S. E. BROWN & H. C. KAIN.

GRATE.

APPLICATION FILED JULY 28, 1916.

1,214,422.

Patented Jan. 30, 1917.

2 SHEETS—SHEET 1.

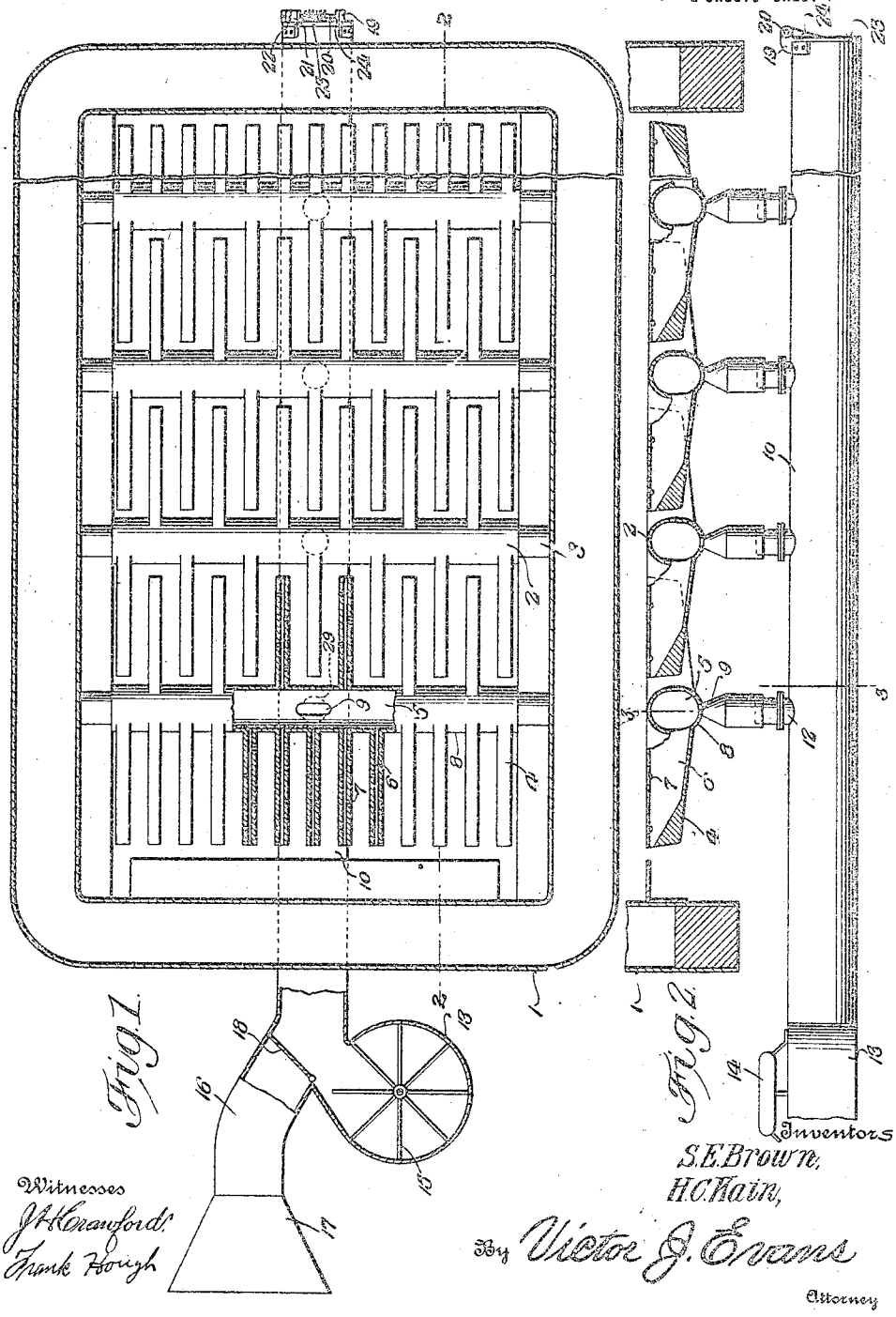


Fig. 1.

Fig. 2.

Witnesses
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2 SHEETS—SHEET 2.

Fig. 3.

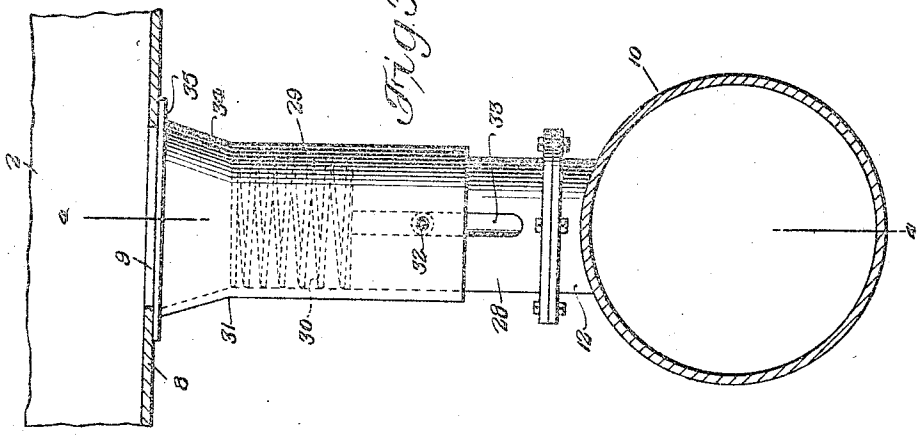


Fig. 4.

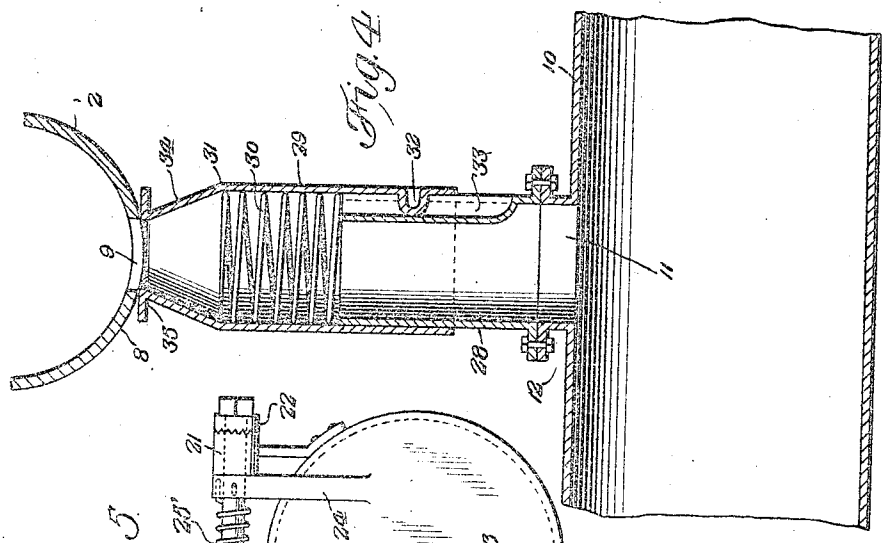
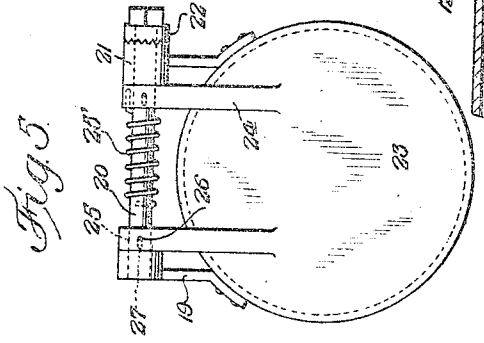


Fig. 5.



Witnesses

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UNITED STATES PATENT OFFICE.

SIDNEY E. BROWN AND HARRY C. KAIN, OF MARSHALL, TEXAS, ASSIGNORS OF ONE-THIRD TO ALOIS P. PRENDERGAST, OF MARSHALL, TEXAS.

GRATE.

1,214,422. Specification of Letters Patent. Patented Jan. 30, 1917.

Application filed July 28, 1916. Serial No. 111,899.

To all whom it may concern:

Be it known that we, SIDNEY E. BROWN and HARRY C. KAIN, citizens of the United States, residing at Marshall, in the county of Harrison and State of Texas, have invented new and useful Improvements in Grates, of which the following is a specification.

This invention relates to a grate which is so constructed that when applied to the fire box of a boiler for generating steam it insures combustion of the fuel within the box taking place in a rapid and satisfactory manner.

The primary object of the invention is to provide a grate in which the bars and fingers thereon have communicating channels with the channels in the grate bars communicating with a manifold for conducting air into the channels in the grate bars to be distributed to the fire box through the channels in the fingers on the grate bars, thus insuring the air that passes through the manifold being evenly distributed to the combustible material within the fire box.

Another object of the invention is to connect with the grate a manifold having mechanism which may be operated to increase the rapidity of the passage of air from the manifold through the grate bars and fingers thereon, thus increasing the rapidity of the combustion of the fuel within the fire box.

A further object of the invention is to provide a connection between the grate bars and manifold which is so constructed that it insures the air within the manifold entering the channels in the grate bars under all conditions especially when the bars have become warped from continuous use.

With these and other objects in view, the invention resides in the novel combination and arrangement of parts, which will be hereinafter described and particularly pointed out in the claims.

The preferred embodiment of the invention has been illustrated in the accompanying drawings, although no restriction is necessarily made to the precise details of construction therein shown, as changes, alterations, and modifications, within the scope of the claims may be resorted to when desired.

Like characters of reference denote corresponding parts throughout the several views in the drawings, in which:

Figure 1 is a top plan view partly in section of a grate constructed in accordance with the invention and showing some of the grate bars broken away to disclose the channels therein. Fig. 2 is a vertical longitudinal section on the line 2—2 of Fig. 1. Fig. 3 is a vertical transverse sectional view on the line 3—3 of Fig. 2. Fig. 4 is a vertical transverse section on the line 4—4 of Fig. 3. Fig. 5 is a detail view of one end of the manifold for connection with the grate bars.

Referring now to the drawings in detail, the numeral 1 designates a portion of a fire box of a steam generating device, such as a locomotive, or the like, with which is shown connected the improved grate including spaced grate bars 2 extending transversely of the fire box 1 and supported thereon for turning movement by means of trunnions 3, said grate bars having spaced and laterally extending fingers upon opposite sides thereof and arranged in staggered relation, so that the fingers upon one grate bar are received between the fingers on the grate bars adjacent thereto.

The grate bars 2 have formed therein longitudinally extending channels 5 which communicate with similar channels 6 in the fingers 4, said channels 6 communicating with outlet ports 7 opening out through the sides of the fingers 4. The bottom face 8 of each grate bar 2 which is curved transversely has formed therein between its ends an elongated and longitudinally extending inlet opening 9.

A manifold 10 which is supported in any suitable manner is arranged below the grate bars 2 and extends longitudinally of the fire box 1 with the ends of the manifold extending beyond the same, said manifold being provided at intervals throughout its length with openings 11 in alinement with the inlet openings 9 in the bottoms of the grate bars, each of said openings 11 being surrounded by a flanged collar 12.

The manifold 10 has connected therewith near one end a fan casing 13 upon which is mounted a motor 14 adapted to be operated from any suitable source of energy not shown in the drawings and having connected therewith a fan 15 arranged within the casing 13. The end of the manifold 10 with which is connected the fan casing 13 is offset, as at 16, and provided with a flared mouth 17 between which and the fan casing

is arranged a valve 18 which when in closed position prevents the fan 15 when operated from causing air to be drawn into the manifold 10 through the mouth 17. The other end of the manifold 10 has connected therewith spaced brackets 19 in which is mounted for turning and sliding movement a shaft 20 extending transversely of the manifold 10 and having connected therewith a toothed sleeve 21 for contact with a toothed collar 22 on one of the brackets 19. A valve 23 for closing the last mentioned end of the manifold 10 has connected therewith a pair of arms 24 having openings 25 in which is received the shaft 20, one of said arms having connected therewith one end of a spring 25', the other end of which is connected with the shaft 20 and normally serves to hold the valve 23 in a closed position. Each arm 24 has passing transversely therethrough a pin 26 which is received in a slot 27 in the shaft 20 so that the shaft 20 may be moved longitudinally of the openings in the brackets 19 and arms 24 against the influence of the spring 25' to remove the teeth on the sleeve 21 from the teeth on the collar 22 so that the valve 23 may be manually moved to an open or closed position or held in an intermediate position to regulate the current of air passing through the manifold 10 if desired.

Each flanged collar 12 has connected therewith one end of a cylindrical extension 28 received for the greater portion of its length in a cylindrical sleeve 29 freely movable longitudinally of the extension and supported thereon by a coiled expansion spring 30 having an end bearing against one end of the extension and its other end bearing against a shoulder 31 near one end of the sleeve 29. The sleeve 29 has formed in its peripheral wall near its other end a depression 32 providing a stud received in a longitudinally extending depression 33 in the peripheral wall of the extension 28 and providing a longitudinally extending groove in which the depression 32 is free to slide while the sleeve 29 is held against turning movement on the extension. The end of the sleeve 29 above the shoulder 31 is restricted to form a tapering neck 34 terminating in an elongated mouth 35 adapted to surround the inlet opening 9 in the bottom 8 of one of the grate bars against which said mouth is held in contact by the expansion spring 30 arranged between the shoulder 31 and end on the extension 28.

Through the above described manner of establishing communication between the manifold and grate bars, it will be seen that when a current of air is passed through the manifold its entrance into the grate bars will be insured irrespective of the condition of the bars particularly when warped and that the sleeves 29 will at all times be held in contact with the bottoms of the grate bars by the springs 30.

When the improved grate is in use, the valve 18 is opened to allow a current of air to enter the manifold and pass through the channels in the grate bars and fingers thereon, the volume of air passing through said channels being controlled by the position of the valve 23. The rapidity with which the current of air passes through the manifold and through the channels in the grate bars and fingers thereon may be regulated through the operation of the fan 15.

From the foregoing description, taken in connection with the accompanying drawings, it is at once apparent that a grate construction has been provided which will enable air to be delivered to a fire box to which the grate is applied in such a manner that perfect combustion of the fuel contained therein is assured.

Having thus described the invention, what is claimed as new, is:

1. In a grate, grate bars having channels therein provided with inlet openings, a manifold arranged below said openings and having extensions registering therewith, sleeves mounted for vertical movement on said extensions, mouths on said sleeves, and springs within said sleeves for holding said mouths in contact with the grate bars adjacent the inlet openings therein.

2. In a grate, grate bars having channels therein provided with inlet openings, a manifold arranged below said openings and having extensions registering therewith, sleeves mounted for vertical movement on said extensions and having restricted ends forming mouths, springs arranged within said sleeves and contacting with said extensions for holding said mouths in contact with the grate bars adjacent said openings, and means on said sleeves and extensions for holding the same against turning movement.

In testimony whereof we affix our signatures.

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HARRY C. KAIN.