No. 786,123. PATENTED MAR. 28, 1905.

H. K. HESS.

BURNER.

APPLICATION FILED JUNE 14, 1902.

2 SHEETS—SHEET 1.

Fig. 1.

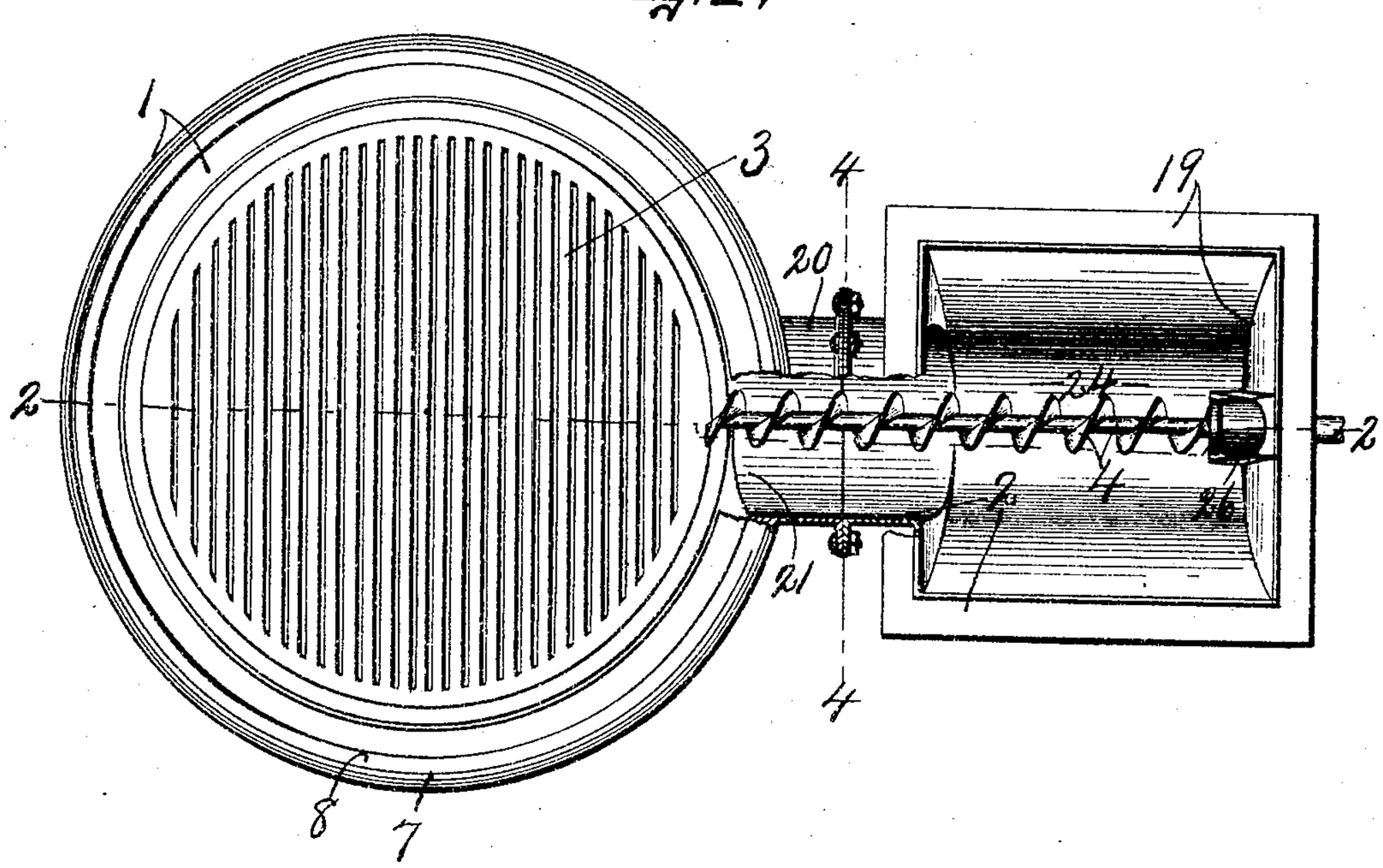
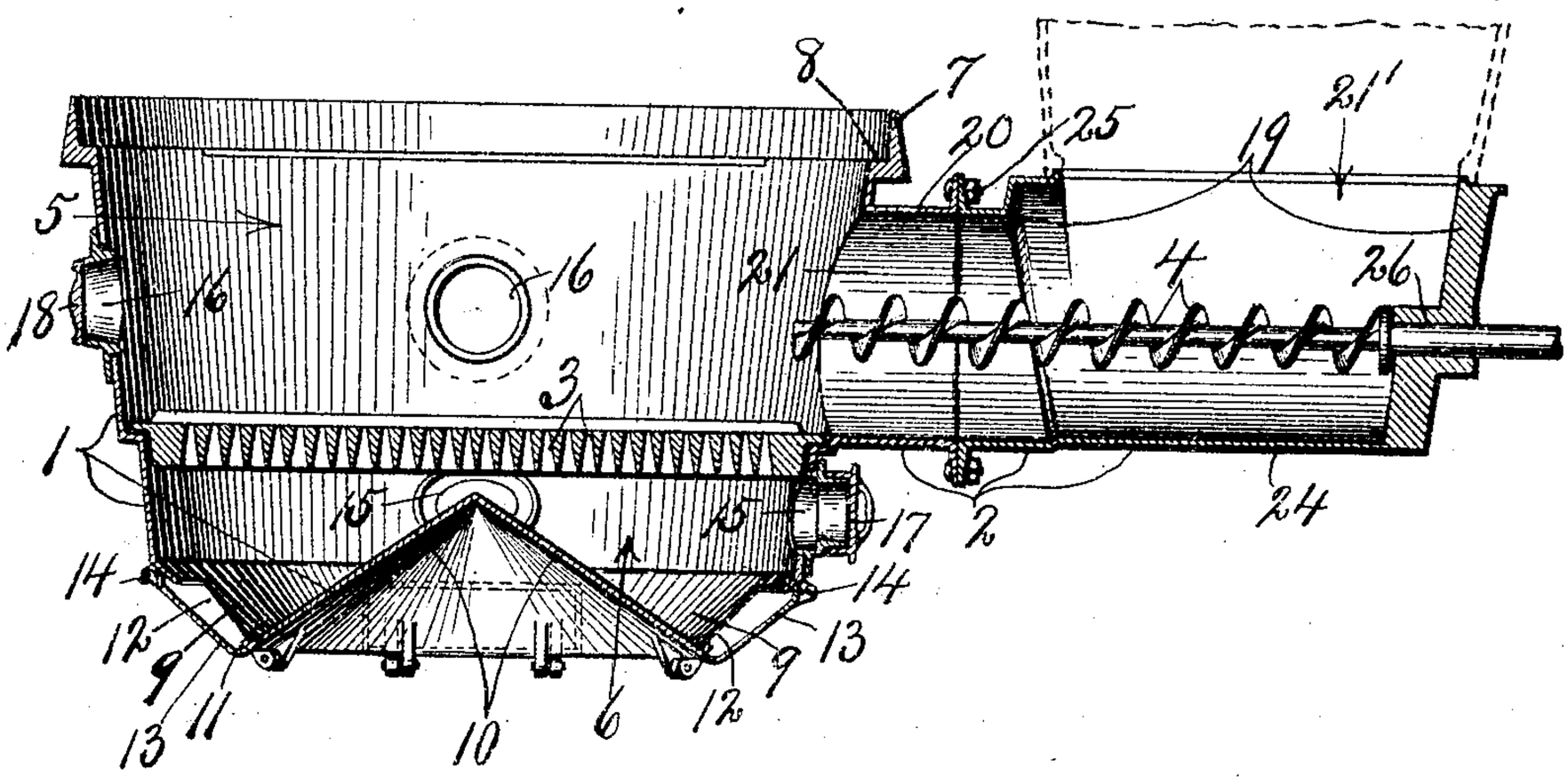


Fig. 2.



WITNESSES:

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2 SHEETS—SHEET 2.

Fig. 3.

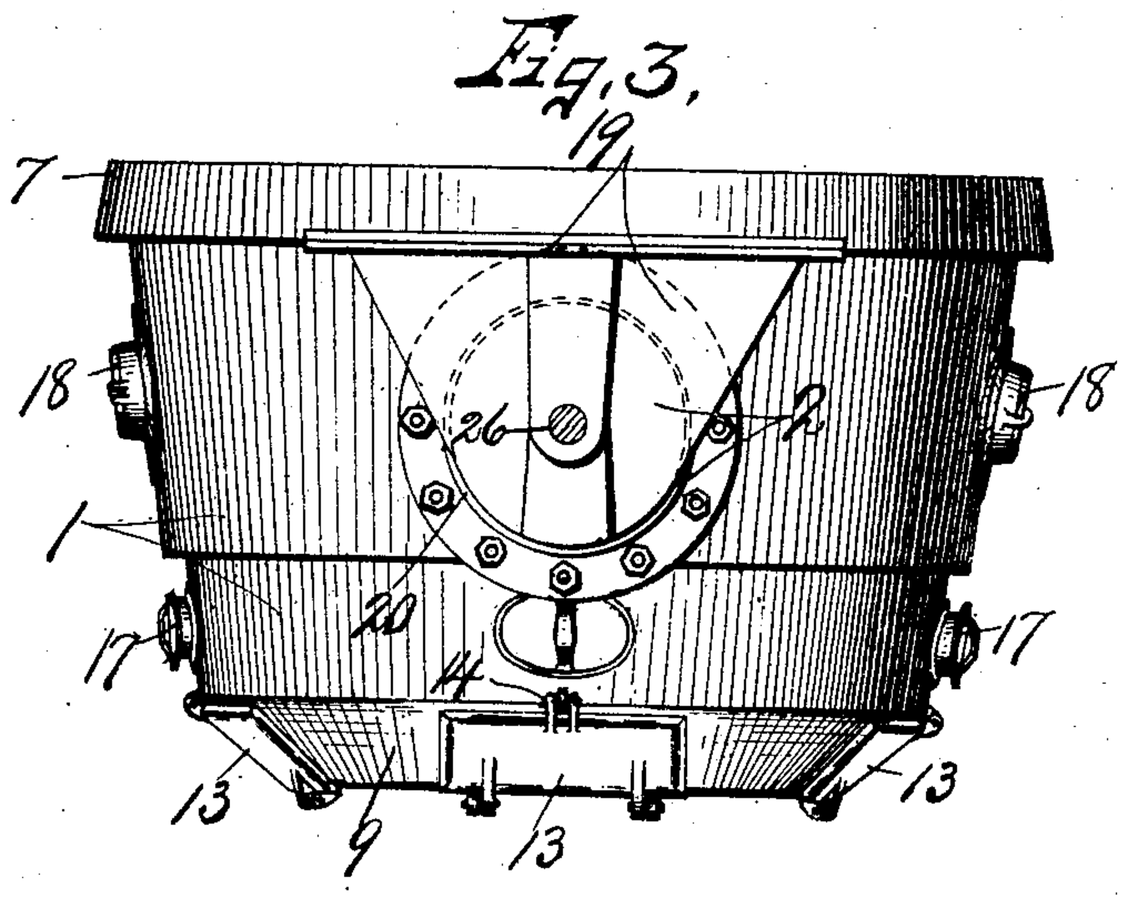
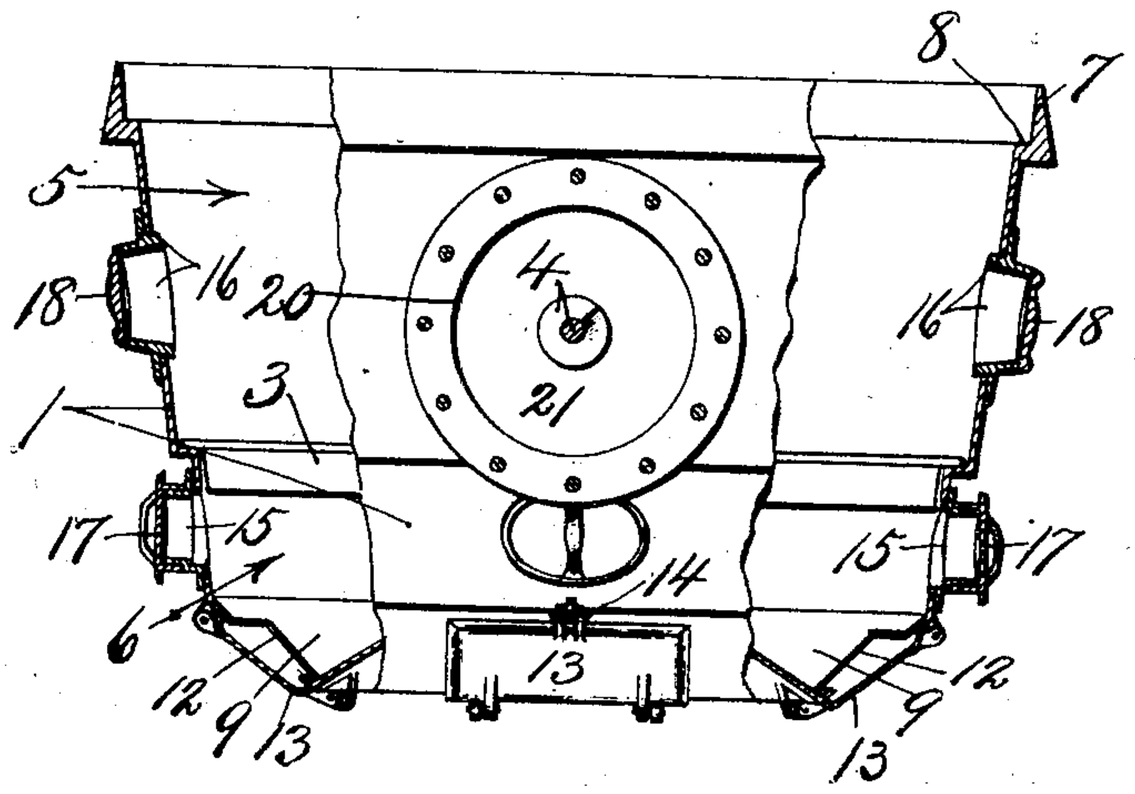


Fig. 4.



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UNITED STATES PATENT OFFICE.

HENRY K. HESS, OF PHILADELPHIA, PENNSYLVANIA.

BURNER.

SPECIFICATION forming part of Letters Patent No. 786,123, dated March 28, 1905.

Application filed June 14, 1902. Serial No. 111,757.

To all whom it may concern:

Be it known that I, HENRY K. HESS, of Philadelphia, in the county of Philadelphia, in the State of Pennsylvania, have invented new and useful Improvements in Burners, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to improvements in burners, having more particular reference to charcoal-burners adapted for use in connection with steam-boilers as applied to steam-propelled vehicles.

The object of my invention is to produce a coal-burner capable of being applied to upright-flue boilers of the type used in connection with steam-vehicles in which solid fuel, such as charcoal, is fed to the grate of the burner by suitable feeding mechanism without liability of congesting the throat of the inlet with fuel or of excessively straining any of the parts of the burner.

Another object is to provide means for concentrating the ashes or siftings through the grate and additional means for facilitating the removal of said ashes or siftings when desired.

One of the specific objects of this device is to construct the throat or channel of the fuel-inlet opening considerably larger than the feeding device, so that in the operation of the feeding of fine and coarse fuel promiscuously into the combustion-chamber there will be no liability of the coarser fuel clogging or becoming congested in the channel, which would tend to interfere with the operation of the feed, or, on the other hand, if the fuel was fed into the combustion-chamber in excess of its capacity or requirements for proper combustion the continued movement of the feed would be ineffective so far as the further feeding of the fuel is concerned, and would therefore prevent any injury or undue strain resulting from such continued feed, as would be the case if the channel in which the feeding mechanism moves was of substantially the same cross-sectional area as said feed mechanism.

In the manufacture of steam-boilers in which solid fuel, as coal or charcoal, is used it is customary to build the combustion-chamber and other parts for feeding the fuel thereto as an integral part of the boiler proper. This is particularly true with reference to upright-flue boilers, and I believe myself to be the first to produce a coal or charcoal burner exclusive of the boiler as a new article of manufacture, the primary object being to substitute this invention for the liquid or gas fuel burners now in use.

It is well known that gasolene, most commonly used as a fuel for steam-boilers and as an explosive mixture for vapor-engines, is highly explosive and is extremely difficult to control and that many serious accidents result from its use, particularly when used for the propulsion of vehicles, such as automobiles.

I have for some time past been conducting a series of experiments with charcoal as a fuel and as a substitute for oil and gas with very satisfactory and economical results, and it is therefore believed that I am entitled to broad protection upon the device hereinafter fully described.

Referring to the drawings, Figure 1 is a top plan of my improved burner. Fig. 2 is a sectional view taken on line 2 2 of Fig. 1. Fig. 3 is an end view of the device seen in Fig. 1. Fig. 4 is a sectional view taken on line 4 4 of Fig. 1, a part of the shell of the combustion-chamber being broken away.

Similar reference characters indicate corresponding parts in all the views.

My improved burner consists, essentially, of an upright shell or fire-box 1 and a horizontal shell or fuel-box 2, a grate 3, and a fuel-feeding device 4, the shell 1 being provided with a combustion-chamber 5 above the grate 3 and with an ash-chamber 6 beneath the grate, the combustion-chamber 5 forming the upper end of the burner and the ash-chamber forming the base of the burner.

The shell or fire-box 1 is preferably disposed in an upright position, being usually constructed of boiler-iron or other suitable sheet metal, and is preferably cylindrical in cross-section, the upper end being open and provided with an annular flange 7 and shoulder 8 for receiving the lower end of the boiler, to

which the burner may be attached in any desired manner not necessary to herein illustrate or describe.

The fire-box 1 preferably tapers downwardly from its upper end, and its lower end is provided with a bottom wall having downwardly and inwardly inclining portions 9, united to the upright walls of the fire-box and terminating in a central conical wall 10, having its apex uppermost and its base united to the lower edge of the portion 9, so as to divert the ashes or siftings from the grate downwardly and outwardly from its center or apex into the base of the ash-chamber 6.

It is apparent from the foregoing description of the bottom wall of the shell or fire-box that a suitable annular trough 11 is formed at the junction of the inclined portions 9 and 10 of the bottom wall, and in order that the ashes and other siftings may be readily removed from this trough I provide one or more openings 12, each having a closure 13, said openings 12 being preferably cut in the portions 9 of the bottom wall, and the closures 13 are preferably arranged in an inclined plane substantially coincident with the wall 9 and their upward ends are adapted to swing downwardly and inwardly, so that the removal of the ashes may be controlled to better advantage and that the doors may swing by gravity out of the way. These doors are usually held in position by suitable catches, as pins 14, which enter apertures in lugs formed, respectively, upon the fire-box 1 and doors 13. The upright walls of the shell 1 beneath and above the grate are provided with openings 15 and 16 and which are provided with suitable caps 17 and 18. The openings 15 beneath the grate serve as draft-openings and are normally open to admit air to the under side of the grate, while the openings 16 are normally closed and may be utilized either for checking the draft or combustion, but serve as a sight-opening through which the condition of the fire may be observed.

The shell or fuel-box 2 may be of any desired form or size greater than the feeding mechanism therein and preferably consists of a hopper 19, united to the front wall of the shell 1 by a cylindrical or tubular portion 20, which forms the throat of an inlet-opening 21, connecting the interior of the shell 2 with the combustion-chamber 5. The hopper 19 is preferably arranged in an upright position, being provided with an inlet-opening 21′ in its upper wall for receiving fuel, such as charcoal, from any desired form of fuel-reservoir, as 22, a portion of which is shown by the dotted lines in Fig. 2. This arrangement of the hopper 19 and its opening 21′ permits the fuel to be fed by gravity to the interior of the fuel-box 2, the opposite sides or inclosing walls of the hopper 19 being usually inclined downwardly toward each other and terminating in a semicylindrical bottom wall 24, which forms the continuation of the cylindrical portion 20 of the shell 2.

I preferably construct the shell 2 in sections, one of which is permanently secured to the fire-box 1 and the other forms the main body or hopper 19, the adjacent ends of said sections being flanged outwardly and are secured together by suitable means, as bolts 25.

Movable within the shell 2 and arranged substantially central therein is the feeding mechanism 4, here shown as consisting of a screw or spiral blade having one end journaled in a bearing 26 in the end wall of the shell 2 and its other end extending inwardly through the inlet-opening 21 of the shell 1. This screw or fuel-feeding mechanism 4 is of considerably less cross-sectional area or diameter than the diameter of the cylindrical portion 20 and inlet-opening 21, and being arranged substantially central therein it is evident that when the screw-feed is operated or rotated the fuel is carried forwardly from the inlet of the hopper 19 into the combustion-chamber 5 without liability of the throat or inlet becoming congested by the large lumps of fuel or by the feeding of an excess of fuel to the combustion-chamber beyond what is actually required for the proper combustion. The primary reason why this fuel does not clog in the shell 2 is that the bulk of the fuel is supported in the hopper 19 and upon the lower wall 24 thereof and surrounds the contiguous portion of the screw, thereby leaving the throat or inlet 21 almost entirely open, and as the screw is operated or rotated the large opening of the inlet permits the passage of any large lumps of coal or charcoal, and on account of the coal gravitating to the bottom wall of the shell 2 the inner end of the screw operates to feed from the surface of the fuel resting upon said bottom wall and gradually forcing the same forwardly into the grate, the inner end of the screw being elevated above the grate a sufficient distance to form a suitable body of fuel thereon.

Any desired means (not necessary to herein illustrate or describe) may be employed for rotating the screw; but it is, however, preferably connected to some part of the running-gear or engine under the control of the operator.

The operation of my invention will now be readily understood upon reference to the accompanying drawings and the foregoing description, and it will be noted that some change may be made in the detail construction and arrangement of the parts without departing from the spirit thereof.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In an attachment for upright-flue boilers, a coal-burner comprising an upright shell hav-

ing an open top and a conical bottom with its apex central and uppermost, said bottom having an opening and a closure for the opening, a fuel-box secured to and opening into one side of the shell, and a screw in the opening.

2. In an attachment for upright-flue boilers, a coal-burner comprising an upright shell having an open top, a conical bottom with its apex uppermost, said bottom being formed with an opening, a door for said opening, a fuel-box secured to and opening into the side of the shell, and a screw in the fuel-box of less diameter than the fuel-opening of the box to form a space around the screw.

In witness whereof I have hereunto set my hand this 10th day of June, 1902.

HENRY K. HESS.

Witnesses:
WM. A. SHRYOCK,
MILTON WOLF.