

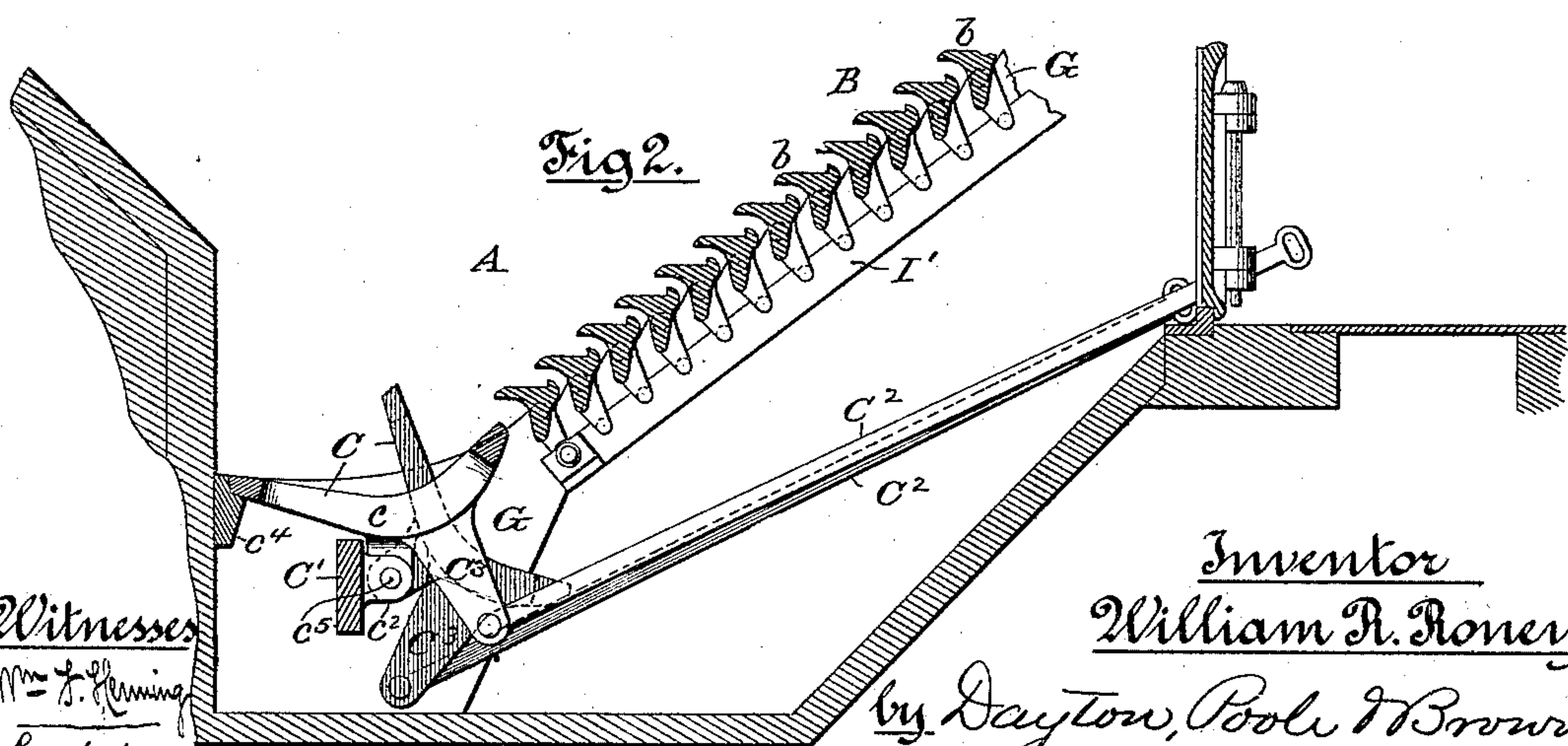
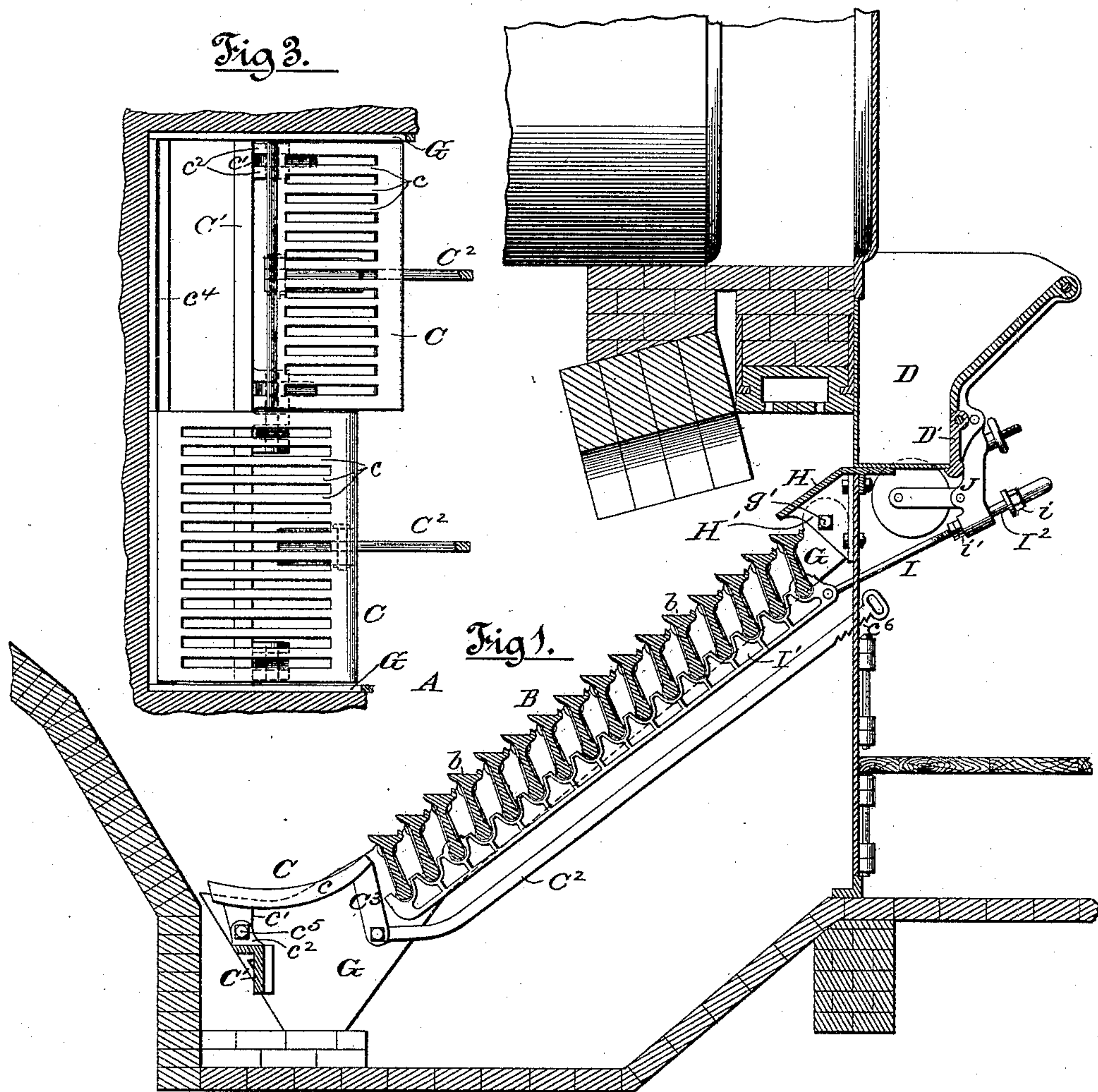
(No Model.)

2 Sheets—Sheet 1.

W. R. RONEY.
FURNACE GRATE.

No. 409,305.

Patented Aug. 20, 1889.



Witnesses

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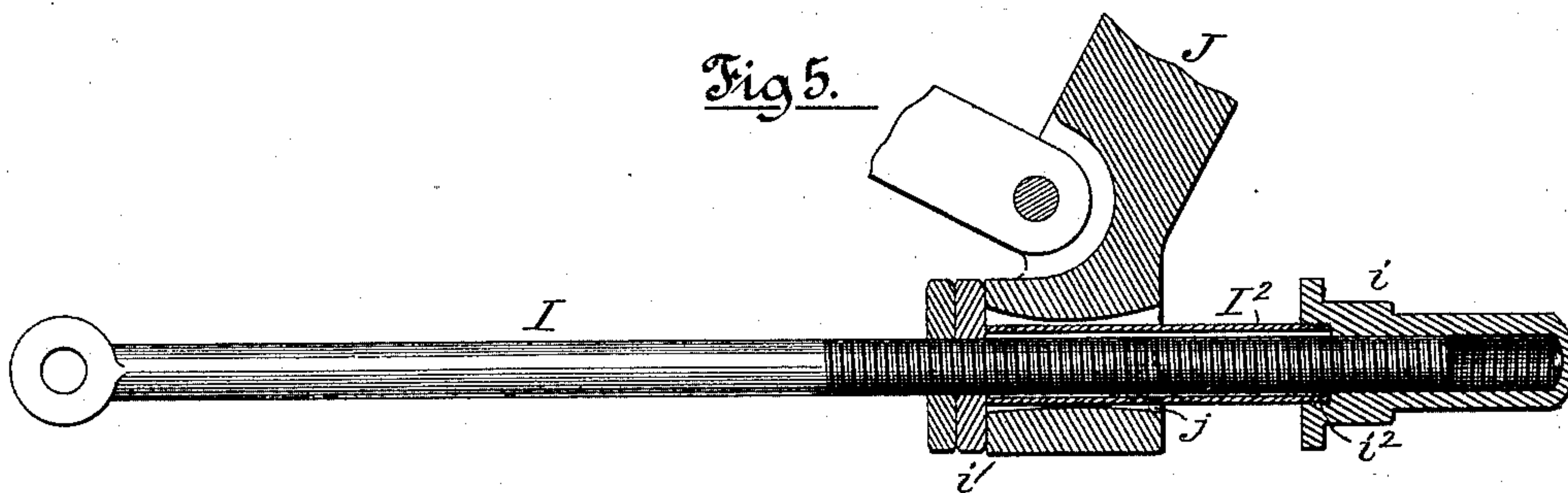
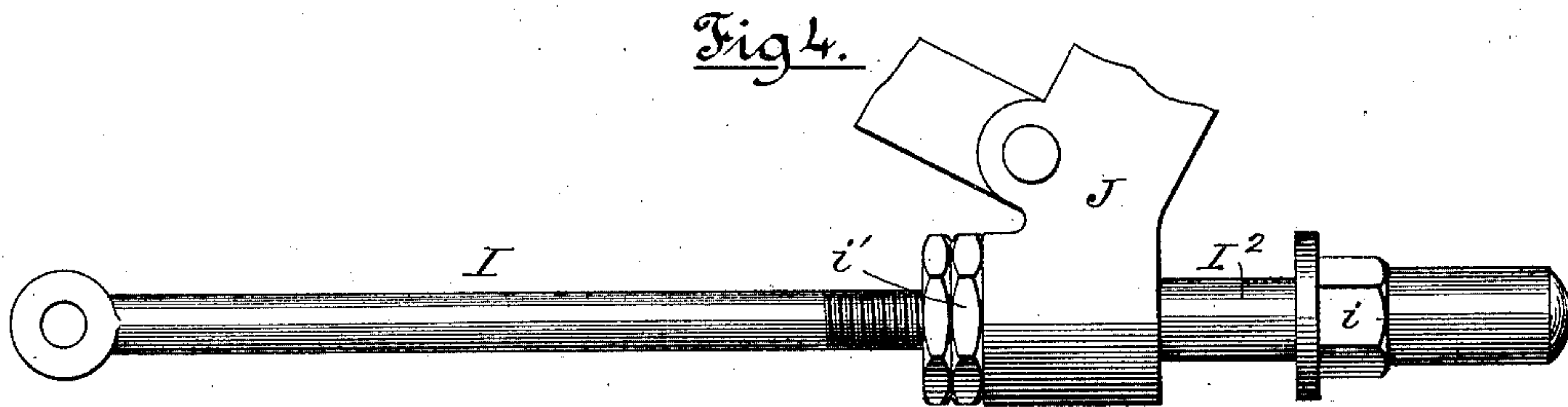
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2 Sheets—Sheet 2.

W. R. RONEY.
FURNACE GRATE.

No. 409,305.

Patented Aug. 20, 1889.



Witnesses

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UNITED STATES PATENT OFFICE.

WILLIAM R. RONEY, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE WESTINGHOUSE, CHURCH, KERR & COMPANY, OF NEW JERSEY.

FURNACE-GRATE.

SPECIFICATION forming part of Letters Patent No. 409,305, dated August 20, 1889.

Application filed June 29, 1888. Serial No. 278,592. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM R. RONEY, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Furnace-Grates; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in furnace-grates of the general character shown in another application for patent filed by me September 23, 1886, and serially numbered 214,304, now pending. The grate there shown comprises a series of transverse rocking bars arranged upon inclined supports to give an inclined main grate, devices for operating the rocking bars from the exterior of the furnace, and a foot-grate at the lower end of the inclined main grate, which is adapted to be dumped by hand.

The present invention relates to means for giving adjustability of inclination to the supports of the main grate, to the construction of the foot-grate, and to certain features of construction in the connections through which the rocking bars of the main grate are operated.

Referring to the drawings, Figure 1 is a central vertical section from front to rear of a steam-boiler furnace containing my improvements in the foot-grate and in the actuating devices for the main grate. Fig. 2 is a similar section illustrating a modification of the foot-grate. Fig. 3 is a plan view of the form of foot-grate shown in Fig. 2. The grate is in this figure shown to be divided into two parts, one of which is in its working position and the other of which is shown in its tilted or dumped position. Fig. 4 is a side view of a part of the actuating-lever which operates the main grate and of the connecting-rod through which the lever connects with the grate-bars. This rod is shown provided with a sleeve-guard, which constitutes one feature of the present invention. Fig. 5 is a section of the sleeve-guard and other parts surrounding the connecting-rod, the latter being shown in side view.

A represents the fire-box or combustion-

chamber of a steam-boiler furnace; B, an inclined grate of the construction set forth in the above-mentioned pending application; C, the foot-grate; D, the hopper; G, the inclined bars which support the main grate; H, the dead-plate over the head of the grate B, and I an adjustable connecting-rod for operating the grate B from the lever J.

In the construction of the inclined bars G for the support of the transverse rocking grate-bars *b b* of the main grate B, as shown in my said pending application, said inclined bars are provided at their upper ends with flanges arranged to bear squarely against the inner vertical face of the front plate of the setting when said inclined bars are at a given angle. To change the inclination of said bars G, therefore, involves the insertion of liners between the flanges thereof and the front plate, and impairs the support which it is intended to give by said bars to the dead-plate H. To avoid this objection and to facilitate the placing of the inclined bars G at any desired inclination, (within certain limits in which the grate may be practically varied in its pitch,) I have introduced in the present case a pivoted connection of the upper end of the bars G with their front supports.

The best form in which I have been able thus far to embody this improvement is shown in Fig. 1, wherein the dead-plate H is sustained by brackets H' from the front plate of the setting, and the grate-supporting bars G are pivoted at *g'* to the brackets H'. By means of this pivotal connection it becomes a very simple matter to adjust the inclination of the grate B to any angle suited to the particular kind of coal to be used, all that is necessary to effect such variation of inclination being to raise or lower the foot blocks or beds upon which the lower ends of the bars G rest. The individual grate-bars *b b* of the grate B may be adjusted to their proper positions in such variation of the angles of the bars G by means of the movable nuts on the connecting-rod I, by which nuts the limits of movement on the part of said grate-bars *b* are determined.

The foot-grate, as shown and described in my aforesaid pending application, consists of a vertical fixed grate-bar located directly at

the foot of the inclined grate B, and a horizontal grate pivoted at its rear margin and meeting or proximating at its front-edge the transverse vertical bar referred to. That foot-grate is therefore in two parts, one of which is fixed and the other of which is pivoted, the two parts being arranged to form a depression, within which a body of cinders, clinkers, ashes, &c., may accumulate, and from which they will be discharged by dropping the lower pivoted horizontal portion of the grate. In the present case the foot-grate C is made in one piece from front to rear, being downwardly curved or concave on its upper surface. It is pivoted at such a point between vertical lines passing through its several ends, that its front and upturned margin may fall. As shown in Fig. 2, it is thus pivoted at or about its middle, and in Fig. 1 at a point back of the middle. In either case, when its front and upturned margin is lowered, its rear margin will be up-tilted. For the purpose of supporting the grate on its axis a transverse metal beam C' is located beneath the grate C and provided with lugs c² for the support of pivot-pins c⁵. The grate-bars c are correspondingly provided with depending or downwardly-projecting lugs c', which stand close to the lugs c² on the beam C' and take the pivot-pins c⁵. In front of its axis each grate is provided with a depending arm C³, to the lower end of which is pivoted a rod C², extending to the front of the ash-pit, by which the fireman may lift and lower the grate. The two possible positions of the grate are shown in Figs. 2 and 3, wherein the foot-grate is made in two sections, one of which is shown tilted forwardly. A cross-bar c⁴ is illustrated in Figs. 2 and 3 as a suitable means for stopping the grate in its working position, though the beam C' may manifestly be made to serve the same purpose, or it may be omitted, as seen in Fig. 1. The operating-rod C² is provided with one or more hooks or teeth c⁶, by which it may in a familiar manner engage an edge of the front plate through which said rod passes.

I prefer, as a special improvement in the grate when pivoted elsewhere than at its rear margin, to locate the axis c⁵ at the rear of the center of gravity of the grate when loaded, so that its front edge will drop under its load when the connecting-rod C² is released from its engagement with the front plate. The slots or bars in the grate C are arranged to run from front to rear to facilitate the discharge of the grate when tilted, as well as to permit of the grate being raked through the front door of the ash-pit.

It will be observed by reference to the drawings that the upper surface of the front and upturned portion of the concave grate C is substantially in line with the inclined grate B, thus forming practically a continuation of said inclined grate. As a result of this form of the grate C and of the continuation thereof with the grate B, it is found that the ashes,

and particularly the clinkers, continue their movement past the junction of the two grates and onto the grate C without an abrupt break and without opening a too large passage through the fuel-bed at this point for the admission of air. On the other hand, melted clinker does not lodge in a depending mass from the lower bar of the grate B, as when the foot-grate is vertical at this point, and no lodged clinker therefore shuts off the air to result in melting the lower bar of the grate B and the adjacent part of the foot-grate, as in the former construction.

Next describing the adjustable connecting-rod I, through the medium of which the bar I' is reciprocated and the grate-flars b-b are rocked by a vibratory movement of the lever J, this connecting-rod I is pivoted to the upper end of the bar I', and passes through a suitable opening j in the lower end of the vibrating lever J, being provided with nuts i i', applied to a screw-threaded portion of the rod I, and therefore adjustable thereon, so that the grate-bars may be rocked through a varying range of movement, beginning and ending at various limits. The nuts i i' being set at a distance apart and the intermediate portion of the rod I being screw-threaded and passing through the opening j, a movement back and forth of the lever J between the nuts tends to wear the screw-threads by frictional contact thereof with the bottom of the passage j, wherefore I provide the rod I with a sleeve I², interposed between the nuts i i' around the rod I, as best shown in the enlarged detail, Figs. 4 and 5, though also seen in Fig. 1. This sleeve may be cut to any desired length, according to the range of movement intended to be allowed the lever J without oscillation of the grate-bars.

The sleeve manifestly takes the wear resulting from rubbing contact with the lever J, and prevents injury to the thread on the rod I, which it embraces. It also has the advantage of insuring the same space between the nuts, when the latter are shifted on the rod with a view only of changing the position of the grate-bars at the beginning and end of their rocking movement.

I prefer to secure the sleeve I² to the outer nut i, and to this end the latter is shown in Fig. 5 as being provided with an enlargement i² of its orifice, in which enlargement is formed a screw-thread to take a thread upon the outer surface of one end of said sleeve I². I also prefer to make the nut i closed at its outer end, and of sufficient length to permit of its being run upon or off the rod I as far as will be required in practice. There is nothing new in the capped nut i of itself.

I claim as my invention—

1. In a furnace-grate comprising transverse rocking grate-bars, inclined supporting-bars for said grate-bars, and supports for the inclined bars, the said inclined bars being provided at their upper ends with hinged connections with their support.

2. The combination of hinged bars G, rocking grate-bars *b b*, connecting-bar I', vibrating lever J, and connecting-rod I, provided with adjusting-nuts for engagement with the
5 lever J.

3. The combination, with an inclined grate B, of a foot-grate C, which is concaved from front to rear, and has its front and discharging portion practically in line with the grate
10 B, said grate C being supported on a transverse axis arranged to allow the front of said grate to be lowered and raised, substantially as described.

4. The combination, with an inclined grate
15 B, of a grate C, which is concaved from front to rear, and is supported on a transverse axis beneath and at the rear of the middle of the grate, substantially as described.

5. The combination, with an inclined grate
20 B, of a foot-grate C, which is concaved from

front to rear, a cross-beam C' beneath and pivotally supporting the foot-grate, an arm C³, connected with the grate C, and a connecting-rod C², whereby the grate may be operated at pleasure.

6. The combination, with rocking grate-bars, a lever J, provided with an aperture *j*, and a screw-threaded connecting-rod I, passing through the aperture *j*, and provided with adjustable nuts on opposite sides of the lever,
25 of a sleeve I², embracing the rod I between the nuts thereon. 30

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

WILLIAM R. RONEY.

Witnesses:

M. E. DAYTON,
TAYLOR E. BROWN.