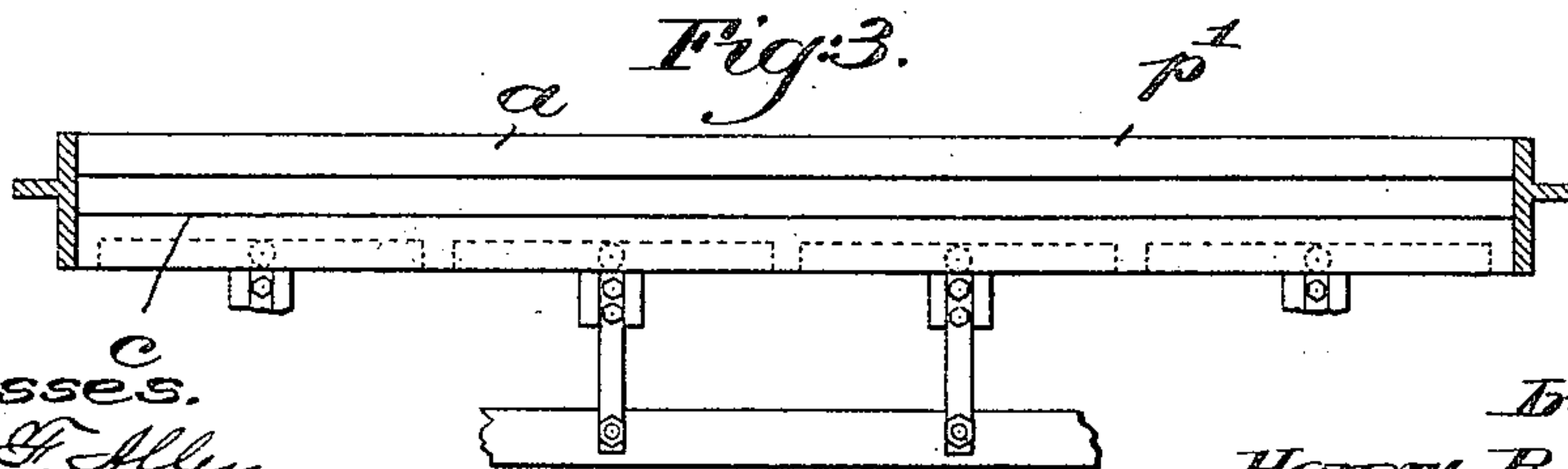
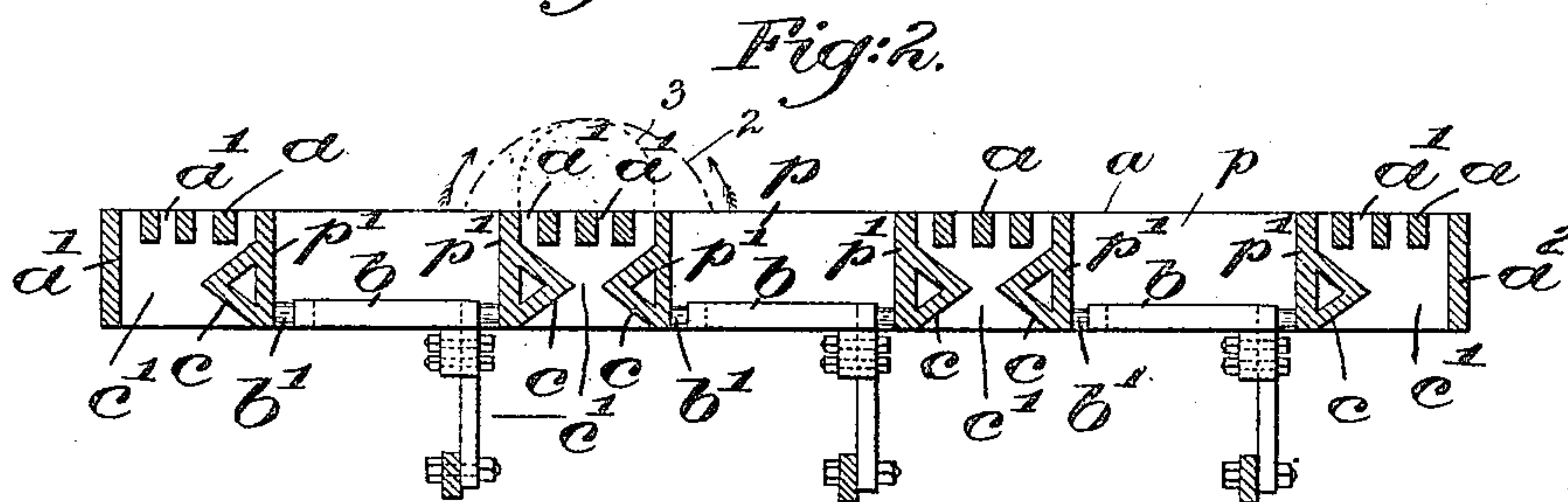
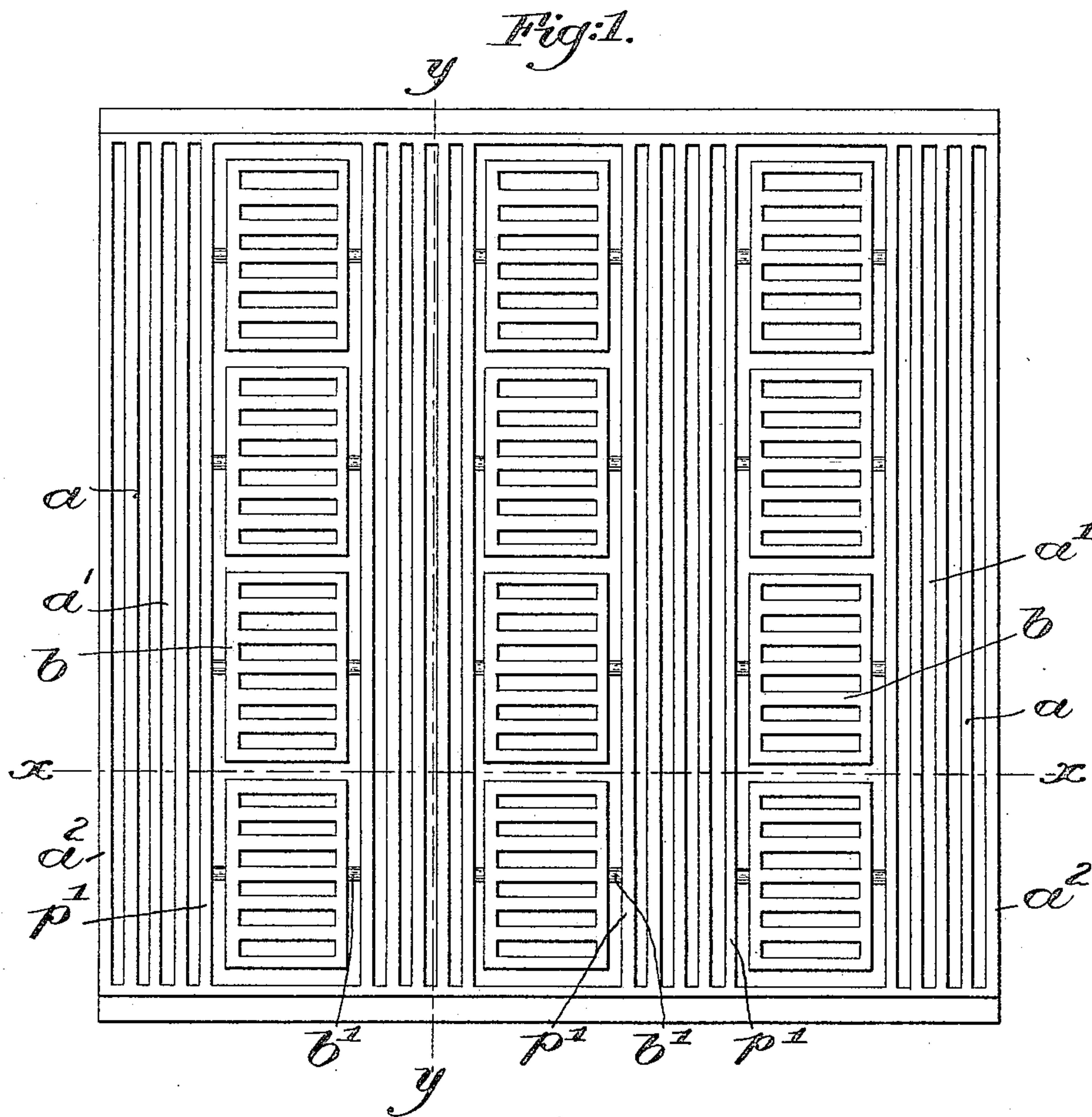


(No Model.)

H. R. LUTHER.
GRATE.

No. 529,504.

Patented Nov. 20, 1894.



Witnesses.
Edward F. Allen.
Thomas J. Drummond

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UNITED STATES PATENT OFFICE.

HENRY R. LUTHER, OF CAMBRIDGE, MASSACHUSETTS.

GRATE.

SPECIFICATION forming part of Letters Patent No. 529,504, dated November 20, 1894.

Application filed March 15, 1894. Serial No. 503,809. (No model.)

To all whom it may concern:

Be it known that I, HENRY R. LUTHER, of Cambridge, county of Middlesex, State of Massachusetts, have invented an Improvement in
5 Grates, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

United States Patent No. 485,684, dated
10 November 8, 1892, illustrates a type of fuel support or grate, consisting of alternately arranged high and low grate surfaces, the latter arranged in long pockets in the former, the side walls of said pockets being imperforate.
15 rate. When grates of this type or construction are placed in practical use it has been found that the intensity of the fire upon the upper grate surfaces along the edges of the pockets is such as to melt down the metal of
20 said walls and in a comparatively short space of time seriously injure the grate. Again, when grates of ordinary construction are replaced by pocket grates of the type above referred to the fuel upon the pocket grates
25 develops a heat much more intense than the same quantity of fuel upon the old form of grate. In many instances, however, when the change from the old form of grate to the pocket grate is made, such change is for the
30 purpose of obtaining the same quantity of heat as before but with a less consumption of fuel, making it necessary to carry a more moderate fire upon the pocket grate to obtain the required heat than was formerly re-
35 quired upon the old form of grate. In practice, however, I have found it very difficult to so control the fire upon the pocket grate as to produce a moderate heat, this difficulty being caused by the lack of sufficient means
40 for properly controlling or regulating the quantity of air permitted to rise between the pockets and through the upper grate surfaces upon which the areas of most intense fire of incandescence is carried.

45 The object of this invention is, first, to provide means for narrowing the section of incandescence or intensely heated sections of fire upon the upper grate surfaces to thereby free the side walls of the pockets to a greater
50 or less extent from the damaging effects of intense heat, and second, to provide means for restricting the amount of air admitted to

the upper grate surfaces to support the combustion thereupon without restricting the area of said upper grate surfaces.

In the construction herein shown and embodying my invention I am enabled to attain both of these objects.

In accordance with my invention I provide the exterior walls of the pockets with what
60 I term "baffle surfaces" integral with or independent of the said side walls but inclined inwardly toward each other to reduce the area of opening through which the air must pass in rising to the upper grate surfaces be-
65 tween the side walls.

In the drawings, Figure 1 represents in top or plan view a large pocket grate embodying my invention; Fig. 2, a cross section of the same on the dotted line $x-x$, and Fig. 3, a
70 longitudinal section on the dotted line $y-y$.

Referring to the drawings, the grate shown consists of alternately arranged high grate surfaces a and low grate surfaces b , the latter being arranged in pockets p , Fig. 2, herein
75 shown as extending the entire length of the grate and provided with imperforate side walls p' , but which so far as this invention is concerned need not be of such great length. In the present instance the lower grate sur-
80 faces b are suspended on pivots b' , said lower grate surfaces being divided into several sections in order that they may be rocked about said pivots; suitable means being provided by which to rock said lower grate surfaces,
85 but which do not constitute a part of this invention and need not be herein further described. The upper grate surface, as usual in all grates, is provided with air openings a' through which air may rise to support com-
90 bustion of fuel upon the grate.

In pocket grates as heretofore constructed, the outer side walls of the pockets have been perfectly straight, permitting air to rise across the entire widths of the upper grate surfaces
95 and through the openings a' in said upper surfaces to maintain intensely hot fires upon the several upper grate surfaces, the cross area of said intensely hot sections being roughly indicated by the dotted line 2 com-
100 posed of alternate dashes and dots, Fig. 2. It will be seen that, when the air is thus admitted across the entire width of the upper grate surfaces, the sections of intensely hot

fire overlap the side walls of the adjacent pockets with the result that said walls are in many cases rapidly melted down.

In accordance with this my present invention I restrict the admission of air to the upper grate surfaces between the pockets, preferably by the use of what I term "baffle surfaces" c , shown as formed integral with the side walls of the pockets, but which so far as this invention is concerned may be independent of said walls and suitably attached thereto. These baffle surfaces are inclined inwardly and upwardly toward each other, as shown in Fig. 2, and are separated to leave a restricted or narrow opening c' beneath the longitudinal center line of an upper grate surface, and through this restricted opening all the air which passes through the grate surfaces above it must pass. The result of this is that the supply of air to the upper grate surfaces is more nearly restricted to the center of said surfaces to thereby reduce the cross-sectional area of the intensely heated portions of the fire, to an area roughly designated by dotted line 3. It will be seen that by narrowing up the cross-sectional area of the intensely heated section of fire upon the upper grate surfaces the side walls of the pockets are subjected to less heat and are therefore enabled to stand for a much longer period of time.

The other object attained by my invention and which in many cases is quite as important as the saving of the pocket walls, is that, by reducing the areas of intensely heated sections, the aggregate heat produced by the fuel upon the grate is less than when a full supply of air is admitted to said upper grates and the intensely heated sections are much larger. This is equivalent to carrying a more moderate fire and enables the pocket grates of the same area as grates of the former type to replace the latter grates and to produce the same heat as the old type of grate, but with less expenditure of fuel.

By varying the opening c' to admit more or less air, and by changing the inclination and vertical location of the baffle surfaces, the cross sectional area of intensely heated sections upon the upper grate surfaces, and the resultant heat produced, may be varied, yet protecting, to a greater or less extent, the side walls of the pockets.

A further and added advantage resulting from the use of my invention is that the air rising to the upper grate surfaces is compelled to pass through a restricted opening c' and is thereby raised to a higher temperature by the heated baffle surfaces and the side walls of the pockets, than where the opening is much larger, the air thus mingling with the fuel upon the upper grate surfaces in a much higher temperature, and in readiness to mingle more thoroughly and perfectly

with the gases escaping with the fuel, than with the old form of pocket grate. It will be noticed that I have provided the space between the side pockets and the vertical side plate a^2 of the grate, with baffle surfaces at one of their sides only, viz: the sides adjacent the pockets in order to crowd the air toward the said side plates a^2 and maintain a more intense heat along the extreme edges of the grate than has heretofore been possible. This not only produces a more uniform fire, but also brings the most intense heat along the edge of the grate next the water space surrounding the fire, to thereby raise the water within said space to a higher temperature and increase the efficiency of the boiler.

Fig. 3, shows the baffle surfaces as extending the entire length of the grate along the side walls of the pockets. It will be noticed that while I restrict the quantity of air admitted to the upper grate surfaces, yet the area of said upper grate surfaces is not reduced, I thereby obtaining a combination and result not heretofore known so far as I am aware.

This invention is not restricted to the particular form of pocket grate herein shown, as it is applicable to any shape, size or arrangement of pockets, that depending entirely upon the character of work for which the grate is designed. Neither is the invention restricted to the particular shape or construction of baffle surfaces herein shown, nor to the location or adjustment of the same shown, all of which may be varied to meet different requirements of surfaces.

I claim—

1. In a grate of the type described, the combination with the upper and lower grate surfaces, the latter arranged in pockets in the former, of a baffle surface projecting from the outside of the pocket wall to restrict the area of opening through which air may pass to the upper grate surface above it without restricting the area of such upper grate surfaces, substantially as described.

2. In a grate of the class described, the combination with upper and lower grate surfaces, the latter arranged in pockets in the former, of baffle surfaces arranged beneath the said upper grate surface and projecting inwardly toward each other from the adjacent side walls of the pockets to thereby restrict the opening through which air may pass to the upper grate surface above, substantially as and for the purpose specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY R. LUTHER.

Witnesses:

FREDERICK L. EMERY,
AUGUSTA E. DEAN.