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PATENTED NOV. 22, 1904.

G. A. ELLIS.
OPERATING APPLIANCE FOR GRATES.
APPLICATION FILED MAR. 10, 1904.

NO MODEL.

Fig. 1.

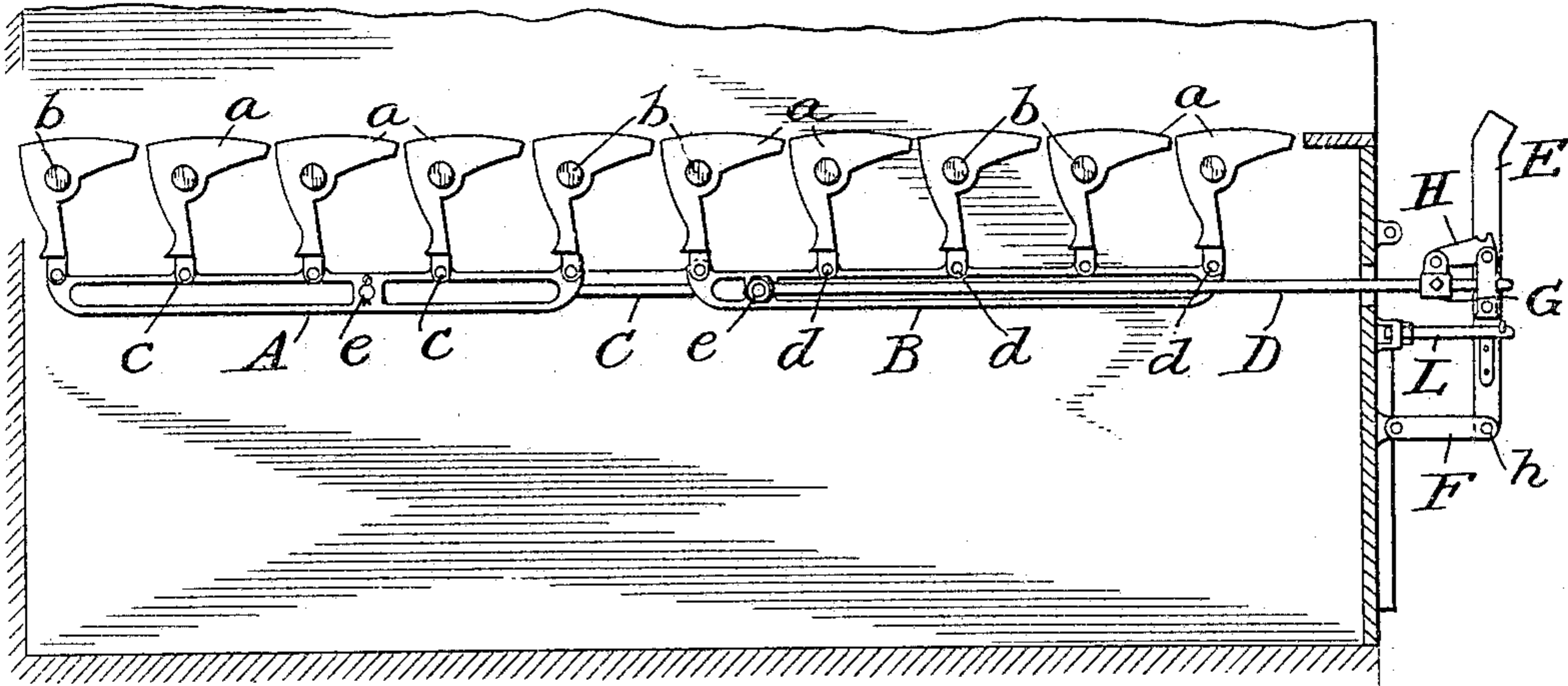


Fig. 2.

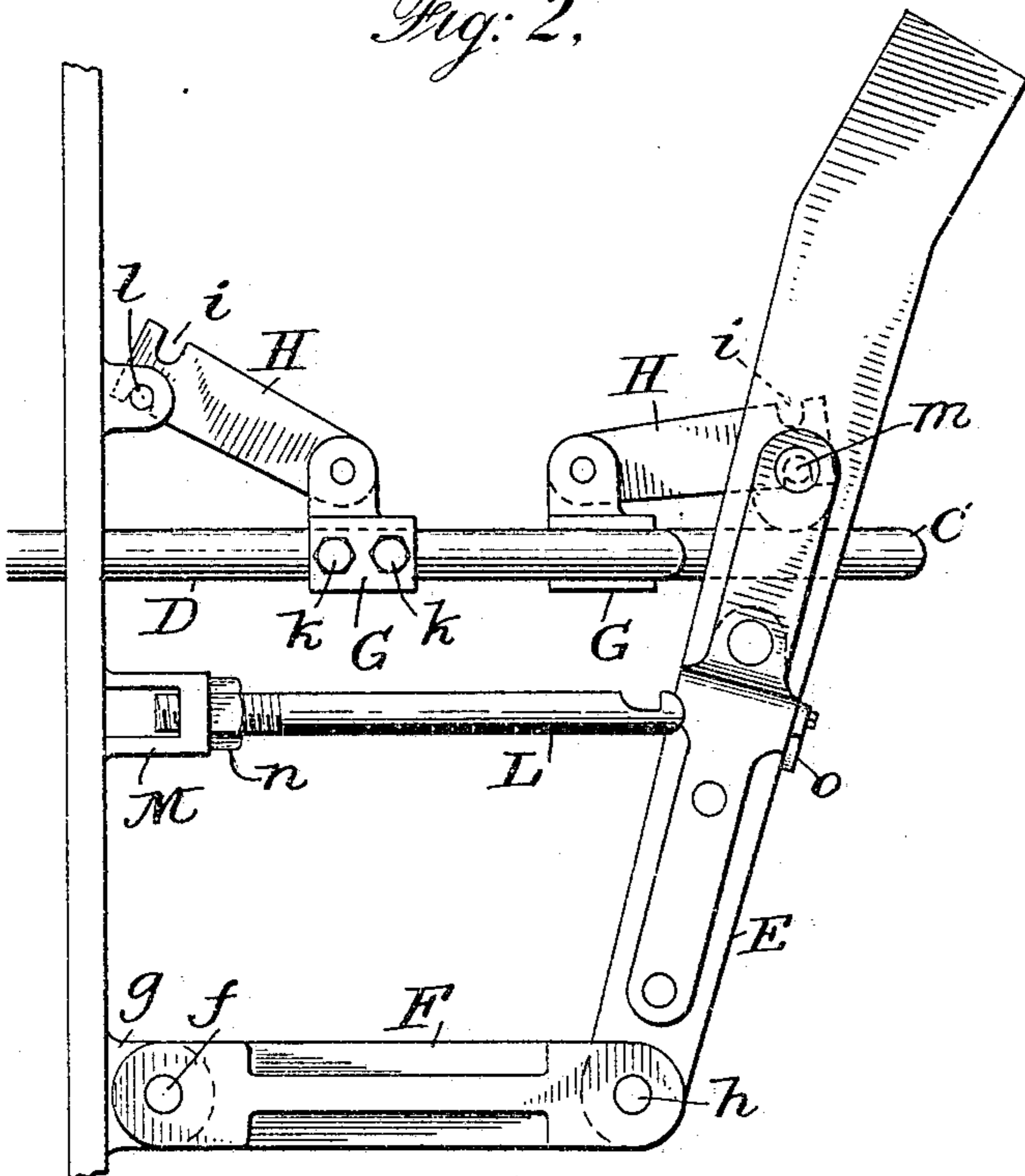
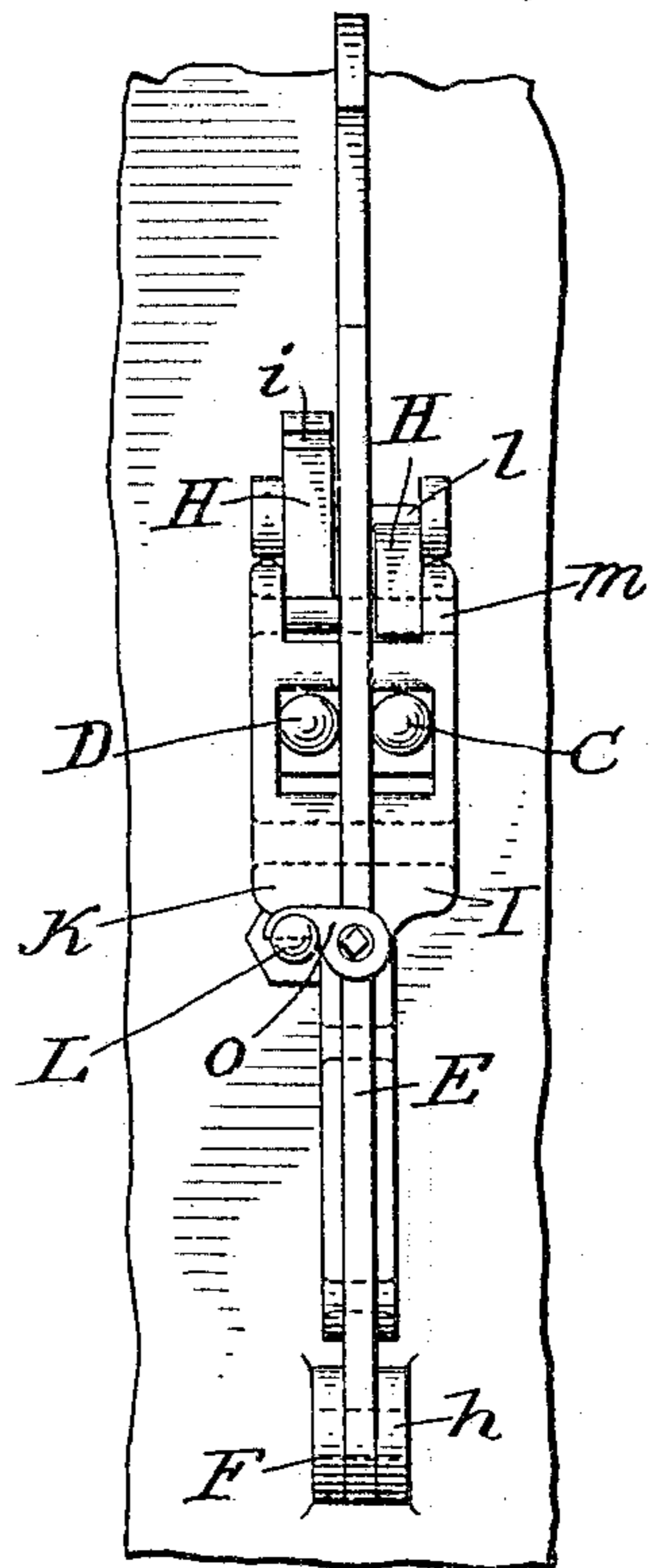


Fig. 3.



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UNITED STATES PATENT OFFICE.

GEORGE A. ELLIS, OF MOUNT VERNON, NEW YORK.

OPERATING APPLIANCE FOR GRATES.

SPECIFICATION forming part of Letters Patent No. 775,395, dated November 22, 1904.

Application filed March 10, 1904. Serial No. 197,428. (No model.)

To all whom it may concern:

Be it known that I, GEORGE A. ELLIS, a citizen of the United States, residing at Mount Vernon, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Operating Appliances for Grates, of which the following is a full, clear, and exact specification, reference being had to the accompanying drawings and to the letters of reference marked thereon.

My invention has relation to means or appliances for operating grates of furnaces and other structures in which solid fuel is consumed and in which the grate-bars are united in separate and independently - operating groups or sections.

My improvements are chiefly applicable in connection with that variety of grates which are known as "pocketing and cutting-off" grates wherein the major portion of the weight of each bar is on one side of the axis of the grate-bar trunnions, by reason of which the bars in either section are liable if not restrained to turn or swing out of their normal positions for the proper support of the fuel thereon; but the improvements are likewise applicable in connection with other forms of grate, if it be desired to so apply them.

The principal objects of my invention are to provide or produce or construct a simple, cheap, efficient, and easily-applicable appliance for operating either of the different sections of the grate independently of the other or others or to operate both or all sections simultaneously, to hold one section immovable while the remainder of the grate is being operated, or to hold all the sections immovable and to securely lock or latch the operating stub-lever in its proper position when it is desired that it shall remain at rest.

Subordinate objects are to operate the independent sections of the grate either simultaneously or separately by employment of a single stub-lever, to make the parts adjustable and applicable at little expense for fitting, constructing, and locating, and to make the whole simple, compact, durable, and efficient.

To accomplish all the foregoing objects and to secure other and further advantages in the

matters of construction, operation, application, and use, my improvements involve certain novel and useful arrangements or combinations of parts and principles of operation, all of which will be herein first fully described and then pointed out in the claims.

In the accompanying drawings, forming part of this specification, Figure 1 is a vertical section and elevation representing my improved appliance arranged for operating in connection with a grate composed of two sections. Fig. 2 is a side elevation, on a larger scale than Fig. 1, representing the ends of the connecting-rods which project through the front ash-pit wall or other plate. Fig. 3 is a front view corresponding with Fig. 2.

In all the figures like letters of reference wherever they occur indicate corresponding parts.

a a are grate-bars, of which *b b* represent the journals or trunnions. These bars are of the pocketing or cutting-off pattern—that is, they are moved in one direction to open the spaces between the bars, allowing the material to drop down in between them, where it is pocketed, and then moved in the opposite direction to cut off the pocketed material and drop it into the ash-pit below, and then after a sufficient quantity has been detached from the bed of fire swung back so that the upper surfaces of the bars will constitute a substantially unbroken grate-surface. In the more extensive grates these bars are coupled together in groups or independent sections, so that all the bars in one section may be simultaneously operated.

A and B are two coupling-bars by which the grate-bars in each of the two sections are united, the union being effected by projections, as *c c* and *d d* on the bars which are pivotally connected with the coupling-bars A and B.

C and D are two connecting-rods, one connected with one coupling-bar and the other with the other coupling-bar and both extending out through the front plate or wall of the ash-pit section and serving to move the coupling-bars back and forth, and thereby to independently or simultaneously operate the different sections of the grate. Connecting-rods

for this purpose and in a similar situation have heretofore been made of special and expensive form both as to the manner of uniting them with the coupling-bars and as to their union with the moving appliances located outside the furnace. Under my improved arrangement I am enabled to make the connecting-rods of merchantable rods straight and of any length and to connect them with the coupling-bars by simple means. By preference I simply bend the ends of these connecting-rods, as at *e*, and carry the bent ends through suitable perforations provided for them in the coupling-bars. The bent ends may be secured against withdrawal either by a cotter-pin or by an applied nut or in any other simple and substantial manner.

E is a short lever, called a "stub-lever," by means of which the connecting-rods are to be moved forward and back. In the form shown in the drawings this lever is connected with the front plate of the furnace or other suitable plate which may be connected thereto and is fulcrumed at its lower end, this being the preferred manner of mounting the stub-lever; but obviously the lever might be fulcrumed above as well as below the point where the connections with the connecting-rods are made.

F is a spacing-piece the length of which determines the distance at which the lever E is located from the front of the furnace, and this should always be of length sufficient to enable the stub-lever to be moved back and forth through the proper distance to effect the desired operations of the grate-sections. This spacing-piece is preferably pivoted or hinged, as at *f*, in a stationary lug *g*, and the lever E is pivoted or hinged to the other end of the spacing-piece, as at *h*. This manner of fulcruming the lever enables it to move up and down in a slight degree, so as to avoid cramping while it is being employed to rock the grate-sections; but other forms of spacing-pieces or means of spacing may be employed, if so desired.

Each connecting-rod is supplied with a collar, as G, carrying a hinged latch H, intended to lock and hold the connecting-rods either in connection with the lever E or the front of the furnace. For this reason the latches H are notched or recessed on both edges to latch with the pins or projections provided for the purpose in whichever direction the latches may be swung. When properly located, the collars G are securely held in place by any suitable means, as by set-screws *k k*. A suitable pin or projection, as *l*, secured to the front wall of the furnace or other stationary plate, serves to hold the latch when the latter is swung in the proper direction for engagement therewith, and thereby to hold the connected connecting-rod against movement.

The lever E moves in the space between the two connecting-rods during the various movements. A simple manner of adapting the le-

ver for this purpose is to apply to it on each side suitable plates, as I and K, the same being rigidly held in place, as by rivets passing through them and through the body of the lever. Near the top of these plates is a pin *m*, with which the latches H engage when they are turned in the proper direction to connect one or both the connecting-rods with the lever E.

The construction and arrangement being substantially as so far described, all that is necessary to adjust the parts to their proper working position is to locate the connecting-rods, which may be of any length, slip on the collars G, swing the latches H to their locked position with respect to the front of the furnace, then regulate the positions of the connecting-rods so that the upper surfaces of the sections of the grate shall be substantially horizontal, and then lock the collars G securely in place. Next swing the lever E up to the point where the latches H will engage the pin *m* and then cut off the extra projecting ends of the connecting-rods and round them off, as shown in the drawings, if preferred to finish them in that manner. This is all the fitting that is necessary, and it obviates the special, and therefore expensive, constructions and fittings heretofore prevailing in this class of grate-operating appliances.

Being properly adjusted for operation in accordance with the foregoing explanations, either of the two connecting-rods may be separately operated while the other is held fast, or the two may be simultaneously operated when they are both latched in connection with the lever, as will be apparent.

The stub-lever E is only a short lever. It may be prolonged by any suitable removable extension, and this extension does not need to be specially constructed, for it may be of any form so long as it will grasp and hold the stub-lever. It is made removable, so as to be out of the way when not required to shake the grate. The top of the single stub-lever may be socketed, if so desired; but the single plain construction as shown in the drawings is preferred.

In these grate-operating appliances it is desirable to supply means for maintaining the lever in an upright position when it is not in use. For this purpose I supply a projecting stud, as L. This is notched at one end to receive a latch pivoted on the lever, and it projects out from the front wall of the furnace or other plate supplied in connection therewith, being located at one side of the path of the movable lever. This stud is shown as threaded into a socket M, so that it may be easily adjusted toward or from the front wall of the furnace to regulate the position at which the lever shall be held when not in use. The necessary adjustment of this stud is easily effected by turning it out or in in its threaded socket until the notch in its outer end is at the de-

sired distance from the front wall of the furnace and then locking the stud in its adjusted position by the use of a suitable lock-nut, as *n*. At *o* on the lever is a swinging latch fashioned to engage with the notched end of the stud L. On bringing the lever E to its upright position and turning the latch *o* into engagement with the notch in the end of stud L obviously the lever will be held in its desired vertical position, and when necessary to release it for use the latch has only to be lifted from its engaging position. When the two latches H H are in locked position either in respect to the front wall of the furnace or in respect to the lever E, and when the said lever is locked to the stud L, the grate-bars will be held in their normal position against any accidental disturbance.

The operating appliance above described is of few and simple parts, easily constructed, mounted, and adjusted, and it will be found to admirably answer all the purposes or objects of the invention hereinbefore alluded to.

The same general construction is applicable in case all the bars of the grate or united with one coupling-bar. If the grate be divided into more than two sections, equivalent means may be adopted for operating each section independently of any of the others or all at one time.

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

1. The combination with pocketing and cutting off grate-bars journaled to one side of their median line and coupling-bars uniting said grate-bars in sections and connecting-rods, of a single stub-lever fulcrumed as explained and arranged to be simultaneously connected with the connecting-rods which actuate the coupling-bars or to be disconnected therefrom or

from either one, substantially as and for the purposes set forth.

2. In an appliance for operating grate-bars, the combination with a grate-section of a connecting-rod, a stationary pin, a lever, a swinging latch notched on both edges and mounted on said connecting-rod and arranged to engage with said lever or with the stationary pin, substantially as and for the purposes set forth.

3. The combination with a grate of a connecting-rod, a stationary pin, an operating-lever, a hinged latch, and a collar arranged to be adjusted and fastened on the connecting-rod, said latch being mounted on the collar and notched on both edges and arranged to engage the lever or the stationary pin, substantially as and for the purposes set forth.

4. The combination with a grate of a connecting-rod, a stationary pin, the operating-lever, a hinged latch mounted on said rod, and a pin on the lever, said latch being arranged to engage either the pin on the lever or the stationary pin, substantially as and for the purposes set forth.

5. In a grate-operating appliance, the combination with a grate of the operating-lever, connecting-rods, a stationary pin, adjustable collars mounted on the rods, and a hinged latch on each collar constructed and arranged to engage either with the operating-lever or with the stationary pin, substantially as and for the purposes set forth.

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

GEO. A. ELLIS.

Witnesses:

C. SEDGWICK,
WORTH OSGOOD.