

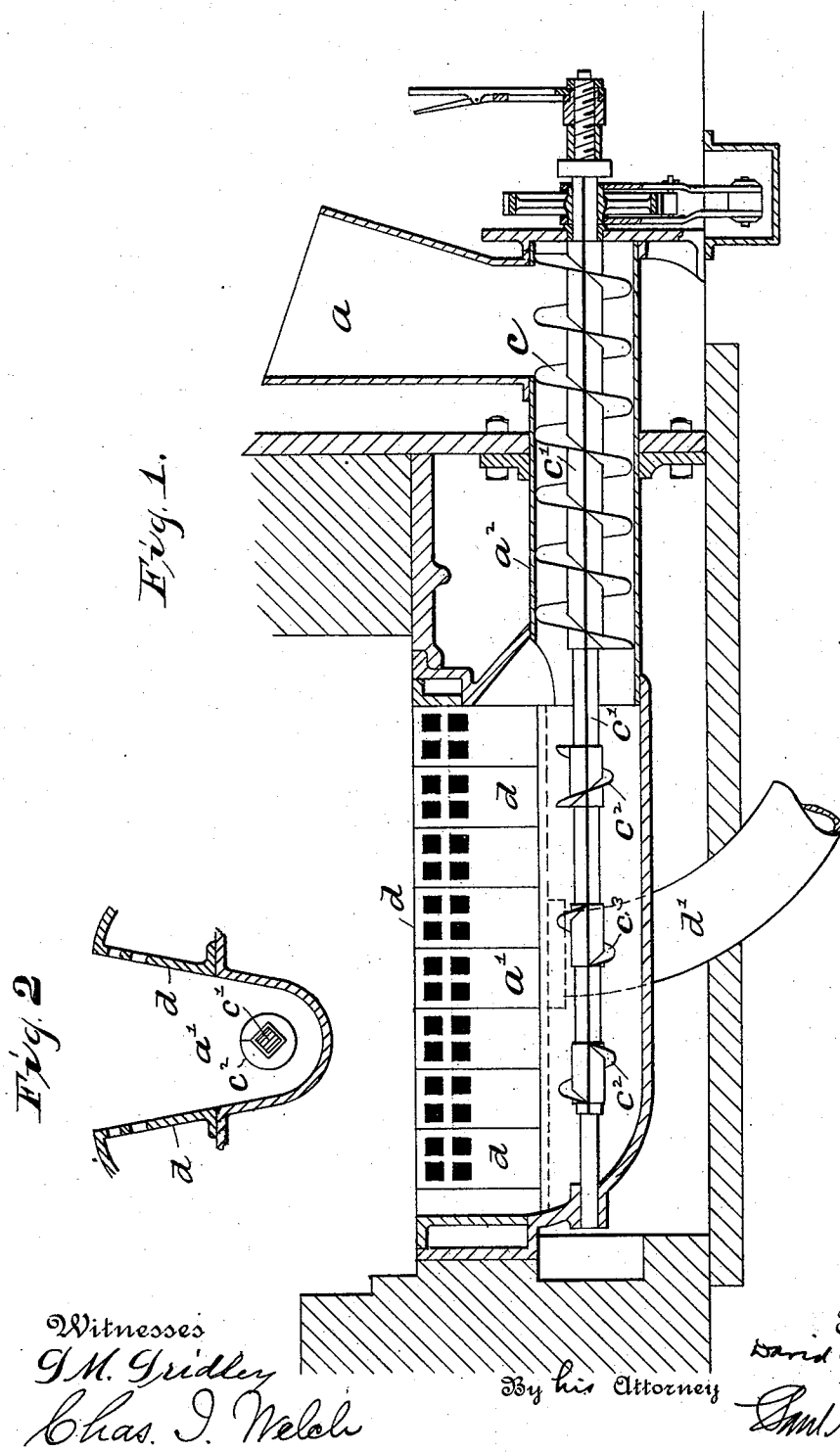
(No Model.)

2 Sheets—Sheet 1.

D. F. GRAHAM.
UNDERFEED STOKER.

No. 570,924.

Patented Nov. 10, 1896.



Witnesses
J. M. Gridley
Chas. J. Welch

Inventor
David F. Graham
By his Attorney
Samuel A. Wiley

(No Model.)

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Fig. 4

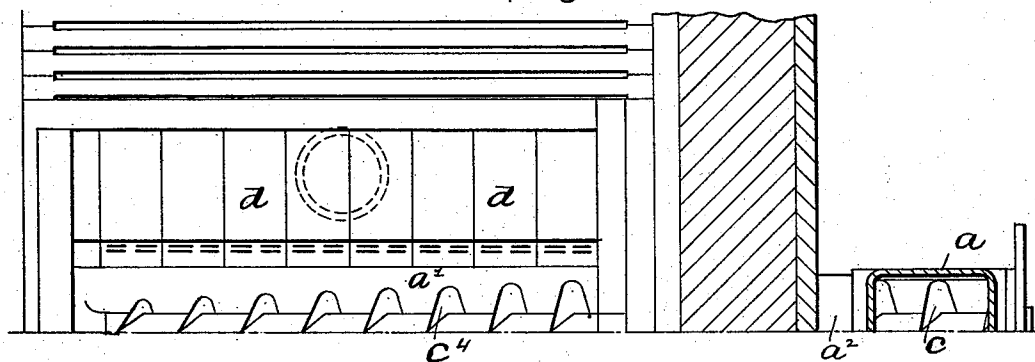


Fig. 3.

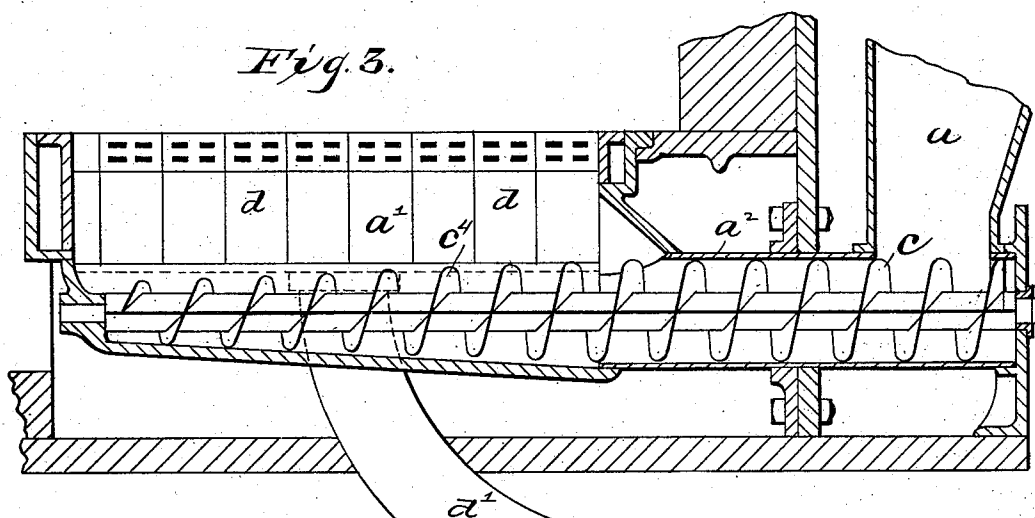
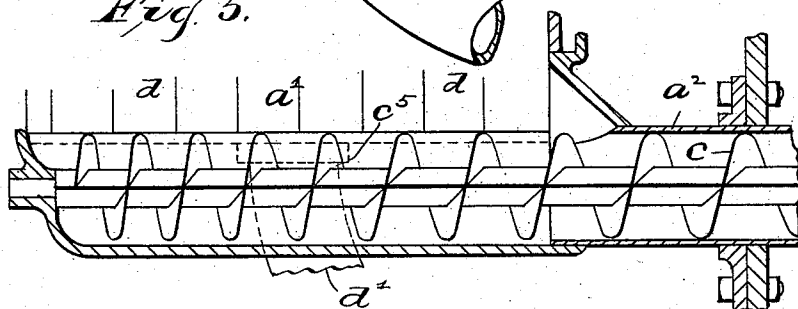


Fig. 5.



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UNITED STATES PATENT OFFICE.

DAVID F. GRAHAM, OF SPRINGFIELD, MASSACHUSETTS, ASSIGNOR TO THE
AMERICAN STOKER COMPANY, OF DAYTON, OHIO.

UNDERFEED STOKER.

SPECIFICATION forming part of Letters Patent No. 570,924, dated November 10, 1896.

Application filed October 28, 1895. Serial No. 567,134. (No model.)

To all whom it may concern:

Be it known that I, DAVID F. GRAHAM, a citizen of the United States, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Underfeed Stokers, of which the following is a specification.

My invention relates to devices for feeding fuel into furnaces, the constructions being especially adapted for feeding furnaces for steam-boilers, although the same constructions are applicable for feeding furnaces of any kind.

The object of my invention is to provide means for readily feeding coal or similar fuel from the outside of a furnace into the interior thereof, so that the coal or other fuel will be fed from the bottom of the furnace and from beneath the fire.

My invention consists in the various constructions and combinations of parts herein-after described, and set forth in the claims.

In the accompanying drawings, Figure 1 is a vertical longitudinal sectional view of a device embodying my invention. Fig. 2 is a transverse section of the same. Fig. 3 is a similar view to Fig. 1 showing a modification. Fig. 4 is a partial plan view of the construction shown in Fig. 3. Fig. 5 is a sectional elevation showing a further modification.

Like parts are represented by similar letters of reference in the several views.

In constructing stokers for furnaces, especially furnaces for steam-boilers, it is desirable that the constructions be such that they may be applied to furnaces already in use, and to this end the parts thereof should be kept within as small compass as possible, and especially this is true of the parts which lead from the outside to the inside of the furnace and which carry the fuel therein. It is also desirable that means be employed by which the fuel may be uniformly fed into the furnace continuously, if so desired, the constructions being such that an equal distribution of the fuel into the fire-box or magazine may be effected. In carrying out this feature of my invention I employ within the furnace, with the top preferably located flush with the grate-bars thereof, a magazine, and on the outside thereof I employ a hopper, the

magazine and hopper being connected by a pipe or conduit through which there is extended a worm conveyer. This worm conveyer is made of a uniform carrying capacity from the hopper through the pipe or conduit, and within the magazine the carrying capacity of the magazine is reduced, so that a portion only of the fuel which is carried into said magazine will be conveyed through the same. A part of the fuel, therefore, will be forced upwardly and an equal distribution thereof takes place within the magazine.

In the said drawings, *a* represents a hopper, and *a'* the fuel-magazine. *a²* is a pipe or conduit which connects the same.

c is a conveyer the flights of which are preferably mounted on a square shaft *c'*, which is journaled at each end in suitable bearings and has at the outside means for rotating the same, any suitable means being employed for this purpose.

As shown in Fig. 1, the reduced carrying capacity of the conveyer is accomplished by reducing the diameter of the conveyer; that is, reducing the width of the conveyer-flights, as shown at *c² c²*. I have also reduced the number of flights. While the pitch of the conveyer remains the same, the reduction in diameter will cause a less carrying capacity, and the coal or other fuel which is supplied to the magazine through the conduit by the conveyer which has a uniform carrying capacity will be distributed along the magazine by the fact that only a portion of the same will be carried through the magazine by the conveyer of reduced carrying capacity. The balance of the fuel, therefore, will necessarily be forced upward by the incoming fuel and will be distributed along the magazine and into the furnace. If desired, this carrying capacity may be still further reduced and a more uniform distribution secured by reversing some of the conveyer-flights, as shown at *c³*; that is to say, employing conveyer-flights of a reverse pitch, which will hold back the fuel brought in the conveyer through the conduit, and thus cause the same to rise in the conduit.

In Figs. 3 and 4 I have shown substantially the same construction, with the exception that the conveyer is formed tapered throughout the magazine, as shown at *c⁴*, the diame-

ter of the conveyer being gradually reduced from one end of the magazine to the other, while the pitch of the conveyer remains the same.

5 In Fig. 5 I have shown means for accomplishing the same result by reducing the pitch of the conveyer within the magazine, as shown at *c*⁵. In this case the diameter of the conveyer is uniform throughout and the
10 pitch thereof is uniform in the hopper and through the conduit; but that portion of the conveyer which is placed within the magazine is formed with a reduced carrying capacity by gradually reducing the pitch, so that
15 a portion only of the fuel which is brought in through the conduit is carried through the magazine, the remainder of the fuel being distributed along the magazine and forced upwardly by the incoming fuel, so as to form
20 an even distribution at the top of the magazine.

The magazine will be provided in the usual way with twyer-blocks *d* at the top thereof, to which air is supplied from any suitable source
25 of supply through suitable air-pipes *d'*. The magazine is preferably formed of a length equal to the length of the grate-bars and is of a uniform width throughout. It is curved at the bottom to correspond to the conveyer,
30 which passes through the same and forms substantially a continuation of the conduit, open at the top, the upper portion of the magazine being formed with inclined or sloping sides, so that the area of the magazine in
35 cross-section is increased from the bottom upwardly.

By the constructions above described it will be seen that I have provided a stoker which may be readily installed in furnaces now in
40 use. The conduit being formed of a straight horizontal pipe of, say, eight inches in diameter, can be readily introduced through the front of any ordinary furnace, an opening of sufficient size being made therein to receive
45 the same. The hopper is placed on the outside of the furnace in convenient position to receive the fuel, and means being provided to revolve the conveyer, the fuel is carried uniformly and, if desired, continuously into
50 the magazine by the conveyer of uniform carrying capacity, where it is distributed by that portion of the conveyer within the magazine which is formed with a reduced carrying capacity.

55 Having thus described my invention, I claim—

1. The combination with a fuel-magazine having a curved bottom, and a conduit leading laterally therefrom, said conduit consisting of a pipe of uniform diameter whose axis corresponds to the axis of the curved portion of the magazine, a hopper connected with said conduit, and a screw conveyer extending from said hopper centrally through said conduit into said magazine, said conveyer being
65 formed of a uniform carrying capacity within said conduit and of a reduced carrying capacity

within the magazine, substantially as specified.

2. The combination with a magazine, a fuel-hopper, and a horizontal conduit, as described, said conduit being of a uniform diameter and located between the hopper and magazine so as to form a substantial continuation of the
70 bottom of each, a screw conveyer extending from said hopper through said conduit into said magazine and adapted to fit said conduit, said conveyer being provided with a uniform carrying capacity through the conduit and of a reduced carrying capacity in the magazine, so
75 substantially as specified.

3. The combination with a fuel-magazine having a curved bottom and tapered sides, a conduit leading horizontally from said magazine and consisting of a pipe whose axis
80 also forms the axis of the curved portion of said magazine, said conduit being of a uniform diameter and cut away on one side near its outer end to form a fuel-opening, and a hopper above said fuel-opening, and a screw
85 conveyer extending through said conduit and the curved portion of said magazine, said conveyer being formed of a uniform carrying capacity through said conduit and adapted to fit the same, and of a reduced carrying capacity within the bottom portion of said magazine, substantially as specified.

4. The combination with a fuel-magazine having a curved bottom, and a conduit leading laterally therefrom, said conduit consisting of a pipe of uniform diameter whose axis
90 corresponds with the axis of the curved portion of said magazine, a hopper connected with said conduit, and a screw conveyer extending from said hopper centrally through
95 said conduit into said magazine, said conveyer being formed of a uniform diameter and pitch within said hopper and conduit, and being tapered to form a gradually-reduced diameter within the magazine, substantially as
100 specified.

5. The combination with a magazine constructed of a substantially uniform width and having tapered sides and a concave bottom as described, a horizontal conduit leading from
105 one end of said magazine, and a hopper arranged above said conduit so as to discharge therein, a square shaft extending centrally through said conduit and magazine, the bottom of said magazine forming a substantial
110 continuation of said conduit, and conveyer-flights on said shaft, said conveyer-flights being formed to fit said conduit and having a uniform carrying capacity within the same and a reduced carrying capacity within the
115 magazine, substantially as specified.

In testimony whereof I have hereunto set my hand this 21st day of September, A. D. 1895.

DAVID F. GRAHAM.

Witnesses:

WM. P. HAYES,
EDWIN D. BEVITT.