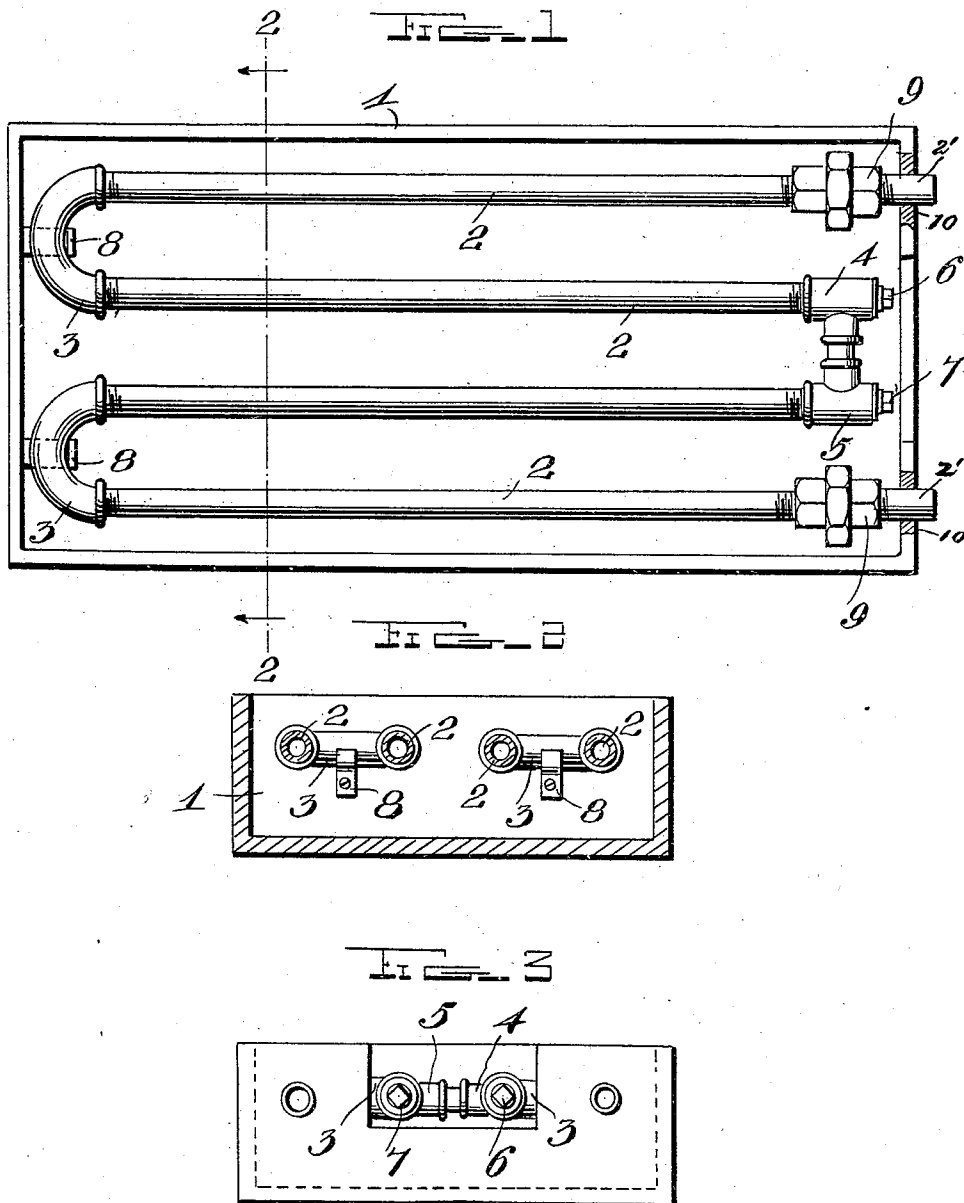


J. H. & A. N. SPANGELO.
FIRE-GRATE.
APPLICATION FILED JAN. 21, 1909.

951,345.

Patented Mar. 8, 1910.



Witnesses

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UNITED STATES PATENT OFFICE.

JAMES H. SPANGELO AND ALBERT N. SPANGELO, OF CONCRETE, NORTH DAKOTA.

FIRE-GRATE.

951,345.

Specification of Letters Patent.

Patented Mar. 8, 1910.

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To all whom it may concern:

Be it known that we, JAMES H. SPANGELO and ALBERT N. SPANGELO, citizens of the United States, residing at Concrete, in the county of Pembina and State of North Dakota, have invented certain new and useful Improvements in Fire-Grates; and we do 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.

This invention relates to improved fire grates, especially adapted for straw and wood burning engines.

The invention consists in the construction and arrangement of parts as will be hereinafter described and particularly pointed out in the claim.

In the accompanying drawings, Figure 1 represents a top plan view of a fire box with this improved grate applied; Fig. 2 represents a transverse vertical section thereof taken on the line 2—2 of Fig. 1; and Fig. 3 represents an end elevation showing the nipples for connecting it to the boiler.

In the embodiment illustrated, a grate 1, is shown composed of tubular grate bars, as 2, preferably screw threaded at their opposite ends and connected at one end by U-shaped couplings or elbows and nipples, as 3, and two of the pipes or tubes opposite the door of the fire box are connected by a plurality of integral T-couplings 4 and 5 connected together by a union 9², and provided with removable plugs 6 and 7, to provide for the cleaning out of the tubes, when necessary. These bars, as 2, are supported within the box in any suitable manner, preferably by curved brackets, as 8, attached to the boiler plate, and the outer bars of the grate are connected with the boiler plate by nipples 9, each of which is provided with a nut 9', for the purpose. Pipes 2', which extend beyond one end of the plate are also secured to the nipples and said pipes 2' serve to support the tubular bars 2, and their inner ends in recesses 10, at the other end of the frame.

This grate is readily attachable to the fire box of any wood or straw burning engine

or boiler, and the length of the grate and the number of tubes is regulated by the size of the fire box, and the tubing may be made of any desired size.

The grate, herein described, provides for the use of the heat generated by the burning of the fuel thereupon, as an additional heating surface for the water in the boiler, as the nipples 9, by which the grating is attached to the boiler plates on each side of the fire box, as hereinbefore described, tap the water area of the boiler and cause a constant circulation of water through the tubular grate bars, and thereby increase the heating capacity of the fire box, and utilize the heat heretofore wasted by contact of the fire with a solid grating, converting it into an additional steam producing surface. The constant circulation of water in the tubular grating, also prevents burning of the grating and the consequent sagging thereof. Clinkers caused by the burning of weeds and straw upon the grating are also prevented.

The tubular bars may be run either crosswise or longitudinally through the fire box, as described, and the fire box may be tapped at any desired point to attach the grate.

From the foregoing description, taken in connection with the accompanying drawings, the construction and operation of the invention will be readily understood without requiring a more extended explanation.

We claim as our invention:

A fire grate of the character described comprising a rectangular frame with curved brackets at one end and having recesses at its other end, tubular grate bars arranged in pairs and having at their outer ends U-shaped couplings, the forward ends of one bar of each pair next to the sides of the frame having nipples secured thereto, said nipples also having supplementary pipes secured thereto which extend outwardly beyond the front end of the frame, means on said nipples for securing said bars and said intermediate pipes thereto, the inner bars of said grate, each having on their forward ends a T-shaped coupling which are secured together by a short pipe, and detachable

means on the outer ends of said T-couplings, said U-shaped couplings and intermediate pipes being detachably connected to said brackets and said recesses, whereby all of
5 the grate bars can be readily removed from the frame without obstruction, substantially as specified.

In testimony whereof we have hereunto

set our hands in presence of two subscribing witnesses.

JAMES H. SPANGELO.
ALBERT N. SPANGELO.

Witnesses:

GEORGE T. SONSTERUD,
T. H. FIKKEN.