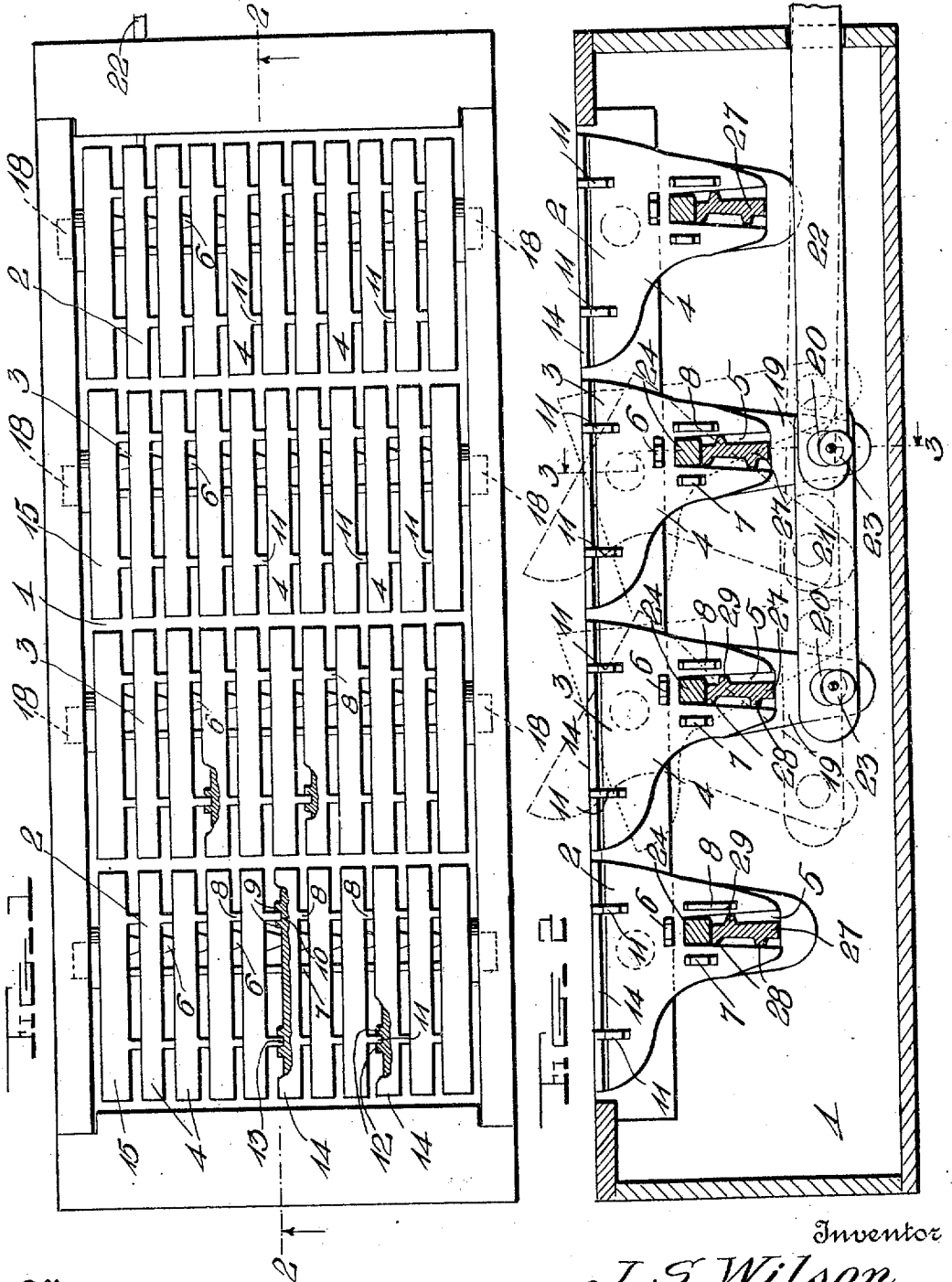


Patented Apr. 12, 1910.

2 SHEETS-SHEET 1.

955,031.



Witnesses

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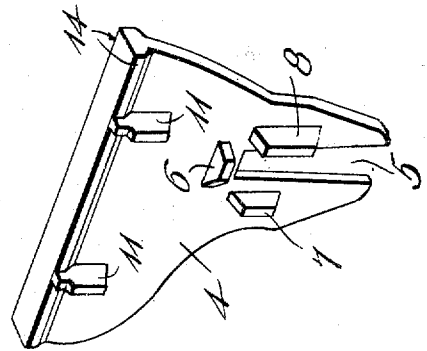
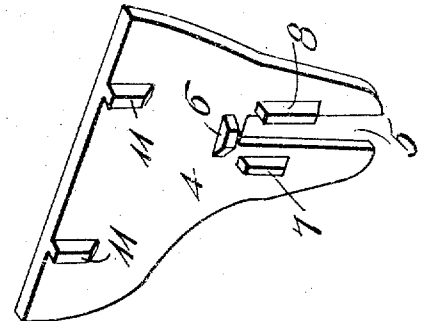
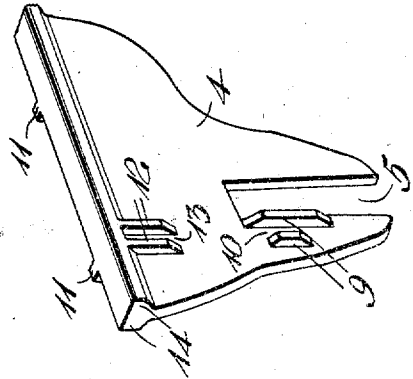
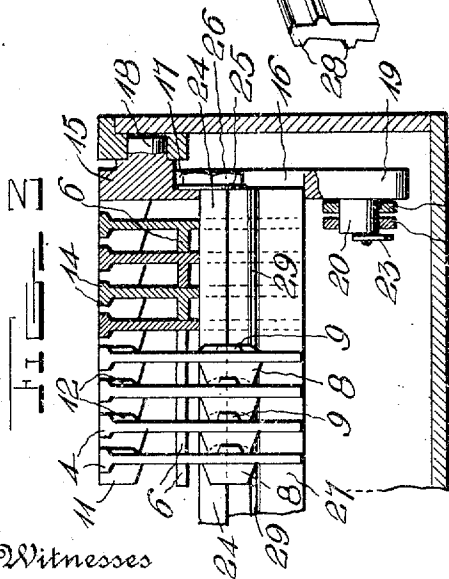
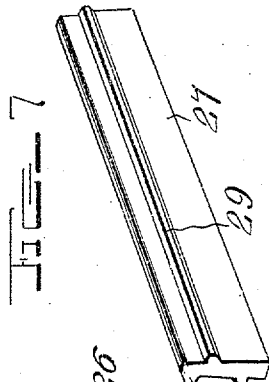
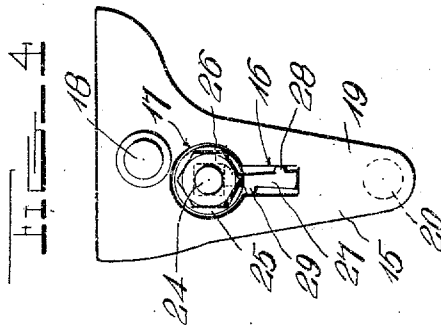
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 GRATE BAR.
 APPLICATION FILED MAY 25, 1909.

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Patented Apr. 12, 1910.

2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

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GRATE-BAR.

955,031.

Specification of Letters Patent.

Patented Apr. 12, 1910.

Application filed May 25, 1909. Serial No. 498,253.

To all whom it may concern:

Be it known that I, JAMES S. WILSON, 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 Grate-Bars; and I 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 improvements in shaking and dumping grate bars.

The object of the invention is to provide a grate bar formed of a series of independent sections, and having improved means for assembling and supporting the sections.

Another object is to provide means for separating the sections of the bar, and holding the sections in spaced relation.

A further object is to provide the sections of the bar with flanged or ribbed upper edges, thus reducing the percentage of air space.

With these and other objects in view, the invention consists of certain novel features of construction, combination and arrangement of parts, as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings: Figure 1 is a plan view of a grate constructed in accordance with my invention. Fig. 2, is a vertical sectional view of the same on the line 2—2 of Fig. 1. Fig. 3, is a detail vertical sectional view taken on the line 3—3 of Fig. 2. Fig. 4, is an end view of one of the grate bars. Fig. 5, is an enlarged detailed perspective view of one of the grate bar sections. Fig. 6, is a similar view looking toward the opposite side of the section. Fig. 7, is a perspective view of one of the bearing or supporting bars of the grate sections; and, Fig. 8, is a perspective view of a modified form of grate bar section.

Referring more particularly to the drawings, 1 denotes the ash-pit of a furnace, in which is shown a grate constructed in accordance with my invention. At the front and rear ends of the fire box are arranged stationary grate bars 2, while between the bars 2, are arranged a plurality of shaking and dumping bars 3. There may be any desired number of shaking and dumping bars 3, two of which are shown in the drawings, forming a part of this application.

The grate bars 2 and 3, are each formed of a plurality of independent sections, 4, said sections being in the form of plates, substantially triangular in shape, as shown, with the upper end of one edge thereof projecting beyond the vertical axis of the plate to a point in advance of the other edge and adapted to engage the adjacent edge of the adjacent bar when the bar is tilted in one direction as shown in Fig. 2 to prevent the passage of coal therebetween and operable when tilted in the other direction to provide a space sufficient to permit the dumping of the contents of the grate. In the lowermost portion of each of the plates is formed an upwardly extending rectangular notch 5, and on one side of the plates, above the notch 5, is formed a laterally projecting spacing lug 6, and adjacent to one edge of the notch is formed a vertically disposed lug 7, and adjacent to the opposite edge of the notch is formed a similar lug 8, said lug 8, being of greater length than the lug 7. On the opposite side of the plate or section, adjacent to one edge of the notch 5, are formed parallel lugs 9, which are spaced apart to form a groove 10, which, when the sections are assembled, is adapted to receive the lug 8, of the next adjacent plate or section. On the side of the plates or sections having the lugs 6, 7, and 8, and adjacent to the upper edge of the plates are formed laterally projecting spacing lugs 11, while on the opposite side of the plate, above the lugs 9, and in line therewith, is a pair of lugs 12, which are spaced apart to form a groove 13, which, when the sections are assembled, is adapted to receive one of the lugs 11, of the next adjacent plate. By means of the lugs on the opposite sides of the sections, the latter will be held apart to provide spaces between the same for the circulation of air. These lugs may be of greater or less width, thus providing a larger or smaller air space between the plates or sections. The parallel lugs on the one side of the sections which provide grooves for the lugs on the opposite sides of the next adjacent plates serve to hold the sections against lateral or rocking movement, when the sections are clamped together in the manner hereinafter described. In the preferred form of bar, the sections are provided on their upper edges with laterally projecting flanges or ribs 14, which may be of any desired width, and are provided to reduce the upper portions of the air spaces

between the sections or plates of the bar, thus permitting the use of fine coal, and also reducing the air space, where a forced draft is used in connection with the furnace. The end sections 15, of the bars are of similar shape to the intermediate sections, and are provided on one side only with the spacing lugs to engage the adjacent sections or to provide grooves to receive the lugs of the adjacent sections. The end sections 15 are provided with slots 16, which coincide with the notches 5, of the intermediate sections, and the outer sides of the sections 15, at the upper ends of the slots 16, are provided with countersinks or recesses 17, the purpose of which will hereinafter appear. On the outer sides of the end sections 15, of the rocking bars of the grate are formed laterally projecting trunnions 18, which are adapted to operatively engage bearing apertures formed in suitable supporting bars arranged on the opposite sides of the fire box. The sections 15, at one end of the rocking bars of the grate are extended downwardly, as shown at 19, and are provided on their inner faces with laterally projecting studs 20, with which are loosely engaged a connecting bar 21, whereby said rocking bars are connected together to move in unison.

Connected to the stud 20, of the first rocking grate bar is an operating bar 22, which extends through a suitable opening in front of the furnace, whereby the outer end of the same may be grasped and the pivoted or rocking bars of the grate may be oscillated to a greater or less degree to agitate or dump the fire. The connecting bar and operating bar are held in position on the studs 20, preferably by means of retaining disks 23, which are eccentrically pivoted on the ends of the studs, so that after the connecting bar and the operating bar are engaged with the latter, the disks will drop down out of alignment with the ends of the studs and thus engaging apertures in the bars, and thus preventing the latter from becoming disengaged from the studs. The sections of the bars are assembled upon a rectangular wrought iron clamping bar 24, which is inserted through the slots 16, in the end sections, and is straddled by the notched lower ends of the intermediate sections, which are dropped down into engagement therewith. The opposite ends of the bar 24, are threaded, and said threaded ends project into the countersunk or recessed end portions of the end sections 15, and on said projecting ends are arranged washers 25, and clamping nuts 26, whereby the sections of the bars are clamped together and held in operative position.

In addition to the clamping bar 24, I preferably employ a bearing or supporting bar 27, which is also inserted through the slots 16, in the end sections beneath the clamping

bar 24, and said supporting bar 27 is also straddled by the notched lower ends of the intermediate sections of the grate bar. The supporting bar 27, is preferably slightly tapered toward its upper edge and is provided on one side with upper and lower radially projecting longitudinal spacing ribs 28, and on its opposite side with a similar rib 29, which is preferably arranged at a point midway between the ribs 28 on the opposite side of the bar. The ribs 28 and 29 space the sides of the bar 27, from the adjacent edges of the notches and slots in the sections, and thus permit a free circulation of air around the bar, which prevents the latter from becoming so hot as to warp out of shape. The ends of the bar 27, engage and rest in the lower portions of the slots 16, in the end sections of the grate bars and provide an additional support for the sections of the bar and a bearing for the clamping bar 24, along its entire length. The bearing bar 27, also acts as a wedge to bind the sections or plates of the bars together.

It will be noted that the lugs on one side of the sections of the grate bar and the grooves which are engaged thereby on the opposite sides of the adjacent sections are vertically disposed and are parallel with the notches in the lower portions of the sections so that by loosening the clamping nuts at either end of the clamping bars 24, a broken or worn out section may be readily removed from the bar and a new one dropped in its place without disconnecting any of its parts or without disturbing any of its sections.

The stationary grate bars at the front and rear ends of the ash-pit are constructed in a similar manner to the rocking bars and said stationary bars are secured to the opposite sides of the ash-pit in any suitable manner.

By providing the sections of the grate bars with the laterally projecting lugs and arranging said lugs, as herein shown and described, the space between the sections is divided by the lugs into a series of spaces, or in other words, the sections engage each other at more than one point and thus reduce the liability of the lateral warping of the sections. The arrangement of the lugs on the upper portions of the sections also prevents the scraper from dropping between the sections when cleaning the fire and thus breaking the sections.

It will be noted that the grooves and lugs which engage the same on the opposite sides of the sections are so near the vertical line of the notches in the lower ends of the sections which engage the clamping and supporting bars that the expansion and contraction of the sections will not appreciably affect the same, owing to this slight distance between these points sections will not bind laterally a sufficient extent to interfere with the removal or replacing of the sections. It

will also be noted that owing to the shape of the front and rear edges of the assembled bars they may be shaken or oscillated by pulling the operating bar outwardly or forwardly and the fire agitated to permit the air to pass more freely therethrough with but slight loss of ashes and no possible loss of fire or coal; while by pushing the operating rod in, the grate bars may be rocked to a position to permit the ashes to be dumped between the same into the ash pit. When the grate bars are in their normal position, the top edges of the sections form a flat level surface over which the ashes and clinkers may be drawn through the fire doors of the furnace if desired, and to facilitate the movement of the firing tool over this surface and to prevent the same from catching in between the edges of the bars, said edges or upper corners of the sections forming same are slightly rounded or beveled.

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.

Various changes in the form, proportion and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention defined in the appended claims.

Having thus described my invention, what I claim is:

1. A grate bar comprising a series of spaced sections provided on their lower ends with alined notches, a bearing bar arranged in said notches and a clamping or locking bar arranged in said notches above said bearing bar.

2. A grate bar comprising a series of sections each provided in its lower end with an angular notch, a locking bar angular in cross section arranged in said notches to lock said sections together, and a bearing bar arranged in said notches below said clamping bar.

3. A grate bar comprising a series of sections each provided in its lower end with an angular notch a locking bar angular in cross section arranged in said notches to lock said sections together, a bearing bar arranged in said notches and having transversely spaced longitudinally extending ribs on one face thereof and a longitudinally extending rib

on the opposite face thereof arranged midway between and parallel with the ribs on the other face.

4. A grate bar formed of a plurality of independent sections, each of which is provided in its lower end with a notch, a series of spacing lugs arranged on one side of said sections, parallel groove forming lugs on the opposite sides of said sections, said grooves and lugs being arranged in parallel relation with the notches in said sections, a clamping bar adapted to be engaged by the notched lower ends of said sections, clamping nuts on the ends of said bar to clamp said sections together in operative position, and a supporting bar arranged in the notched lower portions of said sections below said clamping bar and in engagement therewith.

5. A grate bar formed of a plurality of independent sections, each of which is provided in its lower end with a notch, a series of spacing lugs arranged on one side of said sections, parallel groove forming lugs on the opposite sides of said sections, said grooves and lugs being arranged in parallel relation with the notches in said sections, a clamping bar adapted to be engaged by the notched lower ends of said sections, clamping nuts on the ends of said bar to clamp said sections together in operative position, and a supporting bar arranged in the notched lower portions of said sections below said clamping bar and in engagement therewith, said supporting bar having on its opposite sides longitudinal spacing ribs to engage the opposite side walls of the notches in said sections, whereby a space is formed between the supporting bar and the walls of the notches.

6. A grate bar comprising a series of spaced sections provided in their lower ends with alined notches, a tapered bearing bar arranged in said notches, spacing ribs on the opposite sides of said bar, adapted to engage the opposite walls of the notches in said sections, thereby serving to wedge or bind said sections together, and a clamping bar arranged in said notches above said bearing bar.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JAMES S. WILSON.

Witnesses:

A. G. CURTIN,
EVAN HOPKINS.