(No Model.) 2 Sheets—Sheet 1.

A. O. MÜLLER.

FUEL FEEDING APPARATUS FOR BOILERS.

No. 544,187. Patented Aug. 6, 1895.

Fig. 1.

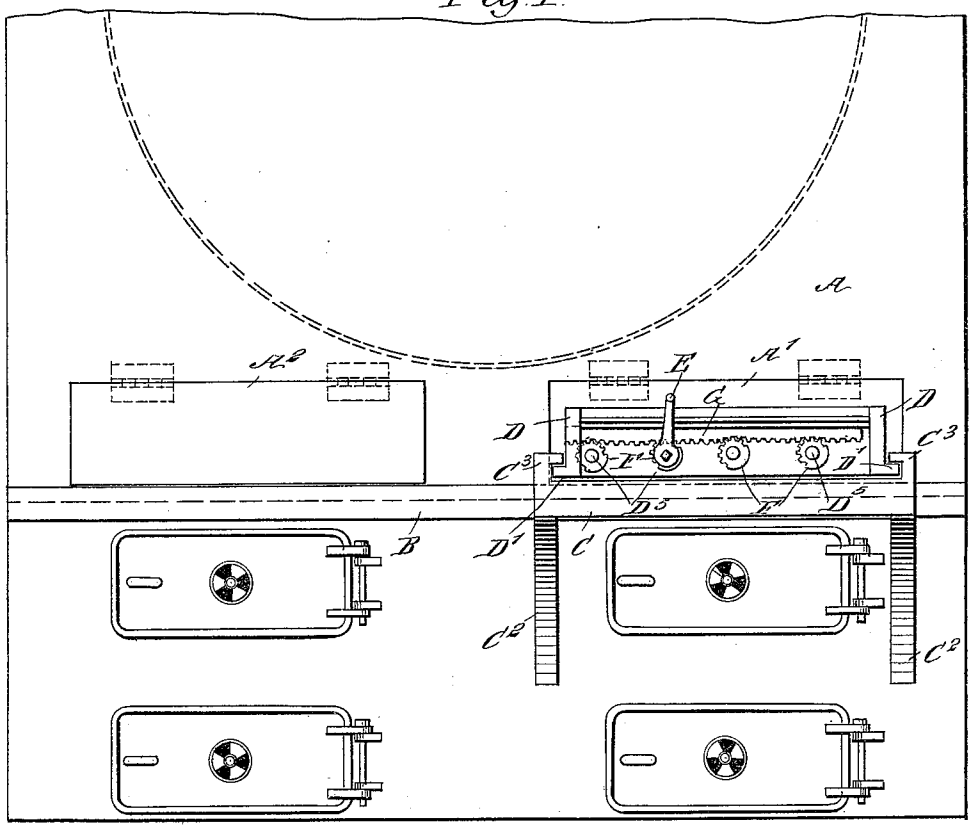

Fig. 2.

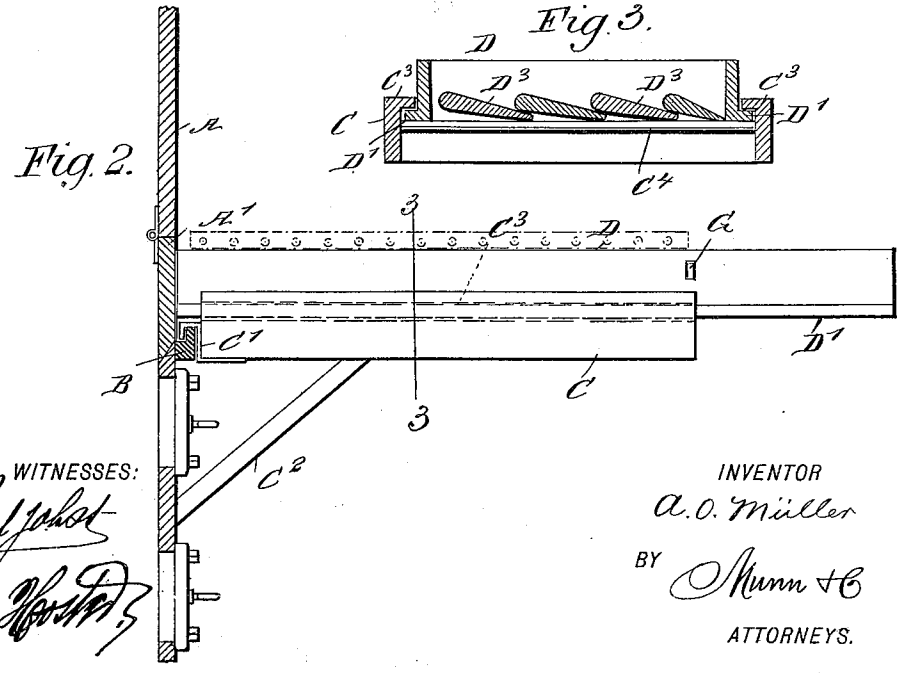

Fig. 3.

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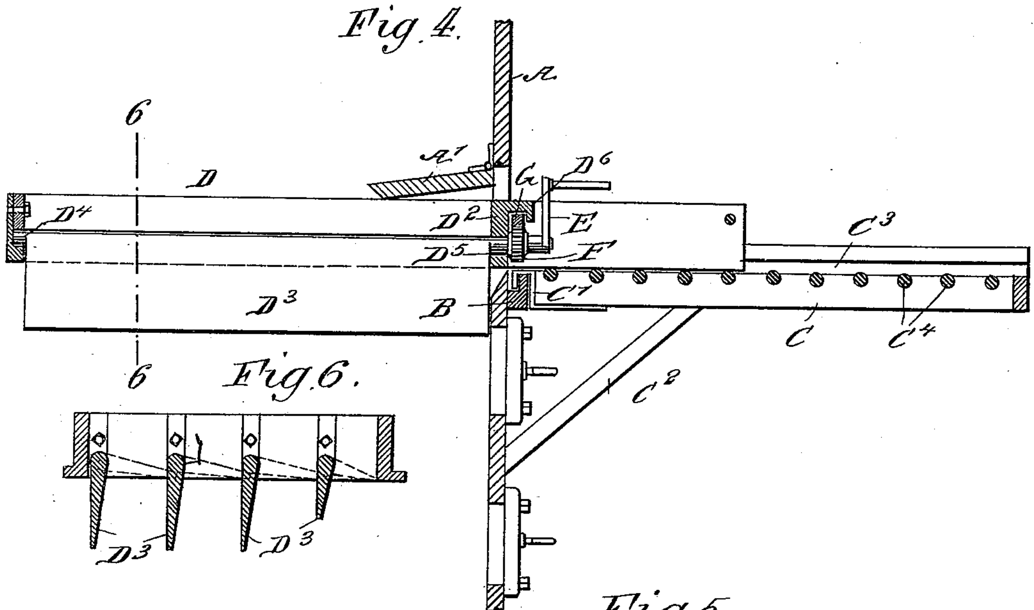

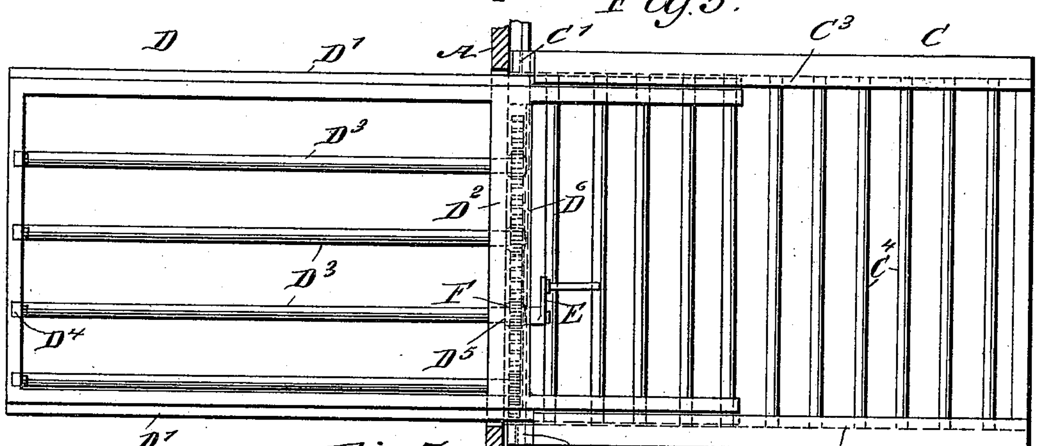

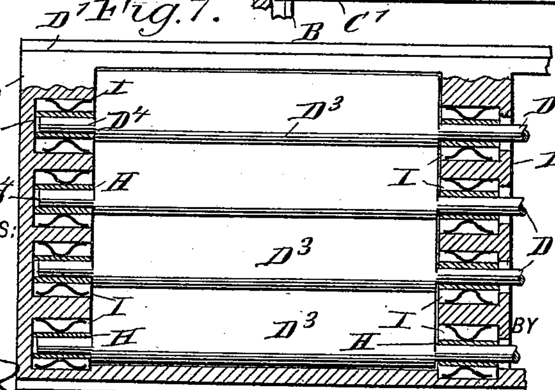

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UNITED STATES PATENT OFFICE.

ADELBERT OSWALD MÜLLER, OF FREMONT, NEBRASKA.

FUEL-FEEDING APPARATUS FOR BOILERS.

SPECIFICATION forming part of Letters Patent No. 544,187, dated August 6, 1895.

Application filed December 15, 1894. Serial No. 531,990. (No model.)

To all whom it may concern:

Be it known that I, ADELBERT OSWALD MÜLLER, of Fremont, in the county of Dodge and State of Nebraska, have invented a new and Improved Fuel-Feeding Apparatus for Boilers, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved feeding apparatus more especially designed for use with boilers and arranged to introduce the fuel in a very simple manner and to distribute the same uniformly in the fire-box to insure proper combustion and regular heating of the boiler.

The invention consists of certain parts and details and combinations of the same, as will be fully described hereinafter and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the views.

Figure 1 is a front elevation of the improvement as applied. Fig. 2 is a side elevation of the same with the boiler-front in section. Fig. 3 is a transverse section of the improvement on the line 3 3 of Fig. 2. Fig. 4 is a sectional side elevation of the improvement as applied and with the fuel-carrier within the fire-box in the discharging position. Fig. 5 is a plan view of the same. Fig. 6 is a transverse section of the same on the line 6 6 of Fig. 4; and Fig. 7 is a sectional plan view of the fuel-carrier, showing the bottom sections journaled in bearings.

The boiler on which the device is applied is provided at its front A with the usual charge-doors A′ A^2, hinged at their upper ends to swing inwardly into the fire-box of the boiler. Under the doors A′ A^2 is secured to the outside of the front A a rail B adapted to be engaged by hooks C′ formed on the inner end of a frame C, having braces or legs C^2 adapted to rest on the front A, as is plainly illustrated in the drawings, so as to support the frame C in a horizontal position in alignment or nearly in alignment with the bottom part of the feeding-door.

The frame C is provided on its sides with guideways C^3, in which are fitted to slide the sides D′ of a fuel-carrier D, made in the shape of a box at its front end by raising a cross-piece D^2 between the sides a suitable distance from the outer end. (See Figs. 4 and 5.) The bottom of the box is formed in sections D^3, having trunnions D^4 and D^5, of which the trunnions D^4 are journaled in the outer end of the box, while the other trunnions D^5 are journaled in the cross-piece or partition D^2, as plainly illustrated in the drawings. The sections D^3, when closed, overlap at their free ends the pivot of the next following section, so as to form a continuous closed bottom, as plainly illustrated in Fig. 3, to support the fuel.

When the carrier D is in the outermost position, as shown in Figs. 1 and 2, then the free ends of the sections D^3 rest on cross rods or rollers C^4, held in the sides of the frame C, to prevent the said sections from opening as long as the fuel-carrier is in an outermost position.

Each of the trunnions D^5 project to the front of the partition D^2, and carries at its outer end a pinion F in mesh with a rack G, mounted to slide transversely in a bearing D^6, formed on the partition D^2. One of the trunnions D^5 is extended beyond its pinion F, and is formed with a square or oblique end to receive a crank-arm E, which, when turned, causes a simultaneous opening and closing of the sections D^3, as the latter are all connected with each other by their pinions F and the rack G.

As illustrated in Fig. 7, the trunnions D^4 and D^5 of the bottom sections D^3 may be journaled in the bearings H, pressed on by springs I, so as to yieldingly mount the sections to permit the same to turn or yield transversely, so that large lumps of fuel can pass between the adjacent sections.

The operation is as follows: When it is desired to introduce fuel into the fire-box—say through the door A′—then the frame C is shifted on the rail B to bring the frame in alignment with the lower part of the door-opening, as illustrated in Figs. 1 and 2. The fuel-carrier is then in an outermost position with the the sections D^3 of its bottom in a closed position to permit of filling the fuel-carrier with the desired amount of fuel to be introduced into the fire-box. When this has been done the operator pushes on the outer end of the fuel-carrier B, so as to move the latter inwardly, whereby the door A′ is opened

and the box part of the fuel-carrier passes within the fire-box, and when pushed into the fire-box its full length then the end D^2 of the carrier fills the door-opening to prevent outer air from entering the fire-box, as illustrated in Figs. 4 and 5. The outer portion of the said fuel-carrier is now still in contact with the frame C, and consequently the fuel-carrier is supported thereby. The weight of the fuel on the sections D^3 will now cause the same to open, as the said sections are no longer supported by the rollers C^4 of the frame C, the said sections D^3 now swinging into a lowermost position, as illustrated in Fig. 6. The fuel now passes between the open sections onto the already burning fuel in the fire-box. The fuel is evenly distributed within the fire-box, and consequently a low fire can be maintained in all parts of the fire-box. As soon as the fuel is discharged the operator turns the crank-arm E, so as to cause the sections D^3 to swing back into their approximately horizontal position, and then the fuel-carrier is pulled outward to permit the charge-door A′ to again close. The frame C, with the fuel-carrier in an outermost position, is now shifted along the rail B to the next charge-door A^2, and then the fuel is placed into the box of the fuel-carrier, after which the above-described operation is repeated—that is, the fuel-carrier D is pushed inward through the charge-door A^2 into the fire-box, and as soon as the hinged sections are released they swing open to permit the fuel to drop into the fire-box. The carrier is then closed at its bottom and pulled outward out of the fire-box.

In case of cleaning the fire-box, the whole apparatus can be hoisted and swung upward to give access to the fire-box for the purpose mentioned.

It will be seen that by the arrangement described no heat whatever can escape from the fire-box, as the operation of charging or delivering the fuel is accomplished in a very short time, and the doors A′ and A^2 instantly close on removing the fuel-carrier from the fire-box. It is further understood that the fireman cannot fill the fire-box higher than the lower edges of the sections D^3 at the time the latter are open, as shown in Fig. 6, so that considerable fuel is saved, as only a low fire can be maintained. Furthermore, the fireman is protected from the heat, as the latter cannot escape from the fire-box.

If two holes, for instance, under a boiler are fired, it will be required to fire each hole about once in fifteen minutes. It requires, say, about one minute to fire each hole, making about eight minutes per hour in which the doors stand open in the old way of firing, making a total of one hundred and ninety-two minutes in twenty-four hours, or three hours and twelve minutes. Assuming that ten boilers are in use, the time in which the doors remain open by the ordinary way of firing amounts to thirty-two hours. It is evident from these facts that in this mode of firing nine boilers will fully do the work, where it formerly required ten boilers to do the work in the old way, and two men, not necessarily practical firemen, can easily fire ten boilers.

To prevent clogging of the fuel prior to discharging it in the fire-box, I prefer to use a screen having a frame and bars running one way parallel, as shown in dotted lines in Fig. 2. This screen is placed on top of the fuel-carrier upon which the coal is cast when loading the carrier, the bars being as far apart as the hinged sections are when opened. Therefore any coal larger than the opening of the hinged sections will remain on top of the screen, which can be removed before pushing the carrier into the fire-box, and thus prevent the coal from clogging in the hinged sections of the fuel-carrier. By the use of this screen the springs in the hinged sections of the carrier can be dispensed with, as the clogging of coal has been overcome, and, therefore, it is not necessary that the hinged sections should spread to allow coal to drop through when clogged between said hinged sections.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. A fuel feeding apparatus comprising a frame adapted to be secured to the boiler in front of the firing door so as to be stationary relatively thereto, and a fuel carrier supported on the said stationary frame and fitted to slide thereon to pass into the fire box, substantially as described.

2. A fuel feeding apparatus comprising a frame provided with attaching devices whereby it may be secured to the boiler in front of the firing door so as to be stationary relatively thereto, and a fuel carrier fitted to slide on the said stationary frame to pass into the fire box, substantially as described.

3. The combination of the furnace having a firing door and a rail adjacent thereto, the frame provided with hooks adapted to engage the said rail and support the frame in front of the firing door, and the fuel carrier fitted to slide on the frame to pass into the fire box, substantially as described.

4. The combination of the supporting frame secured to the boiler directly in front of the firing door, the fuel carrying box fitted to slide on the said frame, the pivoted bottom sections having pinions on their trunnions exteriorly of the box, and a connection between the pinions to cause them to move in unison, substantially as described.

5. A fuel feeding apparatus, provided with a fuel carrier having a bottom made in sections, and yieldingly mounted bearings carrying the trunnioned ends of the said sections, substantially as shown and described.

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