

L. E. JORDAN.
SHAKING GRATE.

No. 486,045.

Patented Nov. 8, 1892.

Fig. 1.

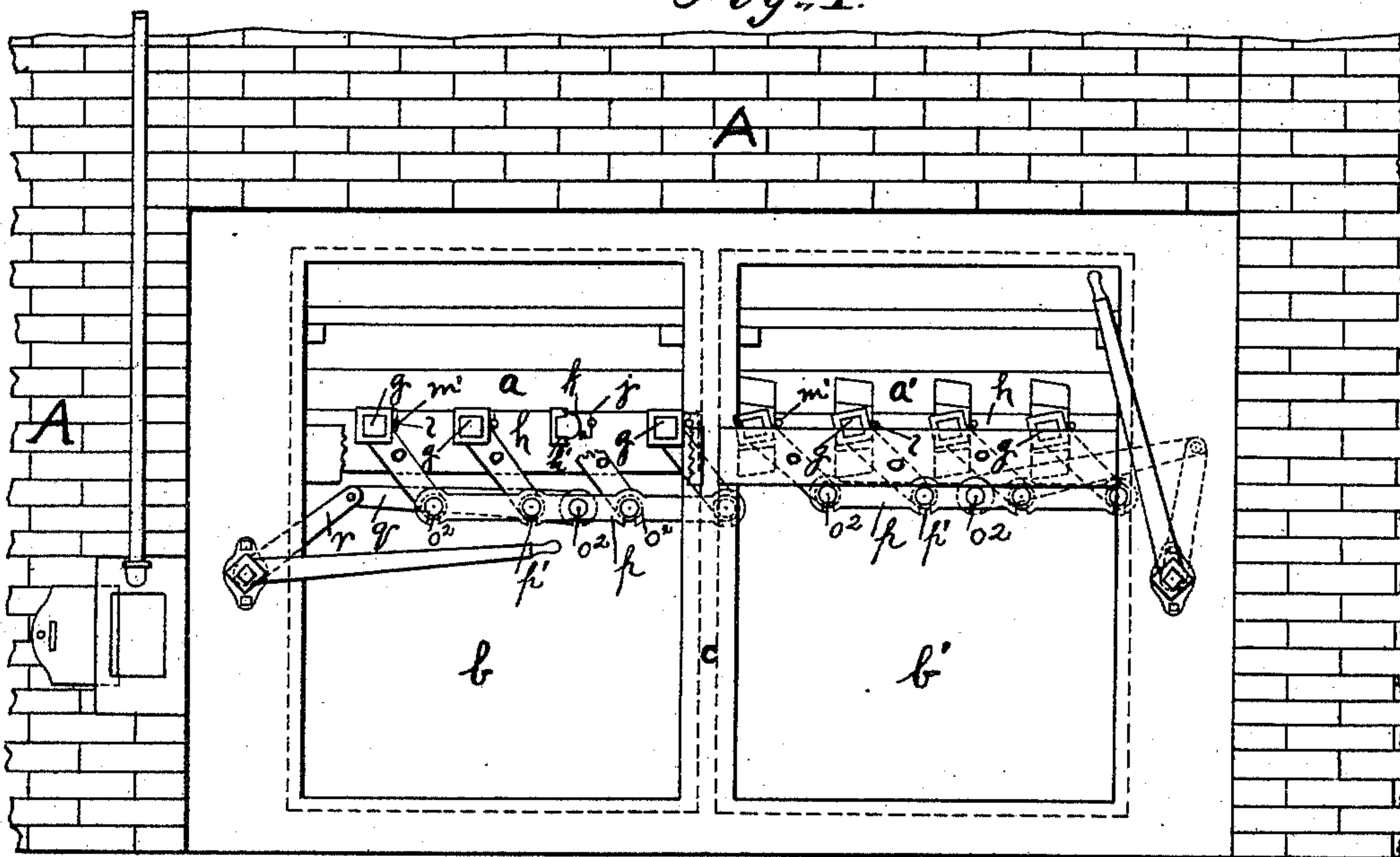


Fig. 2.

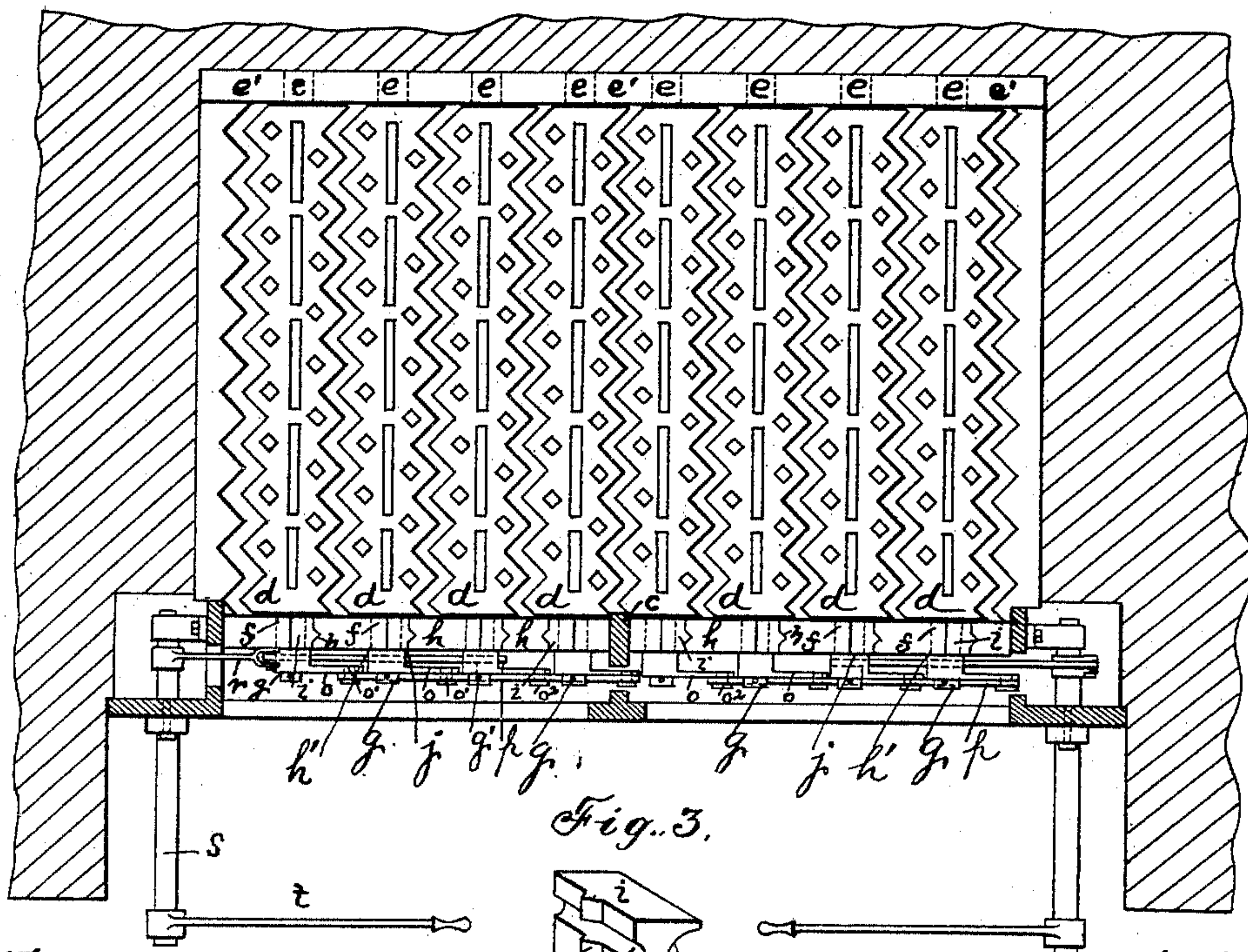
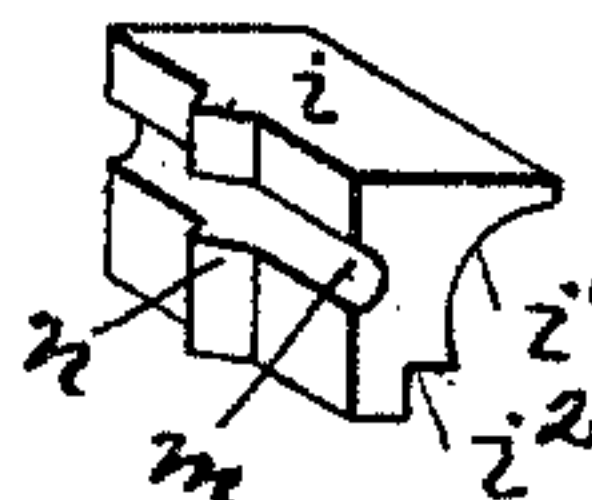


Fig. 3.



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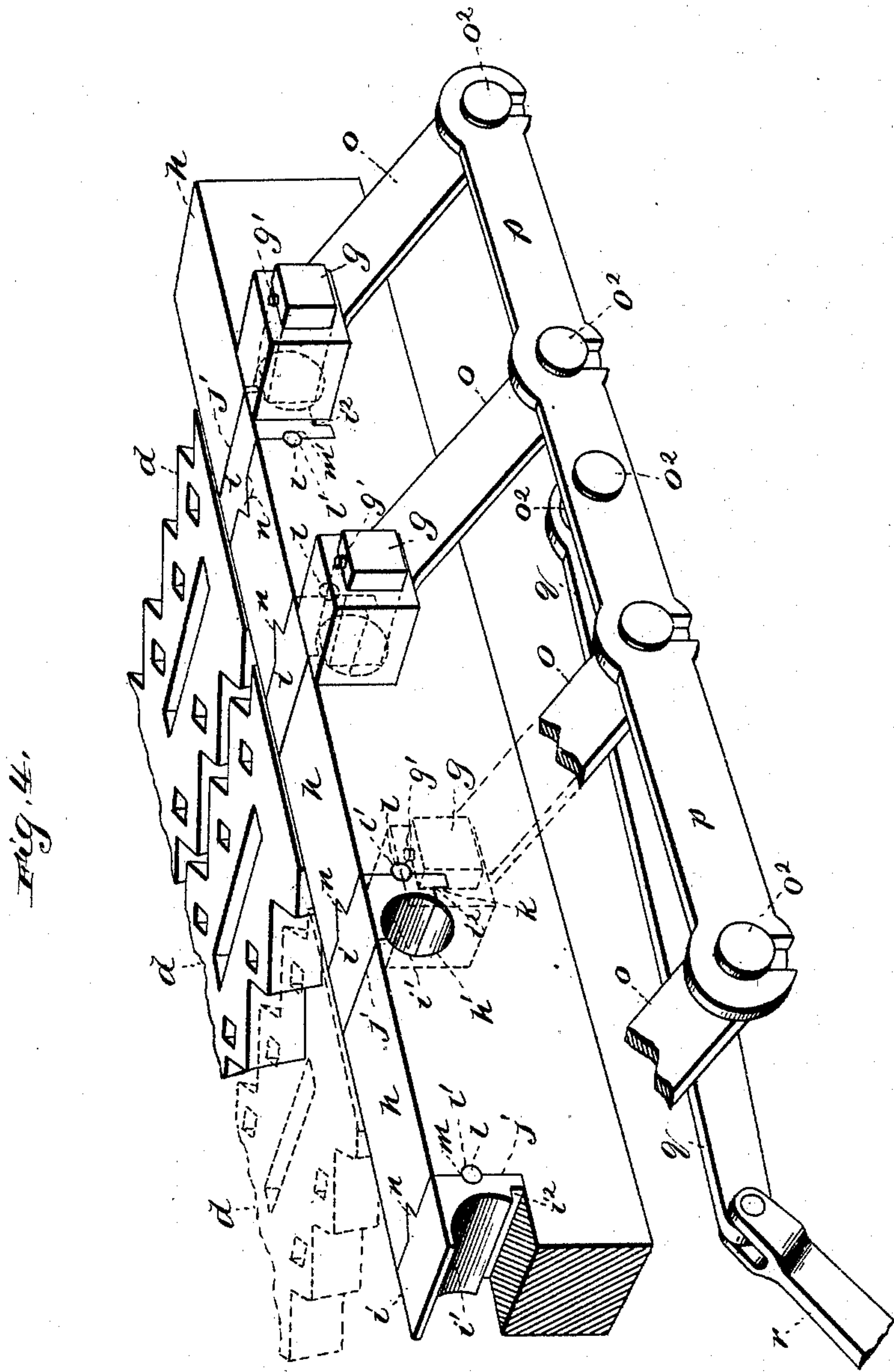
(No Model.)

2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

LLEWELLYN E. JORDAN, OF BELLEVUE, ASSIGNOR OF ONE-HALF TO CALVIN WELLS, OF ALLEGHENY, PENNSYLVANIA.

SHAKING-GRATE.

SPECIFICATION forming part of Letters Patent No. 486,045, dated November 8, 1892.

Application filed June 3, 1891. Serial No. 394,926. (No model.)

To all whom it may concern:

Be it known that I, LLEWELLYN E. JORDAN, a resident of Bellevue, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Shaking-Grates; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to grates for furnaces, and particularly to what are termed "shaking-grates," such as are employed in connection with furnaces in which solid fuel is used and which provide for the removal from time to time of the ashes or scoræ consequent thereto.

The object of my invention is to provide a shaking-grate in which the several grate-bars composing the same are all operated by a common lever and in which the bars are so journaled as to be readily withdrawn or inserted independently of each other when necessary, while their lever connections can be employed with a grate operated either from the right or left hand, the parts being interchangeable.

To these ends my invention consists in certain improvements and combinations of parts, all of which will be more fully hereinafter set forth and claimed.

To enable others skilled in the art to make and use my invention, I will describe the same more fully, referring to the accompanying drawings, in which—

Figure 1 is a front view showing the manner of connecting up the several bars with the tilting mechanism, the grate-bars being tilted to their fullest extent on the right side. Fig. 2 is a plan view, the furnace-walls being in section. Fig. 3 is a perspective view of the journal-block removed. Fig. 4 is an enlarged perspective view of the front end of my improved grate.

Like letters indicate like parts.

My invention is applicable to any metal-lurgic or other furnace in which solid fuel is employed for generating the required degree of heat or in producers for generating gas. In the drawings I have illustrated my invention in connection with the furnace A, having double fire-chambers $a a'$ and ash-pits $b b'$, separated by the vertical wall c . I have

used this form of furnace to illustrate the adaptability of my invention to such a furnace as well as to one with a single fire-chamber and ash-pit. The grate-bars d may be of any suitable shape, and may, if desired, have openings formed therein of suitable size and shape. These grate-bars d are arranged side by side, as shown in Fig. 2, with a sufficient space between to allow for the necessary movement of said grate-bars, as will more fully hereinafter appear. The inner ends of the grate-bars d are provided with the journals e , journaled in suitable bearings in the rear cross-beam e' , secured to the rear wall of the combustion-chambers $a' a^2$ and forming part of the grate proper. Adjacent to the outer ends of the grate-bars d are the journals f , while beyond said journals f and constituting the extreme ends of said grate-bars d are the square or angular bearings g . The journals f of the grate-bars d are journaled in bearings formed partly in seats formed in the grate-front or front cross-beam h and partly in the journal-blocks i . The semicircular or nearly-semicircular bearings h' in said grate-front h are adapted to receive a corresponding portion of the journals f adjacent to the outer end of the grate-bars d , thus affording a bearing for part of said journal f . The bearing-blocks i complete the bearing for the said grate-bars d , and to this end said bearing-blocks i are formed with the semicircular bearings i' , adapted to fit around the portions of the journals f not embraced by the semicircular bearings h' of the grate-front h . To provide for the insertion of the bearing-blocks i , seats j are formed in the grate-front h , said seats being of such a size that when the bearing-blocks i are inserted therein they will fit snugly in said seats with the bearings i' engaging part of the journals f . In order to provide for the detention of said bearing-blocks i securely in place and prevent their displacement in the operation of the grate, the said bearing-blocks i are formed with the groove i^2 , said groove being adapted to engage with a correspondingly-shaped lug k in the seats j . To lock said bearing-blocks i against any upward or vertical movement, a pin l is driven into the opening l' , formed by the union of two semicircular grooves $m m'$ in the bearing-blocks

i and the seats *j*, respectively. To further insure the bearing-blocks *i* against any longitudinal movement, said blocks are provided with the angular or other suitably-shaped lugs *n*, adapted to fit in correspondingly-shaped recesses *n'* in the seats *j*. In the above manner a very secure connection is effected between the bearing-blocks *i* and the seats *j*, and one which will prevent any displacement on the part of said blocks during the shaking of the grate.

Secured to the square bearings *g*, on the outer ends of the grate-bars *d*, are the inclined arms *o*, the upper ends of said arms fitting around said square bearings *g*, the pins *g'* securing said arms thereto. The lower ends of the inclined arms *o* are formed with the studs *o'*, having the heads *o''*. A reciprocating bar *p* has the openings *p'*, which engage with the studs *o'*, the heads *o''* on said studs retaining said bar *p* in place. At about the mid-point of the reciprocating bar *p* is pivoted the rocking lever *q*, the opposite end of said rocking lever being pivoted to the lever *r*. The lever *r* in turn is pivoted at its opposite end to the rod *s*, which extends out beyond the furnace-walls, and secured to the end of said rod *s* is the operating or hand lever *t*. Any suitable mechanism, may, however, be employed for operating the reciprocating bar *p*.

In the operation of my improved shaking-grate with the several parts in the position and constructed as illustrated in Fig. 1, it is apparent that when the operator grasps the hand-lever *t* and draws it up and down that through the lever mechanism described the bar *p* will have a reciprocating movement imparted thereto. The effect of this reciprocation of the bar *p* will be, through the action of the connecting-arms *o*, to tilt or cant the grate-bars *d* from one side to the other, said bars working on their journals *c* and *f*, journaled in the manner described.

When in the operation of the furnace the ashes and clinkers have accumulated on the grate-bars to an extent that they cannot be wholly removed by the simple shaking of the grate, the hand-lever can be brought to the position shown in the right of Fig. 1, when the grate-bars *d* will be brought to the posi-

tion shown in said Fig. 1—that is, on their edges—when the accumulated ashes and clinkers are permitted to fall until all have been removed.

In case one of the grate-bars is broken or is worn out, it is only necessary to free the arm *o*, connected thereto, from the reciprocating bar *p*, remove said arm *o* from the grate-bar, remove the pin *l*, and lift out the bearing-block *i*, when the grate-bar may be readily removed and a new one substituted therefor without interfering with the remaining bars or the continued operation of the furnace, this being accomplished without exposing the operator to great heat. The several parts may also be made interchangeable, as illustrated, being simply reversed according as they are operated from the right hand or the left, and so providing for the operation of the grate in either position and with any number of grate-bars.

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

1. The combination, with the grate-front *h*, of the grate-bars *d*, having the journals *f* journaled in semicircular bearings *h'* in said grate-front *h* and in bearing-blocks *i*, said bearing-blocks fitting in seats *j* and having the grooves *i''*, adapted to engage the lugs *k*, formed in said seats *j*, and lugs *n* on said bearing-blocks *i*, adapted to enter the recesses *n'* in said grate-front, substantially as and for the purposes set forth.

2. The combination, with the grate-front *h*, of the grate-bars *d*, having the journals *f* journaled in semicircular bearings *h'* in said grate-front *h* and in bearing-blocks *i*, said bearing-blocks fitting in seats *j* and having the grooves *i''*, adapted to engage the lugs *k*, formed in said seats *j*, lugs *n* on said bearing-blocks *i*, adapted to enter the recesses *n'* in said grate-front, and the pins *l*, entering the openings *l'* in said grate-front, and bearing-blocks, substantially as and for the purposes set forth.

In testimony whereof I, the said LLEWELLYN E. JORDAN, have hereunto set my hand.

LLEWELLYN E. JORDAN.

Witnesses:

F. G. HAY,
ROBT. D. TOTTEN.