

(Model.)

F. M. LAWRENCE.
GRATE.

No. 282,333.

Patented July 31, 1883.

Fig. 1.

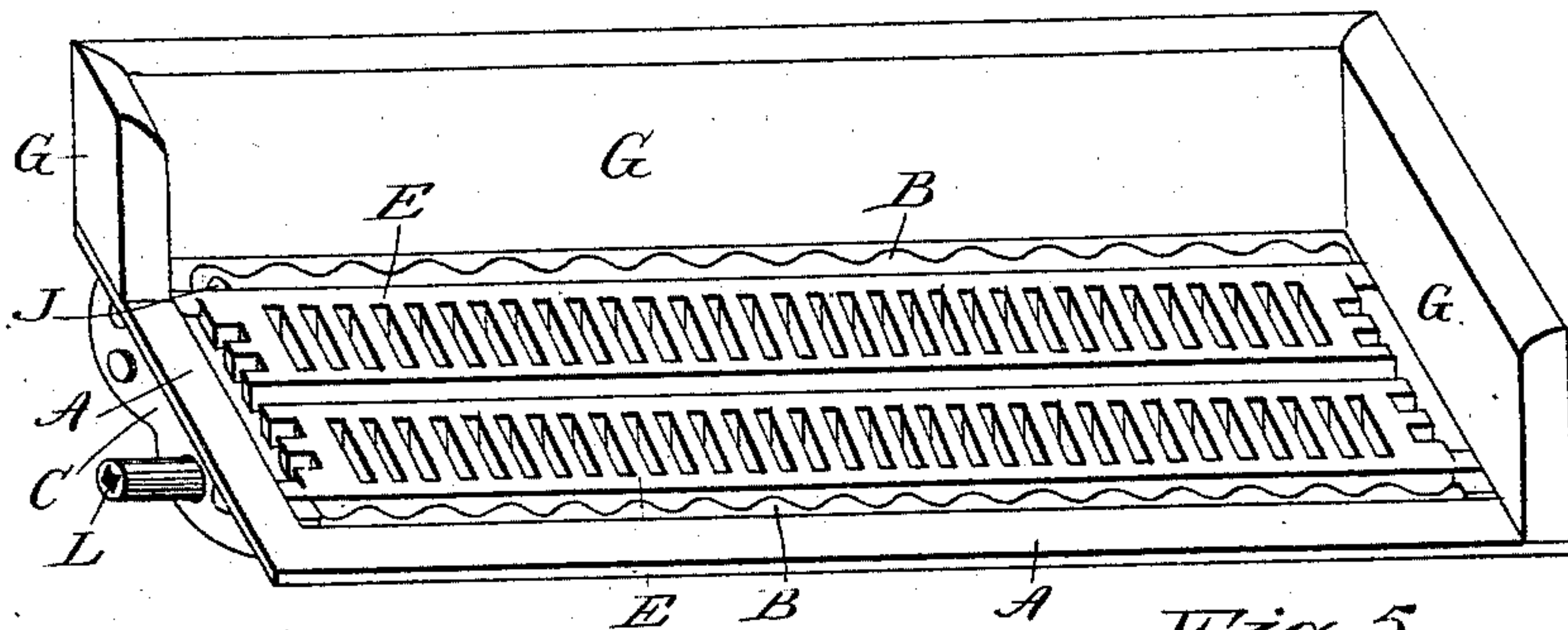


Fig. 3.

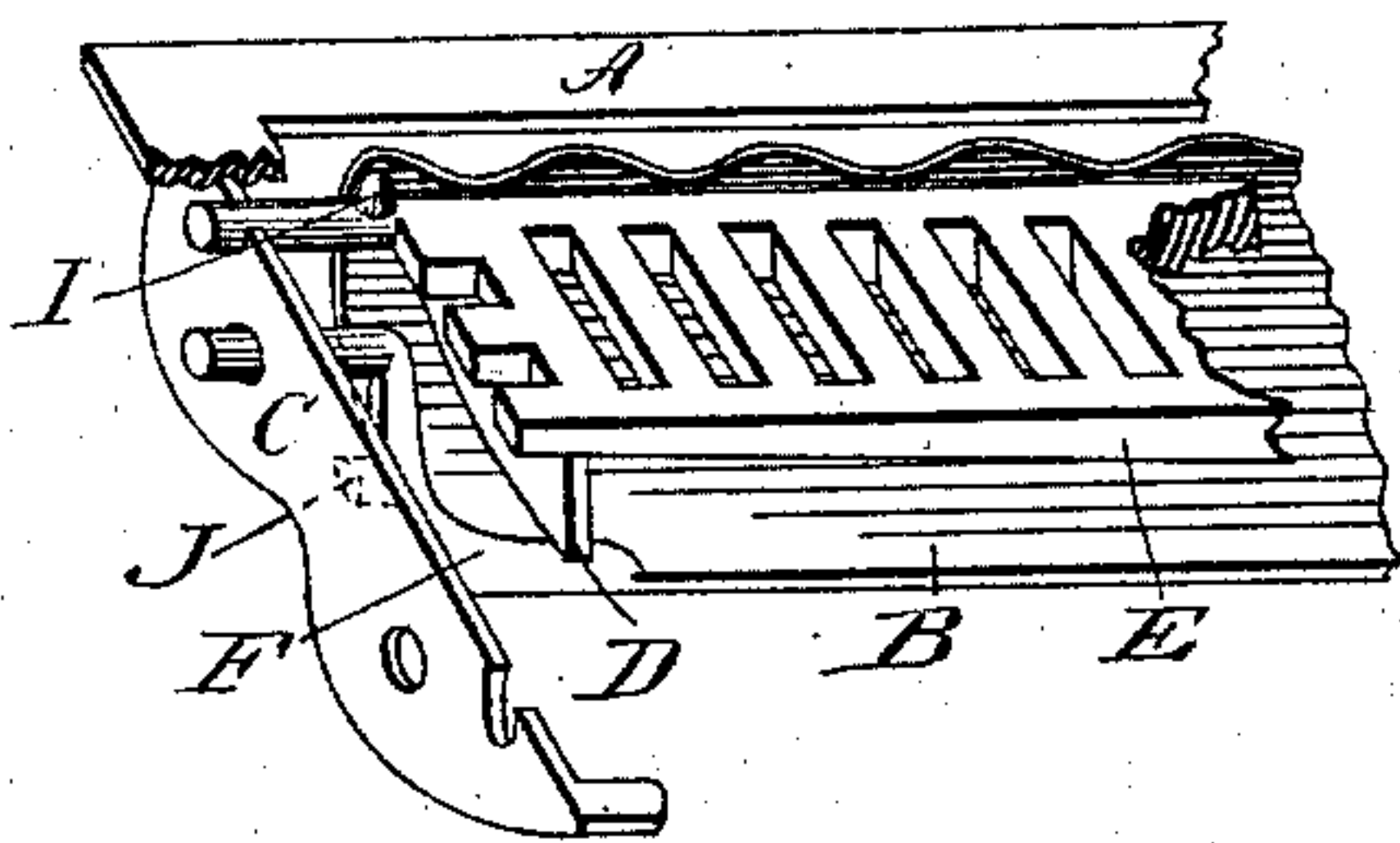


Fig. 5.

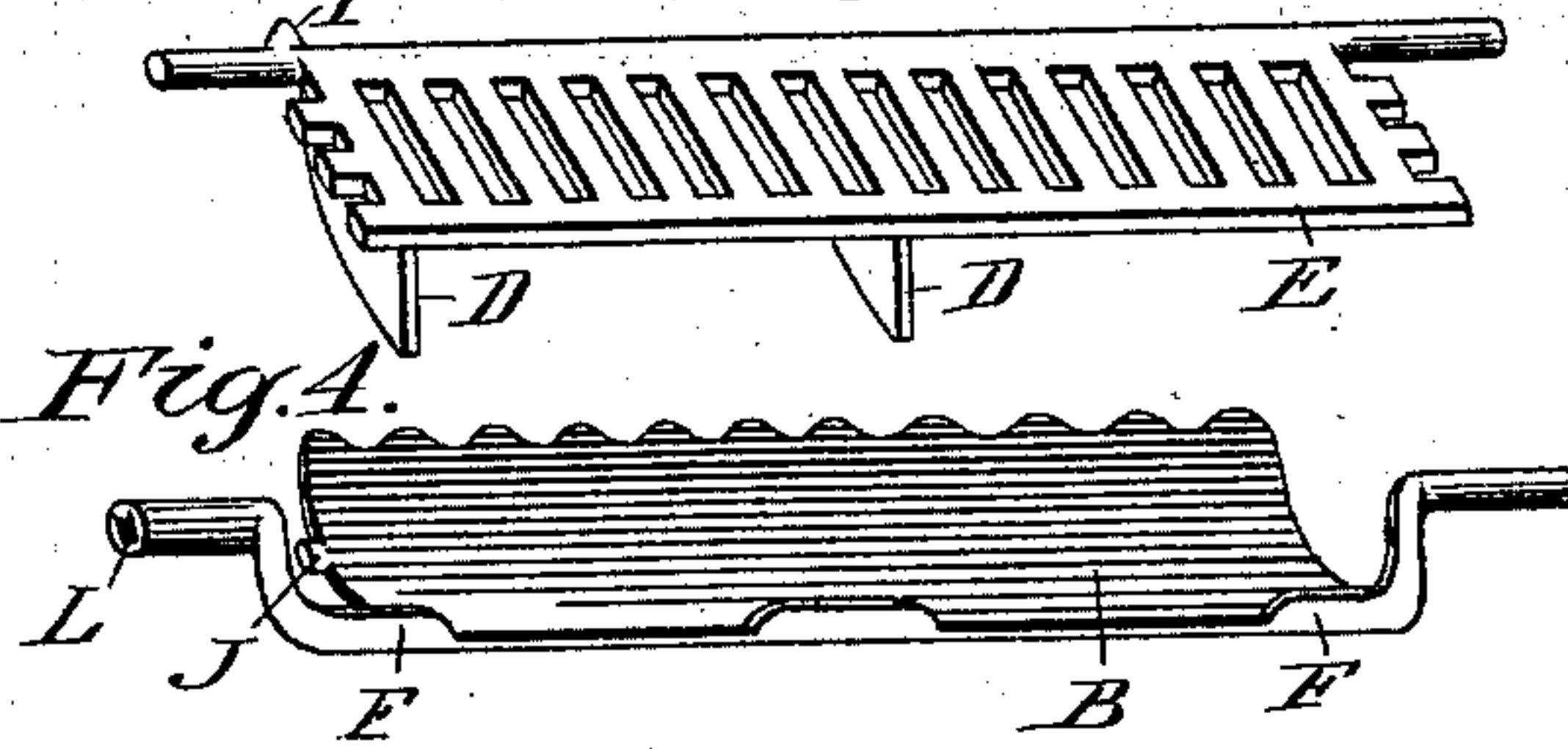


Fig. 4.

Fig. 2.

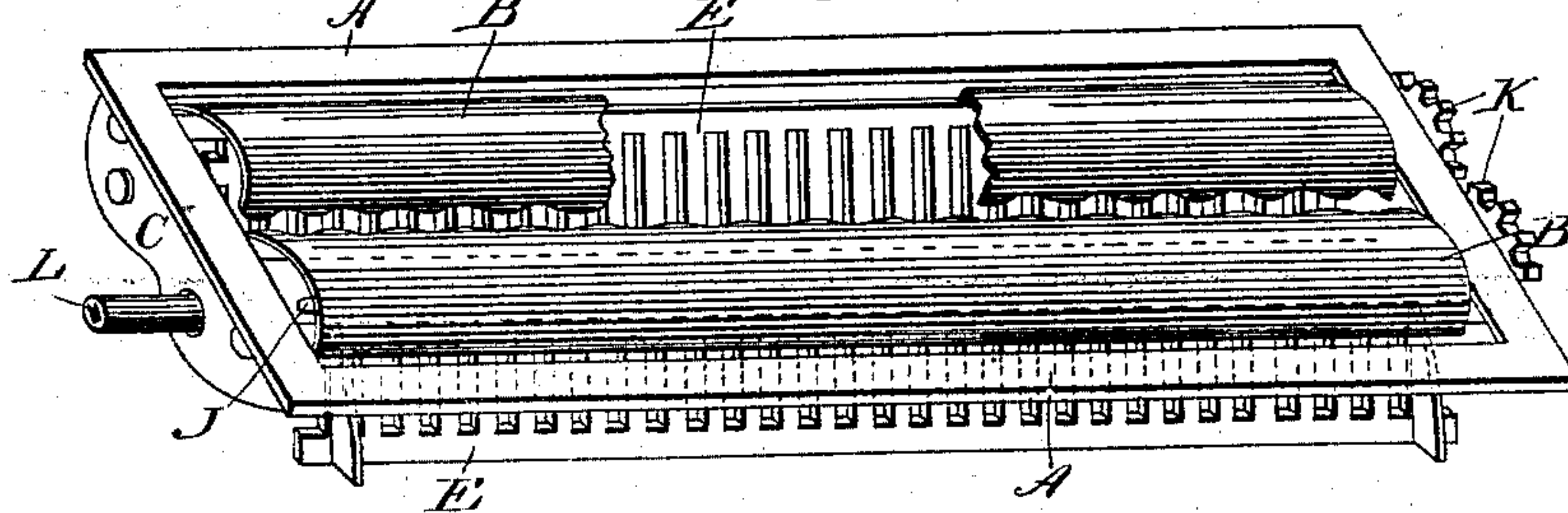


Fig. 6.

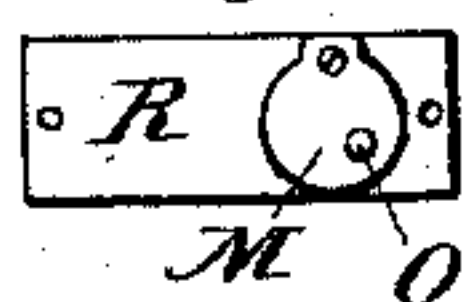


Fig. 7. Fig. 8.

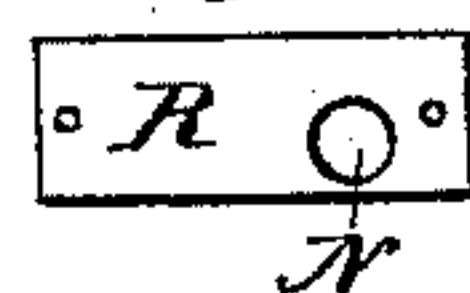
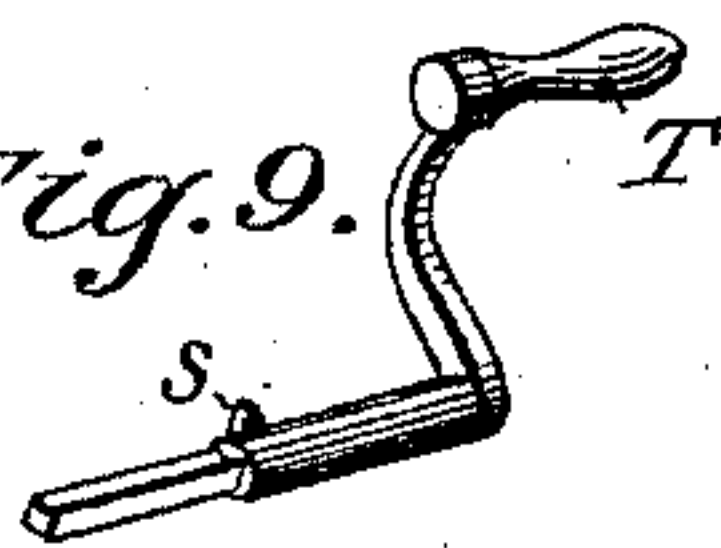


Fig. 9.



Witnesses.

James Hayes

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FRANKLIN M. LAWRENCE, OF PORTLAND, MAINE.

GRATE.

SPECIFICATION forming part of Letters Patent No. 282,333, dated July 31, 1883.

Application filed February 2, 1883. (Model.)

To all whom it may concern:

Be it known that I, FRANKLIN M. LAWRENCE, of Portland, in the county of Cumberland and State of Maine, have invented a certain new and useful Grate for Burning Coal, of which the following is a specification.

My invention aims to produce a grate which will burn coal conveniently, efficiently, and economically without the use of the poker or other tools commonly employed. I consider it necessary, first, to clean the grate-surface by removing clinkers and other large incombustible matter which is too large to be passed through the grates by cutting out and dropping into the ash-pit that part of the contents of the fire-box lying immediately upon the grates, sustaining, while so doing, the upper and greater portion of the fuel without extinguishing the fire; second, to empty the fire-box; third, to remove ashes and small useless matter from the fuel and pass it through the grates into the ash-pit by shaking or agitating the fuel. These operations I secure in my invention.

I employ the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a top view of the grates in position for use. Fig. 2 shows the mechanism in position to sustain the fuel, a part being broken away to show the grate dropped vertically. Fig. 3 is an enlarged view of the device employed to sustain and move the grates. Figs. 4, 5, 6, 7, 8, and 9 show detached parts.

Like letters show similar parts throughout the several views.

In Fig. 1, A is the grate-frame, to which the mechanism is secured, and upon which the brick lining G rests.

C is the hangers, one being bolted to each end of the grate-frame, and in which the journals of the grates and curved plates are made to revolve freely.

As my grate is composed of two or more sets of narrow grates and their respective curved plates, I will describe one set, each other set I employ being constructed in the same manner.

The grate E (see Fig. 1) extends the whole length of the fire-box, and is made narrow and of unusual depth through the bars. It has a cam, D, on its under surface, (see Fig. 5,) and

on its journal a stud, I. Additional cams may be added to support the grate near its middle.

B is a curved plate (see Fig. 4) extending longitudinally through the fire-box, and when not in use it is entirely below the grate-surface. It is made preferably without any interstices, and is connected by arms to its journals, one of which is cast hollow to receive the wrench. (See L, Fig. 4.) Upon its lower edge are projections or bosses, one for each cam on the grate, and on one end is a stud, J, which engages with the horn or stud I of the grate. Its upper edge may be serrated to enable it to pass through the fuel readily. It is made to revolve through the space between the grate and the grate-frame to the position shown in Fig. 2.

The studs I of the grate and J of the plate may both be omitted without interfering with the working of the grate. The curve of the plate or the length of the arms may be changed, so as to cut out more or less of the fuel, or to adapt it to any special work or apparatus. The cams of the grate (see Figs. 3 and 5) are of such shape as to rest upon the bosses F of the curved plate, and to sustain the grate when the plate is in the position shown in Fig. 1, and to gradually drop the grate as the plate passes over to the position shown in Fig. 2. The cams may be of such contour as to cause a quick or retarded movement of the grate.

All possibility of dropping the fuel, and thus losing the fire, is prevented by causing the plate to pass nearly over before dropping the grate.

I usually employ but two grates, each having its respective supporting curved plate, as above described, but do not limit myself to any number, which may be connected by gearing K K, (see Fig. 2,) attached to the journals of the curved plates.

Figs. 6 and 7 show a cast plate which I bolt into and make a part of the outer front wall of the stove. It has a circular opening, N, through which the wrench is introduced to work the grate. The swinging cap M, provided with the stud O, (see Figs. 6 and 7,) is so pivoted to this plate, above the center of the opening N, as to move freely to either side, and by its weight to drop and cover the opening N when the wrench is not in position for use.

Fig. 9 shows the wrench used for operating the mechanism, carrying upon its shank the horn S, and having one of its sides concave to fit the hollow journal of the curved plate. (See L, Fig. 4.) This is to insure the use of the wrench in one invariable position, the desirability of which will appear hereinafter.

Having described the mechanism, I will now explain its operation.

10 With the grates in position, as shown in Fig. 1, push the disk M on the plate R (which is bolted in and made a part of the outer wall of the stove) to the right, and insert the wrench through the opening N into the hollow shank
15 of the curved plate, and throw the handle over to the left. The curved plates, being geared together, move upward through the fuel simultaneously, while the grates, being gradually deprived of support as the bosses on the curved
20 plates move backward under the grate-cams, drop vertically, dumping whatever may be between them and the curved plates, which now support the fuel, into the ash-pit. (See Fig. 2.) By reversing the movement of the wrench both
25 the grates and curved plates are returned to the position shown in Fig. 1. One forward and backward movement of the wrench cleans the grate-surface, and a few repetitions of the movement will empty the fire-box, thus accom-
30 plishing the two first operations above referred to as being considered necessary. For the third operation—that of shaking the fire—remove the wrench, push the disk M to the left, insert the wrench, and throw the handle over,
35 as before, until the horn S of the wrench engages with the stud O of the disk M, which prevents further motion. Owing to the peculiar shape of the wrench-shank and its socket L, (see Fig. 4,) above referred to, the relative po-
40 sition of the horn S and the stud O is fixed and unchangeable, and therefore the motion of the wrench must always be arrested at the same point when the disk M is moved to the left. This stop attachment prevents the curved
45 plates from passing entirely over, and consequently the grates are not dropped. A forward and backward movement of the wrench gives the curved plates a motion in and out of the fuel and the grates a slight rise and fall,
50 which causes the coals to grind upon each other, and thus to free themselves of ashes and other

clogging substances, which are jolted through the grates and dropped into the ash-pit.

I am aware that grates have heretofore been constructed having a single curved plate and grate geared together, either being of sufficient size to support the contents of the fire-box. The objection to this form of construction is that the heat of the fire warps the grate and twists the journals out of their proper relation to each other, thus rendering the grate inoperative. Again, the distance through which both grate and curved plate have to pass is so great that the coal frequently clogs the grate and prevents its operation. Other grates have been constructed having a segment cast onto their outer side, and so arranged as to sustain the contents of the fire-box while the fuel-supporting part of the grate is dropped.

All grates hitherto made, of which I have any knowledge, designed to dump the fuel immediately upon the grate into the ash-pit while sustaining the upper portion of the contents of the fire-box have not met with general favor, owing to their being unreliable in any but skillful hands. This difficulty I obviate in my invention.

I do not claim, broadly, the use of the curved sustaining-plate.

What I claim as my invention is—

1. The grate E, having one or more cams, D, in combination with and supported by the curved plate B, having one or more bosses, F, constructed and arranged to operate as described.
2. The combination of two or more grates, E, each having its supporting curved plate B, as described, with the gears K, grate-frame A, and hangers C, operating as specified.
3. Two or more grates with their respective supporting curved plates attached to the grate-frame and suitably geared together, in combination with the wrench T, having the horn S, the plate R, and the cap M, provided with the stud O, constructed and arranged to operate substantially as described, for the purpose specified.

FRANKLIN M. LAWRENCE.

Witnesses:

JAMES NOYES,
I. B. GREGORY.