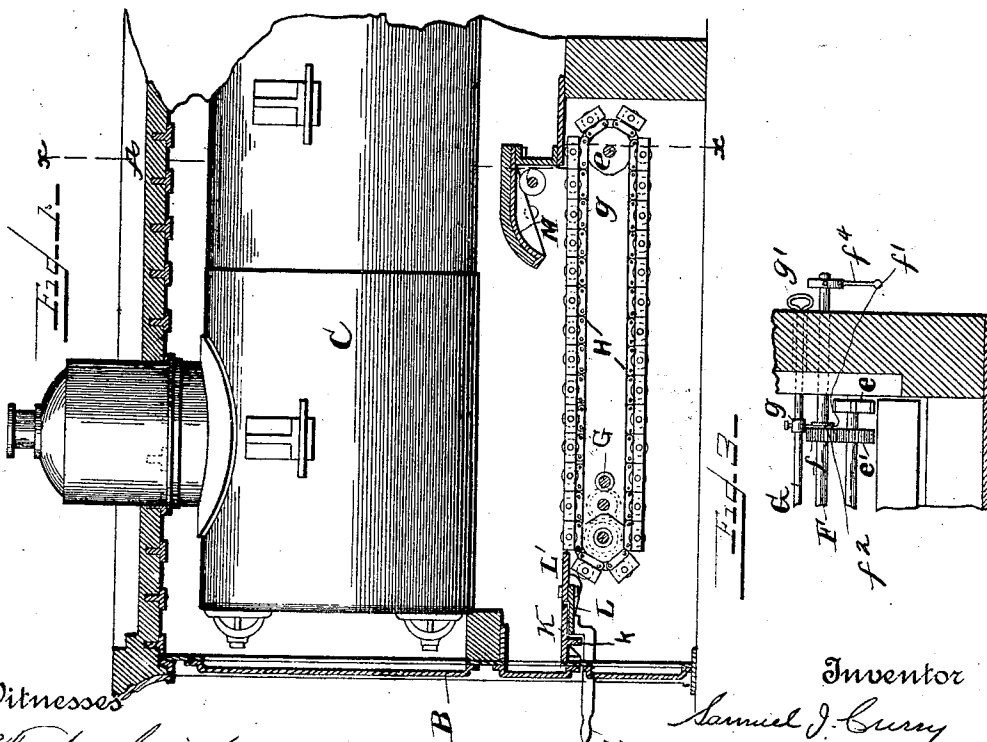
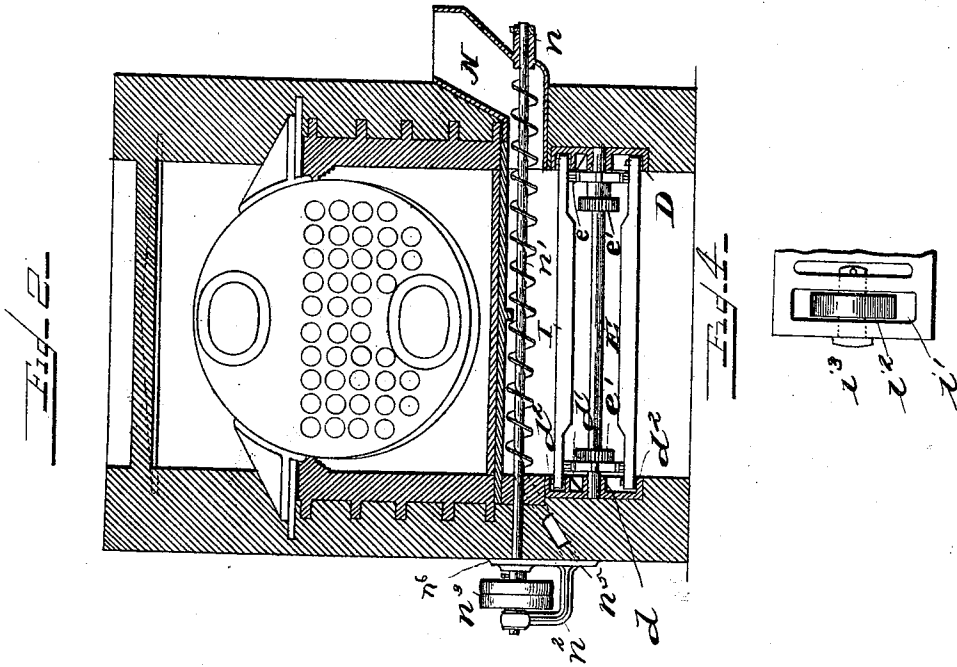


(No Model.)

S. J. CURRY.
FURNACE.

No. 515,197.

Patented Feb. 20, 1894.



Witnesses
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UNITED STATES PATENT OFFICE.

SAMUEL J. CURRY, OF CHESTER, PENNSYLVANIA.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 515,197, dated February 20, 1894.

Application filed March 29, 1893. Serial No. 468,111. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL J. CURRY, a citizen of the United States, residing at Chester, in the county of Delaware and State of Pennsylvania, have invented certain new and useful Improvements in Furnaces; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to furnaces generally but more particularly to grates and stokers for the same, and it consists in certain improvements in the grates and an automatic stoking apparatus. The object being to produce a cheap, simple, yet durable and effective apparatus, and with these objects in view my invention consists of the parts and combination of parts as will be more fully hereinafter set out.

In the drawings: Figure 1 is a central longitudinal section through a furnace the boiler being in elevation. Fig. 2 is a cross section of the same on the line X X Fig. 1. Figs. 3 and 4, are detail views.

A represents the usual casing of a boiler and furnace lined in the usual manner with fire brick, &c.

B is the iron front of the casing and C is the boiler set in any desirable manner.

D are grate supports secured in the walls on each side of the furnace and provided with a journal box *d* and the projections or flanges *d'* and *d''*.

E is a shaft journaled in the boxes *d*, on which are rigidly secured the wheels *e*.

e' are gear wheels also rigidly secured to the shaft E.

F, is a shaft located directly in front of the shaft E, upon which are pinions *f*, having collars *f'* provided with flanges *f''*. These slide on a feather formed on the shaft F. Said shaft F being provided with a suitable operating handle *f''*.

G is a rod secured in front of the shaft F on which are secured two shippers *g* adapted to engage the collars *f'* and the flanges *f''*. This rod is provided with a suitable handle *g'*.

H is a link chain adapted to work upon the wheels *e*.

I are the grate bars secured to the link chain

by means of the bolt not shown, one grate bar being secured to each link in the chain. At each end of the grate bar is a slot *i'* in which is journaled a small wheel *i''* on a pin *i'''*.

To the front of the furnace is secured an inwardly projecting piece of metal K provided with a depending projection *k*.

L and L' are two pieces of metal bolted together and forming a shutter as shown and pivoted in the walls of the furnace. The piece L is provided with a lever *l* which extends outside of the furnace.

M is a box of the form shown, this form having been found the strongest to support the weight of the brick forming the bridge wall. The forward end of this box is so set that it is a certain distance above the grate bars, the object of which will be hereinafter set out.

N is a coal box or hopper set into one side of the furnace and provided with a journal bearing *n* in which is journaled one end of a screw conveying shaft *n'*. The other end of this screw conveying shaft is journaled in a plate *n''* set in the opposite side of the furnace, said plate having a bracket *n'''* in which the extreme end of said shaft is journaled.

n'' are pulleys secured to the screw conveying shaft. This screw conveying shaft, as will be seen, works in the box under the bridge wall and over the rear of the grate. Journals of said screw are outside of the furnace and therefore will not be affected by the heat.

n'' is a slot or opening in the side of the furnace located in the box opposite the hopper N and will be hereinafter referred to.

The operation is as follows: Fire is started in the furnace and the hopper N filled with coal. The coal is then conveyed into the box under the bridge wall by means of the screw conveyer *n'* which drops the coal on the surface of the grate, the screw being allowed to work until the box is full its entire length, this being indicated by the coal dropping out of the slot *n''* at the opposite end of the box from the hopper, and when this occurs the screw is stopped. Thus the box is filled with coal sufficient to cover from twelve inches to sixteen inches of grate surface. It will be supposed (for purposes of illustration) that the fireman wishes to introduce a new supply

of coal. The ash pit and firing doors are first closed to exclude the draft and the lever *l* is pushed down thereby raising and opening the shutter *L'*. This shutter *L'* is always kept closed when the grate is not being moved. The lever *b⁴* is now turned, thereby rotating the shaft *F*, on which is the pinion *f* which engages the gear wheel *e'* thereby rotating the grate about one third revolution or enough to advance the grate about one foot thereby dumping so much ashes at the front of the grate into the ash pit and adding new fuel at the rear of the furnace which ignites from the heat from the other coals. The shutter *L'* is now closed and drafts opened to suit the requirements of steam raising. The hopper *N* is again filled immediately in the manner above set out and the screw conveying shaft operated by a belt on the pulleys *n²*, or otherwise until the box is filled. The depth of the coal on the grate bars is regulated by the distance between the grate bars and the bottom of the bridge wall.

As will be seen the projection *d'* carries the weight of the grate bars in operation, and the coal; the wheels *i²* traveling on said projection, these projections being strengthened by lugs *x*, while the projection *d²* carries the weight of the grate bars out of operation. Thus it will be seen that the entire weight of the traveling grate is supported by the plate *D*.

The mechanism shown which carries the grate forward is only adapted to rotate the grate of one furnace. If, however more than one furnace is built in a "nest" the shaft *E* which carries the grate is separate in each furnace, while the shaft *F* on which are secured the pinions *f* will be extended through all the furnaces in the "nest" and by means of the shifting rod or lever *G* the pinion *f* may be put into and out of gear to suit the particular furnace to which it is desired to admit fresh fuel.

As a rule where automatic stokers are used, furnaces are of particular construction throughout and in the event of a break in the stoking apparatus the furnace cannot be stoked in the ordinary manner, therefore it is useless until the stoker is repaired, and these breaks always occur at the most inconvenient time and entail considerable loss. Whereas in my furnace this objection is overcome for if the stoker should become broken or damaged it is not necessary to put it out of operation as the fireman can stoke the furnace through the door in the front in the ordinary manner, and thus keep it in operation.

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

1. In a furnace the combination with a hollow bridge wall of a screw fuel conveyer in said wall, substantially as and for the purposes described.

2. In a furnace the combination with a traveling grate of a hollow bridge wall extending over the grate, a screw fuel conveyer in said wall adapted to feed fuel on that part of the grate lying under the bridge wall.

3. In a furnace the combination with a traveling grate, and hollow bridge wall extending over a portion of said grate, of a hopper secured in the side wall of the furnace one end of which opens into the hollow bridge wall and a screw fuel conveyer in said hopper and bridge wall.

4. In a furnace the combination with the hopper, the hollow bridge wall and screw conveyer, of a slot or opening from said hollow bridge wall extending through the wall of the furnace opposite the hopper, substantially as and for the purpose described.

5. In a furnace the combination with the traveling grate and its shafts or axles, gear wheels secured to one of said shafts or axles, of pinions mounted on a sliding collar a flange on the collar said collar secured to a shaft in line with the grate shaft whereby the pinions are adapted to engage said gear wheels, and a shipping lever or rod engaging said collars and flanges to throw the pinions into and out of engagement with the gear wheels, substantially as described.

6. In a furnace the combination with a traveling grate, the bars of which are provided with a roller at each end, of plates set into the walls of the furnace and provided with journal bearings, a flange supported by a lug above said bearings, and a flange at its extreme lower end the first mentioned flange adapted to carry the grate bars in use while the lower flange carries the bars not in use.

7. In a furnace the combination with a traveling grate of a shutter pivoted in the walls of the furnace and provided with a depending lever which extends outside of the furnace and is adapted to work in a slot in the front of the furnace, substantially as described.

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

SAMUEL J. CURRY.

Witnesses:

OWEN Z. PYLE,
CHAS. C. LARKIN.