

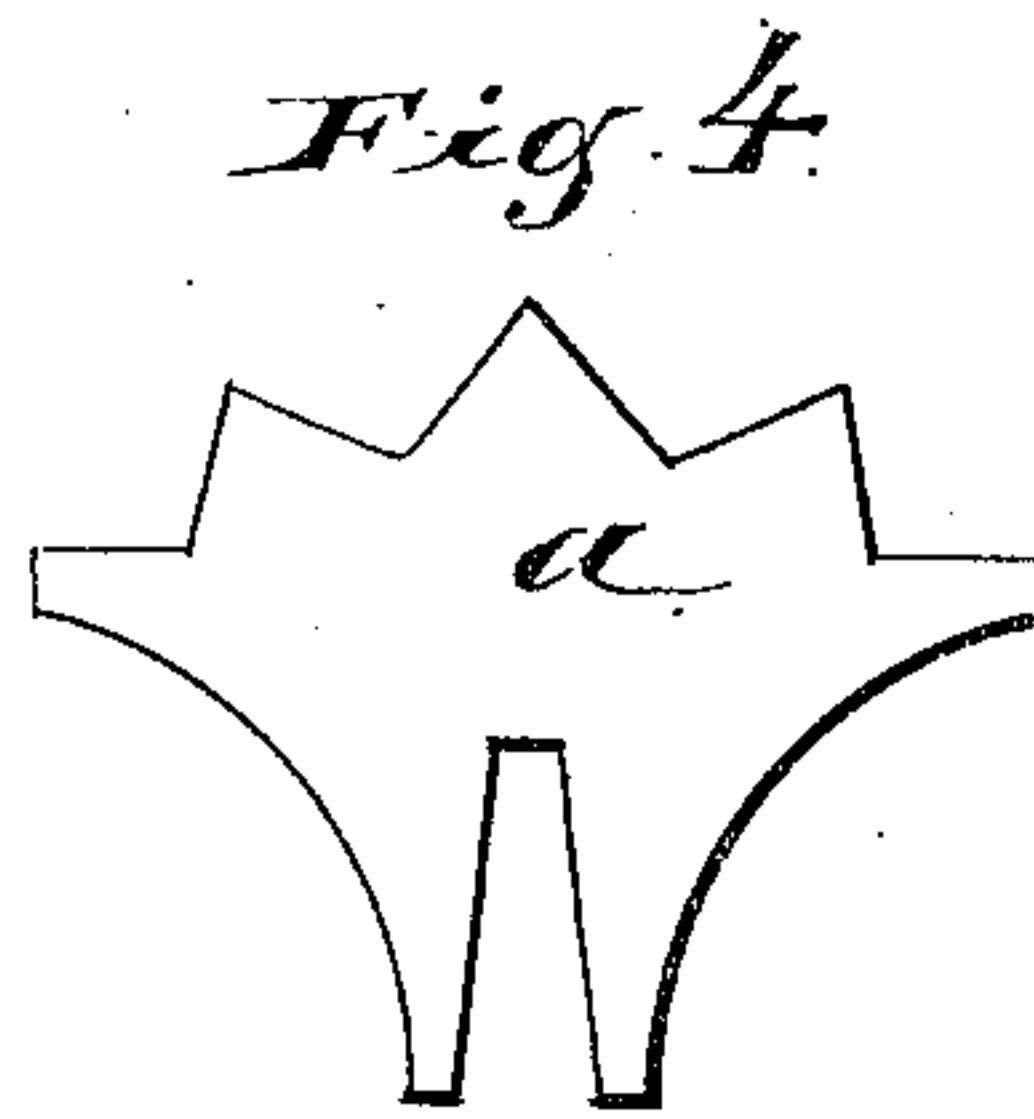
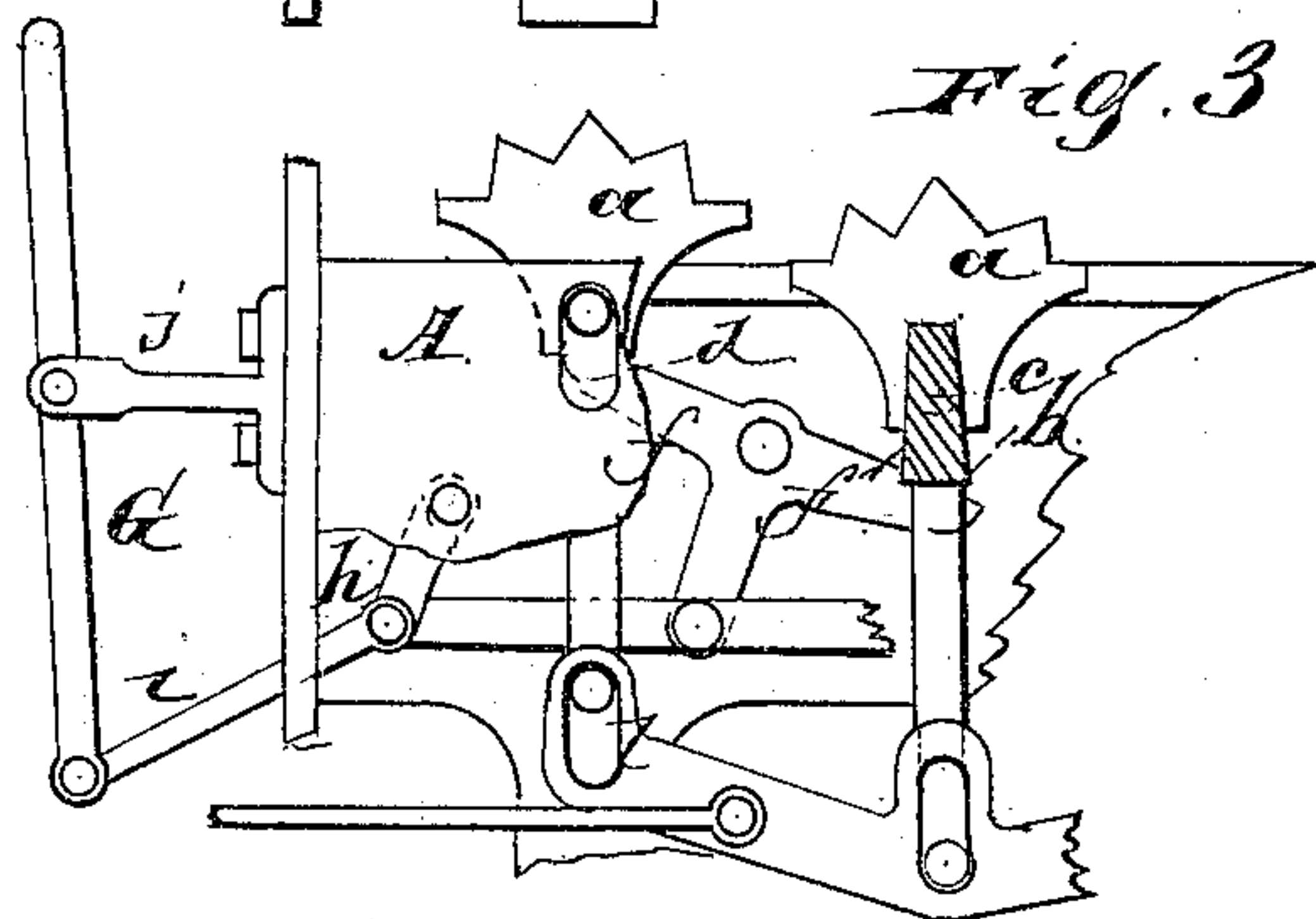
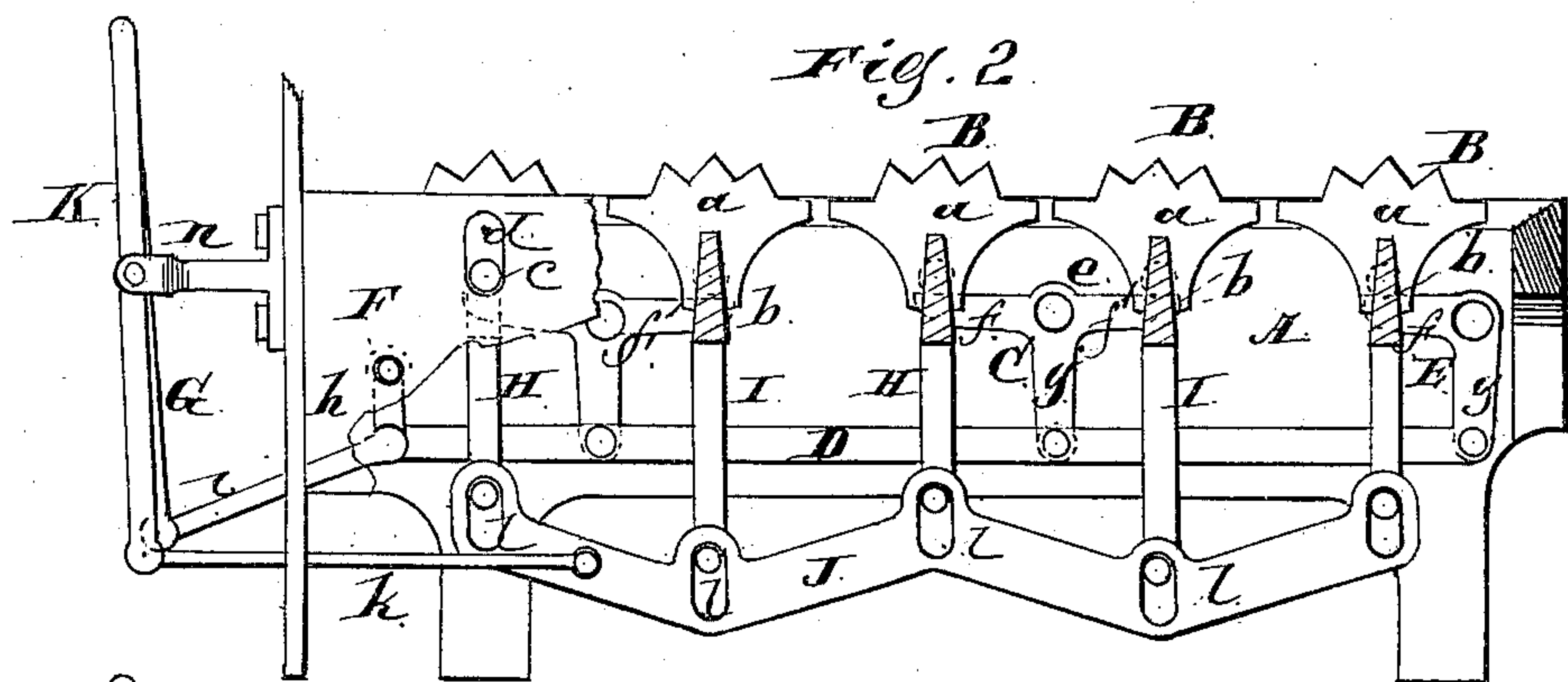
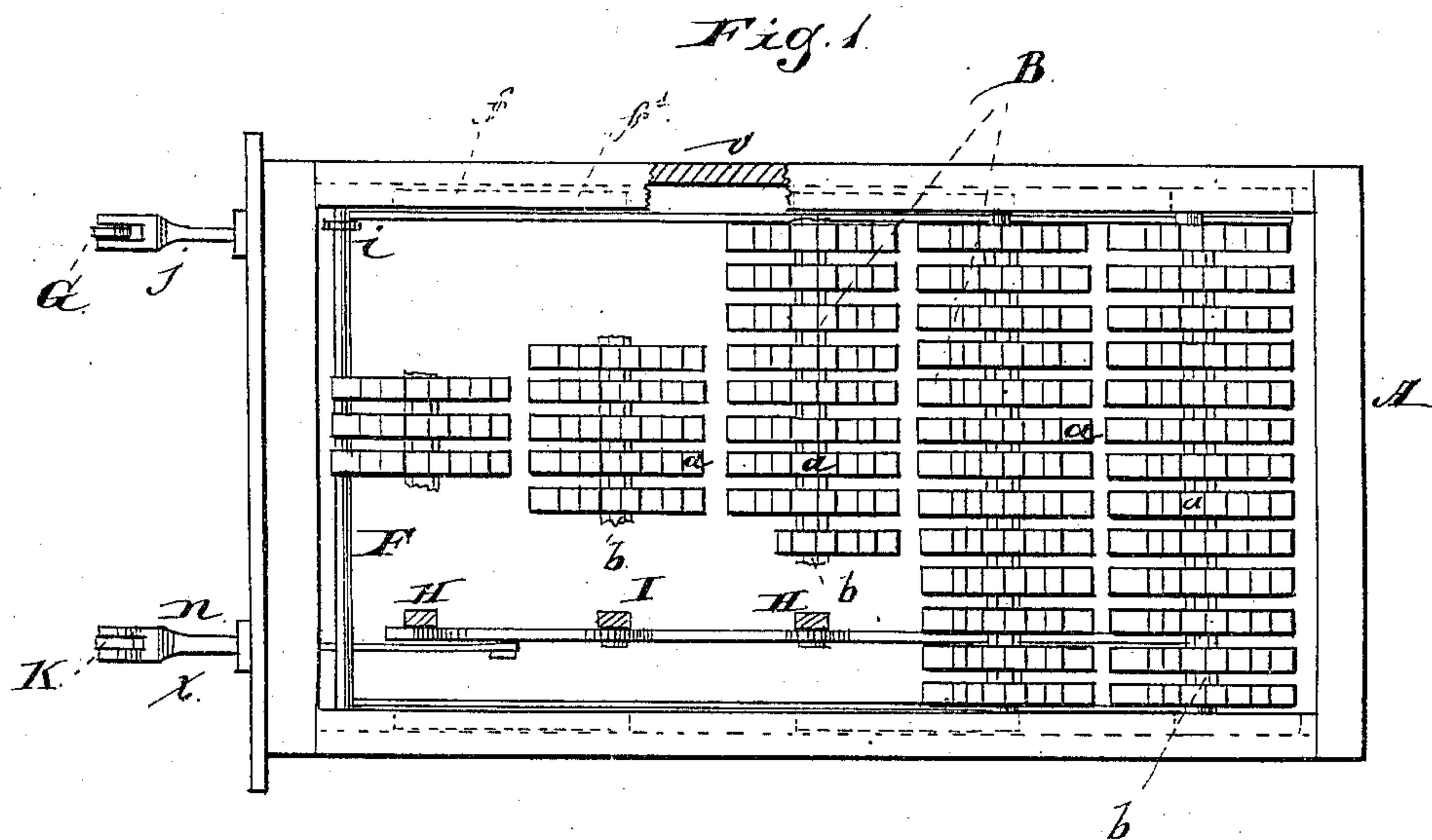
(No Model.)

F. E. CULVER.

FURNACE GRATE.

No. 321,951.

Patented July 14, 1885.



Witnesses:
Albert H. Adams.
Marie E. Price

Inventor:
F. E. Culver.

UNITED STATES PATENT OFFICE.

FITZ E. CULVER, OF CHICAGO, ILLINOIS.

FURNACE-GRATE.

SPECIFICATION forming part of Letters Patent No. 321,951, dated July 14, 1885.

Application filed January 23, 1884. (No model.)

To all whom it may concern:

Be it known that I, FITZ E. CULVER, residing at Chicago, in the county of Cook and State of Illinois, and a citizen of the United States, have invented new and useful Improvements in Furnace-Grates, of which the following is a full description, reference being had to the accompanying drawings, in which—

Figure 1 is a plan; Fig. 2, a vertical longitudinal section at line *x* of Fig. 1, a small portion at one end being shown in elevation. Fig. 3 shows a portion of the parts shown in Fig. 2, illustrating the position of the parts when a portion of the grate-bars are elevated. Fig. 4 is an enlarged view of one of the clips.

It is common to use grates having rolling or rocking bars; and my improvements relate to grates of that class.

The leading object of my invention is to provide improved devices by means of which the fire can be agitated and clinkers, which accumulate, can be broken up and the ashes and clinkers be allowed to pass to the ash-pit, which I accomplish by providing devices by means of which the alternate grate-bars can be raised and lowered, and also by providing devices by means of which all the grate-bars can be rocked, both when they are in the same plane and when a portion are elevated above the others, the rocking devices being such that when the grate-bars are rocked the open spaces between them will be enlarged for the purpose of allowing the clinkers more readily to pass to the ash-pit. Those things which I suppose to be new will appear by the claims.

In the drawings, A represents a frame of any suitable construction, in which the grate-bars are supported. As shown, the upper part of each side piece of the frame is thicker than the main portion, (indicated at *v*, Fig. 1.)

B are the grate-bars, which consist of a series of clips, *a*, secured to a bar, *b*, each end of which bar *b* is provided with a journal, *c*. The clips *a* are toothed or serrated, as shown in Figs. 2, 3, and 4, the toothed portion occupying, preferably, about one-third of a circle. The grate-bars are journaled in the frame A, the journals being all upon the same line, in the usual manner, except that the journals are located in vertical slots *d* in the frame, for the purpose of permitting the grate-bars to be

raised. As shown, there are five of the rocking grate-bars. I do not limit myself to any special number.

C are T-levers located inside of the frame A, and pivoted thereto at *e*. The horizontal arms *f f'* of these levers extend under the journals of the adjoining grate-bars and are adapted to engage with such journals. The downward-extending arms *g* of each one of these levers is pivoted to the longitudinal bar D.

E is a bell-crank lever, the two arms of which are marked *f g*, being the same as the corresponding arms of the T-levers, and serving the purpose of lifting the odd grate-bar. The T-levers, the bell-crank lever, and the bar D are the same upon both sides.

F is a rod pivoted in the sides of the frame. From this rod two arms, *h*, extend downward, one near each end, which arms are rigidly secured to the rod, and to these arms *h* the front ends of the bars D are pivoted.

i is an arm or rod pivoted at one end to the forward end of one of the bars D or to the lower end of one of the arms *h*, while its outer end is pivoted to the lower end of the lever G, which lever is pivoted in the support *j*.

The levers C E, bars D, rod F, and lever G are used for raising the alternate grate-bars, as hereinafter more fully described.

Each grate-bar is provided with an arm extending downward from it, the arms of the alternate bars being of different lengths. H represents the short arms, and I represents the long arms. The lower end of each of these arms H I is pivoted in a vertical slot, *l*, in the bar J.

k is a rod, connected at one end with the bar J, and its outer end is pivoted to the lower end of the lever K, which lever is pivoted in a support, *n*.

The arms H I, the slotted bar J, lever K, and rod *k* are used for rocking the grate-bars, as hereinafter more fully described.

The operation is as follows: Suppose the parts to be in the position represented in Fig. 2. Now, if the upper end of the lever G be moved a little to the right, the lower end will be thrown outward and the bar F will be rocked; and as the bars D are both pivoted to the arms *h*, secured to the bar F, these bars D will be brought forward a little, and the move-

ment of these bars will rock the T-levers upon their pivots *e*, thereby raising the arms *f*, which movement will raise the alternate grate-bars, the T-levers and the grate-bars, which are elevated, being brought into the position shown in Fig. 3. When the lever G is returned to its former position, the grate-bars, which have been elevated, will return to their former position by gravity. The journals of the grate-bars move up and down in the slots *d*. The slots *l* in the bar J permit the vertical movement of the arms H I when the grate-bars are raised. By rocking the rod F the other way, and thus pushing the bars D to the right, the other arms, *f'*, of the T-levers will be raised, and the alternate grate-bars, with which these arms *f'* engage, will be elevated.

By means of the lever K and rod *k*, the bar J can be moved both forward and backward; and this movement of this bar J will carry with it the lower ends of the arms H I, thereby giving a rocking movement to the grate-bars. The lower ends of the arms H I, it will be seen, move the same distance, but in different circles; and, as a consequence of this movement, the grate-bars connected with the short arms must move a greater distance than those which are connected with the long arms, although they are all journaled in the same plane. This rocking movement can be given to the grate-bars when they are all in the same plane or when a portion of them have been raised, as before described.

By elevating and rocking the grate-bars, as described, fire can be well agitated, and any bed of clinker which is formed will be broken

up and the pieces can fall down between the bars, thus clearing the grates more effectually than has heretofore been done. The clips *a* upon the grate-bars being notched, they assist in performing the work.

As a result of the described construction and operation, the spaces between the grate-bars are enlarged by rocking the same, which facilitates the removal of clinker.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination of a supporting-frame having vertical slots, and a series of rocking grate-bars having end journals arranged in the slots, with mechanism connected with the grate-bars for raising and lowering them in the vertical slots in a vertical plane, substantially as described.

2. A series of grate-bars journaled in the same horizontal plane and provided with depending-arms of different lengths connected with a shaking bar or rod, whereby all the grate-bars can be simultaneously rocked, substantially as and for the purpose specified.

3. The combination of a supporting-frame having vertical slots, and a series of rocking bars journaled to rise and fall in the slots, with a lever and connections for raising and lowering the alternating bars and a lever and connections for rocking all the bars, substantially as described.

FITZ E. CULVER.

Witnesses:

E. A. WEST,

ALBERT H. ADAMS.