

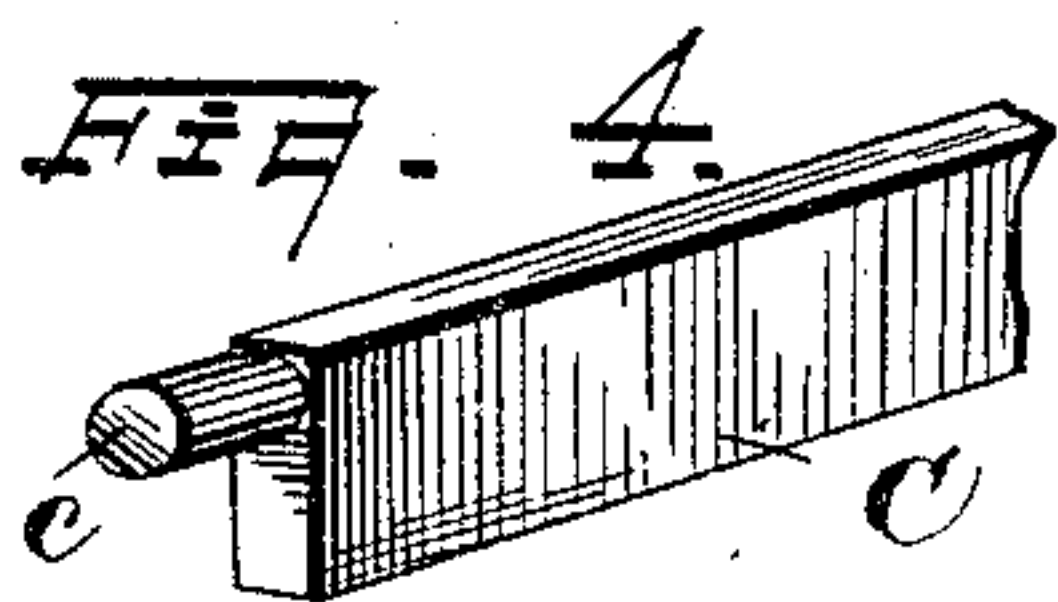
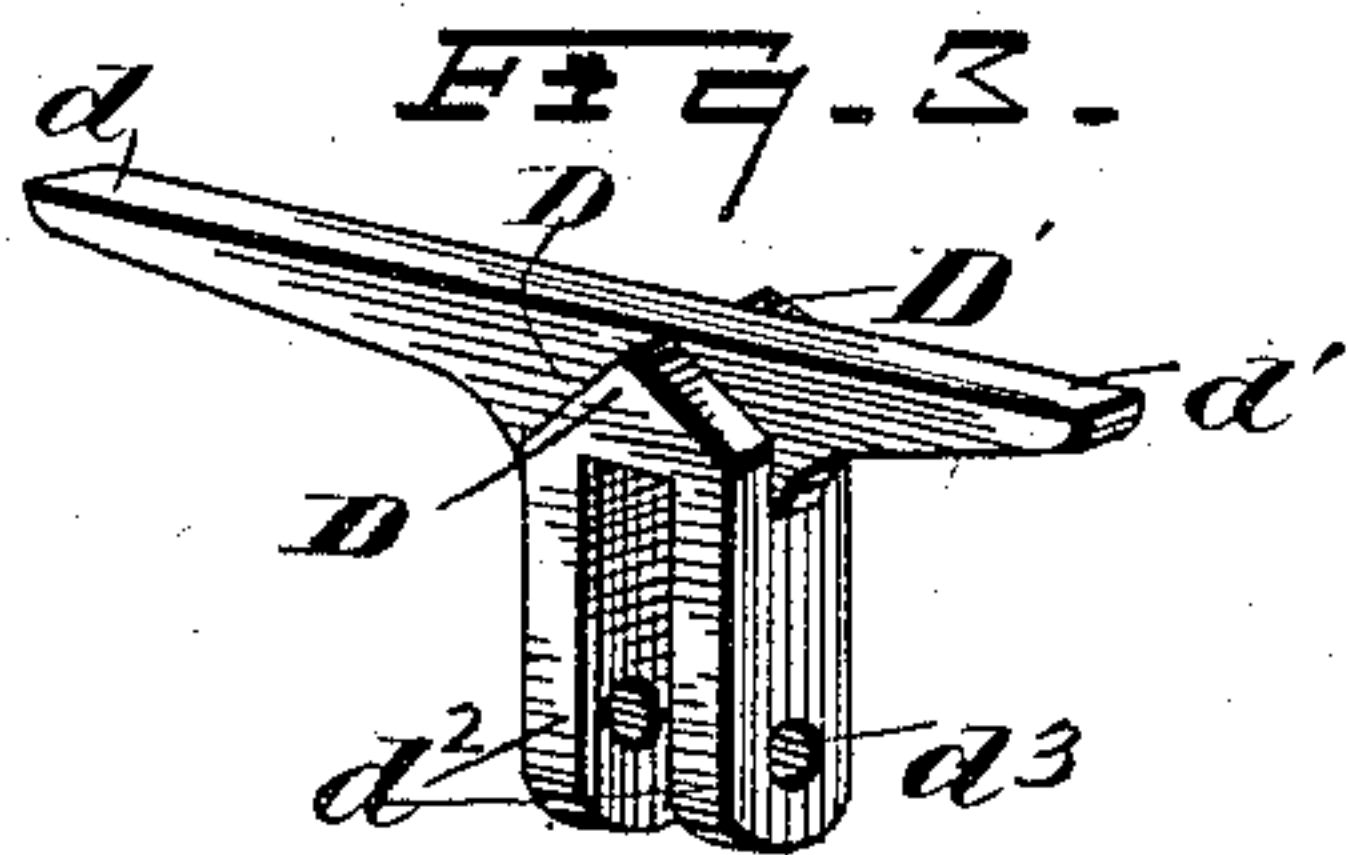
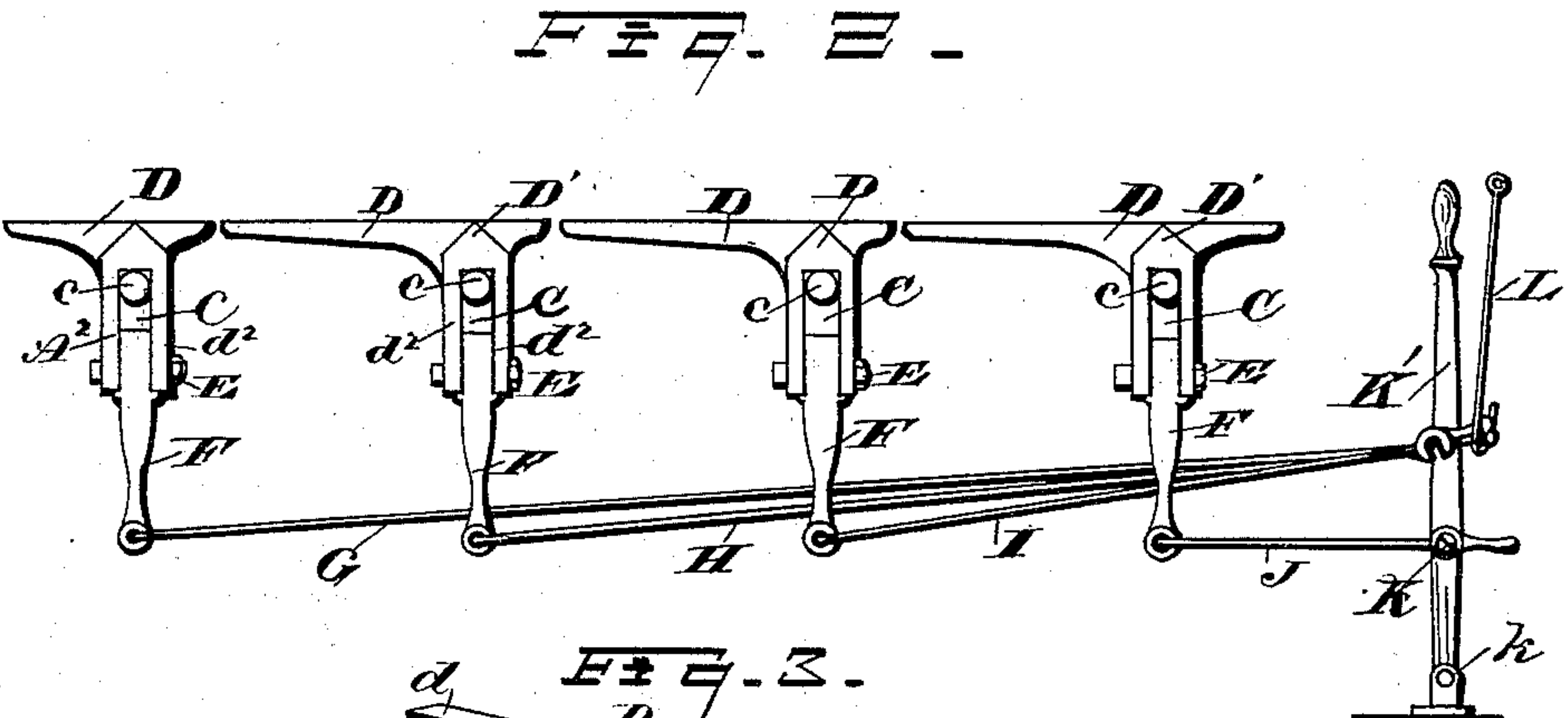
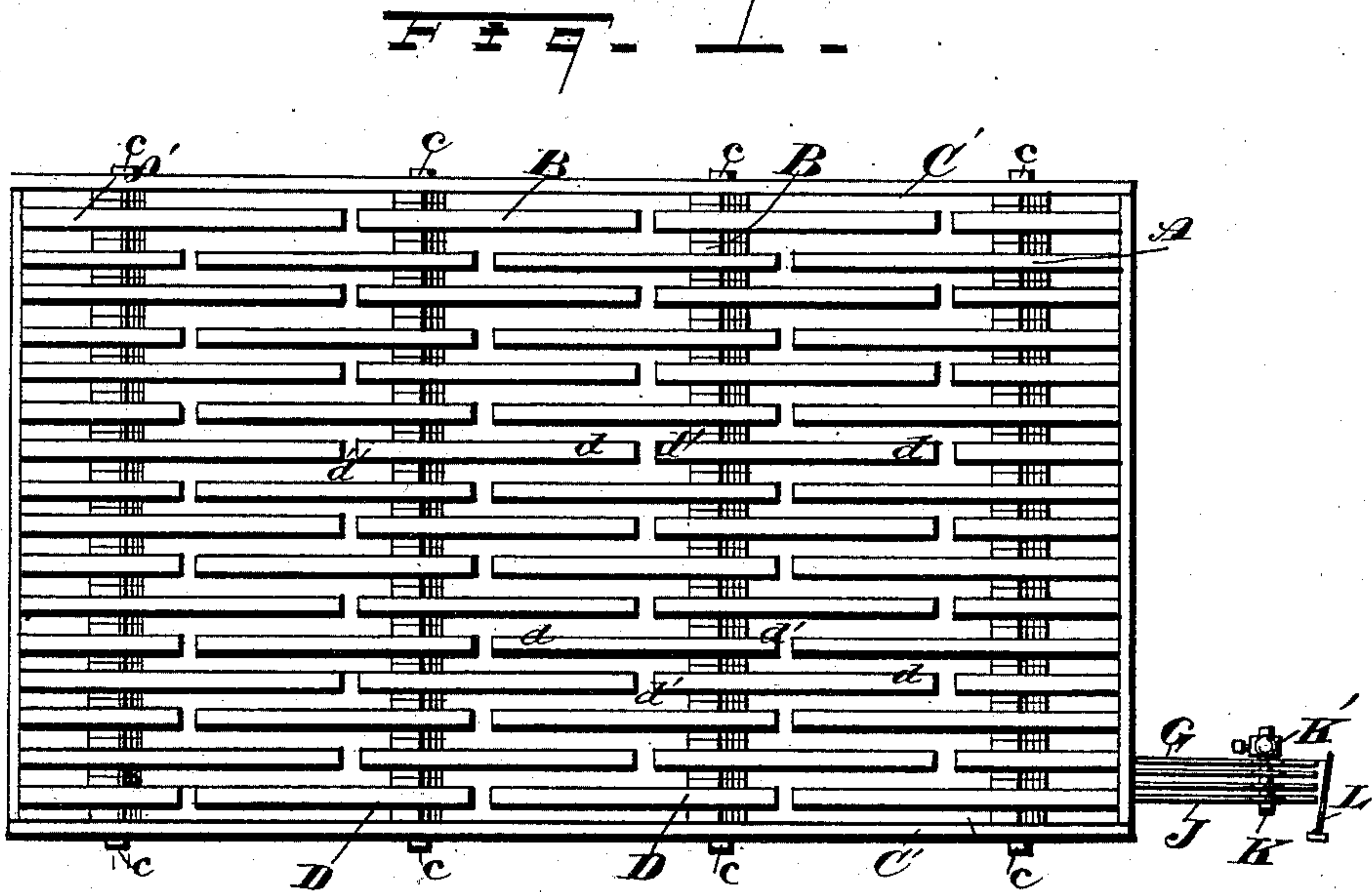
(No Model.)

W. B. CHISHOLM & J. WALKER.

ROCKING GRATE BAR.

No. 316,876.

Patented Apr. 28, 1885.



WITNESSES

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# UNITED STATES PATENT OFFICE.

WILSON B. CHISHOLM AND JOHN WALKER, OF CLEVELAND, OHIO.

## ROCKING GRATE-BAR.

SPECIFICATION forming part of Letters Patent No. 316,876, dated April 28, 1885.

Application filed October 3, 1884. (No model.)

*To all whom it may concern:*

Be it known that we, WILSON B. CHISHOLM and JOHN WALKER, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Rocking Grate-Bars; and we 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 pertains to make and use the same.

Our invention relates to improvements in rocking grate-bars for furnaces, the object being to provide detachable grate-bars arranged in independent sections, the sections extending crosswise of the furnace, while the grate-bars of which each section is composed are lengthwise of the furnace.

A further object is to provide a supporting-bar for each section, with the ends thereof pivoted in bearings in the side walls of the furnace, and so arranged that each section may be rocked independently of, or in unison with, the other sections.

A further object is to construct the grate-bars in such a manner that each one may be easily detached from the supporting-bar and a new one supplied in its place; and to this end each grate-bar is provided with jaws that embrace the supporting-bar, and are provided with a bolt passing through the jaws below the supporting-bar, so that the grate-bars are held in position while they are rocked or dumped, and, by removing the bolt, may be lifted from the supporting-bar without disturbing other grate-bars in the same section.

A further object is to provide certain of the grate-bars with longer jaws, extending so far below the supporting-bar that they are adapted to receive the end of a rock-arm that may abut against the supporting-bar, to the end that the arm and grate-bar may be secured by a single bolt.

A further object is to provide the grate-bars, respectively, with laterally-projecting fingers of unequal length, so that when alternate grate-bars in the same section are reversed the longer fingers from adjacent sections will interlock or pass between each other.

A further object is to provide mechanism by means of which the different sections may be shaken, rocked, or dumped separately or together, as may be required.

With these objects in view our invention consists in certain features of construction and in combination of parts hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a plan view of our improved grate-bars. Fig. 2 is a side view in elevation of the same. Fig. 3 is a view in perspective of a detached grate-bar. Fig. 4 is an isometric view of a portion of a supporting-bar.

In the plan shown in Fig. 1 there are four sections, A, A', and B. The two middle sections, B, are alike, and the front and rear sections are usually alike or similar. Each section is provided with a supporting-bar, C, that is preferably rectangular in cross-section and is set edgewise, and extends across the furnace and has round ends *c*, that are pivoted in the bars C', that are set in the side walls of the furnace. The grate-bars D, as shown in Fig. 3, have a long finger, *d*, and a short finger, *d'*, and have jaws *d*<sup>2</sup>, separated far enough to embrace the supporting-bar C, and have holes *d*<sup>3</sup>, in which bolts E are inserted that pass just under the bars C. These bolts hold the bars in place when the section is dumped, and greatly strengthen what would otherwise be a weak point in the grate-bars above the supporting-bar. The jaws are of such width that the fingers of the grates are separated the required distance for the air-spaces, and the laterally-projecting parts of the jaws are made angular at the top, as shown at D', to prevent ashes from lodging therein. As shown in Fig. 1, alternate bars in each section are reversed, so that the longer fingers extend in opposite directions and pass between the longer fingers that extend toward them from the adjacent sections.

The grate-bars on the sections B are alike, and on the end sections, A and A', the long and short fingers that extend toward the sections B correspond with the fingers of the middle sections, but on the outside the fingers of the end sections are all of the same length and are made longer or shorter as may be required to fill out the length of the furnace.

If any of the grates become warped, broken, or in any way injured, by withdrawing the bolts from the jaws of such grate-bars they may be removed from the respective sections and their places supplied with new bars with-



out removing the sections or disturbing other grate-bars on the same sections. The number of sections and the length of the grate-bars may be varied according to the size of the furnace and judgment of the builder. For instance, in a furnace four feet long four sections might be used, with the long fingers about ten inches and the short fingers three inches in length. As there would be three of the long fingers and five of the short fingers in line, there would be left three inches for clearance, to be distributed at five points. If five sections were used in the same furnace, the length of the long fingers might be seven inches and the short fingers two and three-fourths inches. As there would be four long and six short fingers in line, there would be left three and one-half inches clearance, to be distributed at six points. If the furnace was, say, four feet four inches long, two inches might be added to the outside fingers on the end sections, making these fingers five inches long in the one case and three and three-fourths inches long in the other case.

Certain of the grates that are in line, and usually on one side of the furnace, have longer jaws, as shown in Fig. 2, that embrace not only the supporting-bar, but receive also the ends of the rock-arms F. The top ends of these rock-arms abut against the supporting-bar, so that the bolt E holds the rock-arms in position and secures also the grate-bars on the supporting-bar.

To the lower ends of the arms F are respectively pivoted the rods G, H, I, and J. These rods extend forward and have hook ends, as shown, that may engage the laterally-projecting wrist K of the hand-lever K', that is fulcrumed at *k*. A hook, L, is provided, on which may be suspended any number of these connecting-rods, so that they will not be actuated by the hand-lever.

When it is required to shake or dump any of the sections, the connecting-rods leading to such section are lowered onto the wrist K. In Fig. 2 the rod J is shown in this position.

By oscillating the rod K' the connected sections will be rocked correspondingly.

By moving the hand-lever a sufficient distance the connected sections may be dumped in either direction, or by a slight quick movement of the lever the sections may be jarred sufficiently to dislodge ashes with rocking the sections perceptibly.

When it is necessary to clean the fire, the sections should be rocked to loosen the clinkers. The coal should then be raked from one section, after which the section may be dumped to discharge the clinkers into the ash-pit. Each section may in turn be treated in like manner. After a section has been dumped a portion of the live coal may be raked back over the section and new coal added.

As dumping a section more or less retards combustion, it is advisable to wait some little time for the fire to recover before dumping the next section.

We are aware that rocking grates in sections that may be rocked and dumped separately have been in use, and we do not claim, broadly, such construction.

What we claim is—

1. The combination, with a series of rocking grate-bars and an arm depending from each series, of a lever and connecting-rods secured at one end to the several depending arms of the grate-bars, and removably secured at their opposite ends to an operating lever, whereby all or any number of the grate-bars can be rocked simultaneously.

2. In rocking grate bars, the combination, with a supporting-bar arranged as aforesaid, of detachable grate-bars provided with jaws for embracing the supporting-bar, and adapted also to embrace the upper end of a rock-arm, and the parts so arranged that the rock-arm and engaging grate-bar are held in position by a single bolt, substantially as set forth.

3. The combination, with rock-arms respectively secured in the jaws of grate-bars, of connecting-rods respectively pivoted to the rock-arms and extending in front of the furnace, and provided with hook ends or equivalent devices for engaging the wrist K on the lever K', and provided with the hook L or equivalent device for supporting any number of the connecting-rods, substantially as set forth.

In testimony whereof we sign this specification, in the presence of two witnesses, this 30th day of July, 1884.

WILSON B. CHISHOLM.  
JOHN WALKER.

Witnesses:

CHAS. H. DORER.  
ALBERT E. LYNCH.