

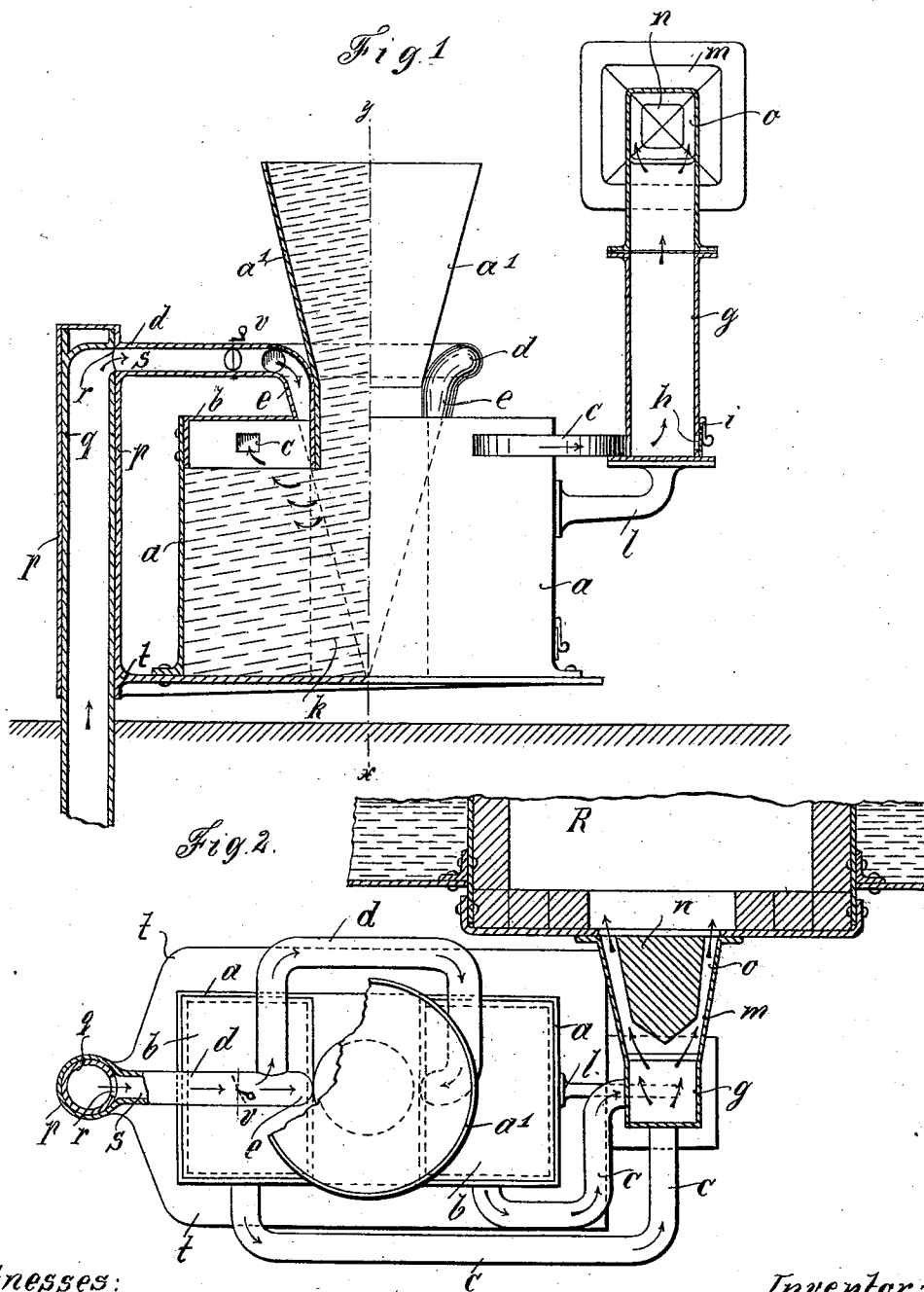
(No Model.)

2 Sheets—Sheet 1.

A. FRIEDEBERG.
COAL DUST FEEDER FOR FURNACES.

No. 537,108.

Patented Apr. 9, 1895.



Witnesses:
Arthur Walther
Carl Rofsbach

Inventor:
Alfred Friedeberg
by Robert D. Van der
Attorney.

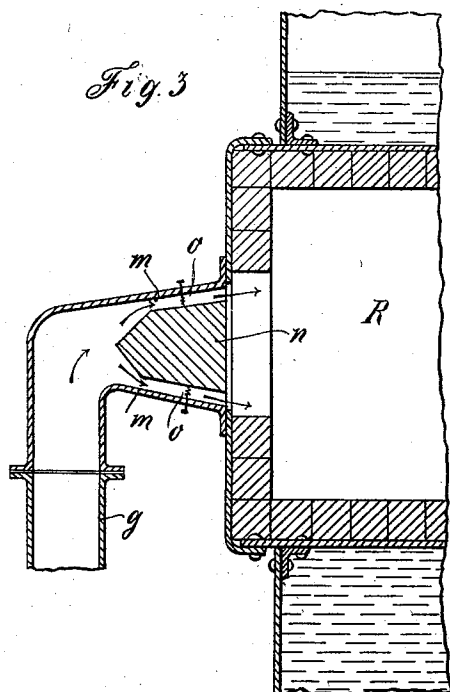
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UNITED STATES PATENT OFFICE.

ALFRED FRIEDEBERG, OF BERLIN, GERMANY.

COAL-DUST FEEDER FOR FURNACES.

SPECIFICATION forming part of Letters Patent No. 537,108, dated April 9, 1895.

Application filed August 9, 1894. Serial No. 519,858. (No model.)

To all whom it may concern:

Be it known that I, ALFRED FRIEDEBERG, a subject of the King of Prussia, German Emperor, and a resident of Berlin, in the Kingdom of Prussia, German Empire, have invented an Improved Coal-Dust Feeder for Furnaces, of which the following is an exact specification.

This invention relates to a device for feeding furnaces, especially boiler-furnaces, with coal-dust, and consists in certain arrangements and combinations of parts which will be more fully described hereinafter.

In order to make my invention more clear, I refer to the accompanying drawings, in which similar letters denote similar parts throughout the several views, and in which—

Figure 1 shows a front view of my improved feeding-device, partly in section. Fig. 2 is an upper view, also partly in section; and Fig. 3 is a detail, shown in vertical section.

The construction is as follows: Several boxes *b* arranged in an inverted position are secured to the upper portion of a common vessel *a*, so as to form a cover or covers for the same. Vessel *a* is covered not entirely by said boxes *b*, but a space is left, into which is inserted a hopper *a'*. Into the bottom or cover respectively of each of the inverted boxes *b* terminates a nozzle *e* forming the mouth-piece of the blast inlet-pipe *d*. The latter is provided with a throttle-valve *v*. Said nozzles terminate into said boxes *b* in such a direction, that the cone of spread *k* resulting from the function of the nozzles enters the vessel *a* below that side-wall of each of the boxes *b* which is situated opposite to the side-wall of vessel *a*. Outlet-pipes *c* communicating at their outer ends with a stand-pipe or stand-pipes *g* extend from the side-walls of the boxes *b*. Said stand-pipe is held in a vertical position by a bracket *l* and is provided near its bottom with an opening *h*, and with a slide or flap *i* adapted to close said opening.

Concerning the stand-pipe *g*, it is of importance that the exit, or delivery-end respectively, of the same is situated above, or higher than, the inlets of the pipes *c* into said stand-pipe. The latter is furnished at its head with a hopper-like body *m* arranged horizontally, and containing or embracing respectively, another hollow or solid body *n* of similar configuration. The respective size of the two

bodies is such that there is remaining between them an annular space *o* adapted to act as a channel for the material dispersed by the blast.

The several parts of the apparatus described up to now are rigidly connected with a tube *p*. This connection is established at the bottom of vessel *a* by a plate *t*, at the head of the same by pipe *d* already mentioned. Said pipe communicates with tube *p* by an opening *s*.

Tube *p* is arranged on a fixed tube *q*, and may be turned on, or around, the same. Said tube *q* is provided with an opening *r* coinciding with opening *s* of pipe *d* when the apparatus is in its proper working position. Tube *q* is then in communication with pipe *d*. Said communication will be interrupted as soon as the whole apparatus is turned around tube *q*, as opening *s* of pipe *d* will be closed then by the wall of said tube *q*.

The whole apparatus is arranged in front of a furnace (especially a boiler-furnace, as indicated for instance at *R* in Figs. 2 and 3) in such a manner, that if the apparatus is in working position, the flange of body *m* lies close to the opening of, or entrance to, the furnace. As long as the apparatus is in this position, tube *q* and pipe *d* are communicating, and a blast of air pressed into tube *q* by any suitable means is allowed to enter the boxes *b*.

Vessel *a* as well as hopper *a'* forms the store-room for the coal dust to be dispersed. The material is introduced into vessel *a* through the hopper, and is filling said vessel up to the lower edge of the side-walls of the boxes *b*. By said walls the coal-dust is hindered from entering the interior of said boxes *b*. There is remaining, thus, a space between the surface of the coal-dust and the covers, or bottoms respectively, of said boxes. If, now, valve *v* is opened, the blast coming from tube *q* will flow through the nozzles *e* into the boxes. The blast pushing upon the surface of the coal-dust causes the latter to be whirled up, and is driving the particles loosened by its action into the channels *c*. By reason of the peculiar arrangement of the nozzles, or by the direction given the blast by said arrangement respectively, there is whirled off that portion of the coal-dust which is indicated by *k* in Fig. 1. Thus, the other portion of the coal-

dust supported up to then by said portion *k* will lose its support, and will fall down into the space emptied by the action of the blast. According to the quantity falling down into vessel *a* out of hopper *a'*, fresh material is automatically introduced into the latter by means of any suitable contrivance. There is, consequently, a steady delivery of coal-dust to the furnace as long as the blast is allowed to enter the boxes *b*. The particles whirled off by the blast are carried away by the latter through the stand-pipe *g*. By reason of the vertical position of said stand-pipe, and by the upward direction imparted thereby to the blast as well as to said particles, all larger or heavier parts, as pieces of coal and slag, are caused to fall down, and to collect on the bottom of the stand-pipe. Said parts may be removed now and then by aid of opening *h* aforementioned. The mixture of coal-dust and air when pushing upon the body *n* is deviated by the latter, and caused to enter the annular channel *o*. By reason of the coaxial arrangement of the two bodies *m* and *n*, and by the equal width of said channel *o*, the mixture is equally distributed within the channel, entering in this state the furnace *R*.

In order to cleanse the furnace, and to remove residues of the fuel, the feeding-apparatus must be swung off the furnace. This is performed by turning the apparatus around tube *q*. The blast is automatically interrupted thereby, as openings of pipe *d* is closed by the wall of tube *q*. The feeding of the material, consequently, ceases, and will commence again as soon as the apparatus is swung back into its former, proper working position.

Having thus fully described the nature of this invention, what I desire to secure by Letters Patent of the United States is—

1. In a coal-dust feeding-device for furnaces: the combination with a vessel *a* adapted to receive the material to be dispersed, of one or more boxes *b* arranged in an inverted position within the upper portion of said vessel, and forming the cover of the latter; a hopper *a'* arranged between said boxes, and adapted to receive the feed-material for the said vessel *a*; blast nozzles *e* arranged at the side of said hopper, and terminating into the top-plates of the said boxes *b*, the outer portion of said nozzles being inclined, substantially as shown and for the purpose as described.

2. In a coal-dust feeding-device for furnaces, the combination with a vessel *a* adapted

to receive the material to be dispersed, of one or more boxes *b* arranged in an inverted position within the upper portion of said vessel, and forming the cover of the latter; a hopper *a'* arranged between said boxes and adapted to receive the feed-material for the said vessel *a*; a feed-pipe *g* connected at its lower end with pipes *c* extending from the said boxes *b*, and at its upper end with the furnace; said pipes *c* and *g* being adapted to convey the coal-dust whirled off by the blast to said furnace, substantially as described.

3. In a coal-dust feeding-device for furnaces, the combination with a vessel *a* adapted to receive the material to be dispersed, of one or more boxes *b* arranged in an inverted position within the upper portion of said vessel, and forming the cover of the latter; a hopper *a'* arranged between said boxes, and adapted to receive the feed-material for the said vessel *a*; a stand-pipe *g* connected at its lower end with pipes *a* extending from the said boxes *b*, and carrying at its upper end a hollow body *m* containing another body *n* adapted to form with body *m* an annular channel *o*; said pipes *c* and *g*, as well as said channel *o* being adapted to convey the coal-dust whirled off by the blast to said furnace, substantially as described.

4. In a coal-dust feeding-device for furnaces, the combination with a vessel *a* adapted to receive the material to be dispersed, of one or more boxes *b* arranged in an inverted position within the upper portion of said vessel and forming the cover of the latter; a hopper *a'* arranged between said boxes and adapted to receive the feed material for the said vessel *a*; blast-nozzles *e* arranged in the top-plates of the said boxes *b*; a vertical tube *p* adapted to be turned upon a stationary tube *q*, and connected at its lower end with the bottom-plate *t* supporting the said vessel *a*, and at its upper end with the nozzles *e* by a pipe *d*; said pipe *q* having a side-opening *r* communicating with said pipe *d* when the latter is in its working-position, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

ALFRED FRIEDEBERG.

Witnesses:

CHAS. H. DAY,
W. HAUPT.