

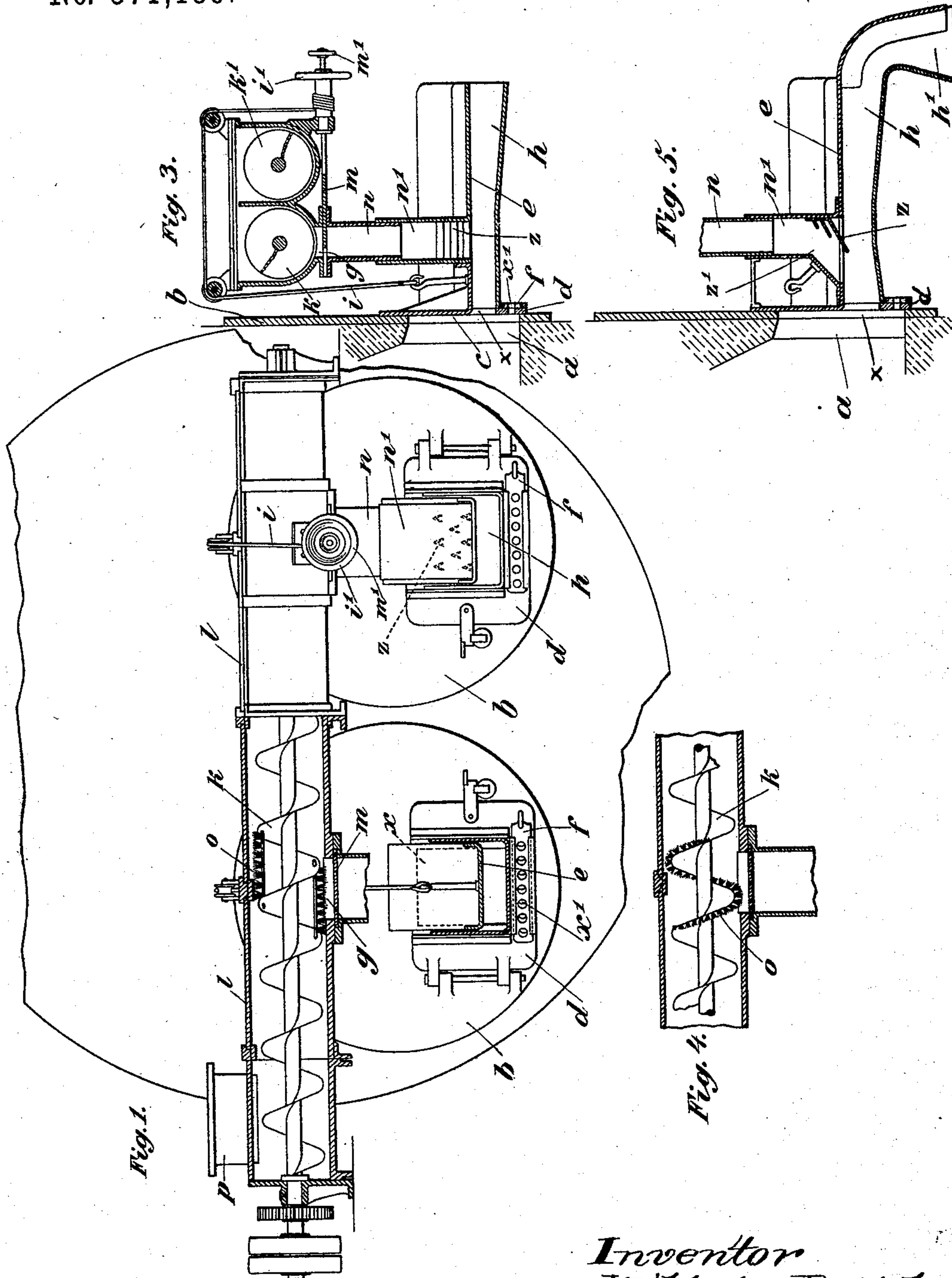
(No Model.)

2 Sheets—Sheet 1.

W. RUHL.  
FUEL FEEDER FOR FURNACES.

No. 571,139.

Patented Nov. 10, 1896.



Witnesses  
J. S. Williamson  
Harry Holgate

Inventor  
Wilhelm Ruhl  
By Geo. H. Holgate

Atty.

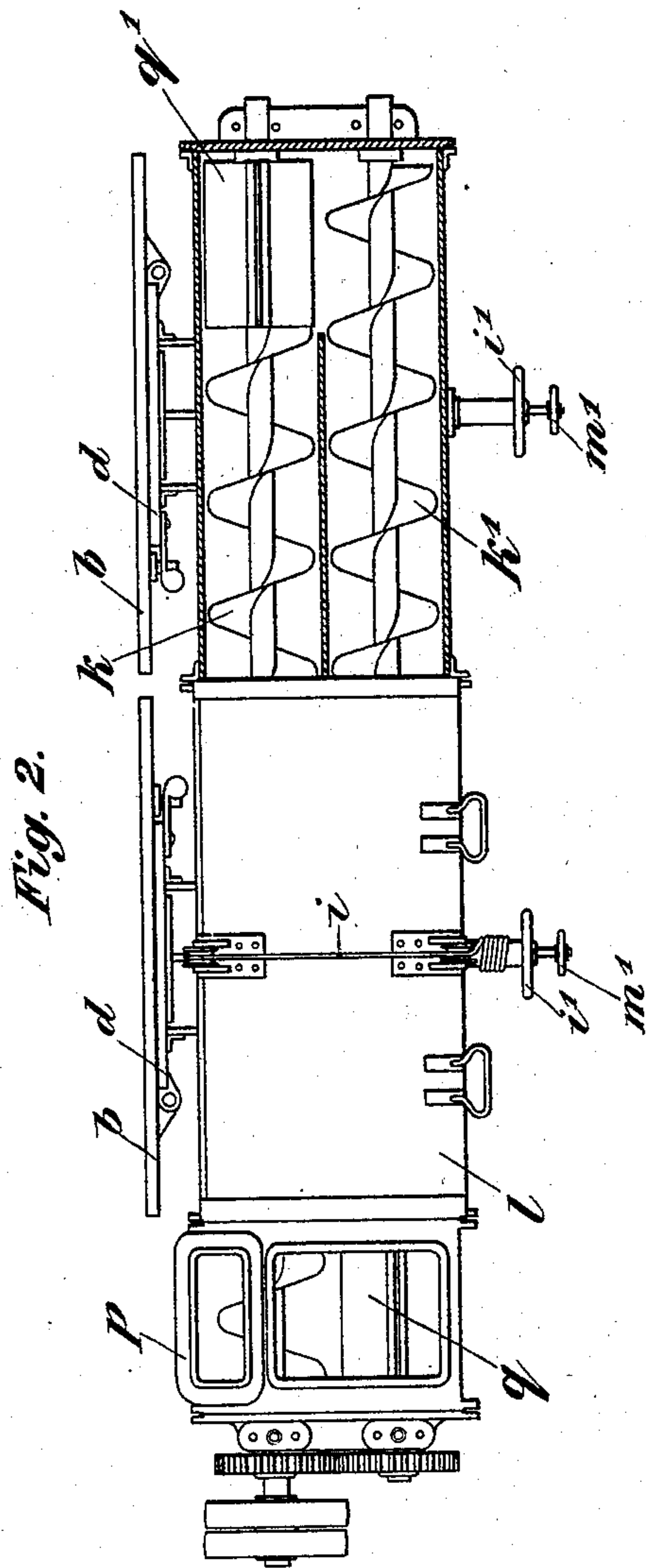
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# UNITED STATES PATENT OFFICE.

WILHELM RUHL, OF BERLIN, GERMANY.

## FUEL-FEEDER FOR FURNACES.

SPECIFICATION forming part of Letters Patent No. 571,139, dated November 10, 1896.

Application filed December 27, 1895. Serial No. 573,467. (No model.) Patented in Germany December 30, 1893, No. 82,919; in Austria December 1, 1894, No. 44/6,190; in Hungary February 5, 1895, No. 2,126; in Italy March 18, 1895, XXX, 38,753; in Belgium June 15, 1895, No. 115,884; in England June 25, 1895, No. 8,289, and in France December 10, 1895, No. 240,605.

To all whom it may concern:

Be it known that I, WILHELM RUHL, a subject of the King of Prussia, Emperor of Germany, residing at Berlin, in the Kingdom of Prussia, German Empire, have invented an Improvement in Fuel-Feeders for Furnaces, of which the following is a specification.

My invention relates to new and useful improvements in feeders for furnaces; and it consists in an improved apparatus for and mode of continually feeding the fuel into the fire or combustion chamber by means of one or more suitable conveyers, for which I have obtained Letters Patent in other countries as follows: Germany, No. 82,919, dated December 30, 1893; Austria, B. 44, S. 6,190, dated December 1, 1894; Hungary, No. 2,126, dated February 5, 1895; France, No. 240,605, dated December 10, 1895; Belgium, No. 115,884, dated June 15, 1895; England, No. 8,289, dated June 25, 1895, and Italy, B. 30, No. 38,753, dated March 18, 1895.

In the accompanying drawings, forming part of this specification, Figure 1 is a front view and shows the feeding device. Fig. 2 is a top view. Fig. 3 is a view in cross-section of the feeding device, and Figs. 4 and 5 are modifications of the same.

Referring to the drawings, *a* represents the mouth of a fire-chamber, which is surrounded by a plate *b*, having an opening *c*, in front of which is a hinged door *d*. This door *d* has an opening *x*, through which the air-mixed fuel is carried into the fire-chamber. There are one or more openings *x'* in the door beneath the opening *x*, which are controlled by a damper *f*, through which air is carried to the fire-chamber for the purpose of facilitating the combustion of the fuel which has not been burned.

The opening *x* in the door *d* is connected with a mixing-chamber *h*, the size of which is made changeable by means of an adjustable top plate *e*, which is raised or lowered by any suitable device, such as the chain *i*, running over rollers and connected to an adjusting-wheel *i'*, so that by turning the wheel *i'* the chain will be wound on or off, thus adjusting the position of the top plate *e*.

Above the mixing-chamber *h* in a suitable-sized carrier-chamber are two hand or mechanism driven worm conveyers *k k'*, which carry the fuel to each fire-chamber. This carrier-chamber is provided with one or more openings *g*, having slidable valve-plate *m*, adjusted by hand-wheels *m'* and so arranged as to regulate the supply of fuel through the pipes *n* and *n'*, which lead to the mixing-chamber *h*.

In the accompanying drawings only the holder of worm *k* is shown provided with openings *g* and connecting-pipes *n n'*; but if needed the holder of worm *k'* can be supplied therewith without departing from the spirit of my invention.

The carrier-chamber is provided with one or more hoppers *p*, which are supplied by any suitable means with fuel to be fed to the chamber by means of openings in their bottoms, which lead into said chamber. *l* are covers for the carrier-chamber.

Starting a fire in a furnace equipped with this device is usually done in the following way: In the fire-chamber is made a small fire, which is kept up until the temperature is sufficient to ignite the material carried by the conveyer. Now gradually open the valve-plate *m*, so that the fuel falls through the opening *g*, pipes *n* and *n'*, into the mixing-chamber *h*, where it meets the air-draft and is carried thereby into the fire-chamber to be consumed.

To prevent the clogging of the apparatus when the plates *m* are partly open, one or more brushes *o* are suitably secured on the worms, so as to keep the opening *g* clean.

The more the plate *m* is opened the more the mixing-chamber *h* has to be opened, so as to give the increased amount of fuel a corresponding amount of air. This can be accomplished, as shown in the drawings, by simply placing both regulator-wheels *m'* and *i'* on one axle, so that to turn one wheel will turn the other.

The air-draft is produced by the smoke-stack or other suitable device.

The brushes *o* may be formed of bristled rods secured between two turns of the worm,



as shown in Fig. 1, or in any other suitable manner, such as shown in Fig. 4, where the bristles are set in the edge of the worm.

$z$  are inverted-V-shaped metal plates secured within the pipe  $n'$  in such a position as to distribute the falling fuel in order to assist the action of the draft.

In Fig. 5 I have shown a modification of the mixing-chamber, which has the pipe  $n'$  bent toward the fire-chamber at  $z'$ , and on the opposite side the plates  $z$  are secured in a slanting position, so as to deflect the fuel toward the fire-chamber to prevent any accumulation in the mixing-chamber. The mixing-chamber in this figure has formed thereon a depending funnel-mouth  $h'$  to assist the draft.

To enable the cleaning the fire-chamber of any refuse, such as clinkers, &c., the pipes  $n$  and  $n'$  telescope each other and are of such a size that by lowering the top  $e$  the pipe  $n'$  is released from the pipe  $n$ , so that the operator is able to turn the door  $d$ , together with the top plate  $e$ , and open same.

It is necessary that the carrier-chamber is supplied with more fuel than all the fire-chambers connected with said carrier-chamber can use, so that the supply may be regular and continuous. This necessitates the providing of means to relieve the carrier-worms of the surplus fuel, which I do in the following manner: Parallel with the carrier-worm  $k$  is placed another carrier-worm  $k'$ , which is separated from the worm  $k$  by partitions, as shown in Fig. 3. These worms are geared in such a manner that they convey fuel in opposite directions and are provided at opposite ends with shovels or vanes  $q$   $q'$ , which take up the oversupply of fuel which has traversed one conveyer and cast it over into the other to be carried to the other end again. Thus a continuous circulation is kept up.

Having thus described my invention, what I claim as new is—

1. In a device of the character described a conveyer, a telescopic pipe connecting the conveyer to a furnace-door, means for distributing the fuel within said pipe, a draft-tube connected to the lower end of said pipe and means for regulating the cross-section of said draft-tube, as and for the purpose described.

2. In a device of the character described, a feeding-conveyer, a parallel return-conveyer, means for transferring the contents from one conveyer into the other and feed-pipes leading from the feed-conveyer to furnace-doors, as and for the purpose described.

3. In a device of the character described, a feed-conveyer, a telescopic pipe leading from the feed-conveyer to a furnace-door, distributors arranged in said pipe and a draft-tube having an adjustable top attached to the lower section of the telescopic pipe and means for operating the top of the draft-tube, as and for the purpose described.

4. In a device of the character described, a conveyer, pipes leading from the conveyer to furnace-doors, brushes attached to the conveyer over said pipes and means for regulating the flow through said pipes, as and for the purpose described.

5. In a device of the character described, a feed-conveyer, a return-conveyer, telescopic pipes leading from the feed-conveyer to furnace-doors, brush attachments on the feed-conveyer over the pipes means for regulating the passage of said pipes, draft-tubes attached to said pipes and having adjustable tops connected to said telescopic pipes means in the pipes for distributing and deflecting the fuel toward the fire-box and means for regulating the passage in the draft-tube and pipes.

6. In a device of the character described, a feed-conveyer, a return-conveyer, means for transferring the contents from one conveyer to the other, telescopic pipes leading from the feed-conveyer to furnace-doors, inverted-V-shaped slanting plates within said pipes draft-tubes having adjustable tops and funnel-shaped mouths secured to the lower section of said pipes, slides in said pipes, brushes on the conveyer over said slides and means for operating the slides and tops of the draft-tubes, as and for the purpose described.

7. In a device of the character described, a conveyer, a swinging furnace-door beneath said conveyer a draft-tube leading to the door, an overlapping top to said draft-tube, slidably connected to the door a telescopic pipe connecting the top of the draft-tube to the conveyer, whereby the said pipes may be disconnected to allow the door to be swung open, as and for the purpose described.

8. In a device of the character described, a funnel-mouthed draft-tube, a feed-pipe entering the draft-tube, and slanting inverted-V-shaped plates in the feed-pipe adapted to distribute and deflect the fuel, as and for the purpose described.

In testimony whereof I hereunto set my hand in presence of two witnesses.

WILHELM RUHL.

Witnesses:

W. HAUPT,  
H. BRANDT.