

No. 884,005.

J. M. BLADES.
FURNACE GRATE.

PATENTED APR. 7, 1908.

APPLICATION FILED JAN. 27, 1906.

3 SHEETS—SHEET 1.

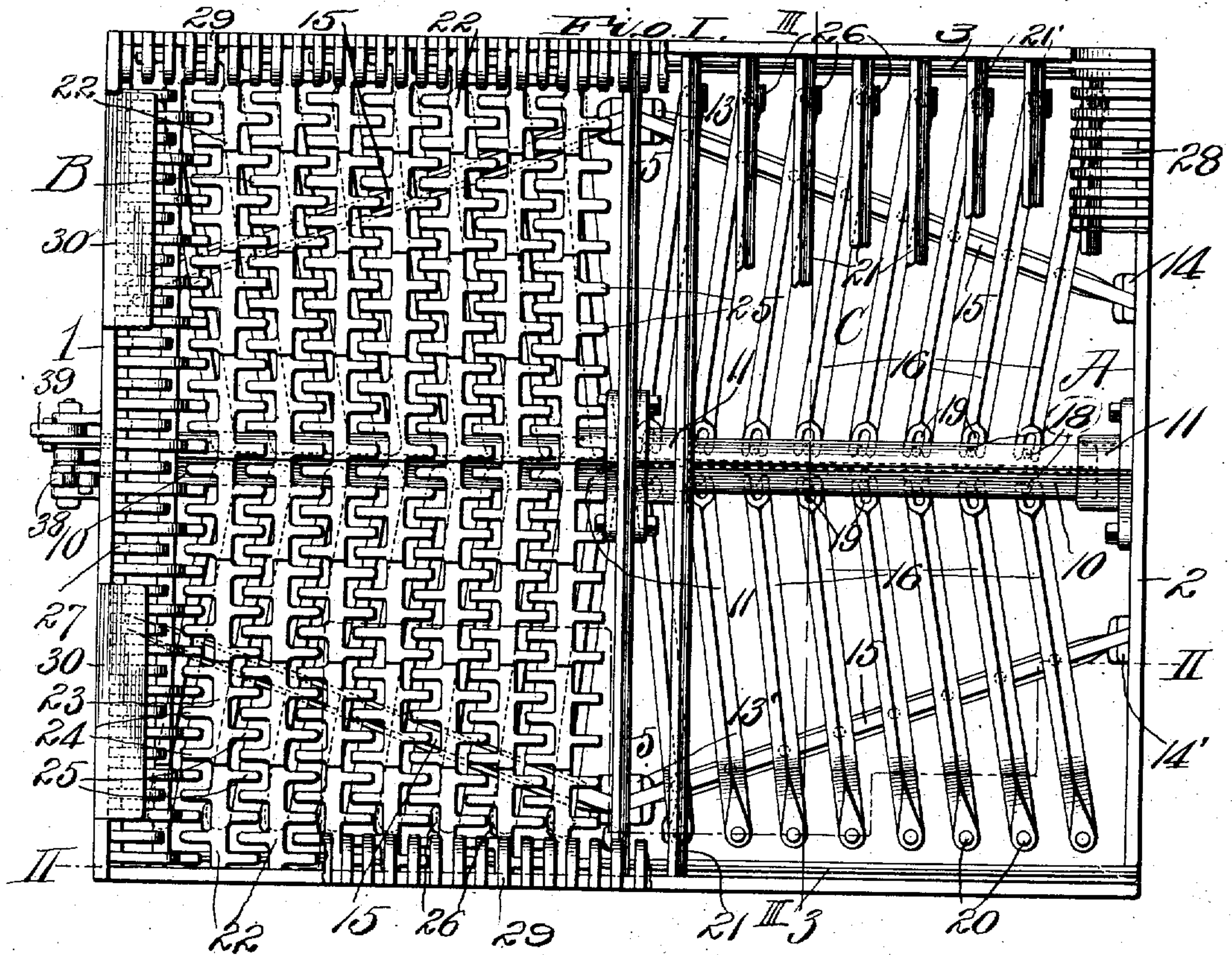
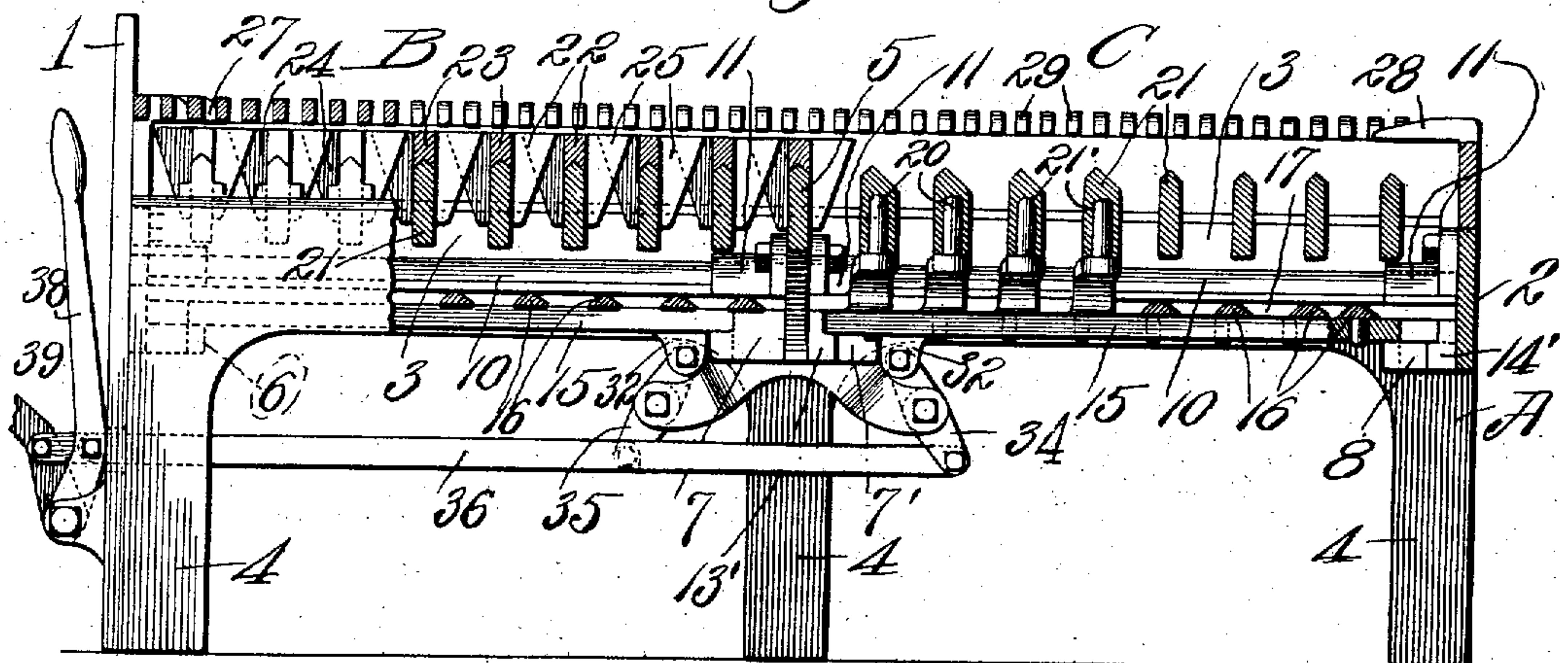


Fig. II.



Attest:
Wm. H. Scott.
Blanche H. Hagan.

Inventor:
John M. Blades,
by Wright, Porter & Wray.

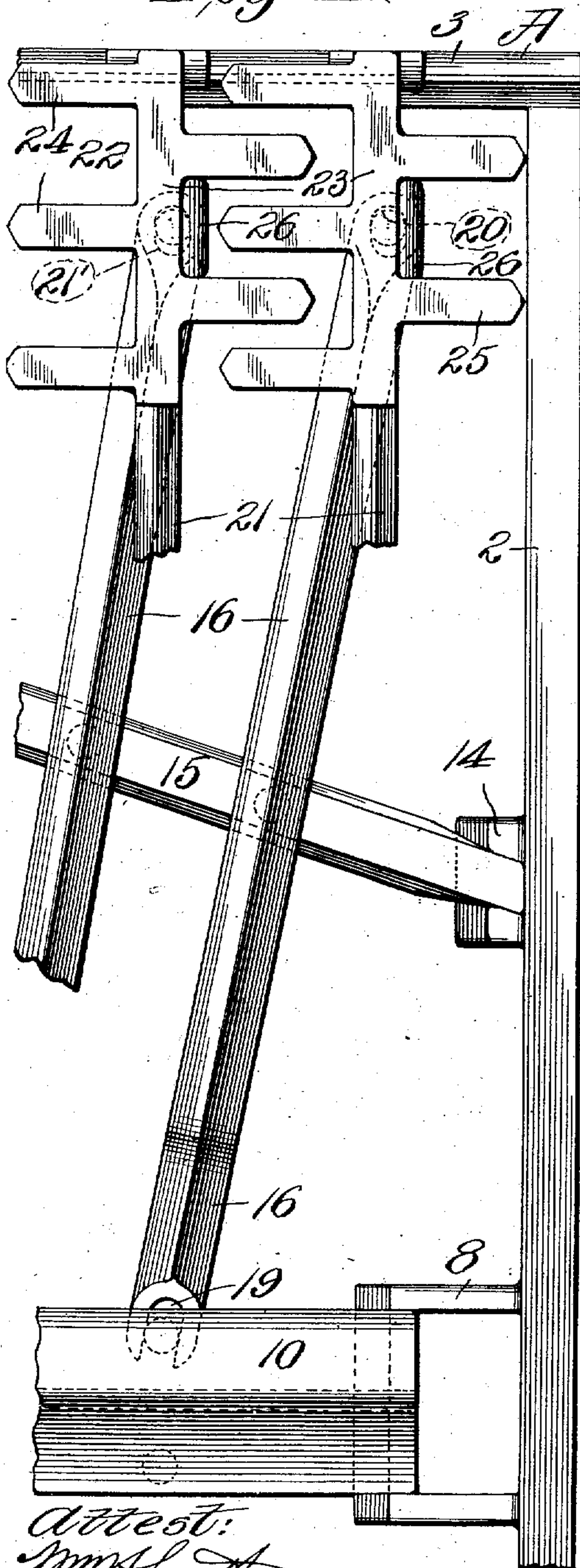
No. 884,005.

J. M. BLADES.
FURNACE GRATE.
APPLICATION FILED JAN. 27, 1906.

PATENTED APR. 7, 1908.

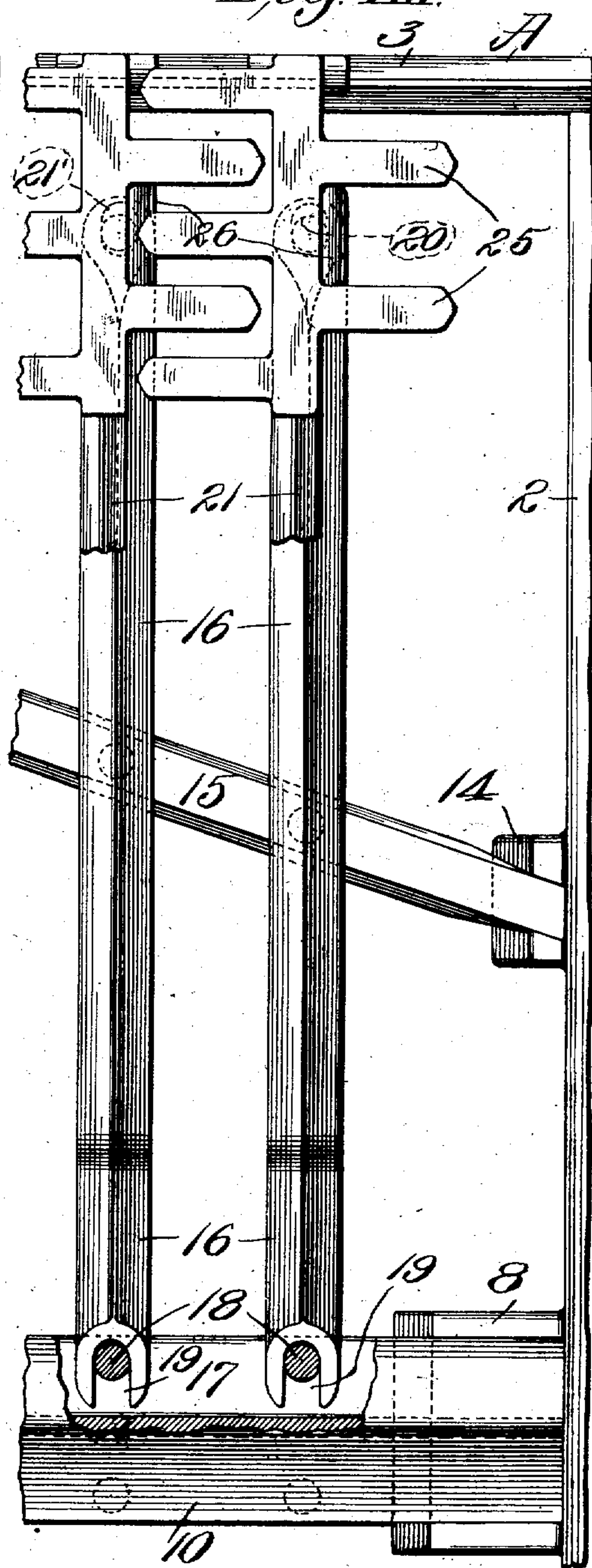
3 SHEETS—SHEET 3.

Fig. VII.



Attest:
J. M. Scott
Blanche Hogan

Fig. VIII.



Inventor:
John M. Blades,
by Wright & Barr
attys.

UNITED STATES PATENT OFFICE.

JOHN M. BLADES, OF ST. LOUIS, MISSOURI, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF ONE-HALF TO BENT GOODLOE AND ONE-HALF TO HART GOODLOE, BOTH OF ST. LOUIS, MISSOURI.

FURNACE-GRATE.

No. 884,005.

Specification of Letters Patent.

Patented April 7, 1908.

Application filed January 27, 1906. Serial No. 298,126.

To all whom it may concern:

Be it known that I, JOHN M. BLADES, a citizen of the United States, residing in the city of St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Furnace-Grates, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to a new and useful improvement in furnace grates and has for its objects first; to provide means whereby the bars of the grate may be moved toward or away from each other in order to regulate the air spaces or interstices between said bars to the desired degree to suit various conditions, such for instance, as whether fine or coarse fuel is used or whether the fire on the grate burns under a strong or weak draft.

Another object is to provide a novel means whereby the bars may be shaken; the construction of the grate being such that either, or both, of the above mentioned manipulations can be made while fuel is burning on the grate.

Figure I is a top or plan view of my improved grate the clips and grate bars proper being omitted in one portion to more clearly illustrate the parts beneath them. Fig. II is a vertical section taken on line II—II, Fig. I. Fig. III is a vertical transverse section taken on line III—III, Fig. I. Fig. IV is a perspective view of one of the fuel supporting clips of the grate bar. Fig. V is a perspective view of one of the grate bars, partly broken away, and one of the fuel supporting clips arranged thereon. Fig. VI is a perspective view of one of the throw bars, by which the grate bars are actuated. Fig. VII is an enlarged top or plan view of a portion of my grate, partly broken away. Fig. VIII is a view similar to Fig. VII showing the grate bars in a differently adjusted position.

A designates a supporting frame which consists of a front wall 1, a rear wall 2, side walls 3—3, legs 4, and a transverse bar 5. This frame is provided with brackets 6, 7, 7' and 8, arranged upon the front wall, transverse bar and rear wall respectively, the brackets 6 and 7, and 7' and 8 being disposed toward each other.

The construction of my improved grate is such that I might term it a double grate

formed of a front section B and a rear section C, and insofar as the major details are concerned in the following description I shall, in the main, refer to the duplicate parts in their singular number, *i. e.* I will describe but one section of the grate.

Slidably mounted upon the brackets 6 and 7 and held against lateral movement thereon by side flanges on said brackets, is arranged a reciprocatory bar 10, the ends of which are covered by suitable caps 11 which prevent said bar from becoming displaced, and also serve to prevent the deposit of fuel or other substance in said brackets to interfere with the operation of said bar 10.

The transverse bar 5 is provided with socket lugs 13 and 13' and the front and rear walls are provided with similar lugs 14 and 14', the former of which lugs are arranged adjacent to the side walls 3—3, while the latter lugs are arranged a greater distance from said side walls. The lugs 13, 14 and 13', 14' support bearing bars 15, which serve as fulcrum members for a plurality of throw levers 16. (See Fig. 1).

The reciprocatory bar 10 is provided with longitudinal grooves 17 formed in its sides, and arranged within these grooves are pivot members 18, which are designed to enter forks 19 at the inner ends of the throw levers 16.

The levers 16 are provided adjacent to their outer ends with vertically disposed studs or pivot pins 20 which enter slots 21' formed in the grate bars proper 21, which are designed to rest and be slidably supported on the side bars 3—3 of the frame A.

22 designates clips which are detachably arranged upon the grate bars proper, see Figs. IV and V. These clips each consist of a longitudinal body 23 which is provided with an inverted V-shaped groove formed in its lower face and which engage the upper V-shaped edge of the grate bars proper. Projecting laterally from one side of the body 23 of the clips are fins 24 and arranged upon the opposite side of said body 23 and alternately disposed relative to the fins 24 are similar fins 25.

I prefer to form each entire grate bar out of a grate bar proper and a plurality of the clips 22 (eight being shown in the drawings) and have provided means for locking said clips against longitudinal movement upon

the grate bars 21, which means consists in forming upon the said grate bars proper, lateral projections 26 which fit between two of the laterally extending fins 24 or 25 of the outermost clips. By thus forming each entire grate bar I am enabled to greatly prolong the life of the entire grate, in that should any one clip become broken or badly burned I can simply remove that clip and insert a new one.

I will here state that the transverse bar 5 also acts as a grate bar proper to receive a plurality of clips, it however being a stationary bar and the movable clips of the sections B and C are arranged on each side thereof.

I prefer to arrange around the entire grate marginal guard bars 27, 28 and 29, said bars being arranged respectively at the front, rear and side walls of the frame A and are secured thereto in any suitable manner.

The front wall 1 of the furnace is provided with openings or recesses 30—30, and 31—31, which openings or recesses are designed to register with or be brought into juxtaposition to the fire doors and ash pit doors of the furnace front.

Each reciprocatory bar 10 of each of the sections B and C of the grate is provided with ears 32 and 33, which are respectively engaged by levers 34 and 35, said levers being pivotally supported by lugs formed on the transverse bar 5 of the frame A. The ends of these levers 34 and 35, opposite to those which engage the reciprocatory bars 10, are connected to links 36 and 37 respectively, which links pass through suitable openings formed in the front wall of the frame A, where they are connected to levers 38 and 39.

When it is desired to shake either or both sections B and C of the grate, the shaking action is accomplished by the manipulations of the lever or levers 38 and 39.

When it is desired to move the grate bars toward or away from each other, in order to regulate the size of the air spaces between them the lever or levers 38—39 are moved forwardly or backwardly as the case requires, whereby through the instrumentality of the link or links, lever or levers, and reciprocatory bar or bars 10 connected thereto, the throw levers 16 are moved in such manner as to cause the grate bars proper 21 and their carried clips to be moved in one general direction, either forwardly or rearwardly.

For illustration, we will say that the grate bars are in the position shown in Figs. I and VII of the drawings, wherein the bars are shown at their maximum degree of separation.

When it is desired to diminish the air spaces between the bars the levers 38 and 39 are manipulated in the proper direction, which as before stated moves all of the grate bars, in this instance, inwardly, and due to the differential fulcrum points of the levers 16 on the diagonally arranged bars 15

each grate bar is moved inwardly but to a degree different from the other bars, that is in a given length of time the grate bar nearest the center wall 5 moves a certain distance, the next grate bar adjacent thereto moves a greater distance, and so on throughout the entire number of grate bars, the next adjacent grate bar to the one previously considered moves an increased distance. This adjustment can be made until the minimum size of the air space is reached, which position is illustrated in Fig. VIII of the drawing. It will be readily understood that the actuation of the grate bars to attain reverse adjustments of them, or the greater separation of the bars, is accomplished by moving the reciprocatory bar 10 in a direction opposite to that in which it was previously moved, whereby the throw levers are swung reversely, but move in the same degrees relative to each other as a consequence of which the grate bars are brought more closely assembled and the spaces between them decreased.

I claim as my invention:

1. A grate consisting of a frame, a plurality of grate bars, throw levers pivotally connected to said grate bars, a support for all of said throw levers, each of said throw levers being fulcrumed to said support at a distance from one of its ends different from the fulcrums of the other levers, and means for moving all of said throw levers, substantially as set forth.

2. A grate consisting of a frame, a plurality of movable grate bars, clips carried by said grate bars, throw levers pivotally connected to said grate bars, a support for all of said throw levers, each of said throw levers being fulcrumed to said support at a distance from one of its ends different from the fulcrums of the other levers, and means for moving all of said throw levers, substantially as set forth.

3. A grate consisting of a frame, grate bars slidably mounted on said frame, throw levers pivotally attached to said grate bars, a support for said throw levers and upon which they are fulcrumed, the fulcrum point of each throw lever being at a distance from one of its ends different from the fulcrums of the other levers, and means for moving all of said throw levers simultaneously to increase or diminish the interstices between said grate bars, substantially as set forth.

4. A grate consisting of a frame, grate bars slidably mounted thereon, clips mounted on said grate bars, throw levers pivotally attached to said grate bars, a support for said throw levers and to which they are fulcrumed, the fulcrum point of each throw lever being at a distance from one of its ends different from the fulcrums of the other levers, and means for moving all of said throw levers simultaneously to increase or diminish the in-

terstices between said grate bars, substantially as set forth.

5 5. A grate consisting of a frame, a plurality of movable grate bars, clips carried by said grate bars, throw levers pivotally connected to said grate bars, a support for said throw levers, each of said throw levers being fulcrumed in said support at a distance from one of its ends different from the fulcrums of the other levers, and a slidable bar mounted on said frame for coöperation with said levers for moving them simultaneously to increase or diminish the interstices between said grate bars, substantially as set forth.

15 6. A grate consisting of a frame, grate bars slidably mounted on said frame, throw levers pivotally attached to said grate bars, a support for each of said throw levers and to which they are fulcrumed, the fulcrum point of each throw lever being at a distance from one of its ends different from the fulcrums of the other levers, and a slidable bar mounted on said frame for coöperation with said throw levers for moving them simultaneously to increase or diminish the interstices between said grate bars, substantially as set forth.

25 7. A grate consisting of a frame, grate bars slidably mounted thereon, a plurality of clips mounted on each of said grate bars, throw levers connected to each of said grate bars, a support for all of said throw levers and to which said throw levers are fulcrumed; the fulcrum point of the two outer-

most throw levers being at different distances 35 from the ends of said levers, while the fulcrum points of the throw levers arranged therebetween are in alinement with the fulcrum points of said outermost levers; a slide bar which coöperates with said throw levers, 40 and means for operating said slide bar whereby the interstices between the grate bars can be increased or diminished, substantially as set forth.

8. A grate consisting of a frame, grate 45 bars slidably mounted thereon, a plurality of clips mounted on each of said grate bars, a throw lever connected to each of said grate bars, a support for all of said throw levers and to which said throw levers are ful- 50 crumed; the fulcrum points of the two outermost throw levers being at different distances from the ends of said levers, while the fulcrum points of the throw levers arranged therebetween are in alinement with the ful- 55 crum points of said outermost throw levers; a slide bar which coöperates with said throw levers, marginal grate bars supported by said frame and overlapping said first mentioned grate bars and their carried clips, and means 60 for operating said slide bar whereby the interstices between the grate bars can be increased or diminished, substantially as set forth.

JOHN M. BLADES.

In presence of—

E. S. KNIGHT,
WM. H. SCOTT.