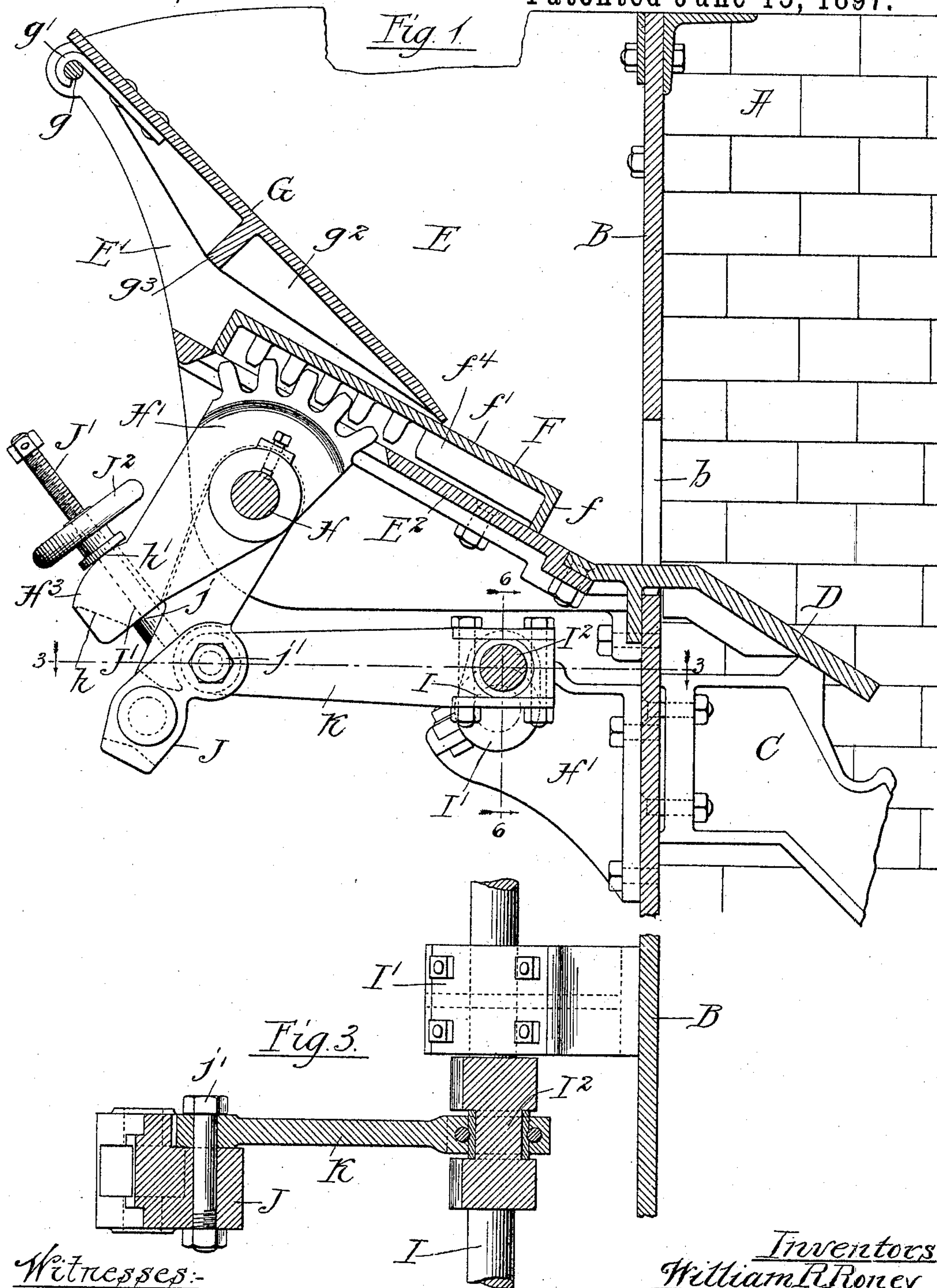


2 Sheets—Sheet 1.

No. 584,561.

Patented June 15, 1897.



Witnesses:-
John W Adams.
L. Chilton Hamlin

Inventors
William R Roney
William M Churchill
by: Pooler, Brown,
their Attys

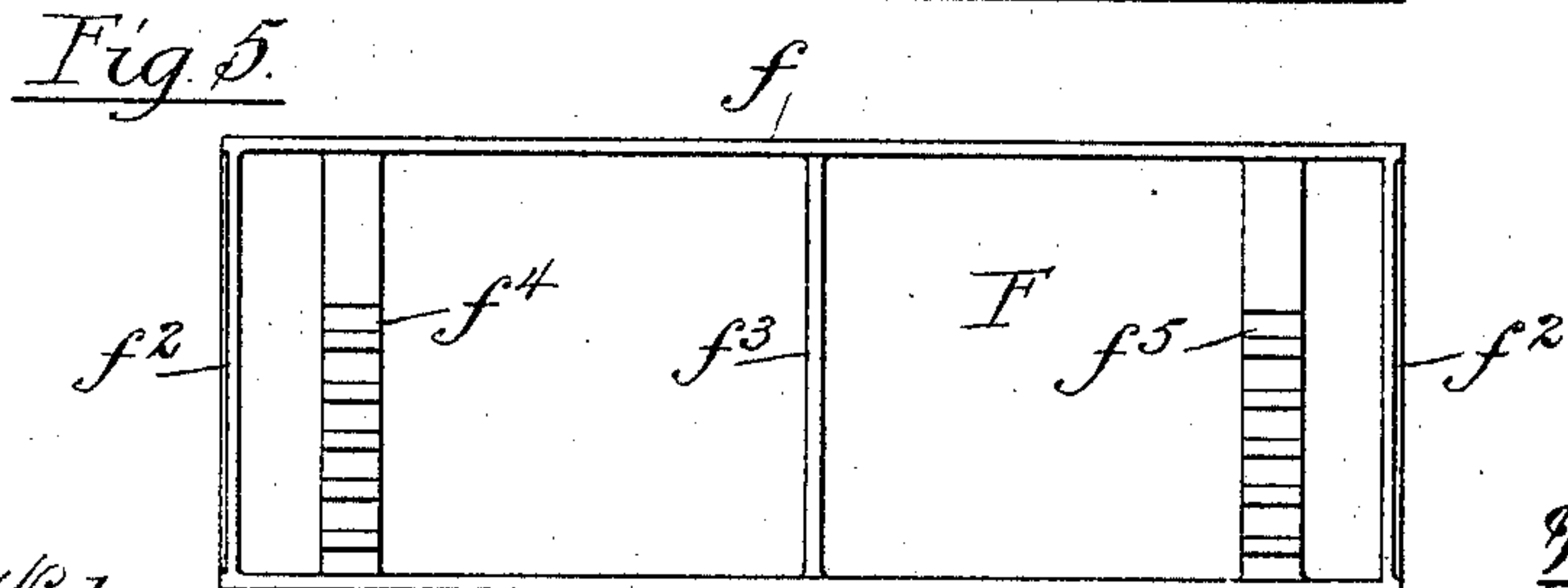
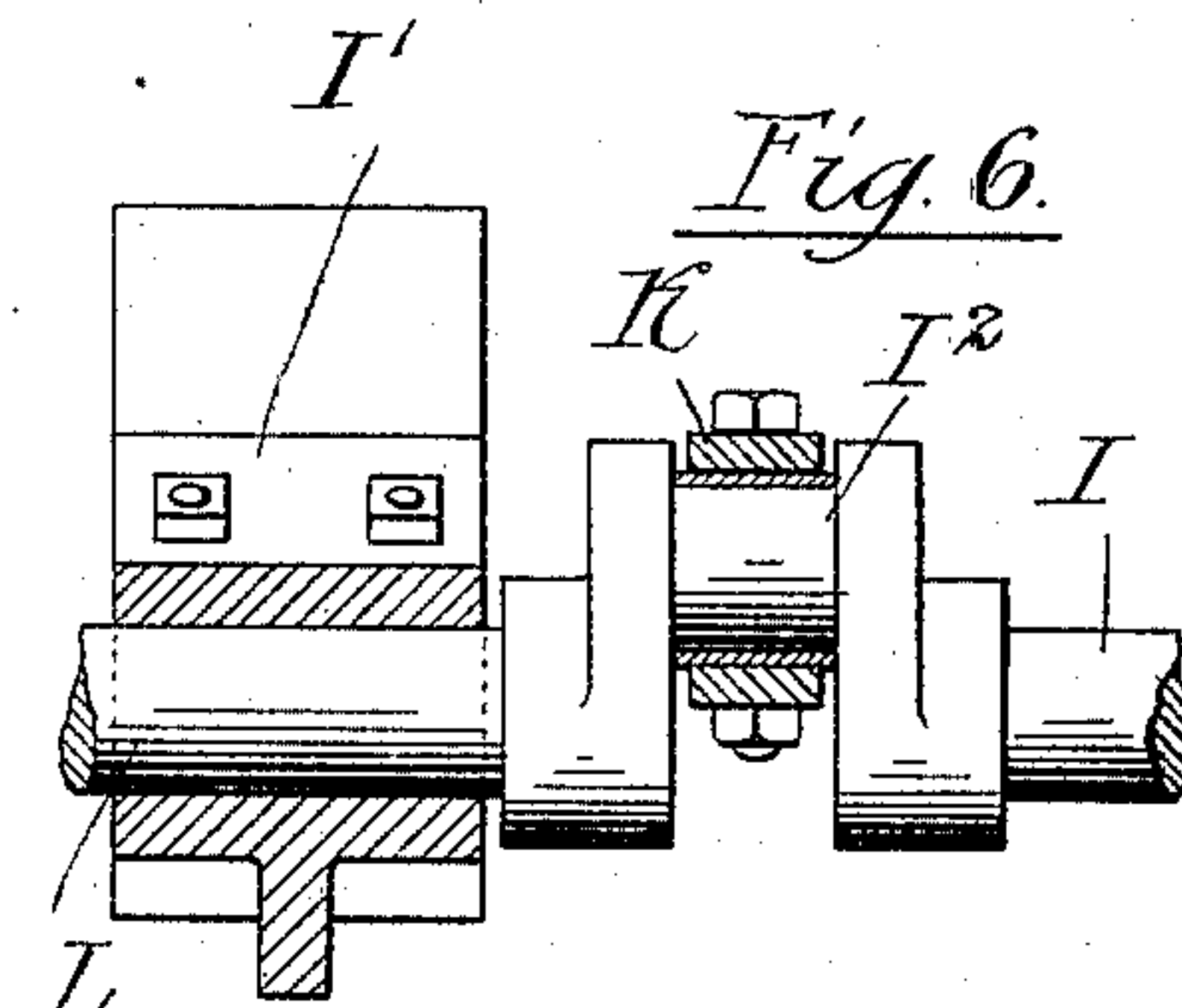
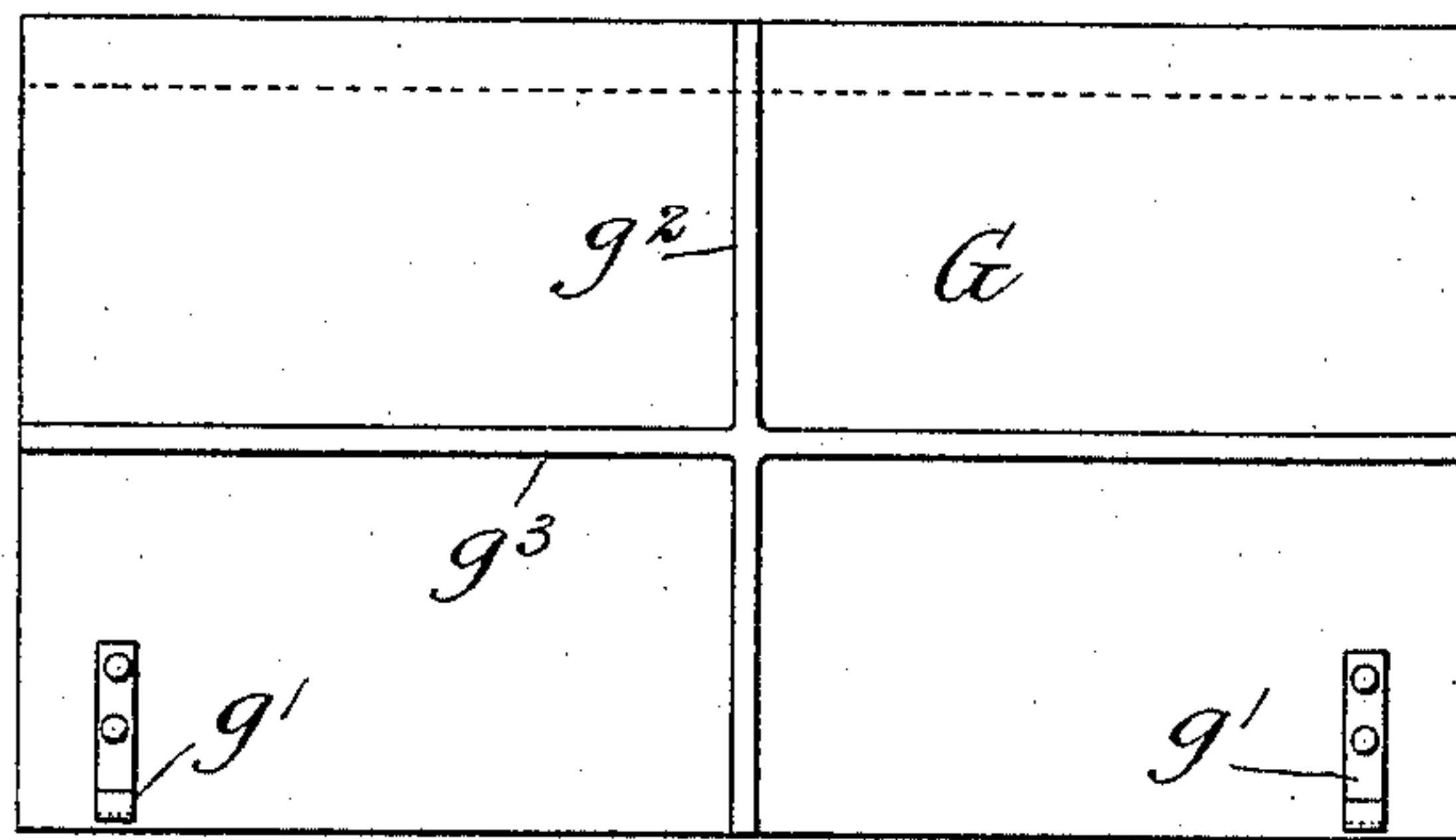
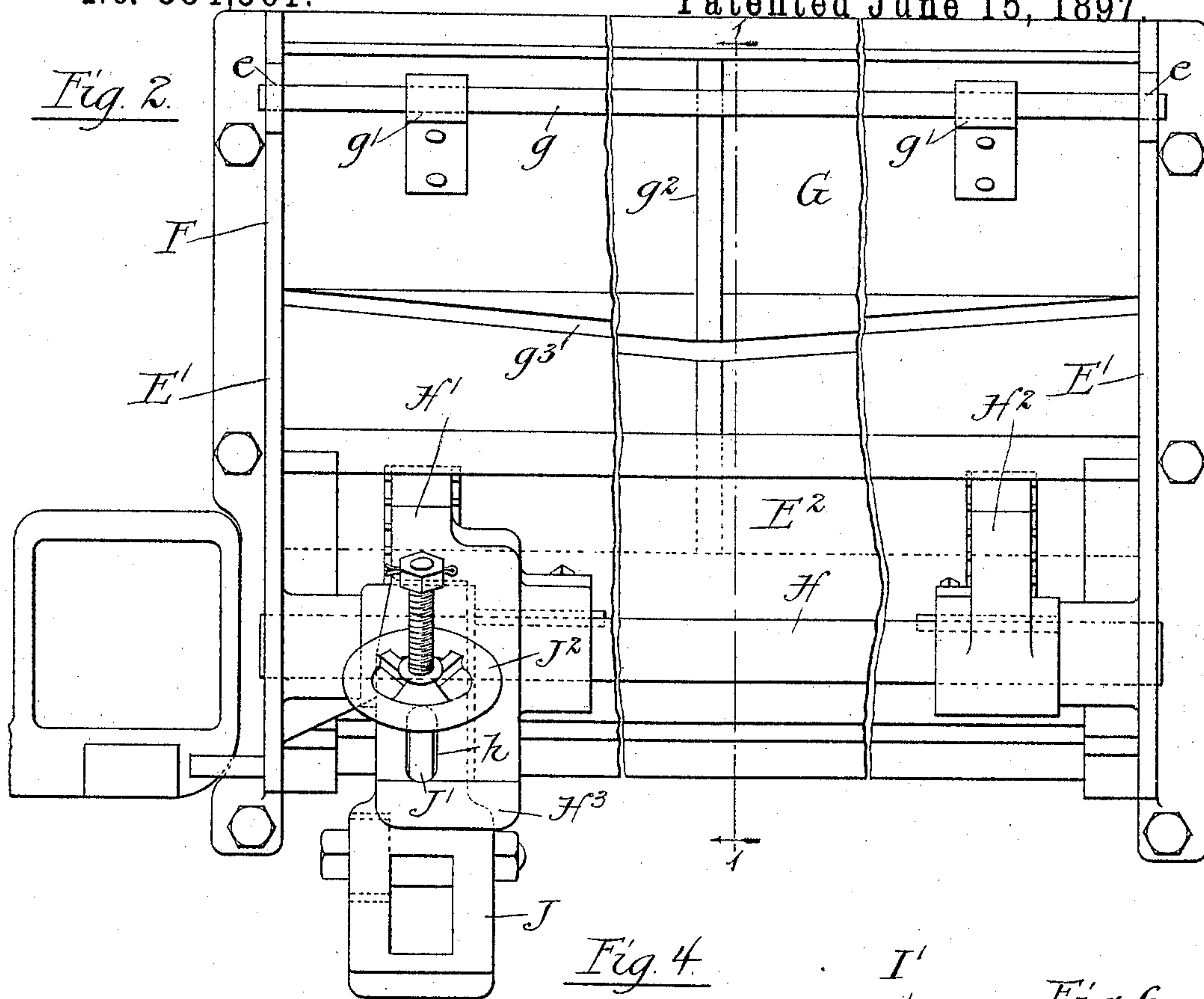
(No Model.)

2 Sheets—Sheet 2.

W. R. RONEY & W. W. CHURCHILL.
FURNACE FEEDING DEVICE.

No. 584,561.

Patented June 15, 1897.



Witnesses:-

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UNITED STATES PATENT OFFICE.

WILLIAM R. RONEY, OF BOSTON, MASSACHUSETTS, AND WILLIAM W. CHURCHILL, OF NEW YORK, N. Y., ASSIGNORS TO THE WESTINGHOUSE, CHURCH, KERR & COMPANY, OF ORANGE, NEW JERSEY.

FURNACE-FEEDING DEVICE.

SPECIFICATION forming part of Letters Patent No. 584,561, dated June 15, 1897.

Application filed May 16, 1896. Serial No. 591,811. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM R. RONEY, of Boston, in the county of Suffolk and State of Massachusetts, and WILLIAM W. CHURCHILL, of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Furnace-Feeding Devices; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in furnaces, having reference to automatic stokers or fuel-feeding devices for use in that class of furnaces having a grate, to which the fuel is delivered by the feeding devices, and also to other features of construction in furnaces, as will hereinafter appear.

The object of the invention is to provide a simplified and improved construction in devices of the character referred to; and our invention consists in the matters hereinafter described, and more particularly pointed out in the appended claims.

The invention will be more readily understood by reference to the accompanying drawings, in which—

Figure 1 is a vertical sectional view of a furnace-front equipped with our invention, the section being taken on line 1 1 of Fig. 2. Fig. 2 is a front elevation of the furnace-front and fuel-feeding devices thereon, parts being broken out to reduce the width of the figure. Fig. 3 is a horizontal sectional view, taken on line 3 3 of Fig. 1, looking downward. Fig. 4 is a bottom plan view of the hinged outer or front wall of the hopper. Fig. 5 is a bottom plan view of the fuel-pusher. Fig. 6 is a detail of the crank connections.

As shown in said figures, A designates the side wall of the furnace, and B the front wall thereof.

C designates the upper end of the inclined grate within the furnace, and D a stationary inclined plate commonly known as the "dead-plate," which is attached to the front wall B and extends inwardly over the upper part of

the grate C. Above the said dead-plate is formed an opening *b*, through which the fuel is fed to the interior of the furnace from a feed-hopper E, mounted upon the front of the furnace, the fuel entering through the passages *b*, passing over the dead-plate D, and thence to the inclined grate.

The hopper E is provided with end walls E', which are attached to the front wall of the furnace with a bottom plate E², which latter is attached to the ends of the plate E', and at its inner or rear edge to the outer edge of the dead-plate D, and with an outer or front wall G. The bottom plate E² is shown as inclined downwardly and inwardly, but in practice it may be more or less inclined, or even arranged horizontally, as preferred.

F designates a fuel-pusher mounted upon the bottom plate E², which has a reciprocatory motion along the bottom of the hopper toward and from the fuel-passage *b*, and which serves to thrust or force the fuel along the bottom of the hopper and through said passage as the pusher is reciprocated. Said pusher is provided with a lateral working face *f*, which acts against the fuel to force the same forward, and a top surface *f'*, which slides beneath the lower edge of the upper wall G of the hopper during the reciprocatory movement of the pusher. Said outer wall of the hopper in the construction shown is formed by a movable or swinging plate, which is pivoted at its upper edge to the end plates E' and rests with its lower or free edge close to the top surface *f'* of the pusher. The pivotal connection of the wall G with the end plates herein shown consists of a pivot-rod *g*, which is mounted to extend horizontally between the end plates E' of the hopper and through suitable apertures *e e* therein, with which rod the movable wall G is connected by means of downwardly-opening hooks *g' g'*, secured to the outer side of the upper edge of said wall. In order to afford proper rigidity to the wall G, the latter is herein shown as provided upon its outer surface with intersecting strengthening-ribs *g² g³*.

The pusher F is shown as made of box-like form, consisting of connected top, front, and

rear walls and transverse webs or partitions $f^2 f^2$ and f^3 . (See Fig. 5.) The partitions $f^2 f^2$ are located near to the end walls E' of the hopper, while the partition f^3 is located intermediate the ends of the pusher. The pusher is shown as made of cast metal of a single integral piece.

The devices for actuating the pusher F are constructed and arranged as follows: H designates a rock-shaft which is horizontally mounted in suitable bearings formed in the parts of the end plates E' which project below the hopper-bottom, Fig. 1, and is provided with gear-segments $H' H^2$, which engage racks formed in the lower edges of the webs or partitions $f^4 f^5$ of said pusher. The rock-shaft H is provided with two gear-segments in the present instance, engaging the pusher in the manner described; but obviously said shaft may be provided with any desired greater number in case the width of the furnace shall require it. The rock-shaft H of the feeding device is driven from a continuously-rotating shaft I , which is mounted in suitable bearings or brackets $I' I'$, secured on the front of the furnace immediately below the hopper E .

Motion is transmitted from the actuating-shaft I to the rock-shaft H by connections, as follows: The gear-segments $H' H^2$ are keyed rigidly upon the rock-shaft H , and said shaft is also provided with a rigid arm, in this instance shown as made integral with one of said segments H' , and provided near its lower end with a transverse opening or slot h .

J designates an agitator or tappet-arm mounted loosely upon the rock-shaft H , adjacent to the segment H' , and having its lower end arranged to depend immediately behind the lower one of the segment-arm H^3 , the latter being offset or deflected laterally with relation to the gear-segment proper, as shown clearly in Fig. 2, to permit the agitator-arm to extend directly behind it. The tappet-arm J is provided with a screw-threaded stud J' , tapped into the lower end of said arm and arranged to project in an upwardly and forwardly inclined direction through the slot or slots h of the segment-arm H^2 . The arm J is also provided with a boss or annular shoulder j , surrounding the said stud, which forms a tappet surface or shoulder for engagement with the rear side of the segment-arm H^2 , while the stud J' is provided at its outer end with an adjusting-nut J^2 , preferably having the form of a hand-wheel, and the inner end of which forms a tappet-shoulder for engagement with the segment-shaped front side h' of the segment-arm when the tappet-arm J is reciprocated in the opposite direction. The slot h is made of sufficient width vertically to permit the relative movement of the parts hereinafter described without bringing the stud J into contact with the ends thereof, as indicated in dotted lines, Fig. 1.

K designates a connecting-bar engaged at its front end with the lower part of the agita-

tor or tappet-arm J by means of a transverse pivot-bolt j' and connected at its rear end with a crank I^2 , formed in the shaft I , the details of said crank connection being of ordinary construction and shown clearly in Figs. 3 and 6.

From the foregoing description it will be obvious that the pusher F will be acted upon positively by each gear-segment and that it will be reciprocated backward and forward to an extent capable of control or regulation by means of the adjusting-wheel J^2 , the amount of lost motion being determined by the distance between the tappet-shoulders or the position of the said adjusting-wheel upon the stud J' . The action of the vibrating or reciprocating pusher is by its backward movement to allow the fuel to fall to the lower part of the hopper in front of its perpendicular face and by its return movement to engage said fuel positively and force it through the passage B upon the top of the inclined grate. Obviously the rate at which the fuel is fed into the furnace is regulable by both varying the extent of the reciprocatory movement of the pusher and by varying the rate of speed of the main driving-shaft.

It will be seen from the foregoing description that the several parts of the apparatus are extremely simple and practical in construction and are so connected and arranged as to afford at once a positive feed motion, while entailing a minimum amount of wear upon the apparatus.

Obviously the details of construction may be varied somewhat without departing from the spirit of the invention—as, for instance, an eccentric and eccentric-strap connections might be substituted for the crank connection of the actuating-bar with the continuously-rotating shaft. We do not, therefore, wish to be limited to the precise details of construction shown, except as hereinafter claimed specifically.

We claim as our invention—

1. The combination with a pusher provided in its under side with a rack, of means for actuating the same, comprising a continuously-rotating crank-shaft, a rock-shaft having a gear-segment keyed thereon which engages said rack, a rigid arm secured to the rock-shaft, a tappet-arm mounted loosely upon said rock-shaft and arranged to act upon the arm of the shaft, a screw-threaded stud upon the tappet-arm arranged to extend parallel with the plane of reciprocation of said shaft-arm through the slot in the latter, an adjustable tappet-nut mounted upon said stud, and a connecting-bar connecting said tappet-arm with a crank upon the crank-shaft, substantially as described.

2. The combination with a pusher provided on its under side with a plurality of racks arranged at intervals, of means for actuating the same comprising a continuously-rotating crank-shaft, a rock-shaft provided with gear-segments keyed thereon which engage the

5 racks of said pusher, a rigid arm secured on
the shaft, a tappet-arm loosely mounted upon
the rock-shaft adjacent to the rigid arm, a
screw-threaded stud upon the tappet-arm ar-
10 ranged to extend parallel with the plane of
reciprocation of said arm and through a slot
in the free end of the latter, a tappet-shoulder
formed on said rigid arm adjacent to the
said stud, an adjustable tappet-nut mounted
15 upon the stud exteriorly to said arm, and a
connecting-bar connecting the tappet-arm

with a crank upon the crank-shaft, substantially as described.

In testimony that we claim the foregoing as
our invention we affix our signatures in pres- 25
ence of two witnesses.

WILLIAM R. RONEY.

WILLIAM W. CHURCHILL.

Witnesses:

HENRY R. KENT,
FRANCIS BLOSSOM.