(No Model.) 2 Sheets—Sheet 1.

E. FALES.

SMOKE CONSUMING FURNACE.

No. 342,083. Patented May 18, 1886.

Fig. 1.

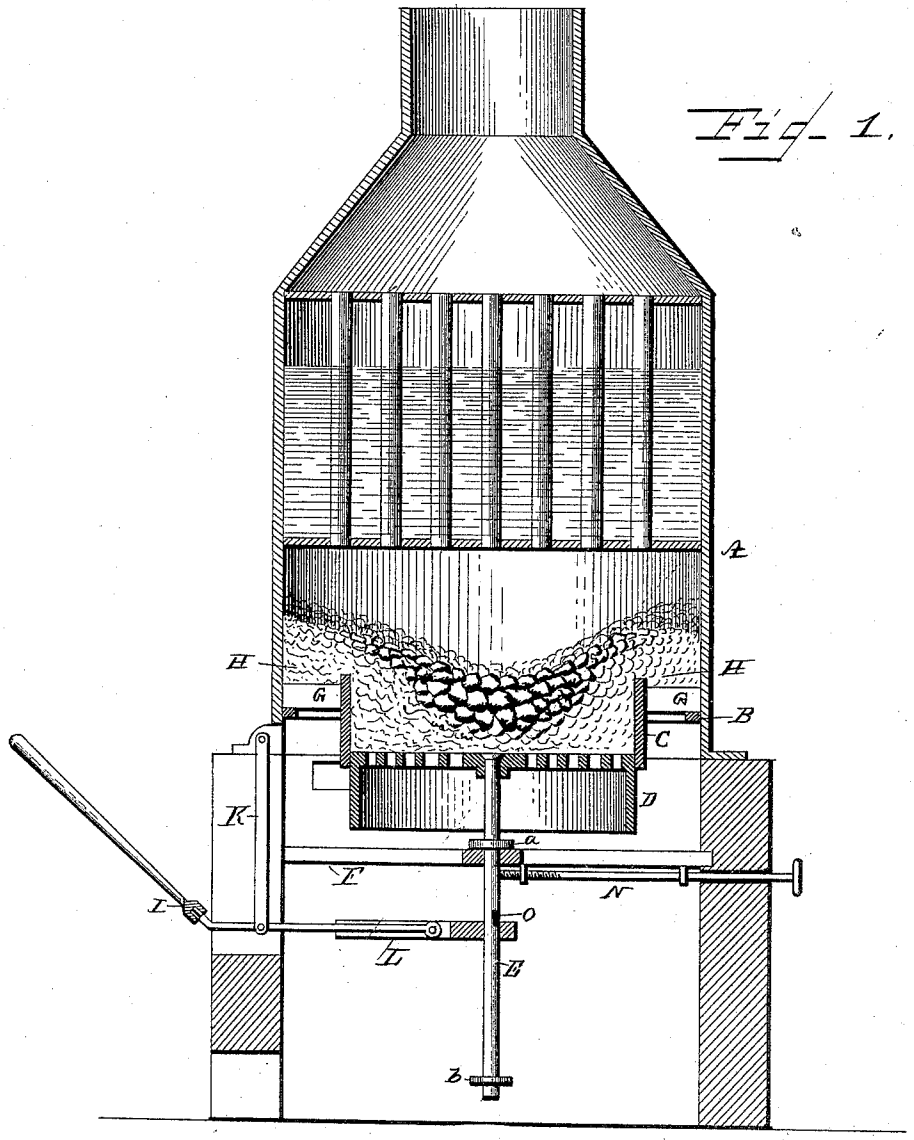
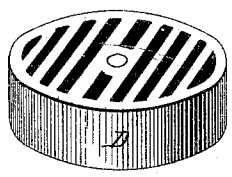


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

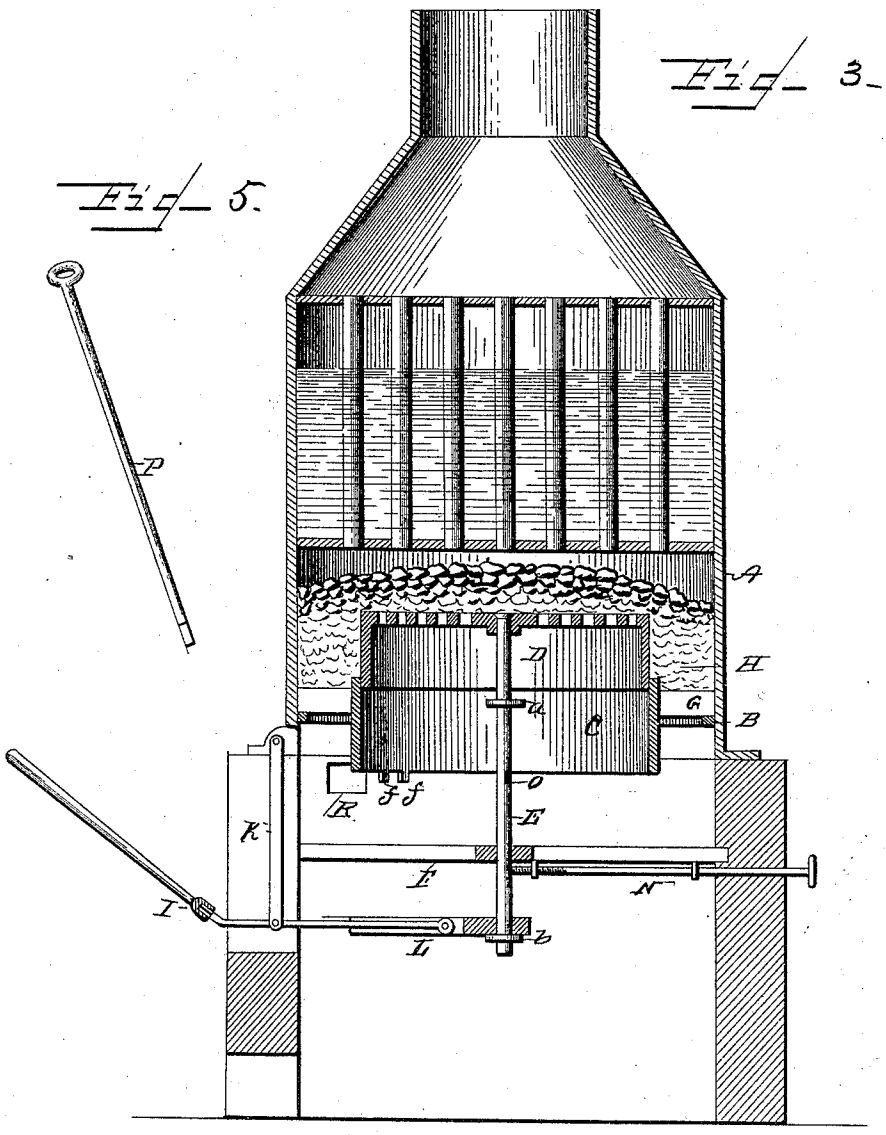
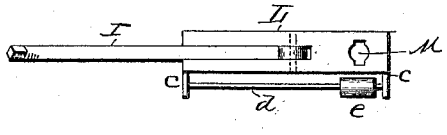


Fig. 5.

Fig. 4.



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UNITED STATES PATENT OFFICE.

EDWARD FALES, OF ST. LOUIS, MISSOURI.

SMOKE-CONSUMING FURNACE.

SPECIFICATION forming part of Letters Patent No. 342,083, dated May 18, 1886.

Application filed February 26, 1886. Serial No. 193,307. (No model.)

To all whom it may concern:

Be it known that I, EDWARD FALES, a citizen of the United States, residing at St. Louis, in the county of St. Louis and State of Missouri, have invented certain new and useful Improvements in Smoke-Consuming Furnaces for Steam-Engines and other Purposes, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to improvements in smoke-consuming furnaces for steam-engines and other purposes.

The object of my invention is to provide a furnace having a rising and falling grate working within a central fire-pot, so that when said grate is raised the live coals will be forced over to the sides of the combustion-chamber, the fresh fuel placed on top of the elevated grate, and said grate lowered, thus burying the fresh coal in the body of the live coals in its descent downward, thereby insuring perfect combustion.

My invention consists of a vertically and horizontally movable grate mounted in a chamber or fire-pot, said pot being provided with supplemental grate-bars projecting from near its upper end to the walls of the combustion-chamber onto which the live coals are forced by the upward movement of the central grate.

My invention consists, further, in certain devices for raising and lowering the central grate, as will more fully appear.

Referring to the drawings, Figure 1 is a vertical sectional view of a furnace with my improved grate. Fig. 2 is a view in perspective of the central movable grate. Fig. 3 is a vertical sectional view of a furnace with the movable grate in an elevated position. Fig. 4 is a top or plan view of the devices used for raising the central grate. Fig. 5 is perspective view of the tool used for shaking the grate.

In an application filed by me December 22, 1885, Serial No. 186,454, I have shown, described, and claimed a furnace or fire-pot having closed sides and a rigid grate secured in the lower end of the same, and radiating arms or projections, which act in the capacity of grate-bars, arranged near the top of and around the outside of the fire-pot; but by this construction it is necessary to push the live coals from the center of the fire-pot over onto the outside grate-bars with a hook or poker, in order that the air passing up through said outside grate-bars will be thoroughly heated before it is mingled with the main body of the gases arising from the fuel in the fire-pot.

The present invention is designed to supply a fresh bed of the live coals to the outside grate every time fresh fuel is put into the furnace, as will more fully appear hereinafter.

A indicates the outer wall of a furnace for steam-boilers and other purposes, which may be round, square, rectangular, or of other desirable shape, the inside of which is provided with a suitable ledge or projection, B, which supports the fire pot or chamber C, said fire pot or chamber being of any convenient form and size to suit the kind of furnace in which it is to be used.

D is a movable grate, supported in the fire-pot or chamber C on the standard E, said standard being provided with an enlarged portion, *a*, which rests on the supporting-bar F, secured in the walls of the ash-pit, it being understood that the standard E passes through the cross-bar F. The standard E is provided with an enlarged portion, *b*, at or near its lower end, so as to prevent the grate from being moved too high, the movement of said grate being effected by devices which will be more fully described hereinafter.

The fire pot or chamber C is made with solid sides, and is provided with a series of radial arms or bars, G, near the upper end at uniform distances apart around the entire outer wall of the chamber, said arms or bars serving to hold the fire pot or chamber on the ledge B, and also acting in the capacity of grate-bars, onto which the live coals are forced when the grate D is moved up in the fire pot or chamber. The top of the fire pot or chamber C extends a short distance above the grate-bars G, so as to leave a fire pocket or chamber, H, between the walls of the furnace and the wall of the fire pot or chamber and grate when elevated, which effectually heats the greater volume of air before it comes in contact with the main body of the gases and smoke arising from the fire chamber or pot C, so as to effect a complete combustion of the gases and smoke.

I is a lever pivoted to the lower end of the

vertical bar K, said bar being pivoted at its upper end to the walls of the furnace or at any other convenient point. The inner end of the lever I is secured to the friction-block L in any convenient manner. The inner end of the friction-block L is provided with an aperture, M, of peculiar construction, through which the standard E is passed, so that when the outer end of the lever I is depressed the edges of the perforation M in the plate L will bite the standard E, and thus raise the grate in the fire-pot.

The plate or block L is provided with projections *c* at each end, which are connected by the rod *d*, on which is placed the weight *e*, the office of which is to regulate or change the direction of the rod or support E. If the support E, with the grate D, is to be raised, the weight *e* is placed in the position shown in Fig. 4. This changes the bite of the plate L, so that the grate will be raised by operating the lever I; but if the grate is to be lowered the weight is pulled over to the other end of the plate L. This will change the bite of the plate L on the standard, and cause the standard E, with the grate, to descend to the lower portion of the fire-pot when the lever I is operated by raising it up and down.

N is a screw-rod working in suitable supports, the inner end of which impinges against the standard E, to hold the same in any desired position.

The standard E is provided with an aperture, O, adapted to receive the end of the rod or tool P, which, when raised to the position shown in Fig. 3, is inserted through the opening R into the aperture O, which, when moved to and fro, shakes the grate D, and when it is desired to shake the fire-pot and move the grate G back and forth on the ledge B the tool P is placed between the lugs *f f*, formed on the under side of the fire-pot, and said tool moved back and forth to free the grate G of ashes.

The operation of my device is as follows: When it is desired to charge the furnace with fuel, the grate D is raised by the devices already described to the position shown in Fig. 3. This will force the live coals over into the pocket or chamber H, leaving a certain amount of the live coals on top of the movable grate. The fresh fuel is now thrown on top of the grate D, and the same lowered into the position shown in Fig. 1. The fresh coal will settle down with the grate, and the surplus of live coals, which has been forced over to the sides of the combustion-chamber, will settle down over the fresh fuel, pocketing the same and completely surrounding it with live coals, so that the gases are at once generated in the fire-pot, and the hot air coming up through the live coals at the side of the fire-pot and through the grate-bars G is mingled with the gases and smoke, thus effecting a complete combustion.

What I claim, and desire to secure by Letters Patent, is—

1. In furnaces for steam-engines and other purposes, the method herein described of feeding the fuel to the same, which consists in raising the live coals from the center of the fire pot or chamber toward the walls of the combustion-chamber and feeding the fuel on to the center of the fire-chamber and permitting it to settle into the same, as described, whereby the fresh fuel is surrounded by a body of live coal, as set forth.

2. In furnaces for steam-engines and other purposes, a fire pot or chamber having a grate projecting from near its top toward the walls of the combustion-chamber and a movable grate adapted to be raised and lowered within said fire pot or chamber, as set forth.

3. In furnaces of the character described, the movable grate D, adapted to be raised and lowered in the fire-pot C, in combination with the friction-block L and lever I, whereby the grate is raised and lowered in the fire-pot, as set forth.

4. In furnaces for steam-engines and other purposes, having a vertically-moving bottom grate, the friction-block L, provided with the sliding weight *e*, in combination with the standard E and lever I, whereby the direction of the moving grate is changed, as set forth.

5. In furnaces of the character described, having a vertically-moving bottom grate, the standard E, provided with the aperture O, and the fire-pot provided with the lugs *f f*, in combination with the rod or tool P, whereby both grates can be oscillated to free the same from ashes, as set forth.

6. In furnaces having a vertically-moving bottom grate, the standard or support E, in combination with the screw-rod N, whereby said standard and grate are held at any desired point, as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

EDWARD FALES.

Witnesses:
N. D. ADAMS,
F. D. BRASS.