

(No Model.)

G. A. BELL.
FURNACE.

No. 538,226.

Patented Apr. 30, 1895.

Fig. 1.

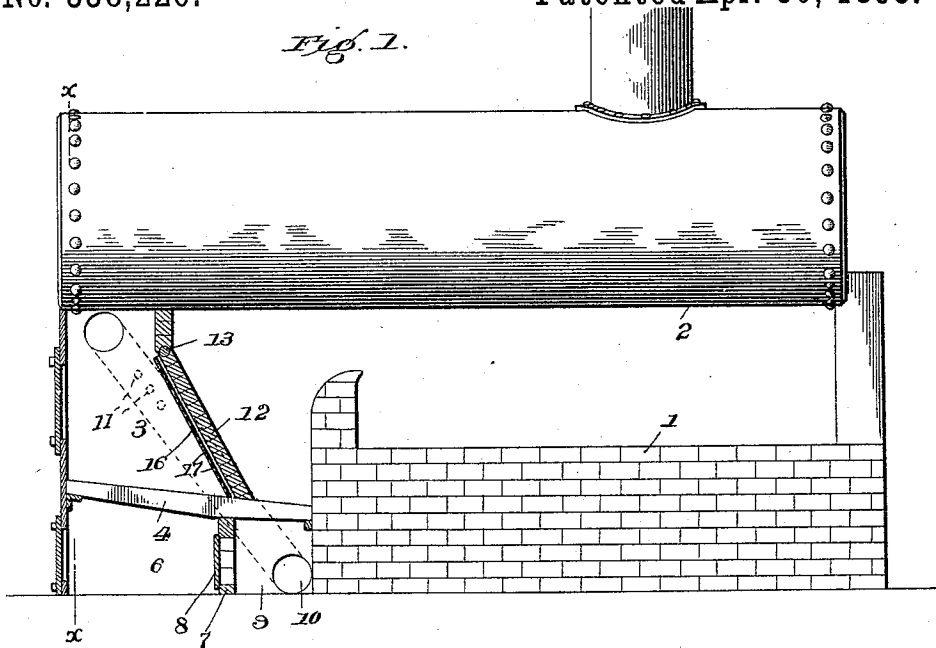


Fig. 2.

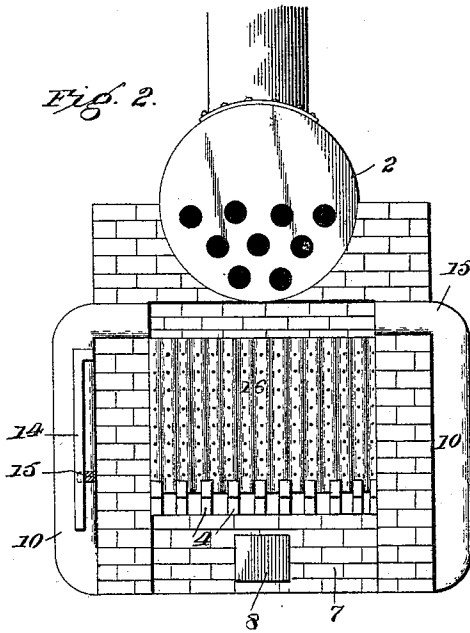


Fig. 4.

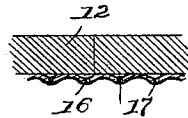
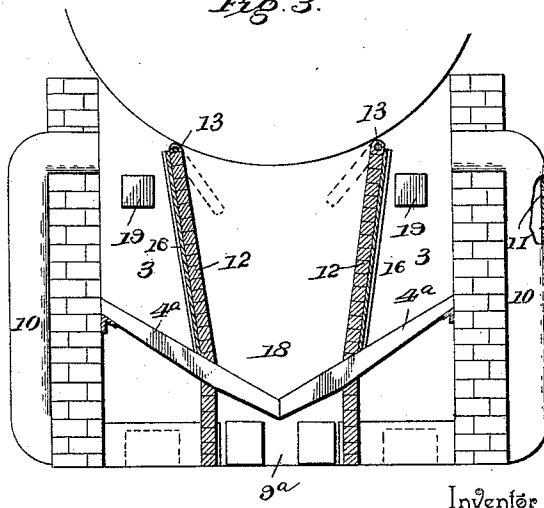


Fig. 3.



Inventor

George A. Bell

Witnesses

M. Johnson
D. P. Hays

By *H. S. Attorneys*,

C. A. Snow & Co.

UNITED STATES PATENT OFFICE.

GEORGE A. BELL, OF LEMARS, IOWA, ASSIGNOR OF ONE-HALF TO CHARLES L. FAVOR, OF SAME PLACE.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 538,226, dated April 30, 1895.

Application filed October 18, 1894. Serial No. 526,314. (No model.)

To all whom it may concern:

Be it known that I, GEORGE A. BELL, a citizen of the United States, residing at Lemars, in the county of Plymouth and State of Iowa, have invented a new and useful Furnace, of which the following is a specification.

This invention relates to furnaces; and it has for its object to effect certain improvements in smoke consuming furnaces, wherein the smoke and other products of combustion will be entirely consumed so that the fuel will be completely utilized, and thereby effect a saving in the amount of fuel ordinarily used in steam boiler furnaces.

To this end the invention contemplates an attachment adapted for use in connection with nearly all ordinary forms of steam boiler furnaces, as well as in connection with stoves and other kinds of heaters, to provide means for effecting a saving in fuel.

With these and other objects in view, which will readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination, and arrangement of parts hereinafter more fully described, illustrated, and claimed.

In the drawings, Figure 1 is a longitudinal sectional view of an ordinary steam boiler furnace equipped with the herein described improvements. Fig. 2 is a vertical sectional view on the line *xx* of Fig. 1. Fig. 3 is a view similar to Fig. 2 showing the herein described improvements applied to another form of steam boiler furnace. Fig. 4 is a detail sectional view of a portion of the adjustable fire wall.

Referring to the accompanying drawings, 1 designates an ordinary steam boiler furnace supporting therein the boiler 2, and the furnace 1, is provided with the usual front fire-box 3, in which is arranged the fire grate 4, located above the usual ash pit 6.

In the present invention the ash-pit 6, is partitioned off by a transverse partition wall 7, provided with a door opening 8, therein, and forming between the same and the bridge wall of the furnace a rear hot air circulating chamber 9, with opposite sides of which connect the lower ends of the opposite hot air side flues 10, the upper ends of which pierce

the opposite sides of the furnace and open into the fire box 3, at the top thereof, immediately under the boiler, and said side flues 10, serve to carry the smoke and other products of combustion from the fire box into the circulating chamber 9, from which the smoke and other products of combustion rise through the fire on the rear portion of the grate in front of the bridge wall of the furnace. The said side flues 10, are provided at suitable points therein with air inlet openings 11, that not only assist in providing a proper draft for the fire, but also supply the necessary amount of oxygen to the smoke to provide for the consumption thereof before it passes out of the furnace.

The fire or fuel on the front and rear portions of the grate 4, is separated by means of an adjustable fire wall 12. The adjustable fire wall 12, preferably consists of a series of closely arranged fire bricks, suitably bound together and connected to a transverse rock shaft 13, supported transversely within the furnace under the boiler therein, and said rock shaft 13, is provided at one end outside of the furnace with an adjusting lever 14, adapted to engage a suitable catch device 15, outside of the furnace to provide for holding the fire wall in its adjusted position.

The adjustable fire wall 12, is arranged at an angle within the fire box of the furnace to provide for the easy opening thereof, and the lower end of said fire wall is adapted to normally rest on top of the grate 4, above the ash-pit partition wall 7, so as to entirely cut off the front and rear parts of the fire box from communication, and therefore compel the smoke and other products of combustion to pass through the side flues 10, into the chamber 9, and thence up through the grate between the bridge wall and said fire-wall, thereby securing a consumption of the smoke in front of the bridge wall. The said adjustable fire wall 12, has securely fitted on one side thereof a corrugated flue-plate 16. The corrugated flue plate 16, entirely faces or lines one side of the fire-wall and is provided with a series of flue openings or perforations 17, in the ridges thereof. The corrugations of the said flue plates 16, extend from the upper to

the lower edges of the adjustable fire-wall, and receive through the openings or perforations 17, the smoke from the fuel on the grate, so that such smoke can be carried into the upper part of the fire box where it escapes into the side flues 10, in the manner already described.

With the adjustable fire-wall positioned as described, the fresh fuel on the grate 4, in front of the fire-wall will give off smoke and other gases, but as soon as such fuel has been coked, the lower edge of the fire-wall is lifted sufficiently to allow the coke to be stoked back onto the rear part of the grate in rear of the fire-wall, and the smoke from the fresh fuel is therefore caused to pass through the coke fire at the rear of the grate, and will be consumed.

In Fig. 3, of the drawings, another form of steam boiler furnace is illustrated, and in this form of furnace inclined side grates 4^a, are employed, which grates decline toward the center of the fire-box to form a central fuel pocket 18, and fuel is introduced onto the inclined side grates 4^a, through the side fuel openings 19, in the front wall of the furnace, as will be well understood by those skilled in the art. In this form of furnace it is simply necessary to duplicate the arrangement described in connection with Fig. 1, and to arrange one of the fire-walls 12, over each of the grates 4^a, and the partition walls 7, under the grates 4^a, inclose therebetween under the grate a central circulating chamber 9^a, that communicates with the central fuel pocket 18, which pocket is adapted to hold the coke which is introduced therein under the lower edges of the fire-wall 12, and through which the smoke and other products of combustion are compelled to pass, as will be easily understood by those skilled in the art. The adjustable fire-wall 12, in connection with the side flues 10 and partition walls 7, can be used in connection with other forms of furnaces than those described, and may also advantageously be employed in connection with stoves and other heaters for securing the same results as those described.

Changes in the form, proportion and the minor details of construction may be resorted to without departing from the principle or

sacrificing any of the advantages of this invention.

Having thus described the invention, what is claimed, and desired to be secured by Letters Patent, is—

1. The combination with the fire grate of a stove or furnace; of an adjustable imperforate fire wall supported at an angle over the grate and adapted to normally rest at its lower edge directly on the grate, a partition wall adapted to be arranged under the grate below the lower edge of the fire-wall, and a hot air flue connecting the space in front of said fire-wall with the space under the grate at one side of said partition wall, substantially as set forth.

2. In a stove or furnace, the combination with the fire box and the grate therein; of an ash-pit partition wall arranged under the grate near one end thereof to form a circulating chamber under the grate, an adjustable fire wall supported at an angle over the grate and adapted to rest at its lower edge thereon over said partition wall, and a hot air flue leading from the upper part of the fire box at one side of the fire wall to the circulating chamber at one side of the partition wall, substantially as set forth.

3. In a stove or furnace, the combination with the fire box and the grate therein; of an ash-pit partition wall arranged under the grate, an adjustable fire brick fire-wall pivotally supported at an angle over the grate and adapted to rest at its lower edge thereon over the partition wall, means for adjusting said fire wall, a regularly corrugated flue plate fitted to one side of the fire-wall and having flue openings or perforations in its corrugations, and a hot air flue leading from the upper part of the fire-box at one side of the fire wall to the circulating chamber at one side of the partition wall, said hot air flue being provided at suitable points with air inlet openings, substantially as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

GEO. A. BELL.

Witnesses:

JOHN H. SIGGERS,
HAROLD H. SIMMS.