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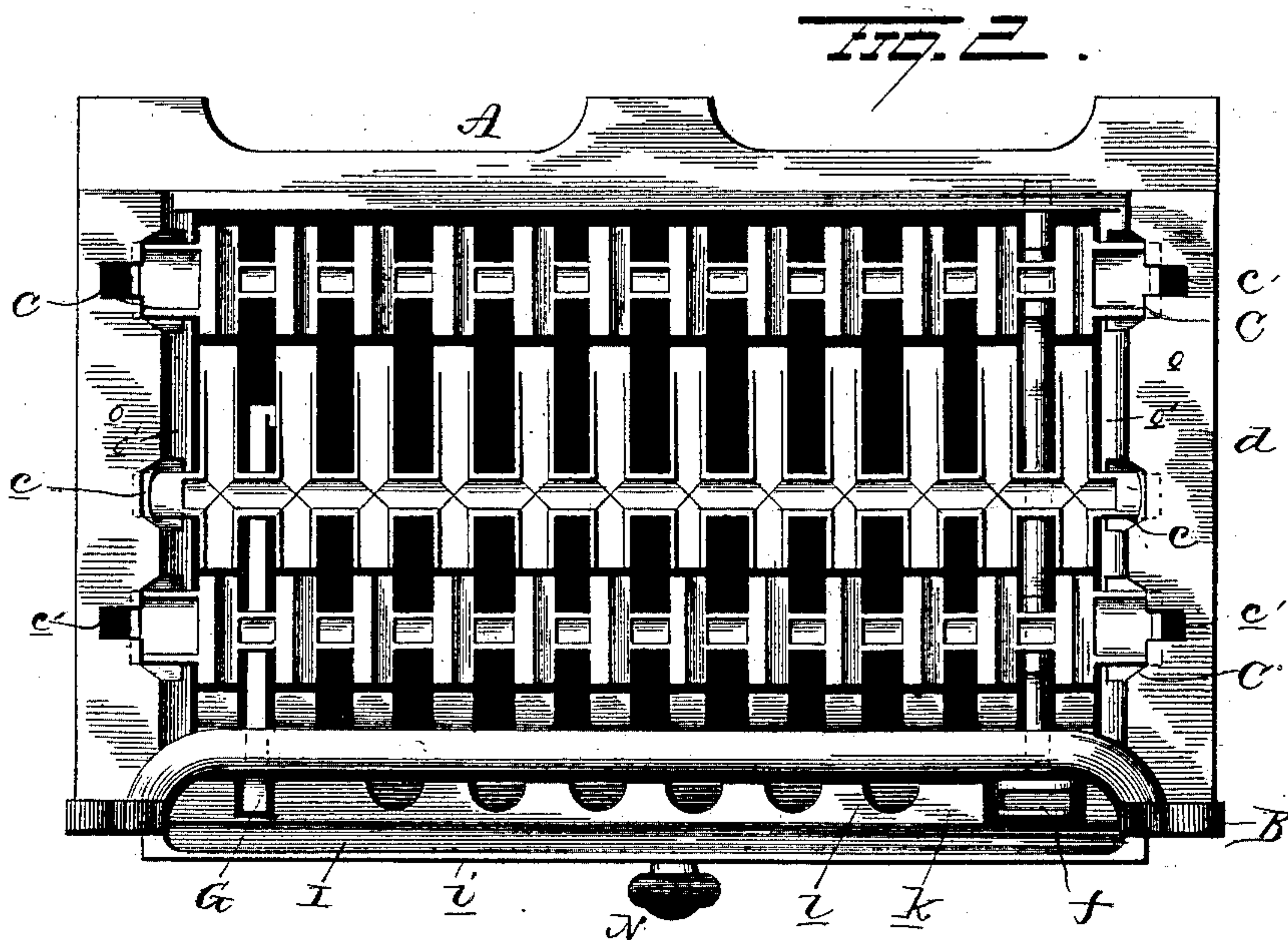
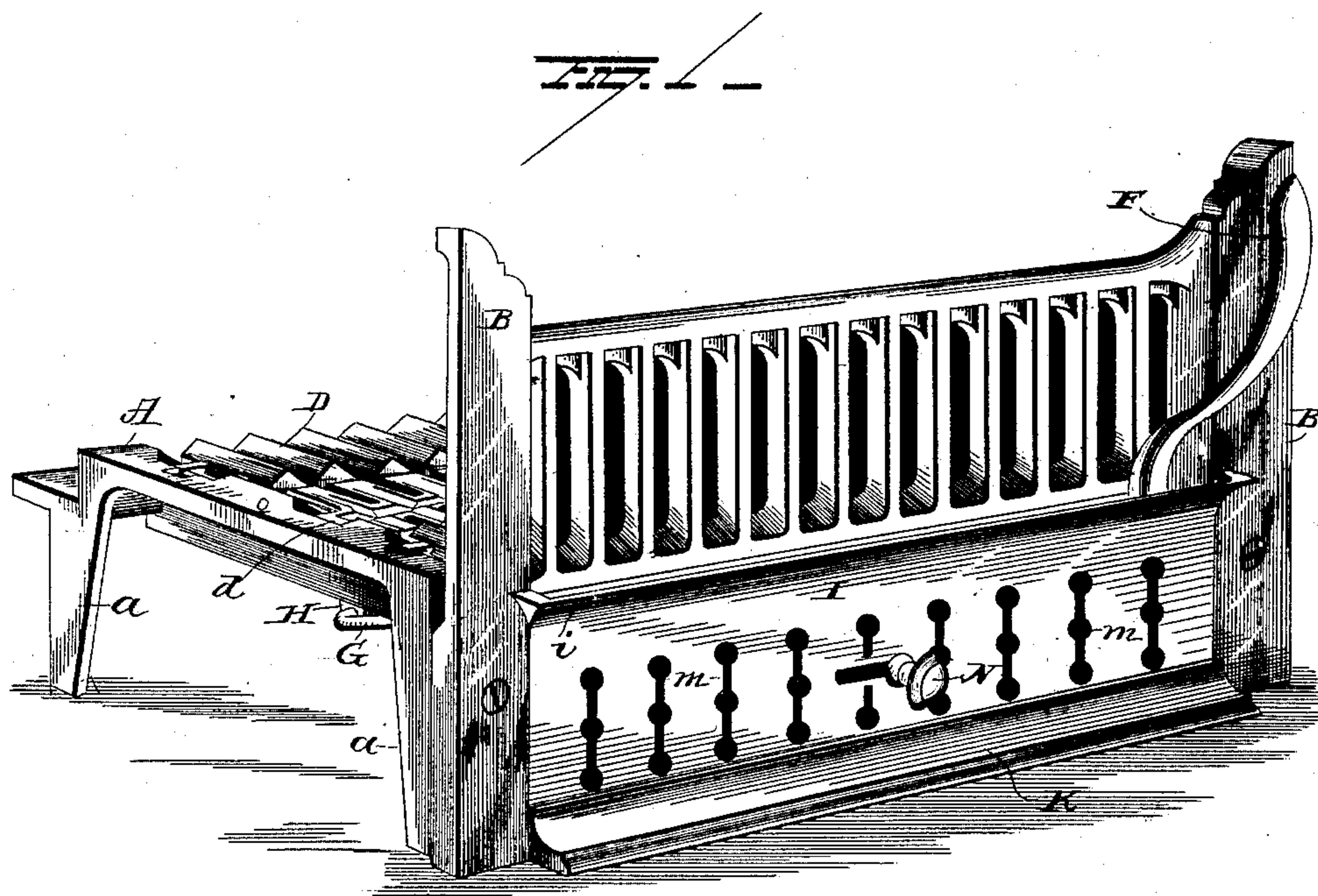
2 Sheets—Sheet 1.

H. M. WEAVER.

GRATE.

No. 371,112.

Patented Oct. 4, 1887.



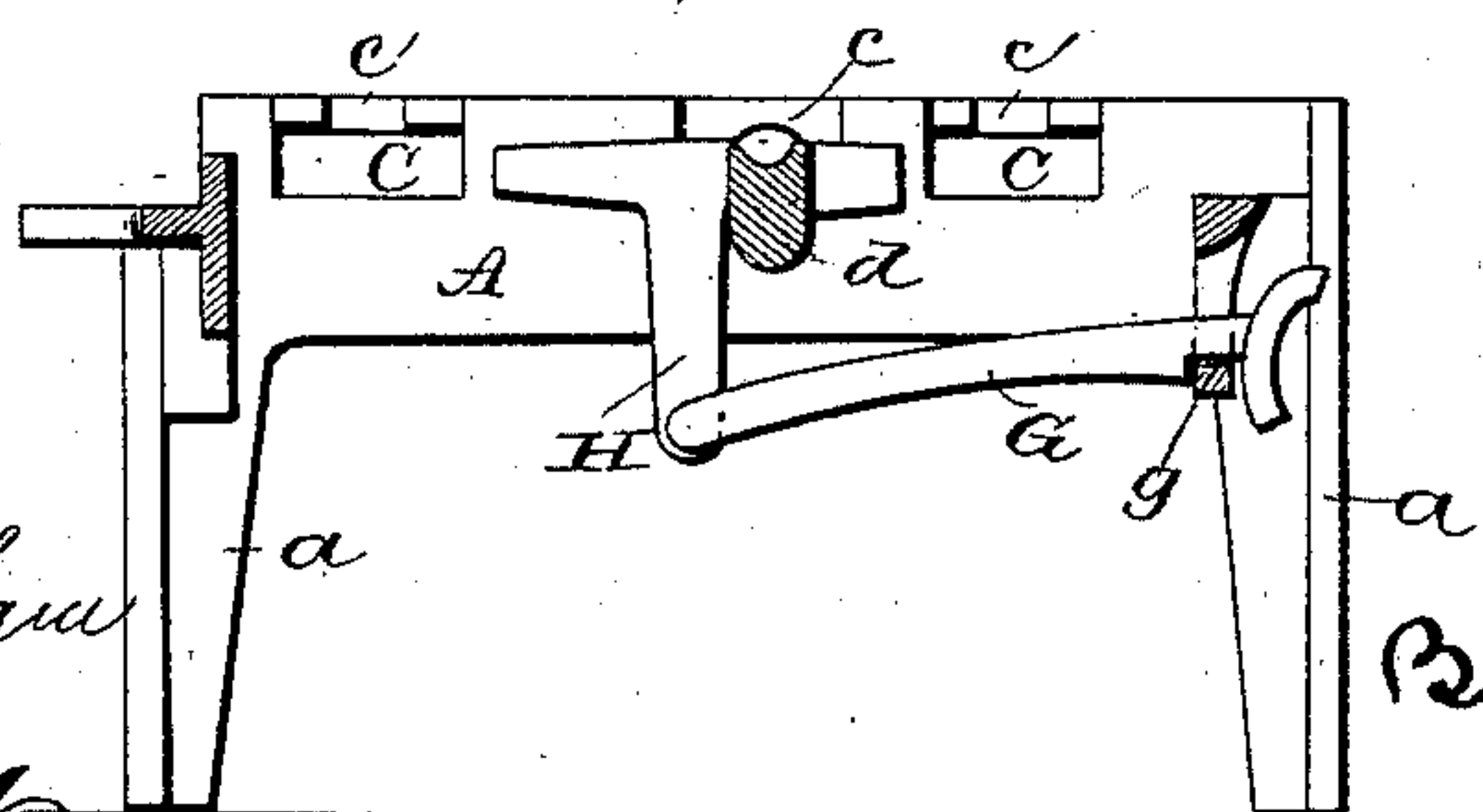
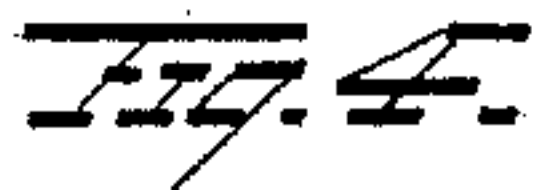
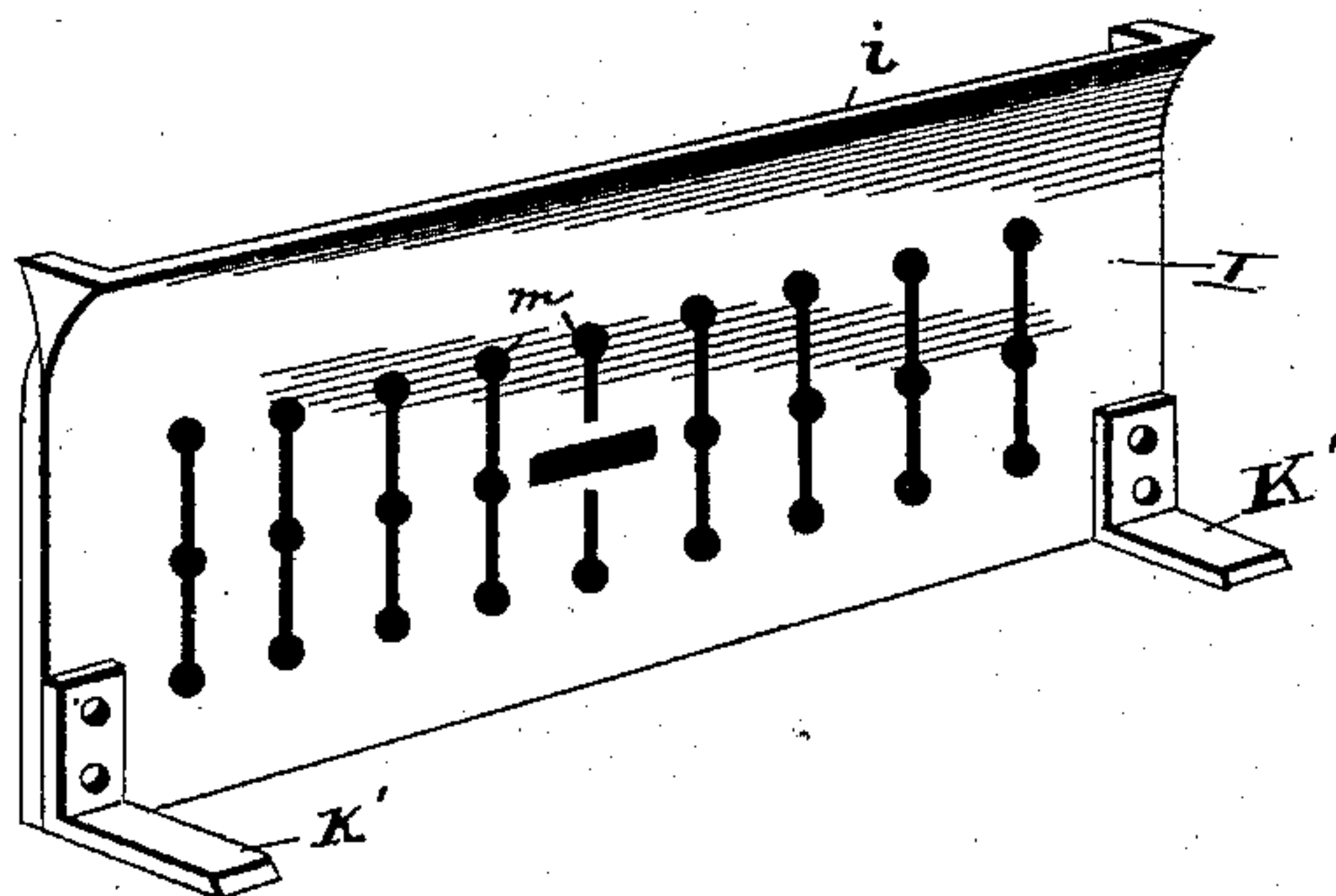
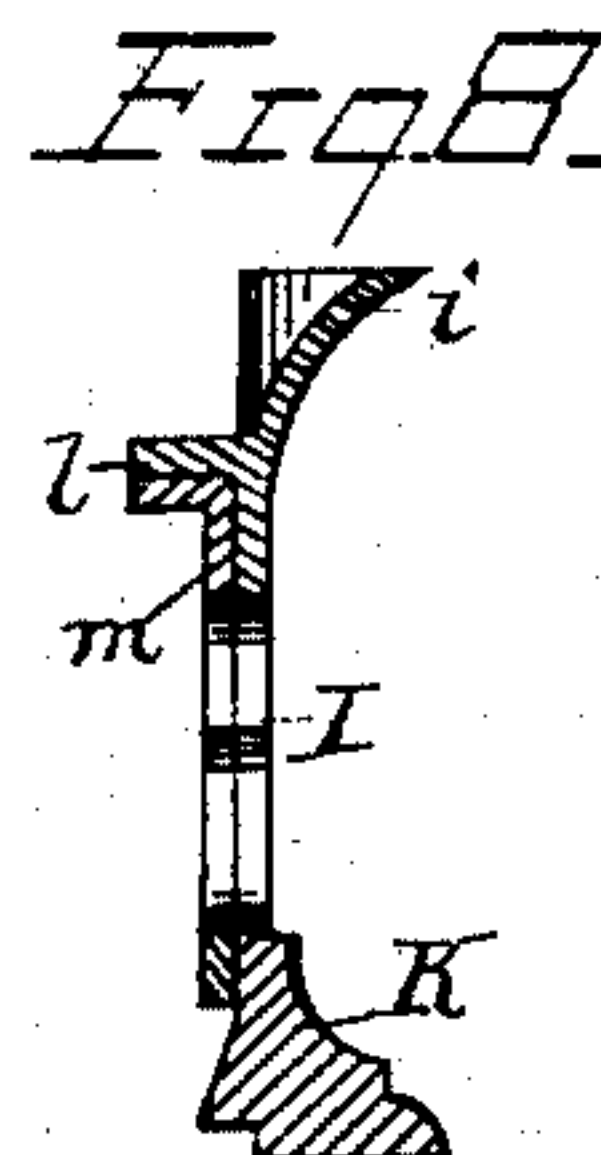
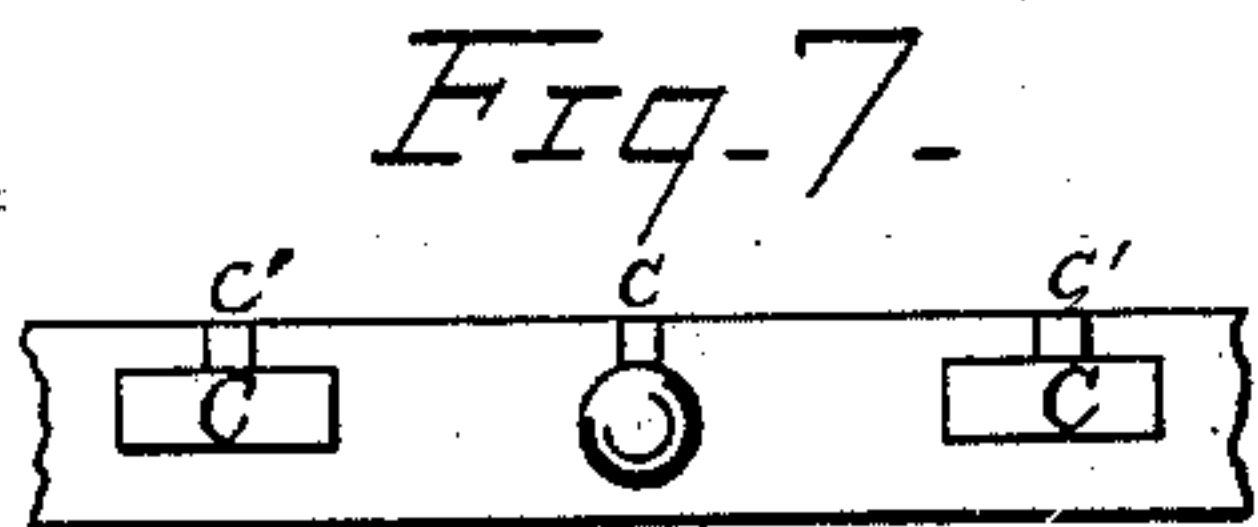
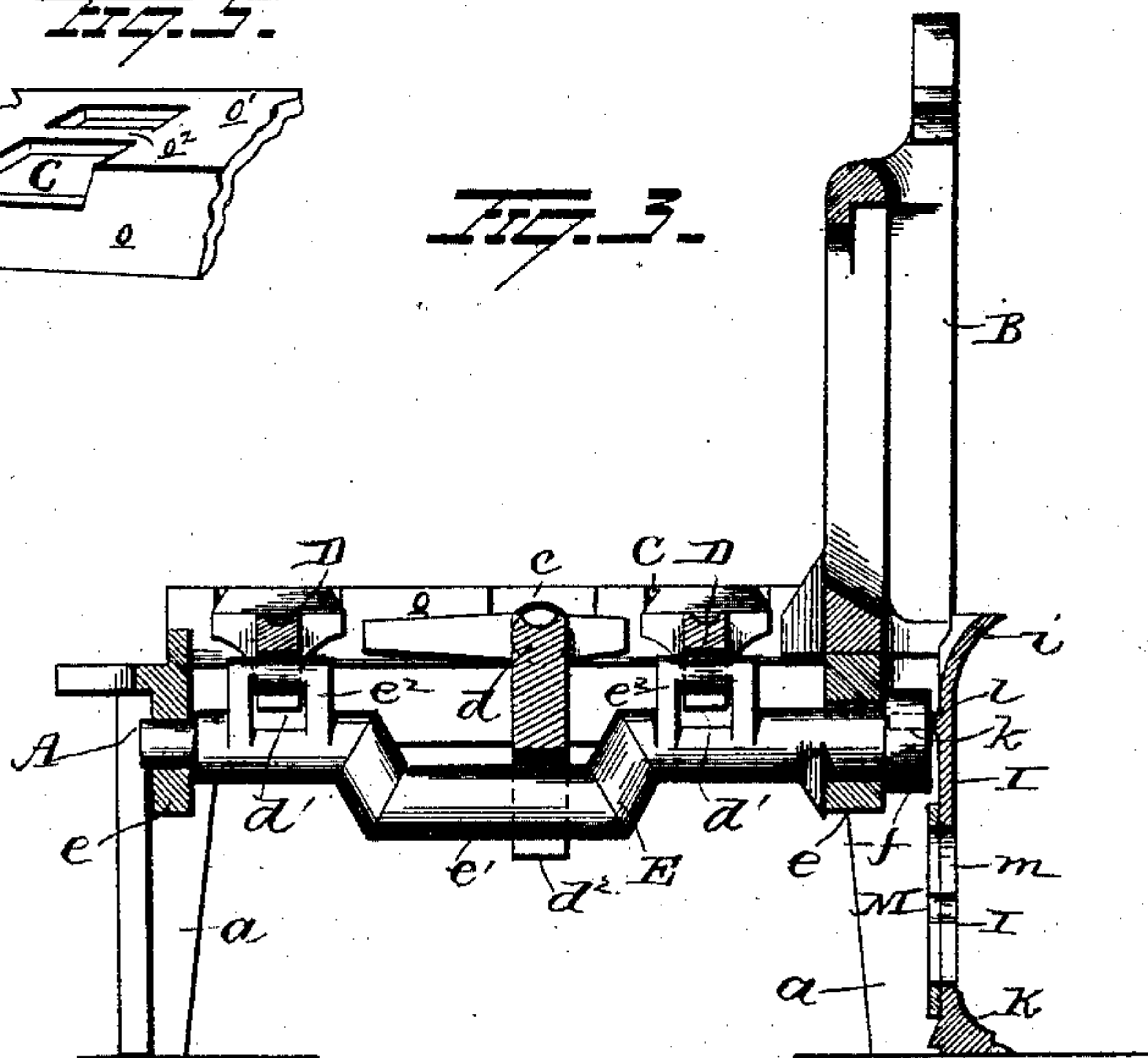
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2 Sheets—Sheet 2.

GRATE.

Patented Oct. 4, 1887.



WITNESSES

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# UNITED STATES PATENT OFFICE.

HENRY M. WEAVER, OF MANSFIELD, OHIO.

## GRATE.

SPECIFICATION forming part of Letters Patent No. 371,112, dated October 4, 1887.

Application filed September 1, 1886. Serial No. 212,380. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY M. WEAVER, of Mansfield, in the county of Richland, State of Ohio, have invented certain new and useful  
5 Improvements in Grates; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it apper-  
tains to make and use the same.

10 My invention relates to an improvement in grates.

In my application for Letters Patent entitled "Grates," Serial No. 182,582, allowed  
15 July 16, 1886, a set of longitudinally-reciprocating grate-bars were shown and described adapted to slide along the edges of a middle dumping-bar, and an apron or crown was  
20 shown adapted to close the front below the grate-bars, the said apron being provided with an outwardly-flaring lip or flange at the top for collecting the ashes which work through  
the front grate-bars.

It has been found that the manner of securing the ends of the dumping-bars was not  
25 proof against a possible displacement of the bars when a clinker became wedged between them, and no provision was made for cutting off all ingress of air to the space below the grate-bars—a very necessary feature when it  
30 is desired to keep a low fire.

The object of my present invention is to provide a grate in which the bars shall have such a movement as to readily clear the ashes and  
effectually grind the clinkers without any liability of becoming displaced, and to provide  
35 a damper in connection with the apron or crown by which the draft may be cut off from beneath the grate.

A further object is to provide a grate-bar  
40 which shall be capable of a longitudinally-sliding movement, and also of a rocking or dumping movement.

With these ends in view my invention consists in certain features of construction and  
45 combinations of parts, as will be hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a perspective view of the grate. Fig. 2 is a  
50 plan view. Fig. 3 is a vertical section from front to rear. Fig. 4 is a similar view showing the working or dumping bar. Fig. 5 is a modified construction of end bearing for the

sliding grate-bars. Fig. 6 is a view in perspective of a slightly-modified construction of apron. Fig. 7 is a view in side elevation of  
55 one end of the grate-frame, and Fig. 8 is a view in transverse section of the apron.

A represents the grate-frame, provided with four legs, *a*. A pair of upright standards, B, connected above the plane of the grate-bars by  
60 the upper and lower rails of a series of upright bars, are bolted to the front legs or front rail of the frame A. The horizontal frame and legs *a* are preferably cast in one piece and the standards B, connected by the front  
65 series of bars, in another; but the standards and front bars might be cast integral with the grate-frame, if found desirable. The ends of the frame A are provided with slots C and *c*,  
70 for the reception of the ends of the grate-bars. The slots are formed in the upper portions of the depending flanges *o* of the ends, so that the ends of the grate-bars, when the bars are  
slid lengthwise, will slide beneath the horizontal flanges *o* of the ends, and become  
75 thereby locked against displacement. The horizontal flanges may either be left solid along the upper edges of the slots or they may be provided with narrowed openings *c'*, extending back from the edges of the slots, not  
80 broad enough to allow the grate-bar to become displaced, but affording ventilation from beneath the grate up the ends of the fire-box. The horizontal flange *o* might also be provided with a narrow strip of metal, *o'*, across  
85 the extended opening, the said strip of metal forming the stop for preventing the displacement of the end of the grate-bar. Such construction is shown in the modification, Fig. 5.

The grate consists of a series of independent  
90 bars—in the present instance three—the two outside bars, D, being adapted to be reciprocated longitudinally, while the middle bar, *d*, is adapted to have both a longitudinal and  
rocking motion. The slots *c*, in which the ends  
95 of the central bar slide, are preferably circular in form, as shown in Figs. 2 and 7, and the slots C, in which the ends of the bars D slide, are preferably of oblong shape, as shown, to prevent the bars from a laterally-tilting move-  
100 ment. Each of the bars D and *d* is provided with spurs or branches extending laterally from both edges, the spurs or branches on the central or dumping bar preferably being longer



on the rear side than on the front side to enable the bar to be dumped with greater ease.

The operating-bar E, for reciprocating the grate-bar, is journaled in suitable bearings, *e*, cast in the front and rear rails of the frame A near one end of the frame, and is bent downwardly into crank shape at *e'*, where it passes beneath the middle or dumping bar, *d*. The said operating-bar E is provided with a pair of upwardly-extending loops or lugs, *e''*, the upper ends of which are adapted to engage open slots *d'* in the lower edges of the grate-bars D. The middle or dumping bar, *d*, is provided with a pair of depending branches or with a fork-ended lug, *d''*, adapted to embrace the opposite sides of the cranked portion *e'* of the operating-bar. Thus, when the operating-bar E is rocked back and forth by a suitable handle or shaker, F, inserted in a socket, *f*, in the end of the bar E, or adapted to embrace a squared end of the bar, as may be found desirable, the outside bars, D, will be propelled in one direction while the middle bar is propelled in the opposite direction, and the speed of the spurs on the adjacent bars, passing each other in opposite directions, will be double what it would if one of the bars were stationary, the speed of the shaker being constant. This causes an increased agitation of the ash and cinder, grinding the latter to powder and clearing the ashes out in a short time. The ends of the grate-bars, when at any point in their stroke excepting the extremes, are both held securely against any possible displacement, and there is no liability of their being thrown out of place at that instant.

It will be observed that the connection between the dumping-bar *d* and the operating-bar E is such as to admit of the bar *d* being freely rocked in its bearings. This rocking or dumping motion is given the bar, when desired, by pulling outwardly on the hooked end of the rod G, the opposite end of which is attached to the lower end of a depending lug, H, on the under side of the bar *d*. The rod G projects through the front rail of the frame A, and is provided with a notch, *g*, on its under side, which, when the bar *d* is in its normal position, engages the front rail, as shown in Fig. 4, and locks the bar *d* in position. The bar *d* is thus rendered capable of both a longitudinally-reciprocating and laterally-rocking movement without the introduction of an auxiliary frame.

The apron or crown I consists of a thin plate of metal provided, as in the former case, with an outwardly-flaring upper lip, *i*, the plate being of a suitable size and shape to fit between the standards B and close the space below and at the front of the grate. The particular devices for holding the apron I in position are not essential, as several well-known devices might be advantageously employed; but I find it convenient to construct the lower edge of the apron bulging outwardly, as shown at K, or with feet, as shown at K', Fig. 6. In the former construction there was a narrow open-

ing between the inside face of the apron and the front of the grate, through which the ashes which rattled out through the front grate passed down to the ash-pan or hearth. In the present instance the narrow opening *k* is partially closed by a series of projections, *l*, formed on the rear side of the apron and extending into contact with the front of the grate-frame. The apron is provided with a series of draft-openings, *m*. A damper, M, seated on the back of the apron and operated by a knob, N, on the front, is adapted to be slid and open and close the openings *m*, and also the spaces between the projections *l* on the back of the apron. Thus, when the damper is closed, the ingress of air beneath the grate will be completely cut off, while the ashes which fall through the front grate and lodge on the ledge *l* will be allowed to drop through the spaces between the projections *l* when the draft is open.

It is evident that the central bar might be made to reciprocate and rock while the remaining bars were stationary or motionless, and that the bars might be all of them arranged, like the central bar, to reciprocate and rock, and the apron might be held in position by brackets at its lower edge simply, or it might be hooked to the standards, and other slight changes might be resorted to without departing from the spirit and scope of my invention; hence I do not wish to limit myself strictly to the construction herein set forth; but,

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

1. The combination, with a grate-frame provided with bearings for the grate-bars, of a longitudinally-sliding grate-bar supported in the bearings, the latter overlapping the ends of the grate-bar when the grate-bar is in a position between the limits of its longitudinal movement and exposing an end of the bar when the latter is at the extremities of its throw, substantially as set forth.

2. A grate-frame and grate-bars, the grate-frame being provided with grate-bar bearings overlapping one end of each bar and locking them at said end against accidental displacement when the said bars are at the extremities of their longitudinal movement, substantially as set forth.

3. A grate-frame provided with ventilating-slots, the latter being located at points in line with and beyond the ends of the grate-bars, substantially as set forth.

4. The combination, with a grate-frame provided with bearings, of a series of sliding bars supported in said bearings, the latter overlapping the ends of the bars when said bars are in a position between the limits of their longitudinal movement, and a cranked rock-bar adapted to reciprocate the grate-bars simultaneously in opposite directions, substantially as set forth.

5. The combination, with the outside grate-bars, of the middle grate-bar and the rock



bar adapted to reciprocate the outside and central bars simultaneously in opposite directions, substantially as set forth.

5 6. The combination, with the sliding outside bars and the sliding and rocking middle bar, of the cranked rock-bar adapted to reciprocate the outside and middle bars in opposite directions, and the rod for rocking the middle bar, provided with a notch adapted to  
10 engage the edge of the front rail and lock the rocking bar in horizontal adjustment, substantially as set forth.

15 7. The combination, with a grate, of an apron provided with an outwardly-flaring lip at its upper edge and with a series of projections along the inner face at the base of its flaring lip, substantially as set forth.

8. The combination, with an apron provided with a series of draft-openings and with a flar-

ing upper edge for catching ashes, of a damper 20 attached to the apron and adapted to close the draft-openings and the openings between the apron and the grate-frame, substantially as set forth.

9. The combination, with a grate-frame and the 25 apron provided with a series of projections on its back adapted to partially close the opening between the apron and grate-frame, of a damper attached to the apron and adapted to close the spaces between said projections, substantially 30 as set forth.

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

HENRY M. WEAVER.

Witnesses:

J. P. HENRY,

W. H. FUNK.