said conduit, a conveyor in said container and an impeller at the end of said container, said impeller having diverging openings therethrough which communicate directly with the end of said container, and coaxial shafts for said impeller and conveyor extending through said container, said impeller shaft being inside said conveyor shaft.

11. In a powdered fuel burner, an air conduit, a container extending into said conduit, a conveyor in said container and an impeller at the end of said container, said impeller having diverging openings therethrough which communicate directly with the end of said container, the walls of said container being provided with openings sloping toward said impeller.

12. In a powdered fuel burner, an air conduit, a container extending into said conduit with openings through the walls thereof, a conveyor in said container and an impeller at the end of said container, said impeller having diverging openings therethrough which communicate directly with the end of said container.

HERMAN C. HEATON.