H. H. & P. McNAUGHTON.

GRATE BAR.

APPLICATION FILED DEC. 15, 1908.

**945,574.**

Patented Jan. 4, 1910.

2 SHEETS—SHEET 1.

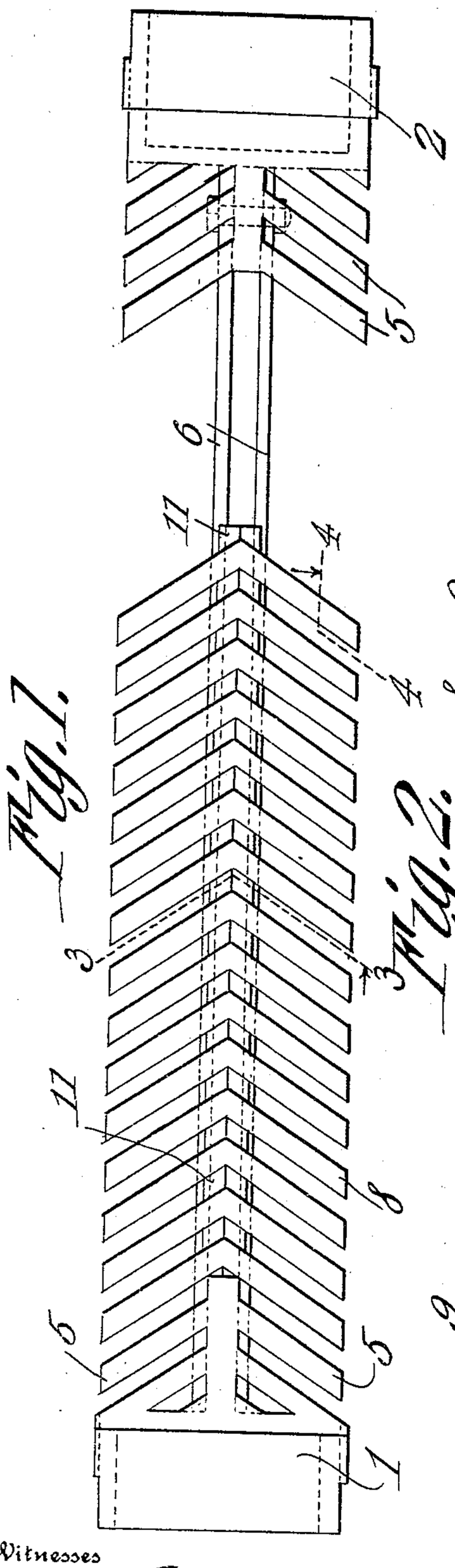


Fig. 1.

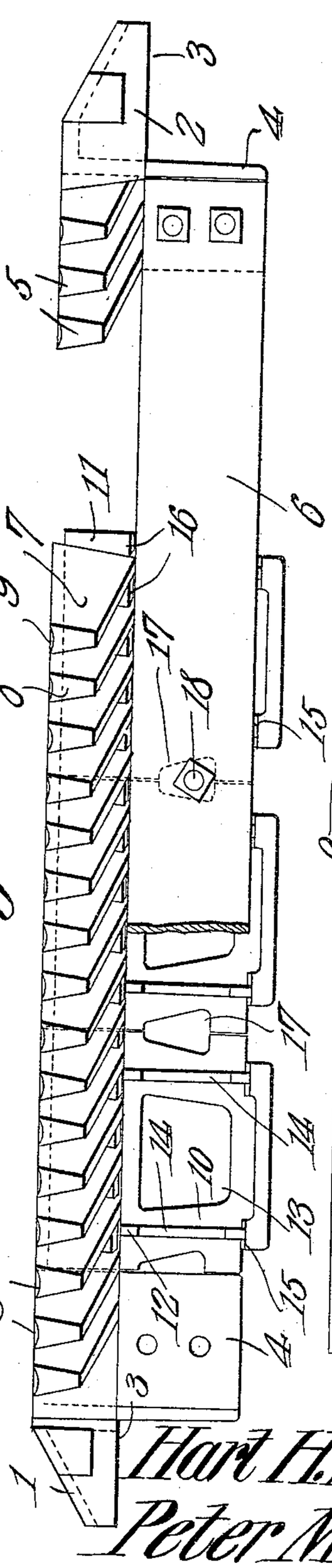


Fig. 2.

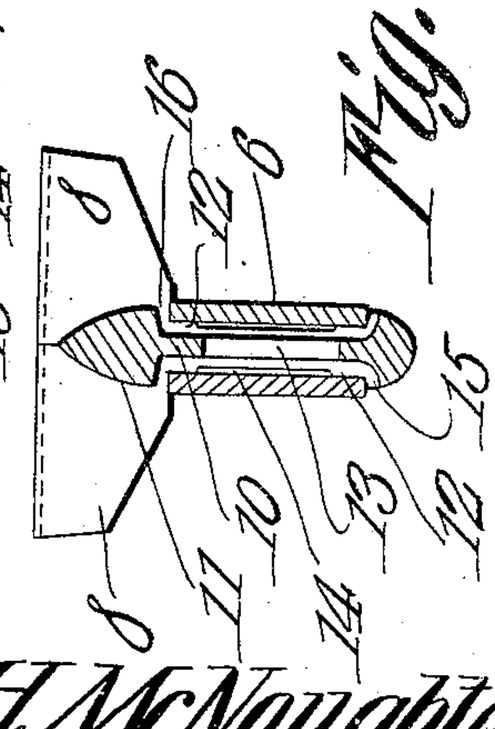


Fig. 3.

Fig. 4.

Witnesses

E. F. Stewart

E. Daniels

Hart H. McNaughton AND Peter McNaughton, Inventors.

By C. A. Snow & Co. Attorneys

945,574.

H. H. & P. McNAUGHTON.

GRATE BAR.

APPLICATION FILED DEC. 15, 1908.

Patented Jan. 4, 1910.

2 SHEETS—SHEET 2.

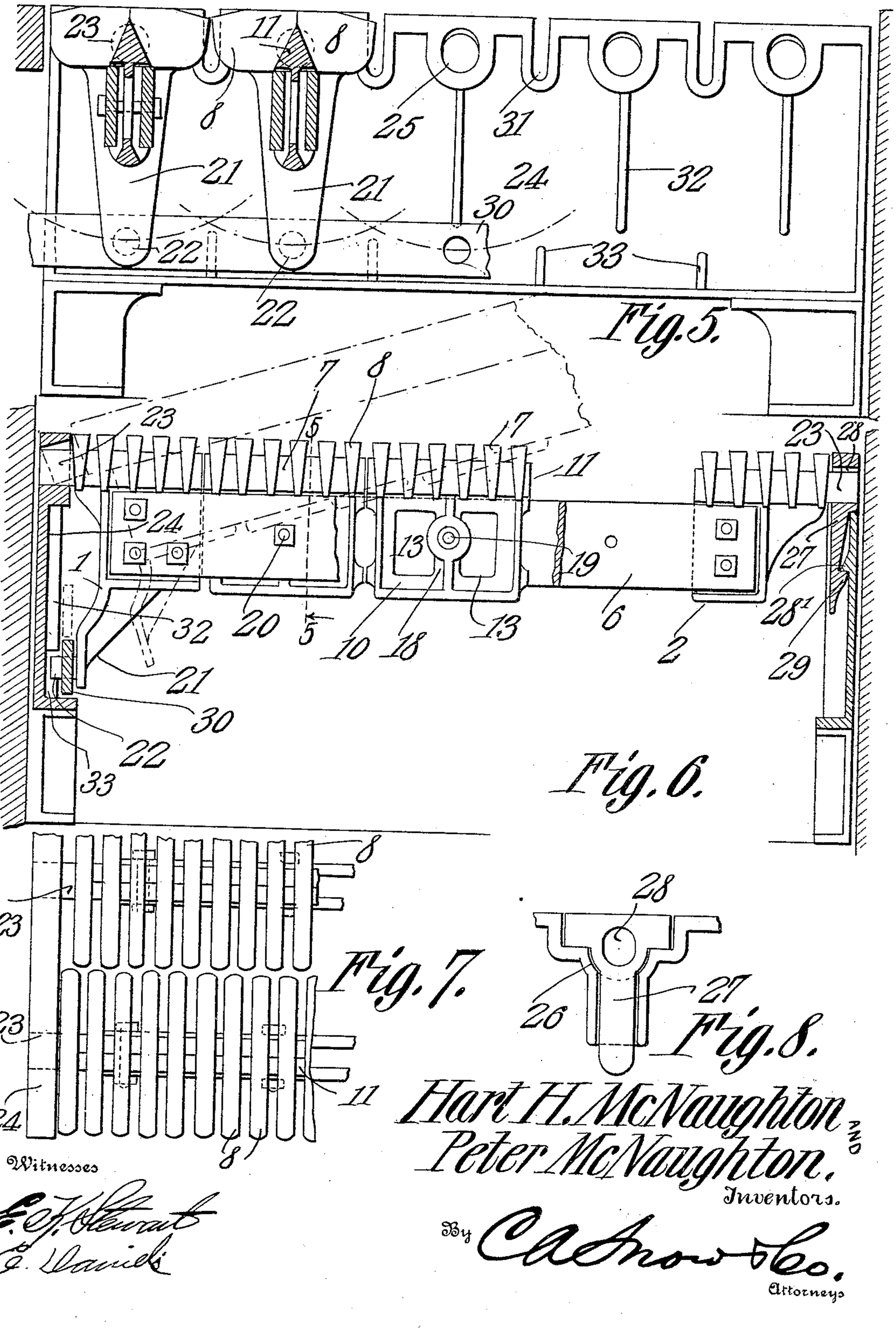


Fig. 5.

Fig. 6.




Fig. 7.




Fig. 8.

Witnesses

E. J. Stewart

E. Daniels

Hart H. McNaughton AND Peter McNaughton.

Inventors.

By Cachow & Co.

Attorneys

# UNITED STATES PATENT OFFICE.

HART H. McNAUGHTON AND PETER McNAUGHTON, OF CHARLOTTE, MICHIGAN.

## GRATE-BAR.

945,574. Specification of Letters Patent. Patented Jan. 4, 1910.

Application filed December 15, 1908. Serial No. 467,588.

*To all whom it may concern:*

Be it known that we, HART H. McNAUGHTON and PETER McNAUGHTON, citizens of the United States, residing at Charlotte, in the county of Eaton and State of Michigan, have invented a new and useful Grate-Bar, of which the following is a specification.

This invention has relation to grate bars and it consists in the novel construction and arrangement of its parts, as hereinafter shown and described.

The object of the invention is to provide a grate bar which is made up of a series of sections of cast pieces supported upon steel or sheet metal bars in such manner that air may pass up between the bars and through the wings of the cast pieces in practically unobstructed currents.

A further object of the invention is to provide a sectional grate bar as indicated, the parts of which may be conveniently stored and readily assembled, whereby grate bars of different lengths may be built up, as occasion may require, thereby avoiding the necessity, on the part of a dealer, of keeping a vast number of bars of different lengths in stock to supply his trade.

In the accompanying drawings:—Figure 1 is a plan view of one form of the bar, with parts removed. Fig. 2 is a side elevation of the form of bar as shown in Fig. 1, with parts removed and parts broken away. Fig. 3 is a transverse sectional view of the bar as shown in Fig. 1 cut on the line 3—3 thereof. Fig. 4 is an enlarged transverse sectional view of one of the wings of the bar cut on the line 4—4 of Fig. 1. Fig. 5 is a transverse sectional view of a modified form of the bar cut on the line 5—5 of Fig. 6, showing a portion of a frame for pivotally supporting the same. Fig. 6 is a transverse sectional view of the said supporting frame, showing the modified form of bar in side elevation, with parts broken away. Fig. 7 is a plan view of the form of bar as shown in Fig. 5. Fig. 8 is a side elevation of a bearing for pivotally supporting one end of the bar.

In the form of the invention, as illustrated in Figs. 1 to 4 inclusive, the bar consists of the end castings 1 and 2, which are of the same configuration, and a description of one will answer for both. This form of bar is what is termed a stationary bar, and each of the said castings is provided with a shoulder 3 and a depending portion 4. The wings 5 are cast integral with the depending portion 4 and the shoulder 3. The bars 6 are cut from strips of steel or iron and are bolted at their ends to the depending portions 4 of the castings 1 and 2 respectively. The intermediate portion of the grate bar is composed of a series of castings 7. Each of said castings is provided with a series of wings 8, which are provided with concaved upper surfaces 9. A web 10 depends from the wings 8 and is provided with a wedge-shaped head portion 11, which lies between the said wings 8. The wedge portions 11 extend at their edges over the edges of the bars 6 and serve as deflectors and protect the bars 6 against falling coal. The lower edges of the portions 11 are spaced from the upper edges of the bars 6 and thereby provide space for the upward movement of air currents as will be explained. The web 10 is also provided at its opposite sides with shoulders 12, which are adapted to bear against the inner sides of the bars 6, whereby the inner faces of the said bars 6 are spaced from the major portions of the sides of the web. The web 10 is also provided with an opening 13, which establishes communication between the spaces at the opposite sides of the web and within the bars 6. The recesses 14 separate the upper and lower end portions of the shoulders 12, lying upon the same side of the web 10, and the recesses 15 extend below the lower edges of the bars 6 and communicate with the space between the inner faces of the said bars and the sides of the web 10. The lower edge of the head 11 is spaced from the upper edges of the bars 6 as at 16. Each web 10 is provided at its opposite end with an approximately V-shaped recess 17, which recesses, when the castings 7 are assembled upon the bars 6, form openings through which the bolt 18 may be passed for the purpose of holding the castings 7 in position upon the bars, and for preventing the said bars 6 from spreading laterally.

From the above description, it is obvious that a grate bar may be readily built up, and that the length of the bar depends upon the lengths of the bars 6 and the number of castings 7 positioned thereon. It will also be seen that, during the use of the bar, should one or more of the castings 7 become defective or useless that the impaired casting or castings may be readily removed and new ones substituted in their stead, without disturbing those castings upon the bars 6

which are fit for further use. Inasmuch as the members 7 are castings formed of relatively brittle metal and the bars 6 are of steel or relatively tough metal, an impaired casting 7 is struck a lateral blow upon the ends of the wings 8 with sufficient force to break the casting at the upper portion of the web 10 and at the lower edges of the wings 8. The web 10 can then be forced down from between the bars 6 without disturbing the other castings 7. The web of a new casting may then be forced down between the bars 6 as the said bars will by such pressure be forced apart, until the lower ends of the recesses in the shoulders 12 pass below the lower edges of the bars 6 when the said bars will spring back into the recesses and assume their normal relation. It will also be seen that when the castings 7 are asembled upon the bars 6, sufficient space is provided about the sides of the webs 10, of the castings, and between the inner faces of the said bars, to permit currents of air to pass up along the sides of the said webs and between the said bars, which currents are discharged between the fuel-supporting wings 8, and may feed the fire resting thereon.

In the form of the invention, as illustrated in Figs. 1 to 3 inclusive, it will be seen that the wings 8 upon one side of the web of each casting 7, are pitched at an angle to the wings upon the opposite side of the web of each casting. Each wing 8 is thickest vertically at the point where it merges with the head 11, and gradually decreases in vertical thickness toward its outer end. Each wing is broadest, horizontally, at its upper edge, and gradually decreases in horizontal breadth toward its lower edge. The concaved grooves 9 at the upper surfaces of the wings form ash receptacles, which are adapted to protect the wings from the excessive heat of the fire resting thereon.

In the form of grate bar as illustrated in Figs. 5, 6 and 7 of the drawings, the same general principles are involved as are present in that form heretofore described. In the last said form the wings 8 are parallel to each other and extend at right angles to the heads 11 of the webs 10. Each web 10 is provided with a series of perforations 13, instead of a single perforation, as in the form illustrated in Figs. 1 to 3 inclusive. The perforations 13 of the webs 10, as shown in Fig. 6, are separated from each other by a column 18, which column is provided with a bolt perforation 19, which is adapted to receive a bolt 20, whereby each individual casting 7 is provided with positive means for securing the same to the side bars 6.

In the form of the invention as shown in Figs. 5, 6 and 7, the castings 1 and 2 are devoid of the shoulders 3, but the casting 1 is provided with a depending lug 21, upon the lower end of which is mounted the laterally disposed pin 22. The castings 1 and 2 are provided with the trunnions 23. The grate frame 24 is provided, at one side, with the vertically elongated bearings 25, which are adapted to receive the trunnion 23 of the castings 1. The opposite wall of the grate frame 24 is recessed as at 26, and the said recesses are adapted to receive the members 27, each of which is provided with a bearing 28. The bearings 28 are adapted to receive the trunnion 23 of the castings 2. The rear wall of the grate frame 24 is provided with the catches 28′, and each of the members 27 is provided with a laterally disposed shoulder 29, which, when the member 27 is in position in its recess 26, lies under the lug 28, and forms means for positively holding the member 27 in position in the said recesses 26. The rocking bar 30 is pivotally mounted upon the pins 22 of the lugs 21, and which, when reciprocated, is adapted to rock the grate bars upon their trunnions 23. The upper edge of the front wall of the frame 24 is provided with the recesses 31, which divide the upper portion of the said side of the said frame into sections, and each section may expand or contract independent of its adjacent section, thereby preventing the said frame from warping out of shape, as the result of intense heat being applied to any one particular spot along its upper edge portion. The walls of the frame 24 are also provided with the strengthening ribs 32 and 33.

Having described our invention, what we claim as new, and desire to secure, by Letters Patent, is:—

A grate bar comprising end members, parallel bar members rectangular in cross section and of uniform transverse width and thickness throughout their length detachably connected at their ends to the end members, and wing members mounted upon the bar members and having web portions provided with openings and located between the bar members and extending below the parallel bar members and provided on opposite sides with laterally disposed recessed shoulders which space the sides of the webs from the sides of the bar members and which extend below the parallel bars and lock the wing members on the same, the same web portions having wedge shaped end portions, the edge portions of which project over the upper edges of the bar members and are spaced from the same.

In testimony that we claim the foregoing as our own, we have hereto affixed our signatures in the presence of two witnesses.

HART H. McNAUGHTON.
PETER McNAUGHTON.

Witnesses:
M. Whatoe,
B. P. Moyer.