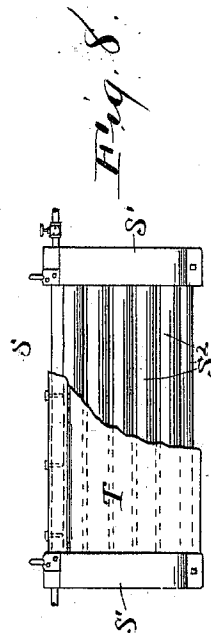
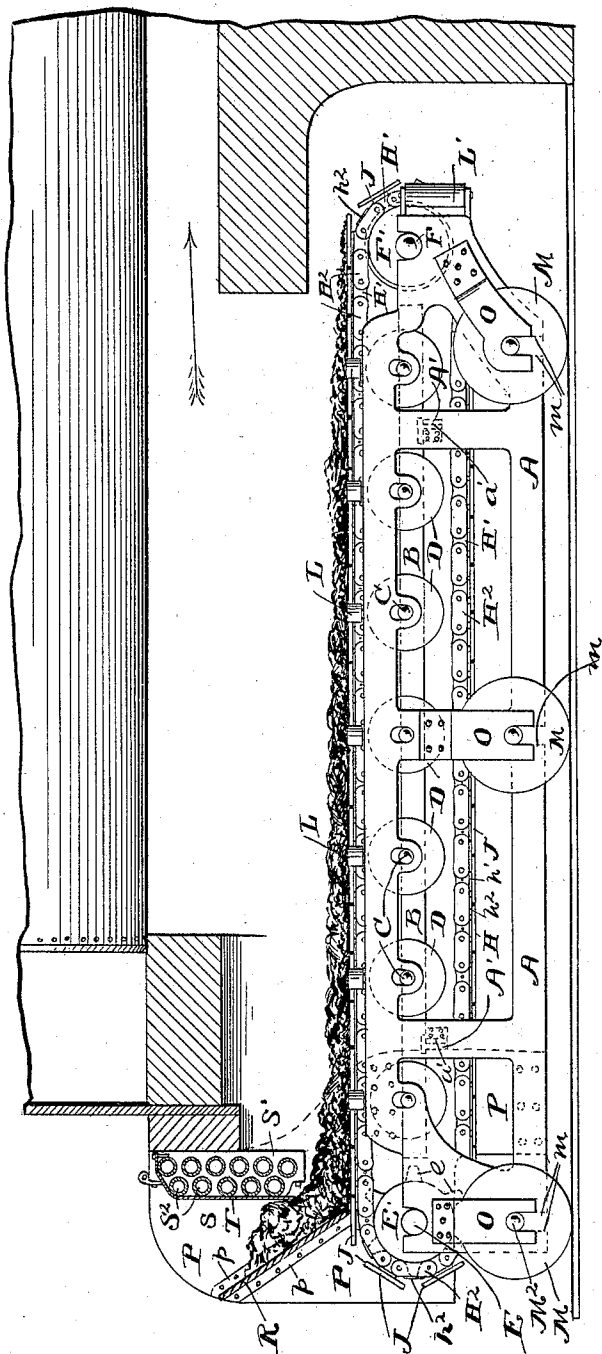


G. PLAYFORD, Jr.
MECHANICAL STOKER FURNACE.

No. 570,268.

Patented Oct. 27, 1896.

Fig. 1.



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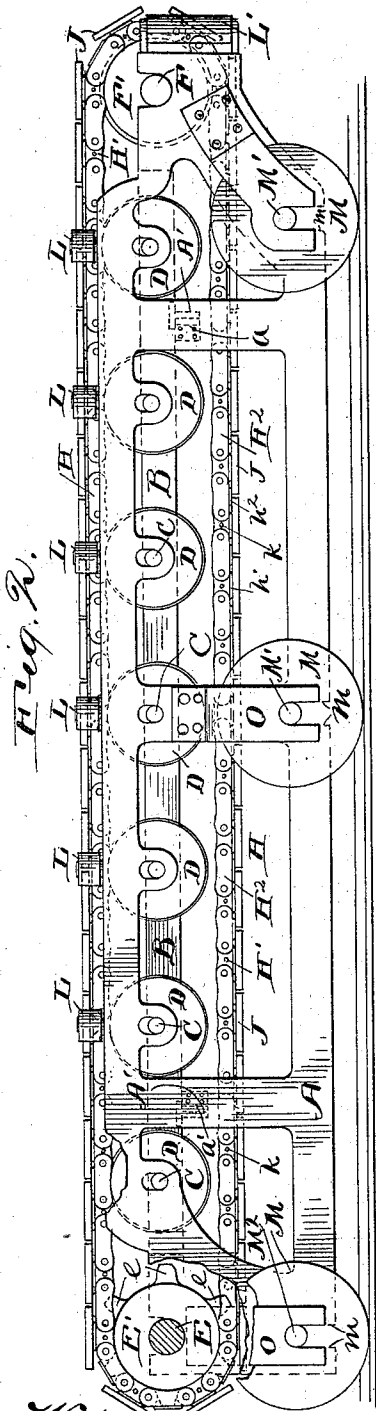
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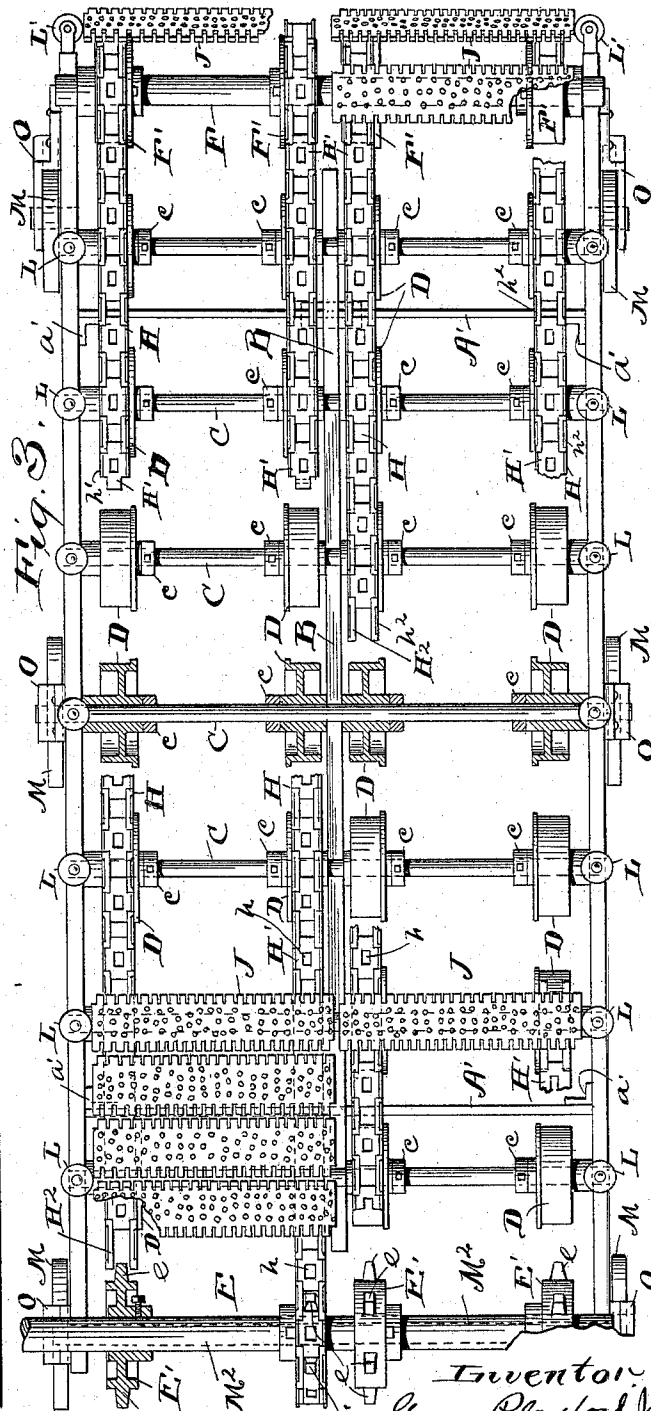
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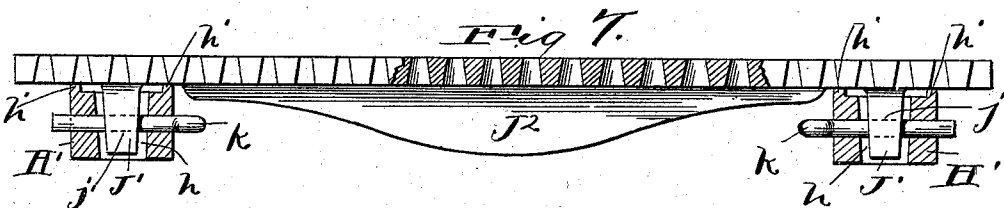
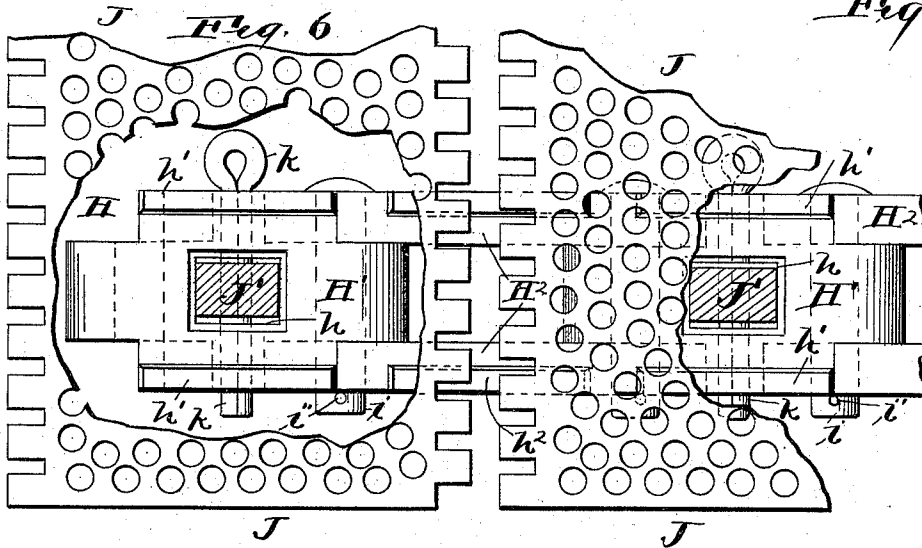
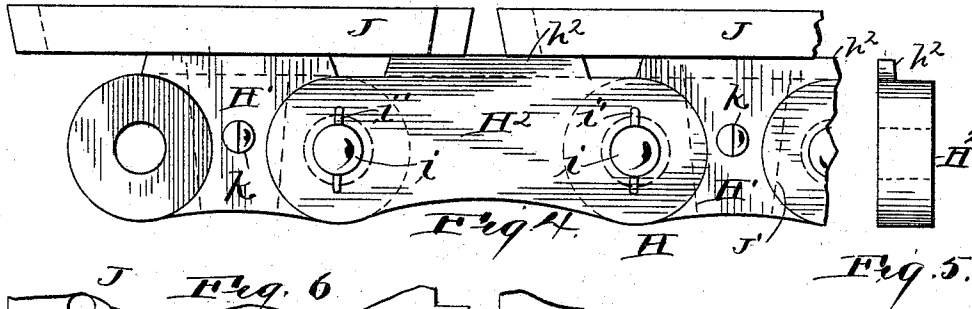
(No Model.)

3 Sheets—Sheet 3.

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No. 570,268.

Patented Oct. 27, 1896.



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UNITED STATES PATENT OFFICE.

GEORGE PLAYFORD, JR., OF CLEVELAND, OHIO.

MECHANICAL-STOKER FURNACE.

SPECIFICATION forming part of Letters Patent No. 570,268, dated October 27, 1896.

Application filed March 30, 1896. Serial No. 585,375. (No model.)

To all whom it may concern:

Be it known that I, GEORGE PLAYFORD, JR., of Cleveland, Cuyahoga county, Ohio, have invented certain new and useful Improvements in Mechanical-Stoker 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 pertains to make and use the same.

My invention relates to traveling-grate furnaces, or to that class of furnaces known as "mechanical-stoker" furnaces, the object being to so construct a furnace as regards the traveling grate and its supporting and operating mechanism as that the parts are interchangeable and easily replaced when from any reason they become broken, burned out, or in other ways inoperative, and also to obviate as far as practicable the use of screw-threaded bolts and nuts in securing the parts together.

My invention consists in the peculiar construction of the parts so that the above objects are attained, and also whereby the hopper-gate is kept cool and made to perform the function of a water-heater, either communicating with the boiler or not, as desired.

In the drawings, Figure 1 is a sectional view, in side elevation, of a furnace illustrating my improved stoker and the location of the same in the furnace. Fig. 2 is a view in side elevation, showing the traveling grate and frame removed from the furnace. Fig. 3 is a plan view with parts removed, illustrating the top of the grate and frame. Fig. 4 is an enlarged view illustrating more clearly the link connection and mode of securing the grate-bars thereto, showing the same in side elevation. Fig. 5 is an end view of one of the link-bars. Fig. 6 is a top view of parts shown in Fig. 4. Fig. 7 is a sectional view of a grate-bar and the carrying-link, showing the air-space around the lug of the grate-bar where it is connected to the link. Fig. 8 is a view in front elevation of gate, showing apron broken away.

A A represent the side frames of my device, which are "tied" together by means of cross-braces A' A', secured to the sides A A by means of angle-clips a' a' a' a'.

B represents what I term a "bridge-piece," which is located about centrally between the

sides A A and is supported by and secured to the cross-braces A' A'. The bridge-piece B acts, in conjunction with the sides A A, to support the shafts C C, upon which are mounted the loose guide-wheels D D D D, which in turn are secured in position on the shafts by means of collars c c c c, provided with suitable set-screws.

At the forward end of the side frames A A is journaled a shaft E, on which are mounted sprocket-wheels E' E' E' E' in such a manner as to revolve with the said shaft. This shaft E, with its sprocket-wheels, is driven by any suitable mechanism.

At the rear end of the frame A A is located a shaft F, which has mounted thereon four guide-wheels F' F' F' F', preferably of the same diameter as the sprocket-wheels E'.

Extending between wheels E' E' E' E' and F' F' F' F' are four endless chains H H H H. The chains H H H H are made up of links H' H'. The links H' are each made of one solid piece and provided with central orifices h for receiving the downwardly-extending lugs of the grate-bars. At their upper ends the links H' are provided with projections h' h', one on either side, as shown. These projections act to support the grate-bars at their central portion, as shown in Figs. 4 and 7. The links H' are formed of two parts, each being pivotally secured to the links H' by suitable pins i, which are in turn secured by smaller pins i'. Each piece of the links H' is also provided at its upper ends with projections h² h², which act to support the sides of the grate-bars, as shown in Figs. 2 and 4. It will be noticed that the orifices h in the links H' are much larger than is necessary to accommodate the lugs of the grate-bars. This feature, in connection with the providing of the projections h' h² on the links, allows of the free circulation of air around and through the parts and in a measure keeps them cool and free to operate.

Another object in providing the projections h' h² on the links is, as heretofore stated, to prevent the accumulation of ashes and cinder between the under surface of the grate-bar and the upper surface of the links, inasmuch as the bearing-surfaces are so small or narrow that very little accumulation of ash or cinder can get between the bearing-sur-

faces. This would not be the case were the bearing-surfaces between the grate-bar and its bearing-link full, inasmuch as a greater amount of ash and cinder would accumulate and come between the bearing-surfaces and bind the parts and strain the connection pin.

Still another feature in providing the connecting-links H^2 with projections is that they provide a resting or bearing surface for the sides of the grate-bar, as shown in Fig. 4, without the necessity of making the projection a full width of the link. These projections, taken in connection with the orifices h in the links H' , which are much larger than the lugs of the grate-bars, allow the ash, especially the fine ash, to sift through and at the same time allow of a free circulation of the air through and around the parts and prevent them from becoming overheated.

J represents the grate-bars, which are perforated vertically and provided at their edges with alternate projections and openings, the lower ends of both the perforations and the openings being larger than the upper ends, as shown in Fig. 7, the object in thus forming them being to allow of the air freely entering through the grate and rendering the openings less liable to clog.

J' represents the downwardly-projecting lugs, which are formed integral with the grate-bars and are provided with a hole j , which is so located as to register with a hole in the link H' for the purpose of securing the grate-bars in place on the said links by means of a split pin k .

J^2 represents centrally-located flanges for strengthening the grate-bars.

The sprocket-wheels E' , as shown in Figs. 2 and 3, are provided with a single line of projecting teeth e , which enter between the parts of the links H^2 and abut against the ends of links H' , thus giving a central pull on the chains and keeping them in line, and also allowing of the links resting on or hugging the rim of the wheel closely.

The flanged guide-wheels D support the chains and grate-bars from beneath. In order to aid in keeping the grate-bars in line and prevent any side shifting, I provide a series of rollers L , mounted on the upper end of the side frames A , which rollers engage the outer ends of the grate-bars, and thus "line" them in case of any shifting action. Two end rollers $L' L'$ are also provided, which are intended to guide the grate-bars as they descend around the wheels F' and prevent their ends from any possible contact with the ends of the frame.

$M M M$ represent trucks, the two rear sets of which are mounted on short axles M' , on which they are preferably shrunk, the axles being in turn mounted in the side frames A . The forward trucks are shrunk on an axle M^2 , which may extend the full length across the forward end from one side frame to the other. This axle M^2 is also mounted in frames A . The forward trucks may,

however, if desired, be mounted the same as the rear trucks. All of the trucks are located outside of the frames A , and hence out of the way of dirt and heat. In order to properly mount the trucks having the short axles, I provide the lower end of each frame A with open end journals m , in which the inner ends of the axles M' rest. The outer ends of the axles M' are journaled in brackets O , which are suitably secured to the frames A and are offset so as to embrace the trucks, as shown in Figs. 1, 2, and 3. The object in providing the trucks M is to allow of the frames and the grate being wholly removed from beneath the boiler, or out of the furnace, thus permitting the repairing of the parts without the necessity of entering the furnace.

The rear end of the frames A , and hence the endless grate, is made to overhang or project beyond the rear trucks in order to avoid dumping the ashes, &c., on the trucks or operative parts of the same.

At the forward end of the frames A and located above the forward end of the moving or traveling grate is the fuel-hopper, which is composed of two side pieces P of plate metal, which also form the continuation of the furnace at its front end. These side pieces P are secured at their lower ends to the frames A by suitable means, as shown in Fig. 1, and are made so as to separate from the furnace-walls when the grate is drawn out. The front end of the hopper is formed by a plate of metal R , which is removably secured in place by means of cleats $p p$, between which the plate R slides.

The rear end of the hopper is formed by an adjustable gate S , operated vertically in any suitable manner. This gate S is composed, as shown, of two "headers" $S' S'$, between which extend two series of pipes $S^2 S^2$, which are in communication with the headers. The gate is fed with water and may be used as a water-heater and connected to the boiler or not, as desired. Of course a suitable flexible connection is provided between the gate and water supply, &c., so as to allow of the adjustment of the gate. An apron T is provided at the front end of the gate S to prevent the fuel from sifting through.

By forming the hopper, as above described, with the detached side of pieces P and the plate R attached thereto, the hopper and its contained fuel may be removed with the grate.

What I claim is—

1. A mechanical-stoker furnace comprising two or more endless-chain grate-carriers operated by suitably-driven sprocket-wheels, said chains being composed of alternate one-piece and two-piece links, said links provided, at their upper ends or faces with upwardly-extending ledges, the one-piece links connected to and supporting the grate-bars, and the two-piece links having apertures for the teeth of the sprocket-wheel, substantially as and for the purpose shown and described.
2. In a mechanical-stoker furnace, the com-

5 bination with the frame supporting the opera-
tive mechanism, of two or more endless chains
carrying grate-bars, and vertical guide-rollers
located along the full length of said frame
and adapted to engage the outer ends of the
grate-bars and keep them in line, substantially
as and for the purpose shown and described.

10 3. In a mechanical-stoker furnace, the com-
bination with a single-piece link provided
with a central opening and upwardly-project-
ing lugs at either side of said opening, of a
grate-bar provided at its end with a project-
ing lug adapted to enter the opening in the
single-piece link, and means, such as a pin,
15 for securing the lug therein, substantially as
shown and described.

20 4. In a mechanical-stoker furnace, the com-
bination with a frame and its traveling grate,
of trucks located outside of said frame and
mounted upon short axles, the outer end of
said axles being located or journaled in open
bearings, substantially such as described
whereby said trucks may be easily removed,

substantially as and for the purpose shown
and described.

25 5. In a mechanical-stoker furnace, the com-
bination with the supporting-frame and end-
less traveling grate, of the vertical guide-roll-
ers located at the rear end of the frame and
acting to guide the grate-bars as they descend
around the rear wheel, substantially as and
30 for the purpose shown and described.

6. In a mechanical-stoker furnace, the com-
bination with the hopper of the same, of a gate
comprising two headers and a series of tubes
communicating with said headers, and an
35 apron covering the front of said gate, all op-
erating substantially as and for the purpose
shown and described.

In testimony whereof I sign this specifica- 40
tion, in the presence of two witnesses, this 19th
day of March, 1896.

GEORGE PLAYFORD, JR.

Witnesses:

L. WARD HOOVER,
ELLA E. TILDEN.