

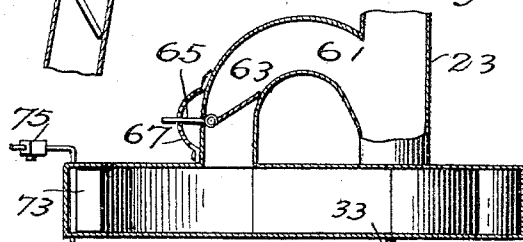
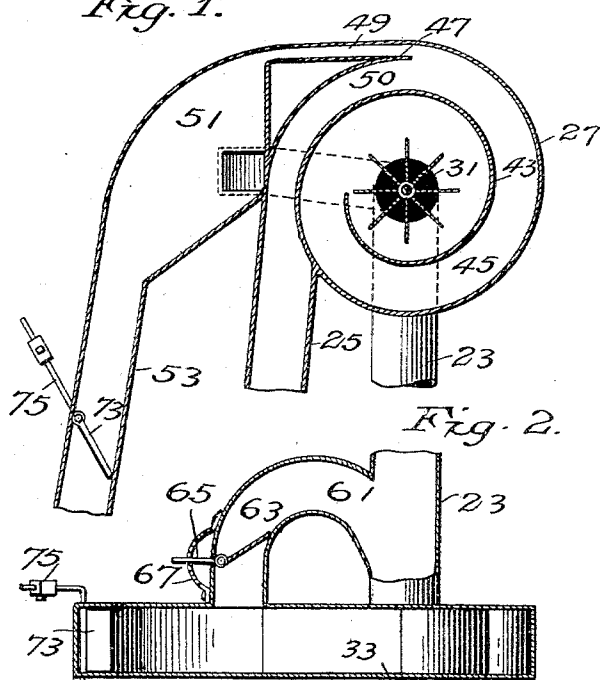
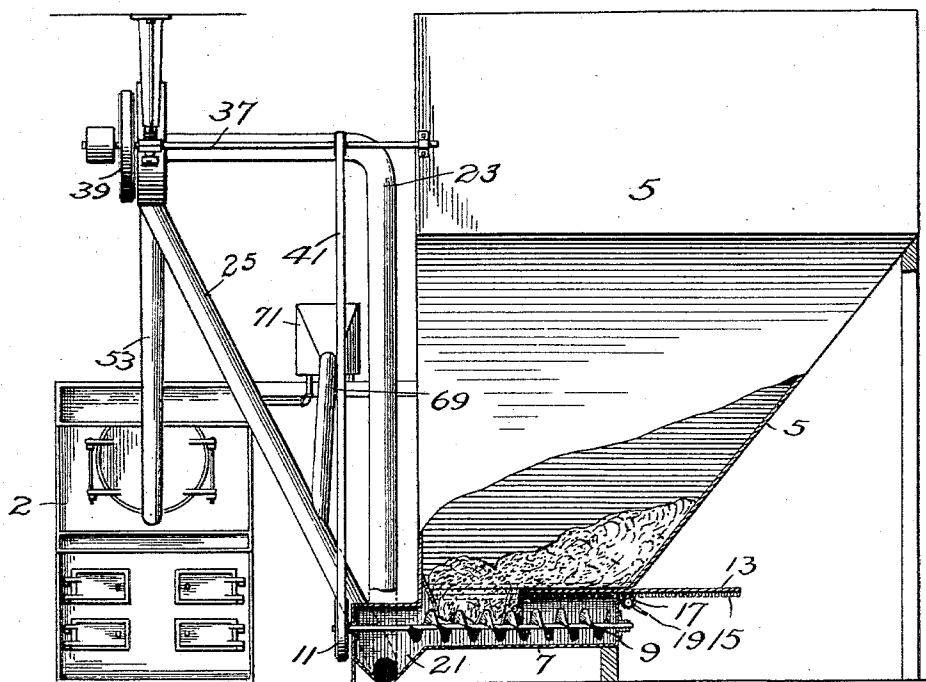
(No Model.)

2 Sheets—Sheet 1.

H. L. DAY.
FUEL FEEDER.

No. 603,077.

Patented Apr. 26, 1898.



Witnesses:

C. E. Van Doren.

W. E. Cooley

Fig. 3.

Inventor:

Henry L. Day.

By (

Paul Hamling
his attorneys.

(No Model.)

2 Sheets—Sheet 2.

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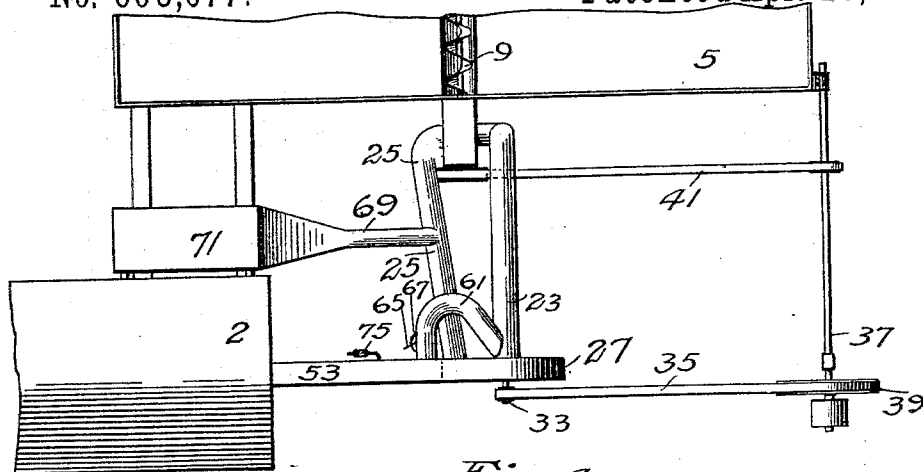


Fig. 4.

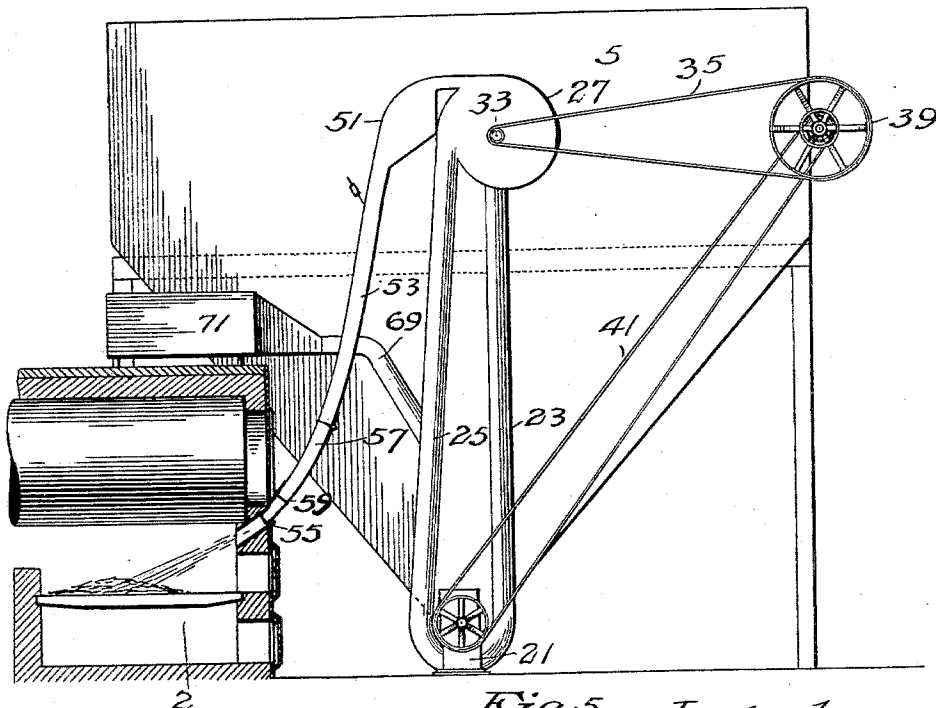


Fig. 5. Inventor:

Henry L. Day

By Paul & Hawley
his attorneys.

Witnesses:

C. E. Van Dusen

W. C. Cooley

UNITED STATES PATENT OFFICE.

HENRY L. DAY, OF MINNEAPOLIS, MINNESOTA.

FUEL-FEEDER.

SPECIFICATION forming part of Letters Patent No. 603,077, dated April 26, 1898.

Application filed September 21, 1897. Serial No. 652,408. (No model.)

To all whom it may concern:

Be it known that I, HENRY L. DAY, of the city of Minneapolis, county of Hennepin, State of Minnesota, have invented certain new and useful Improvements in Fuel-Feeders, of which the following is a specification.

This invention relates to improvements in a device designed for automatically delivering fuel to furnaces; and the object I have in view is to provide a simple and economical device which may be used for feeding shavings, fine coal, dust, or other light or fine material to furnaces.

The invention consists generally in means for producing an air-belt or continuous air-current, with means for supplying the fuel to the current at some convenient point, and means for separating the fuel from the current and delivering it to the furnace, whereby if any of the fine material is not separated from the air-current it is carried around again by the current to the point where the fuel is supplied and then to the point where the fuel is separated from the current. Thus none of the dust or light material is permitted to escape into the atmosphere or into the room where the apparatus is located.

The invention consists, further, in the constructions and combinations hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, forming a part of this specification, Figure 1 is a front elevation of an apparatus embodying my invention, showing the arrangement in connection with a suitable furnace. Figs. 2 and 3 are detail sections of the means for creating the continuous air-current and separating the fuel therefrom. Fig. 4 is a plan view of the apparatus shown in Fig. 1. Fig. 5 is a side elevation of the same, the front end of the furnace being shown in section.

In the drawings, 2 represents a portion of a suitable furnace which may be of any ordinary or preferred construction and into which the fuel is to be fed.

5 represents a suitable reservoir or hopper, also of any preferred size, shape, or construction, and into which the fuel is placed and from which it is fed, preferably by gravity. Arranged below the hopper is a conveyer-

trough 7. This is preferably of ordinary spiral form, the shaft of which extends through the end of the conveyer-trough and is provided with a suitable belt-pulley 11, to which power may be applied for turning the conveyer. The bottom of the hopper 5 is preferably formed with a gate or slide-bottom 13. This bottom may be provided upon its under surface with a series of teeth 15, engaging a pinion 17, which is adapted to be operated by a suitable handle 19. By this means the slide may be opened or closed to a greater or less extent for the purpose of regulating the passage of the fuel from the hopper into the conveyer-trough. The end of the conveyer-trough is preferably provided with a depression or pocket 21, and air pipes or conductors 23 and 25 are connected to the opposite sides of this pocket. The pipes 23 and 25 extend to a suitable fan or blower case 27, the pipe 23 connecting with the eye or center of the case and the pipe 25 being connected to the exit part of the case. Arranged within the case 27 is a suitable fan 31, having its shaft 33 extending through the wall of the casing and provided with a suitable pulley, to which a belt 35 is connected. This belt extends to a counter-shaft 37, engaging a pulley 39 thereon, and from the shaft 37 a belt 41 also extends to the pulley 11 of the conveyer herebefore referred to. Power may be applied to the shaft 37 through any suitable means.

The fan-case 27 is provided with the spirally-arranged wall 43, as shown in Fig. 2. This wall forms a spiral duct 45, leading from the center portion of the fan-casing and having an unbroken peripheral surface. The duct 45, after extending substantially around the inner portion of the fan-casing, is divided into two parts by the division-wall 47. These two parts I designate as the "outer" duct 49 and the "inner" duct 50. The outer duct 49 leads into an expansion-chamber 51, which connects with a pipe 53, that extends into an opening 55 in the wall of the furnace. The lower end of this pipe is preferably provided with the two oppositely-hinged sections 57 and 59, (see Fig. 5,) and the jointed portions of the pipe permit of its lower end being inserted into the opening 55 or withdrawn therefrom. A return-pipe 61 leads out of the expansion-chamber 51 back to the eye of the

fan-casing, as shown in detail in Fig. 3. An adjustable valve 63 is arranged in the return-pipe 61 and is provided with a handle 65, extending outside of the pipe and adapted to engage a notched segment 67, by means of which it may be held in any desired position. This valve may be closed or it may be set open or partially open, so as to permit a greater or less amount of air from the expansion-chamber 51 to be drawn back into the fan-case.

The air-current passing through the pipe 23 into the eye of the fan-casing will carry with it the fine fuel that has before entered the current from the hopper 5. The air and the fine material mingled with it will be driven through the spiral duct 45, and the solid particles and material will, by centrifugal force, be driven against the peripheral wall of the duct and will travel along this wall and will be taken out by the separating-plate 47 and directed through the duct 49 into the expansion-chamber 51. The principal portion of the air-current will pass through the duct 50 into the pipe 25, and from this pipe again into the pipe 23, after taking up a further supply of material from the pocket 21. As the air from the fan-casing and the material mingled with it pass into the expansion-chamber 21 the air will be considerably expanded and the fine fuel or material will drop directly into the pipe 53, and by having the valve 63 partially open a considerable portion of the air will pass back into the fan-case through the pipe 61. It will be understood that while the air-current through the pipes 23 and 25 is a continuous one some portion of the air will pass from the expansion-chamber 51 through the pipe 53 into the furnace, and it is therefore necessary to supply a corresponding amount of air to take its place. This is accomplished by means of a pipe 69, that is connected to the pipe 25, as shown in Figs. 1, 4, and 5. This pipe preferably is connected to a heater 71, so that the air passing into the pipe 25 through the pipe 69 will be previously heated. By this means heated air will be supplied to the furnace through the pipe 53.

I may arrange an automatic valve or damper 73 in the pipe 53, as shown in Fig. 2. This valve is provided outside of the pipe with a weighted arm 75, which tends to hold it in a closed position. As the air and fine fuel carried thereby enter the expansion-chamber 51 the fine fuel will be precipitated, as above explained, and will drop into the lower part of the expansion-chamber and the upper part of the pipe 53. The force of the air-current and the weight of the material passing into the pipe 53 will open the damper 73 and the material will pass below said valve and enter the furnace. The valve or damper 73 serves as a safety device in the pipe and prevents any material there may be in the pipe from getting on fire should the air-current be shut off and the lower end of

the pipe 53 not be removed from the opening in the furnace-wall.

When the device is not in use, the lower end of the pipe 53 will preferably be removed from the opening in the wall in the furnace, the hinged sections permitting such movement of the pipe.

While I have shown the pocket 21, to which the pipes or conductors 23 and 25 are both connected, it will be readily understood that this pocket may be omitted, and the pipes 23 and 25 are joined together or formed as one continuous pipe, in which case provision may be made for feeding the material directly into the pipe.

I do not limit myself to the details of the construction of the device herein shown and described, as obviously the same may be varied in many particulars without departing from my invention.

I claim as my invention—

1. Means for feeding fuel to furnaces, comprising, in combination, a suitable fan or blower, air-conductors connected to the inlet and outlet of the casing of said fan or blower and communicating with each other, means for directing fuel into said air-conductors, means located in said fan-casing for separating the fuel from the air-current, and means for directing said fuel into a suitable furnace, for the purpose set forth.

2. Means for feeding fuel to furnaces, comprising, in combination, a suitable fan or blower, a fan-casing provided with a spiral duct leading from its central portion and having an unbroken peripheral surface, a suitable wall dividing said duct into an outer and an inner part, a pipe or conductor connected to the inner part of said duct and communicating with a pipe or conductor leading to the inlet of the fan-casing, means for feeding fuel into said conductors and means for directing the fuel from the outer part of said duct into a suitable furnace.

3. Means for feeding fuel to furnaces, comprising, in combination, a suitable fan or blower, a fan-casing provided with a spiral wall 43 forming a spiral duct 45 having an unbroken peripheral surface divided by the wall 47 into an inner duct 50 and an outer duct 49, an air-conductor 25 connected to the duct 50, an air-conductor 23 with which the conductor 25 communicates, said conductor 23 leading into the inlet of the fan-casing, a pipe 53 connected to the outer duct 49 and arranged to conduct material received therefrom into a suitable furnace, and means for feeding fuel into the conductor 23, for the purpose set forth.

4. Means for feeding fuel to furnaces, comprising, in combination, a suitable fan or blower, a fan-casing provided with a spiral wall 43 forming a spiral duct 45, the transverse wall 47 dividing said duct into inner and outer ducts 50 and 49, the fuel hopper and pocket 21, the air-conductor 25 leading from the duct 50 to said pocket, the air-con-

ductor 23 leading from said pocket to the inlet of the fan-casing, the expansion-chamber 51 with which the duct 49 communicates, and a pipe leading from said expansion-chamber 5 to a suitable furnace.

5 5. Means for feeding fuel to furnaces, comprising, in combination, a suitable fan or blower, a fan-casing provided with a spiral duct leading from its central portion and having an unbroken peripheral surface, a suitable wall dividing the said duct into an outer and inner part, an air-conductor connected to the inner part of said duct and communicating with another conductor that leads to

the inlet of the fan-casing, means for feeding 15 fuel into said conductors, an expansion-chamber with which said outer duct communicates, a return-pipe from said expansion-chamber to the inlet of the fan-casing, and a pipe leading from said expansion-chamber into a suitable furnace. 20

In testimony whereof I have hereunto set my hand this 29th day of April, A. D. 1897.

HENRY L. DAY.

In presence of—

A. C. PAUL,
M. E. GOOLEY.