

No. 641,133.

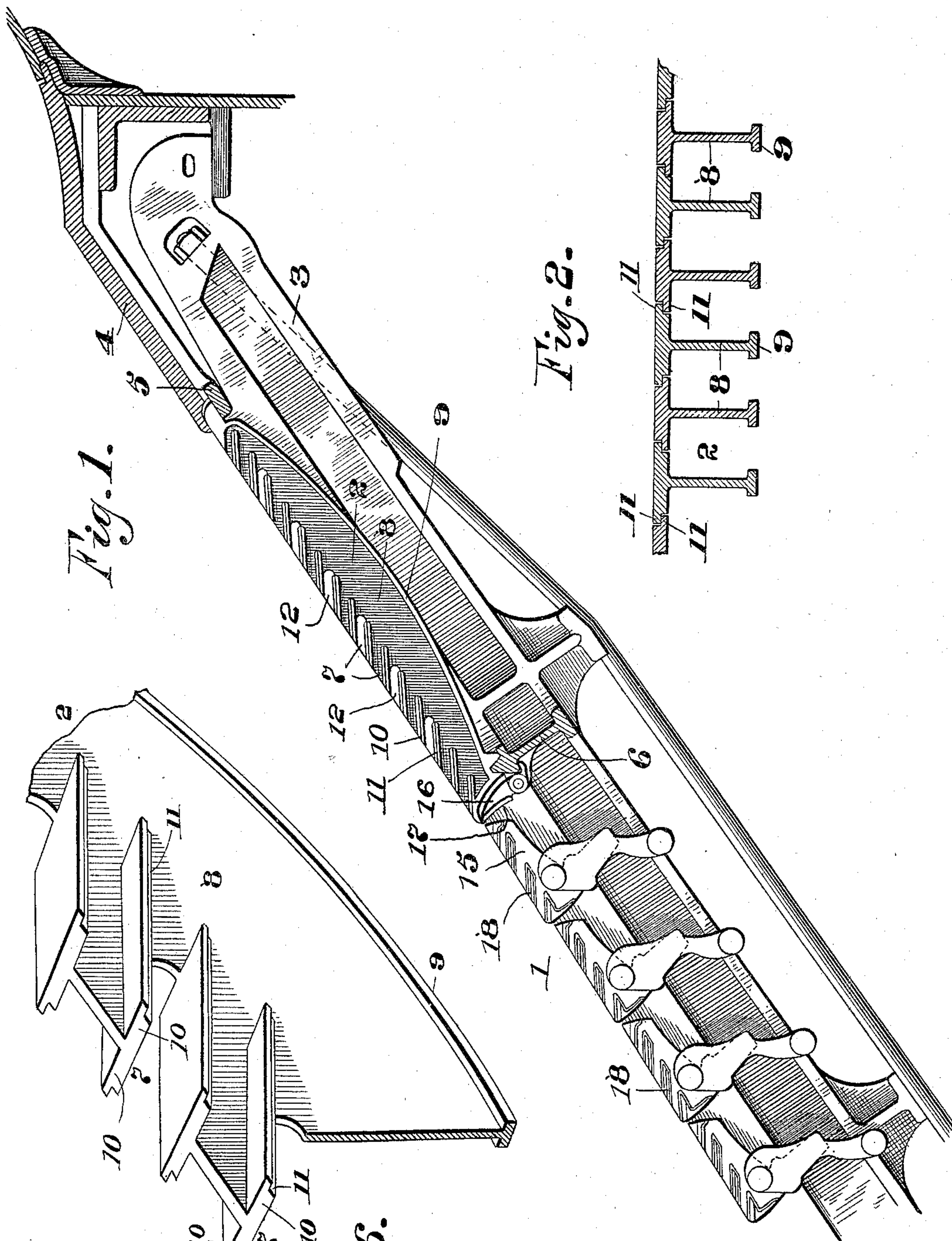
Patented Jan. 9, 1900.

W. McCLAVE.  
GRATE.

(Application filed Oct. 21, 1899.)

(No Model.)

3 Sheets—Sheet 1.



WITNESSES  
*Allan H. Fuss.*  
*Read Clift.*

*Fig. 6.*

INVENTOR  
*William McClave*  
*by his Attys*  
*Mason & Merrick*



No. 641,133.

W. McCLAVE.

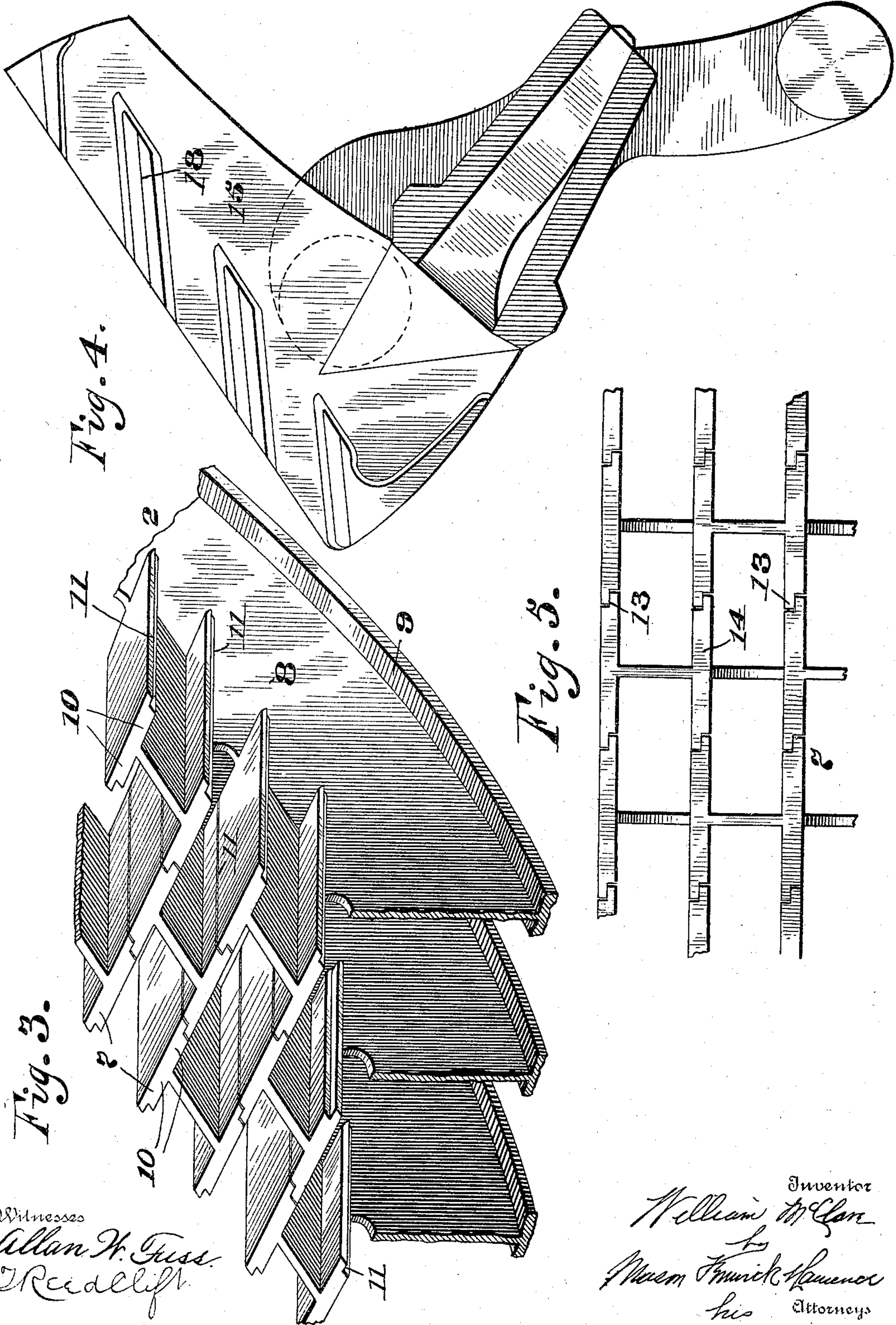
Patented Jan. 9, 1900.

GRATE.

(Application filed Oct. 21, 1899.)

(No Model.)

3 Sheets—Sheet 2.



Witnesses  
Allan H. Foss.  
J. Readly.

Inventor  
William McClave  
by  
Mason F. H. Spencer  
his Attorney



No. 641,133.

W. McCLAVE.

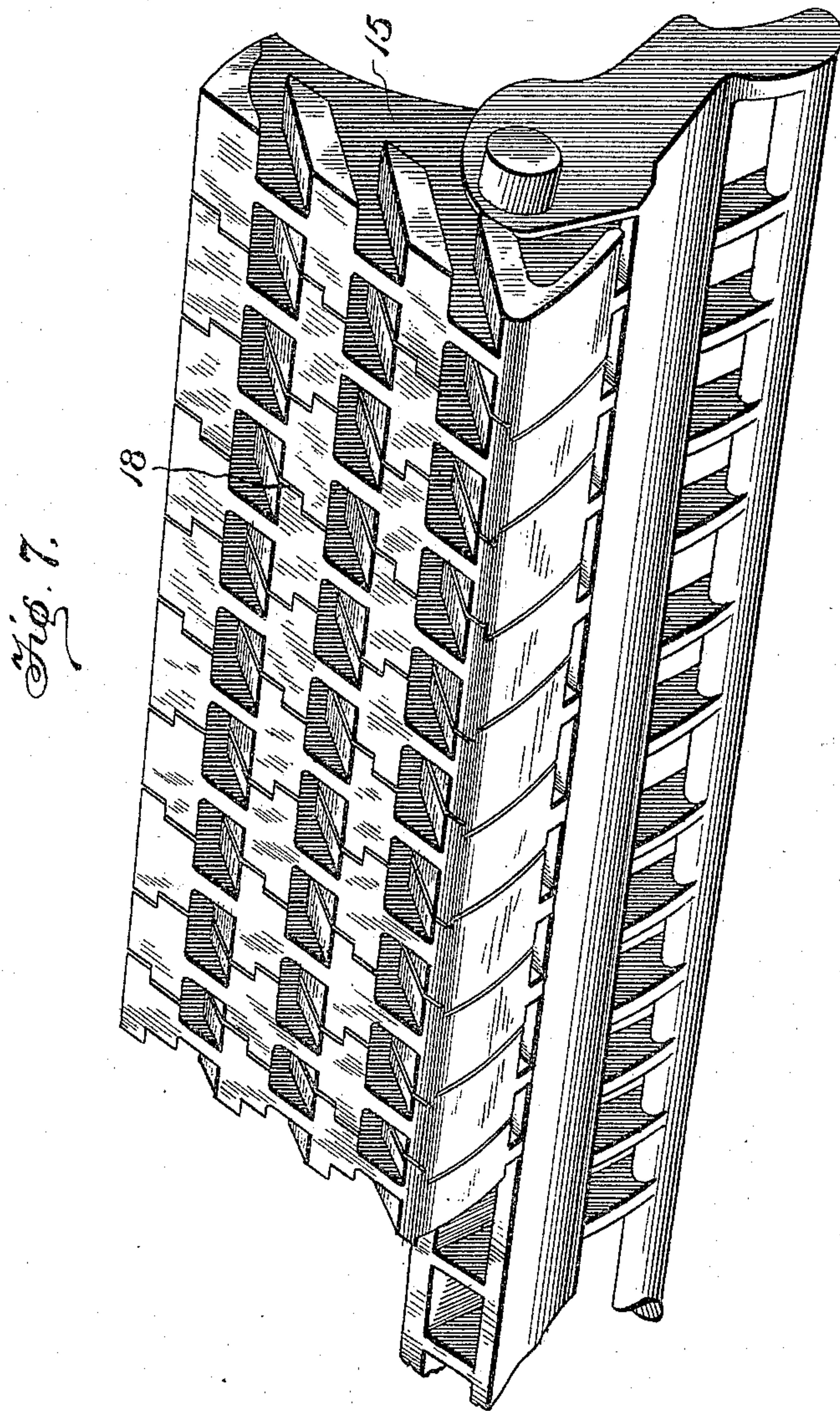
Patented Jan. 9, 1900.

GRATE.

(Application filed Oct. 21, 1899.)

(No Model.)

3 Sheets—Sheet 3.



Witnesses  
Fenton S. Belt,  
Allan W. Fuss.

Inventor  
William McClave  
by  
Mason F. Hamner  
his Attorney



# UNITED STATES PATENT OFFICE.

WILLIAM MCCLAVE, OF SCRANTON, PENNSYLVANIA.

## GRATE.

SPECIFICATION forming part of Letters Patent No. 641,133, dated January 9, 1900.

Application filed October 21, 1899. Serial No. 734,372. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM MCCLAVE, a citizen of the United States, residing at Scranton, in the county of Lackawanna and State of Pennsylvania, have invented certain new and useful Improvements in Grates; 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 improvements in grates for furnaces, and more particularly to grates which are inclined and adapted to have fuel fed down their fire-supporting surfaces.

It consists in an inclined grate made up of grate-bars having vertical webs and laterally-extending teeth on said webs, said teeth being provided with rabbeted portions at their edges, which meet and lap the rabbeted portions formed in the edges of teeth provided on webs of adjacent bars, so as to prevent fine fuel from running through the grate.

It further consists in a grate made up of stationary bars for a portion of its fire-supporting surface and rocking bars for the remainder of its surface, the said stationary bars being provided with laterally-extending teeth, which overlap each other and which are arranged in such relation to the teeth of the adjoining bars as to form a close, tight joint between the same and prevent the running through of fine fuels of various kinds.

It also consists in certain other novel constructions, combinations, and arrangements of parts, as will be hereinafter fully described and claimed.

In the accompanying drawings, Figure 1 represents a vertical longitudinal section through a portion of a grate employing grate-bars constructed in accordance with my invention. Fig. 2 represents a transverse vertical section through a series of stationary bars used in my improved grate. Fig. 3 represents a perspective view of a portion of the said bars, showing the relation of every tooth to the others. Fig. 4 represents a detail sectional view of a rocking bar, showing the arrangement of teeth upon the web on one of its fingers. Fig. 5 represents a front elevation of a portion of the grate-bars, illustrating a little different manner of arranging the

teeth thereof. Fig. 6 is a perspective view of a portion of one of the stationary grate-bars; and Fig. 7 is a perspective view of a portion of the rocking grate-bar, showing the rabbeted construction.

In the use of inclined grates down the surface of which fuels are fed, and especially rocking grates, which have a movement for assisting in the feed of the said fuel, a great deal of fine fuel is likely to sift through the grate, especially at the upper end thereof, before it becomes coked and thus slightly held together, so as to bridge over the intermediate spaces. This is especially so in using very fine fuels, which are the ones generally employed with stoking-furnaces. My present invention is designed to obviate this difficulty and to provide a grate-surface at the upper end of the grate, and when necessary all the way down the grate, which will admit draft for the combustion of the fuel, but prevent fine fuels from running through into the ash-pit without being consumed.

I construct inclined grates, whether composed of rocking bars or stationary bars, or partially of both, with bars having webs along the sides of their upper edges, the said webs being provided with laterally-extending teeth on each upper side thereof, which are provided with rabbets at their edges, so that the meeting edges of the teeth extending toward each other from adjacent bars or webs are joined by a rabbet-joint, so as to close the space between them against any running through of fuel. For the sake of illustration I have represented in the drawings a grate composed partially of stationary bars and partially of rocking bars, though it will be evident that the grate could be composed entirely of either without departing in the least from the spirit of the invention.

In carrying out the features of my invention I may, as shown, mount upon a grate 1 a series of stationary grate-bars, as 2 2, supported preferably as follows: A transverse support 5 is formed at the lower edge of the dead-plate 4, which is adapted to receive and support the upper ends of the grate-bars 2 2. The lower ends of the grate-bars rest upon a cross-beam or carrier-bar, as 6, which is supported by the side carrier-bars 3. The lower



portion of the grate 1 is preferably made up of rocking grate-bars adapted to feed the fuel down the grate. The stationary bars 2 2 thus receive the fresh fuel from the dead-plate and pass it along to the upper rocking grate-bars, the fuel having a chance upon the said stationary bars to slightly coke or fuse, so as to cling together and not be so liable to run through the grate when it reaches the rocking or moving grate-bars. The arrangement of the teeth 7 7 of the bars forms an important part of my invention. The bars 2 are constructed of a body portion or vertical web, as 8, preferably strengthened at its lower edge by horizontal flanges, as 9. The upper edges of the web carry laterally-extending teeth 10 10, projecting upon either side of the web and extending sufficiently far to meet the ends of teeth formed upon the adjoining bars. These teeth are arranged practically horizontally, as seen in Figs. 1 and 6 of the drawings, with respect to the side of the web, but may vary from the horizontal line with respect to the longitudinal line of the furnace, and their forward edges overlap the rear edges of the teeth below them, a sufficient space being left between the teeth to admit air from the ash-pit to support combustion upon the grate-surface.

In order to prevent the fuel from running between the meeting ends of the teeth 10 10, I provide the said teeth with rabbeted portions, as at 11 11, so that the said rabbeted portions of adjoining grate-bars overlap each other, thereby completely closing the space against the running through of fuel. The rabbeted joints are made sufficiently free and open to permit of the expansion and contraction of the metal under the action of the different temperatures to which the furnace may be subjected. As seen in Fig. 3 of the drawings, the bars are preferably made in two patterns, each alternate one being alike, so that the teeth of every other bar overlap with their rabbeted portions the rabbeted portions of the teeth of the intervening bars. The web between each pair of teeth is cut away, as at 12, to present short lines of metal to the fire in order to prevent warping. It will also be apparent that the rabbets on the edges of the teeth instead of turning all in the same direction upon the same grate-bars may be made with one facing up and the other facing downwardly, as shown in Fig. 5, without departing from the spirit of my invention. The lower edge of the stationary grate portion is arranged in close proximity to the upper edge of the upper rocking grate-bars 15, and in order to prevent the chance of fuel running between these portions of the grate I preferably mount pivoted followers or pieces, as 16, at the bottom of the stationary grate and upon a cross bearer-bar 6. The followers 16 are provided with curved lower faces, as 17, so that the noses of the teeth on the said bar will move in a concentric circle with the said surface. The pivoted followers or pieces

16 will thus rest of their own weight against the said rocking grate-bars and prevent the running through of fuel at these points. The rocking grate-bars 15 are also provided with the same kind of teeth as the stationary bars 2, as clearly seen in Figs. 1 and 4 of the drawings, the ends of the said teeth being provided with rabbeted portions, as at 18, which close the joints between the adjacent teeth in the same manner as above described with reference to the teeth of the stationary bars.

As seen in Fig. 3 of the drawings, the web portions which extend between the teeth 7 7 to their forward edges are arranged alternately with the forward extended web portions of the adjoining bars, so that in using a hoe or other implement upon a grate-surface it will not catch between the teeth, but will bridge over from one web to the other.

It will be seen that by this construction I am enabled to produce a grate protected completely against the running through of fine fuel and yet constructed so as to admit a draft for proper combustion.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. An inclined grate comprising rocking grate-bars, the said bars having webs extending upwardly, lateral teeth on said webs with air-spaces between them and provided with rabbeted portions at their ends, whereby meeting teeth extending from adjacent webs will have their rabbeted ends brought together and fit upon each other, to close the space between them so that fine fuel cannot run through the grate, substantially as described.

2. In a grate, the combination with inclined carrier-bars, of rocking bars mounted thereon, cross bearer-bars mounted on said carrier-bars, stationary grate-bars mounted upon the said cross bearer-bars having a body web portion, teeth upon their upper edges extending laterally from either side of the said web on the same plane, the forward edges of the said teeth overlapping the rear edges of the teeth below them, the said teeth overlapping the edges of the teeth on the adjacent bars, the construction being such that fine fuel is prevented from running through into the ash-pit, substantially as described.

3. An inclined grate comprising in its construction a series of stationary bars having lateral teeth, cut-away portions arranged between some of the teeth for securing short lines of metal to prevent warping, the forward edges of the said teeth overlapping the rear edges of the teeth below them, offset or rabbeted portions upon the edges of said teeth adapted to meet and correspond with the rabbeted portions of the teeth upon the next adjoining bar, whereby the space between the teeth will be sealed against the running through of fuel but sufficient play will be allowed for the expansion and contraction of the metal, substantially as described.



4. A grate comprising rocking grate-bars  
and stationary grate-bars, lateral teeth formed  
upon all of said bars, said teeth being rab-  
beted at their ends with respect to the teeth  
5 of the next bars, pivoted followers mounted  
at the lower end of the stationary bars and  
adapted to rest against the upper edge of the  
upper rocking bars for preventing the fuel

from running through at this point, substan-  
tially as described.

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

WILLIAM MCCLAVE.

Witnesses:

A. V. BOWER,  
M. A. SOMMAR.

10