

No. 654,852.

Patented July 31, 1900.

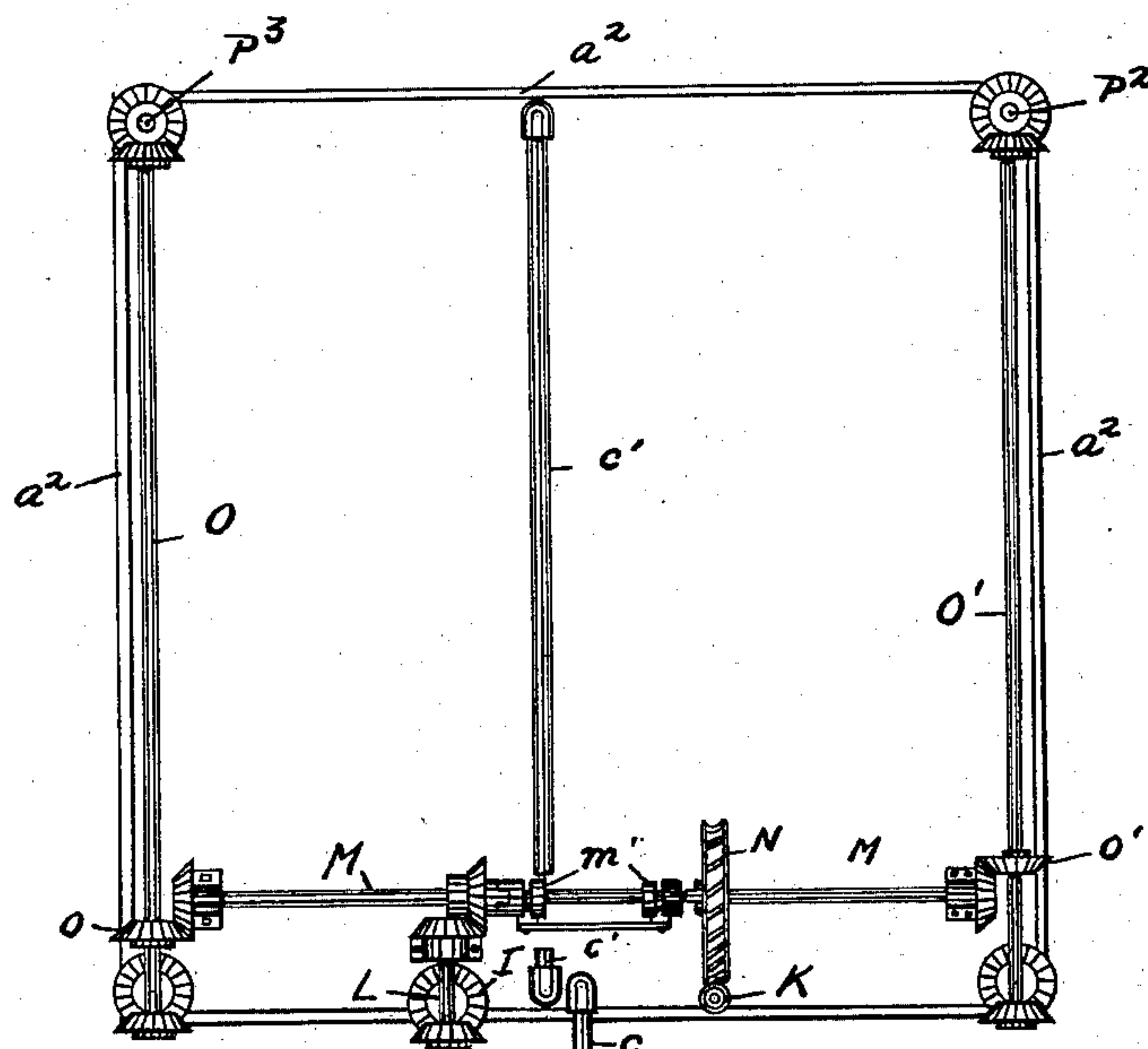
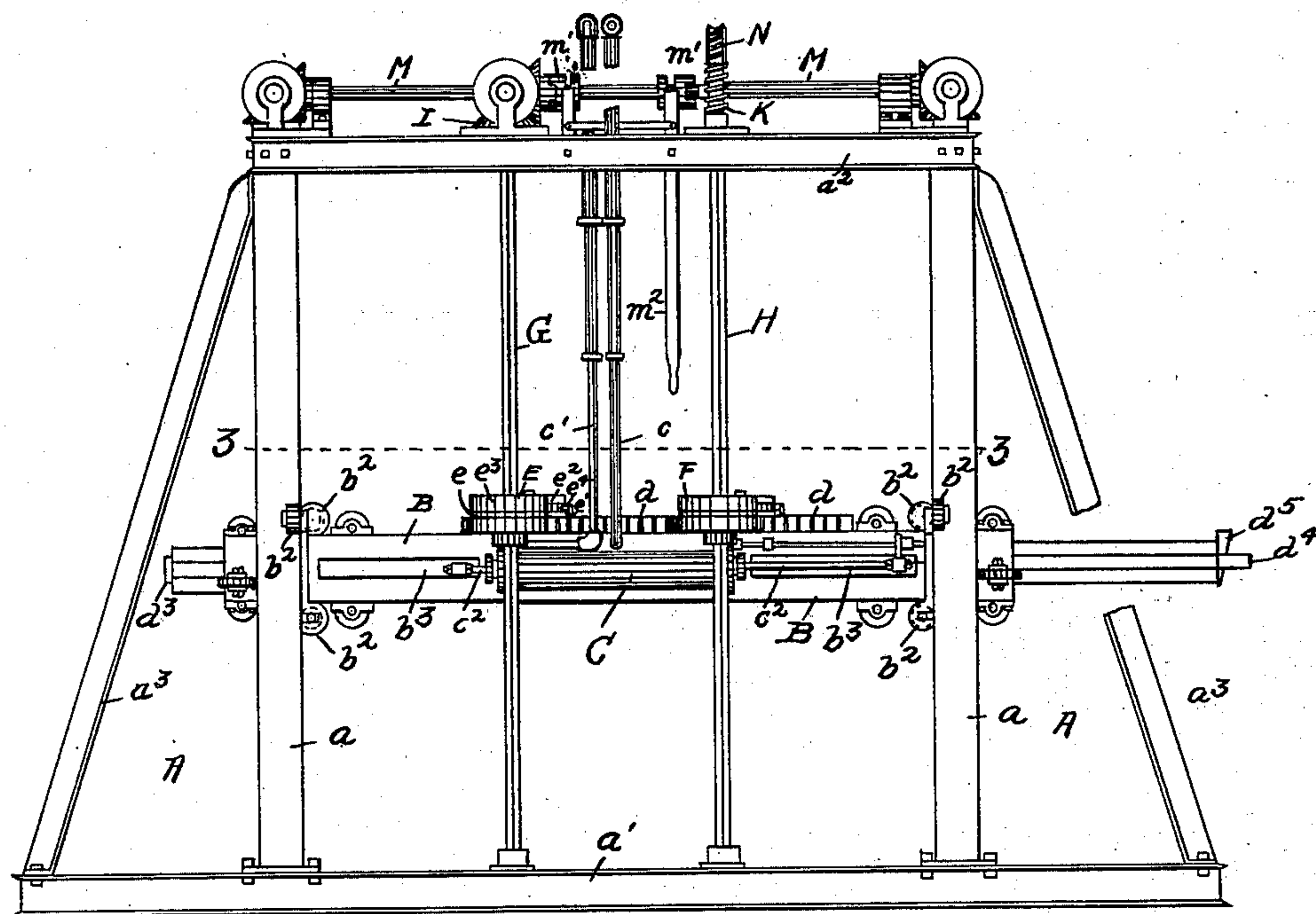
C. E. SMITH.

APPARATUS FOR OPERATING STONE SAWS.

(Application filed May 17, 1899.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses
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Thomas V. Conry

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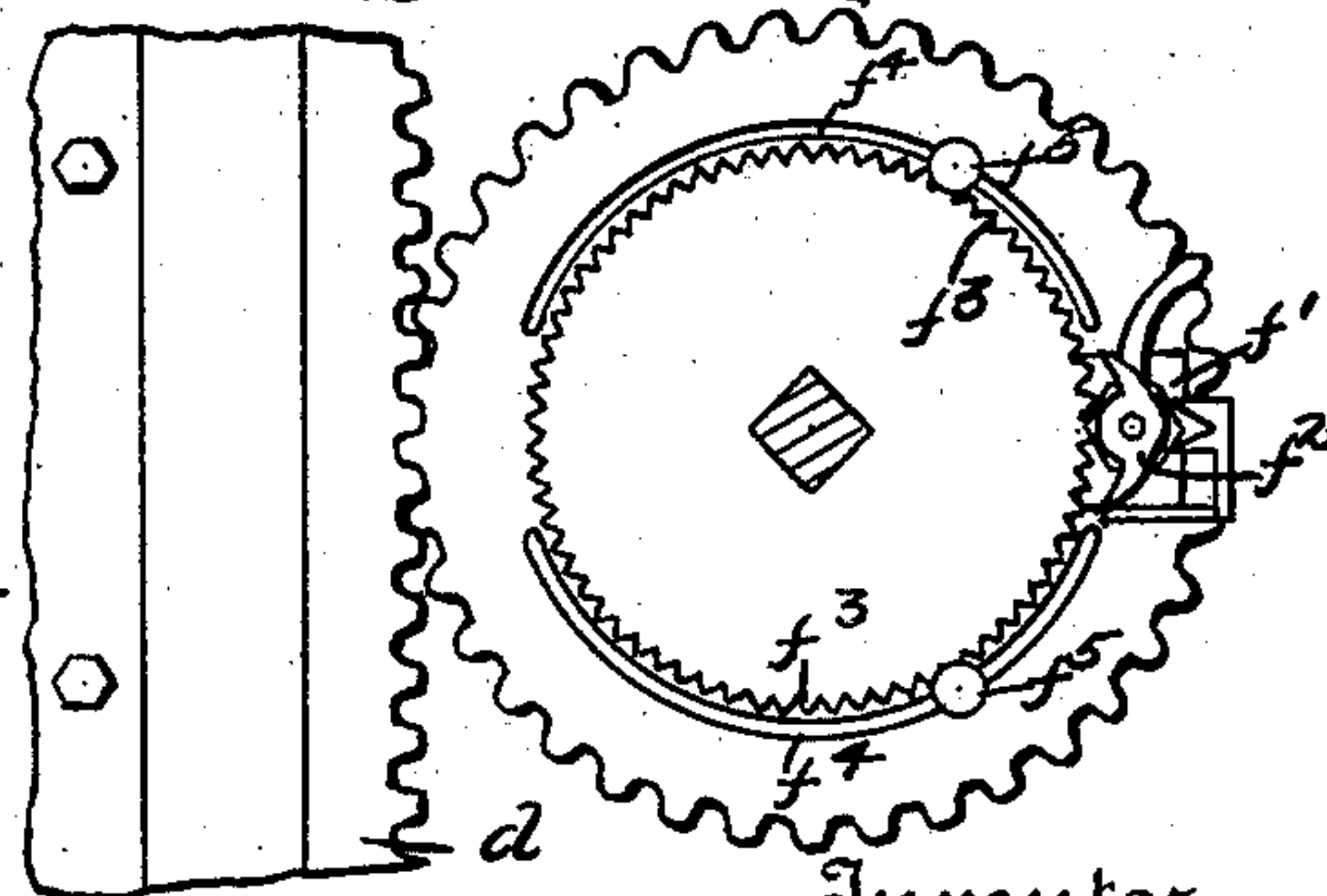
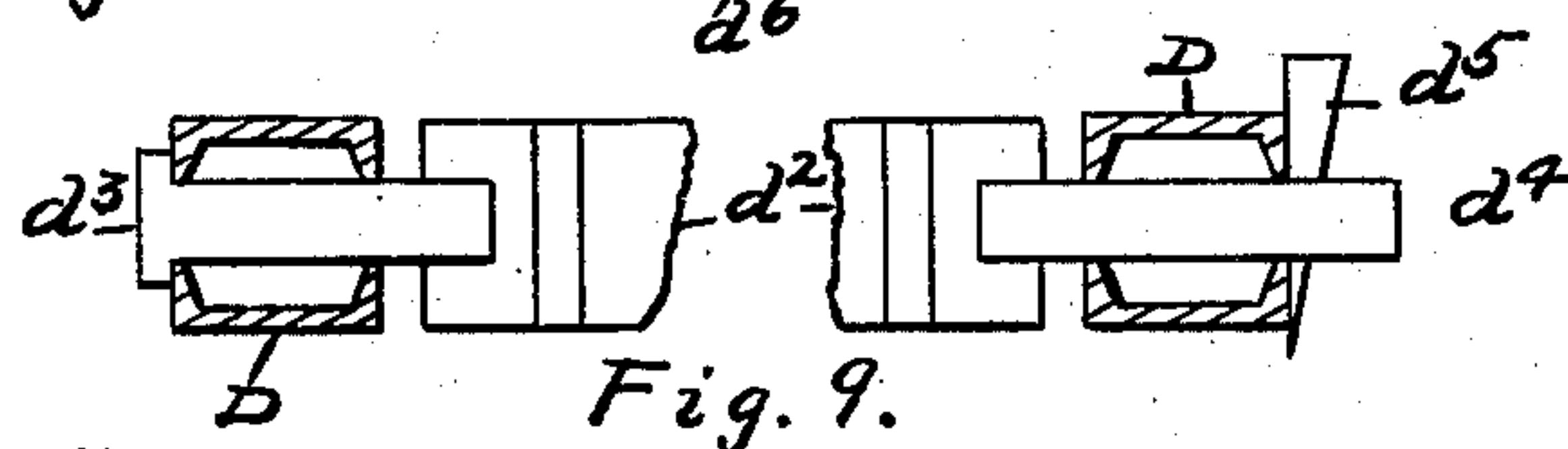
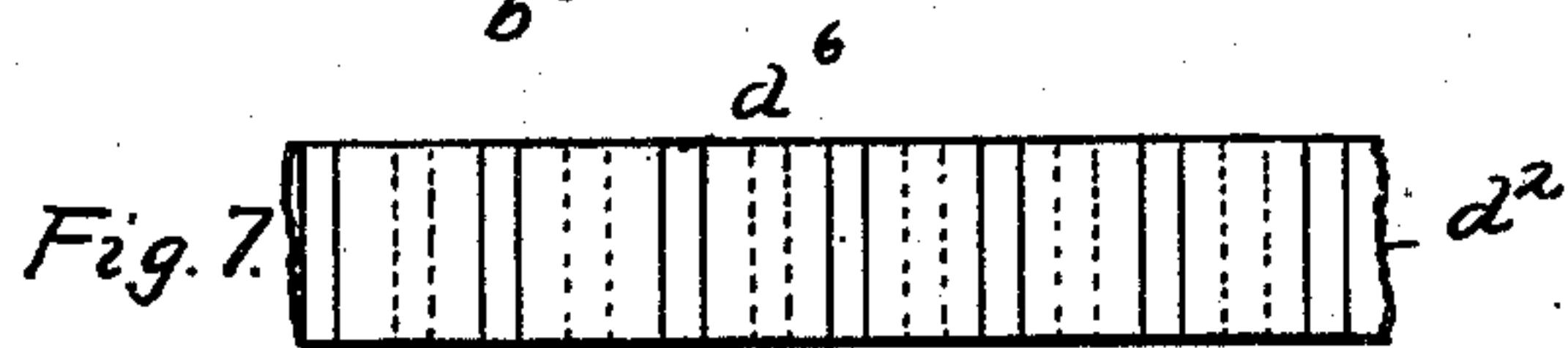
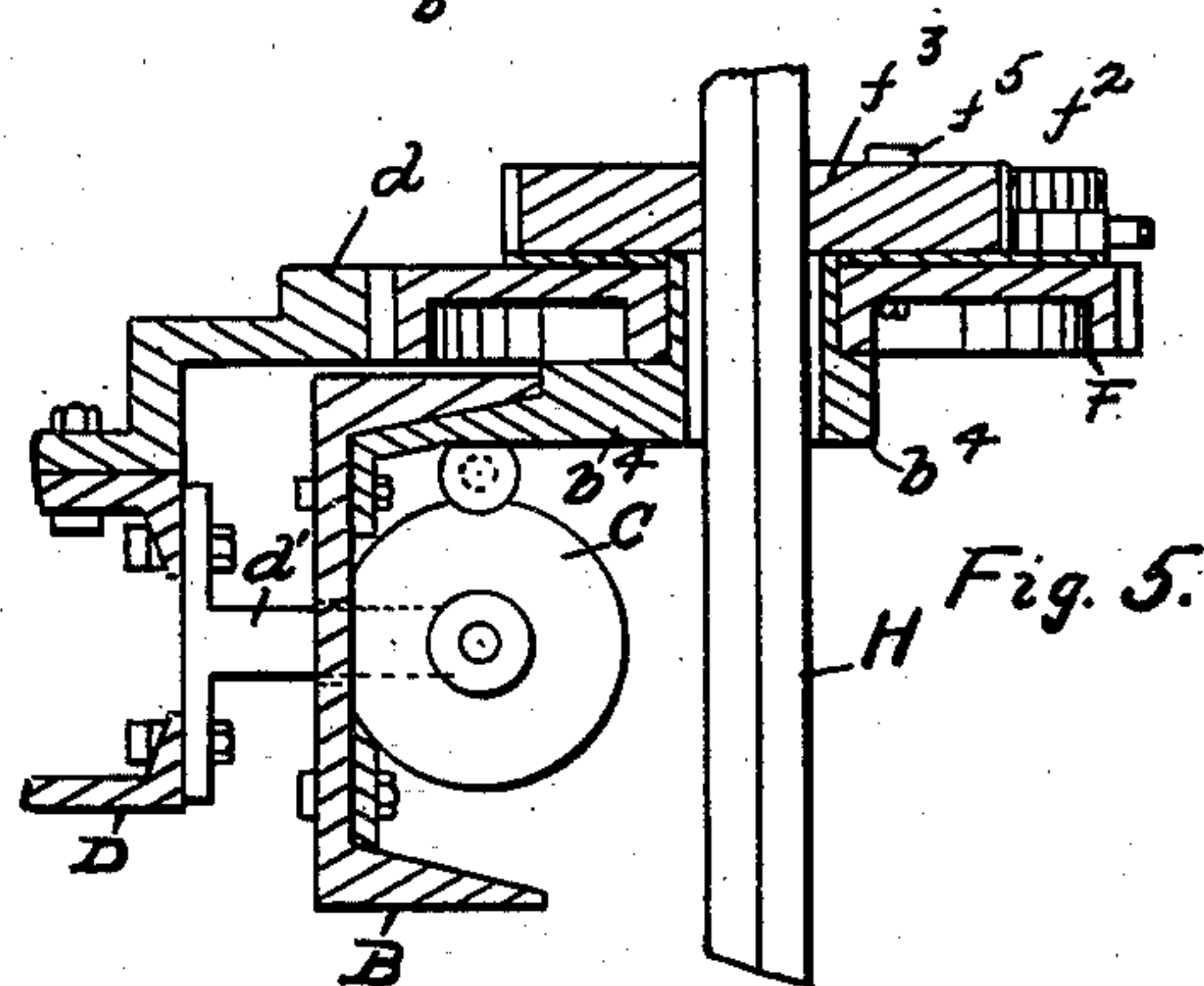
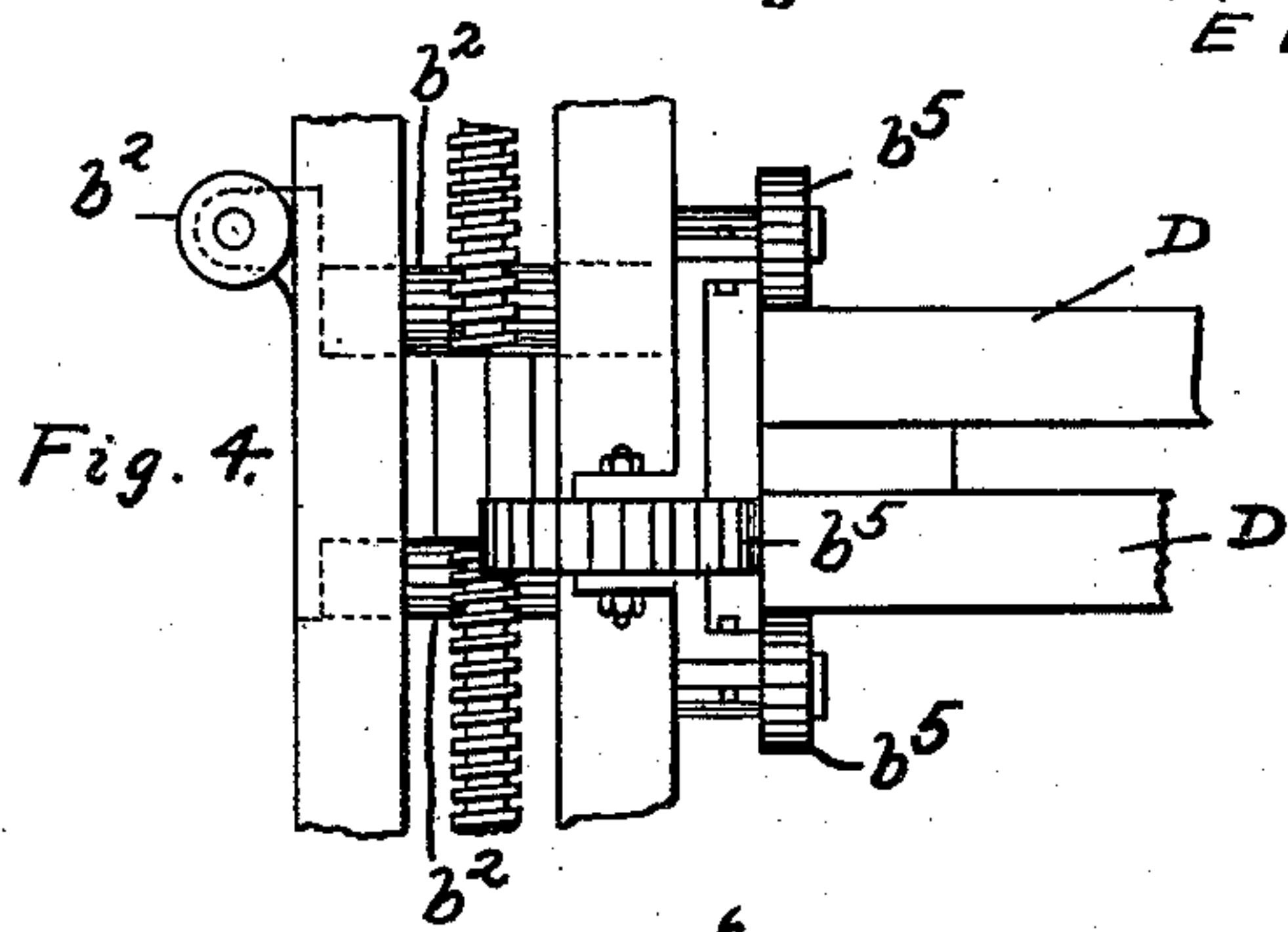
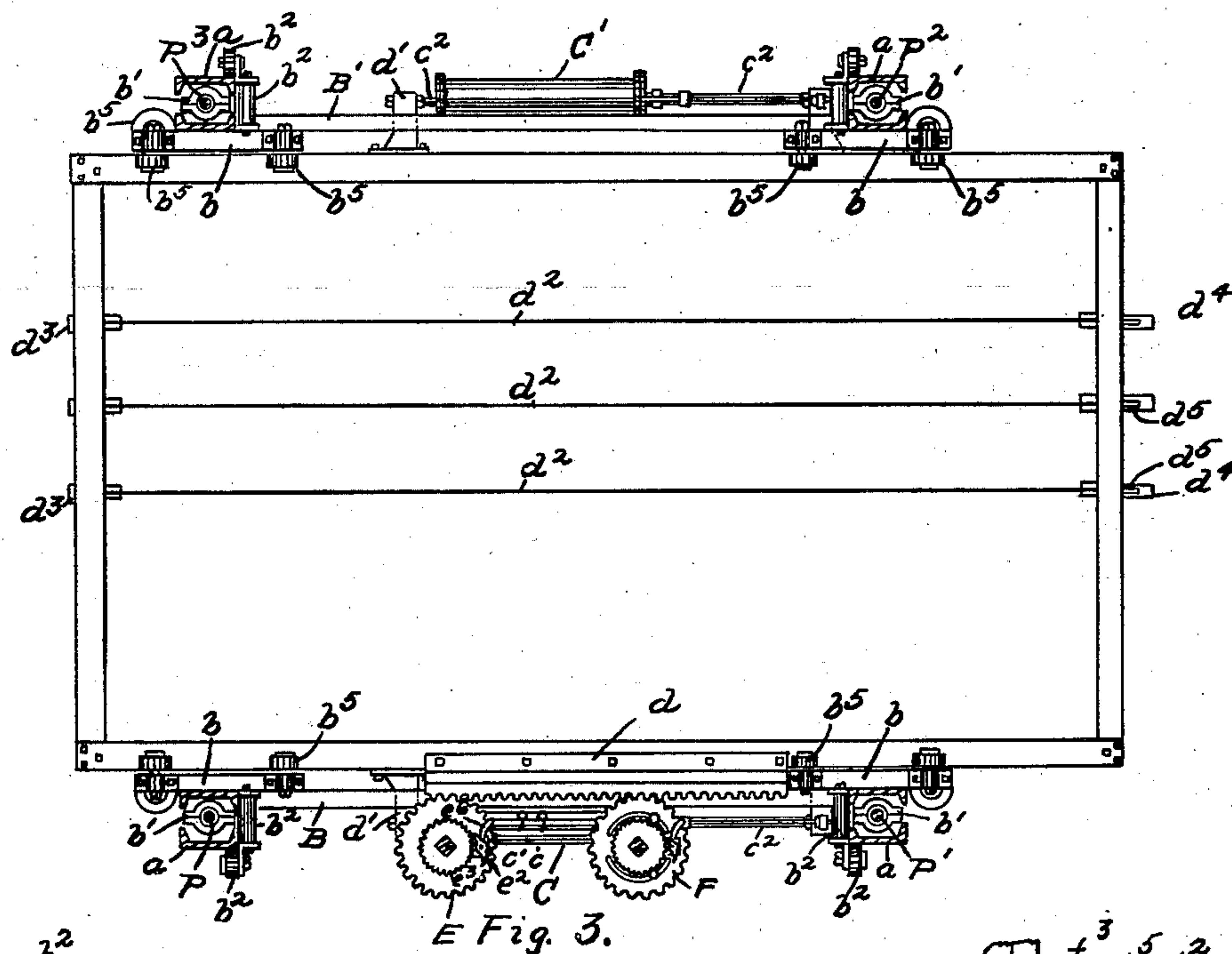
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(Application filed May 17, 1899.)

(No Model.)

3 Sheets—Sheet 2.



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Fig. 6. Inventor
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APPARATUS FOR OPERATING STONE SAWS.

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3 Sheets—Sheet 3.

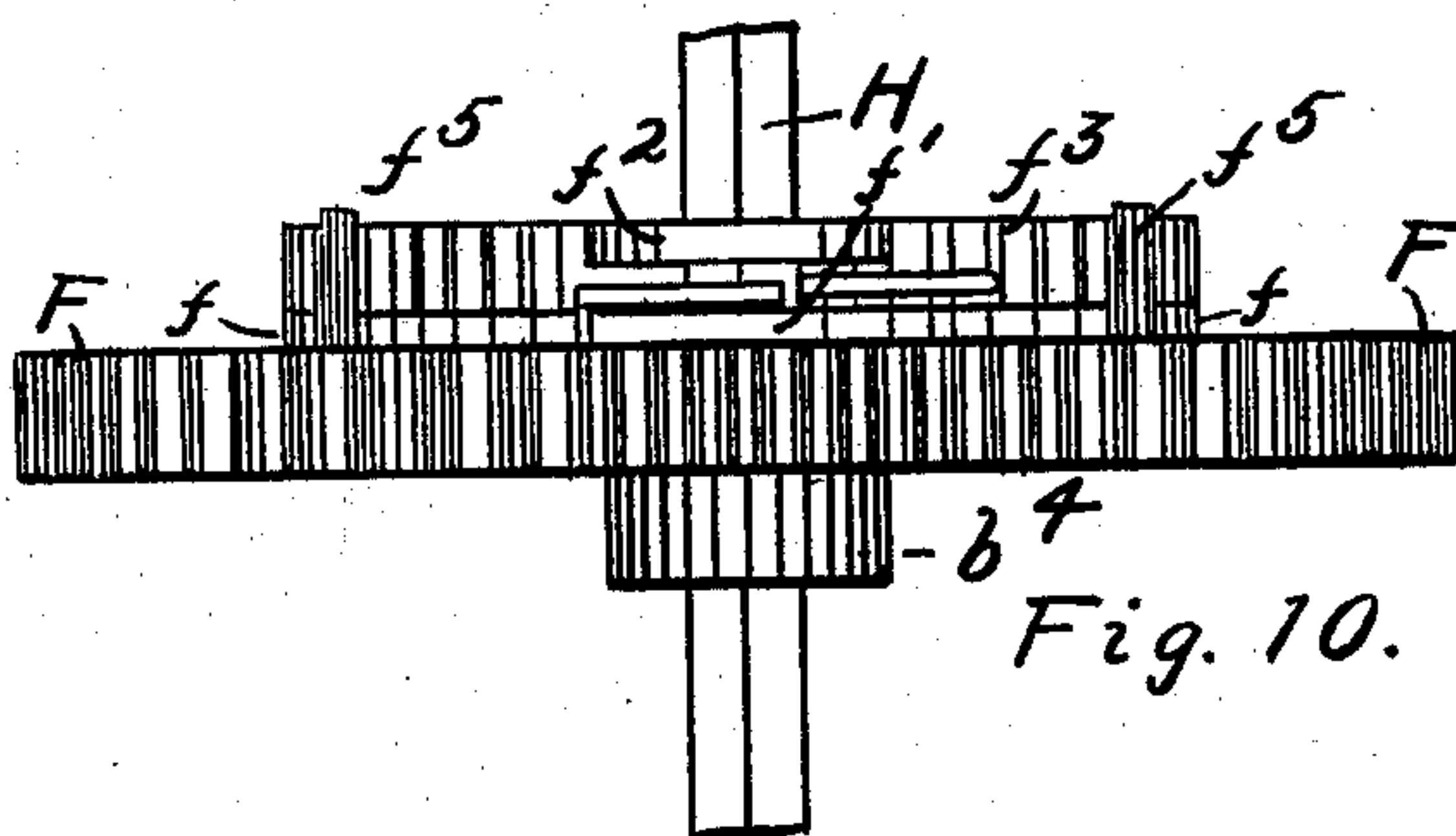


Fig. 10.

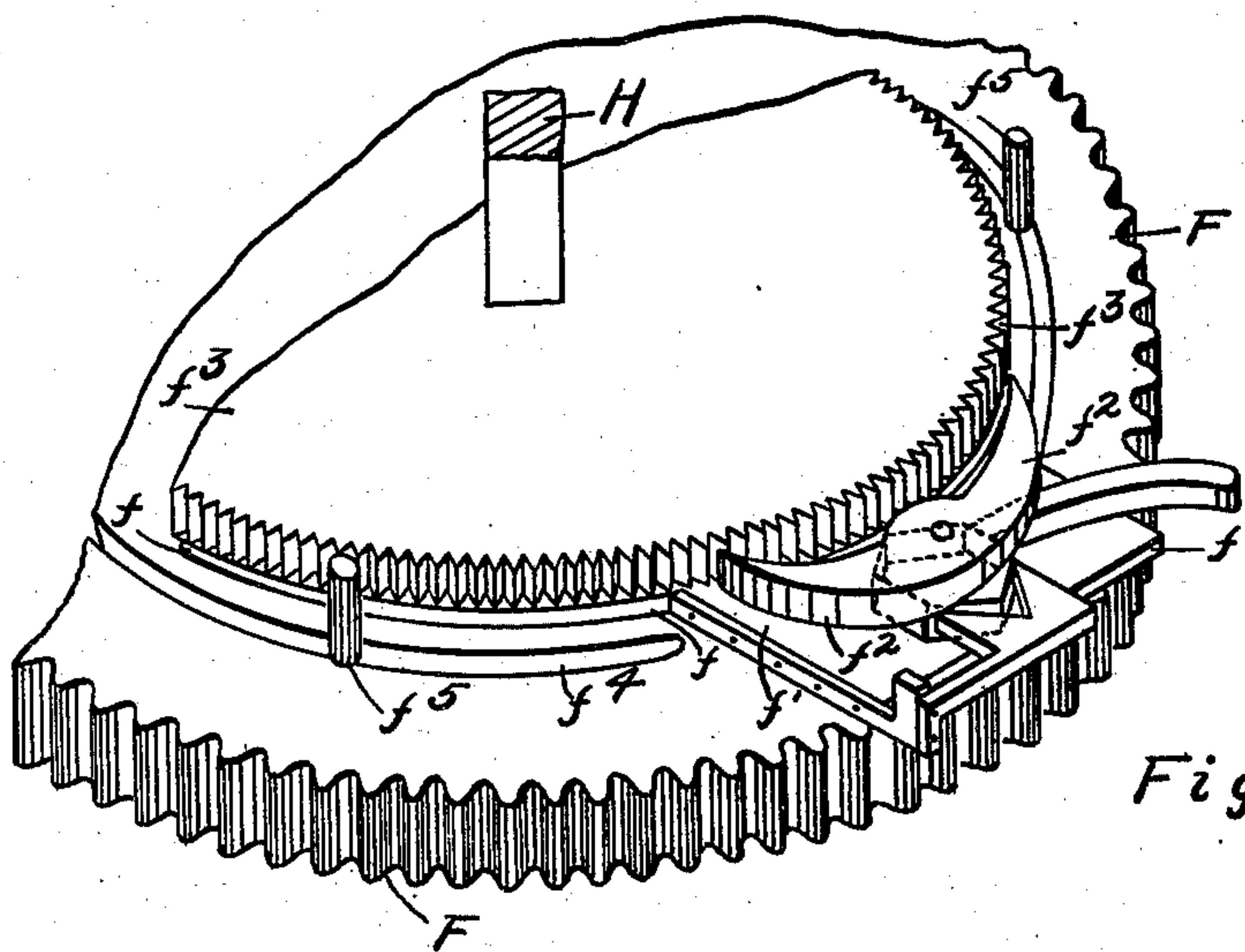


Fig. 11.

Witnesses

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UNITED STATES PATENT OFFICE.

CHARLES E. SMITH, OF CHATTANOOGA, TENNESSEE.

APPARATUS FOR OPERATING STONE-SAWS.

SPECIFICATION forming part of Letters Patent No. 654,852, dated July 31, 1900.

Application filed May 17, 1899. Serial No. 717,207. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. SMITH, a citizen of the United States, residing at Chattanooga, in the county of Hamilton and State of Tennessee, have invented certain new and useful Improvements in Apparatus for Operating Stone-Saws, of which the following is a specification

The object of my invention is to provide improved apparatus for operating stone-saws; and it consists in the combination and arrangement of parts set forth and claimed.

In the drawings, Figure 1 is a side elevation of a device embodying my invention; Fig. 2, a top plan view of the mechanism on top of the main frame; Fig. 3, a horizontal section on line 3 3 of Fig. 1; Fig. 4, a detail view showing the mounting of the saw-frame; Fig. 5, a sectional detail view showing the mechanism which causes the saw-frame to travel up or down; Fig. 6, a top plan view corresponding to Fig. 5; Fig. 7, a side elevation of a saw-blade, and Fig. 8 a plan view corresponding to Fig. 7; Fig. 9, a sectional view of the saw-frame; Fig. 10, a side elevation, on an enlarged scale, of the mechanism which causes the saw-frame to travel up or down; Fig. 11, a perspective view of the same.

The reference-letter A denotes a supporting-frame; B and B', engine bed-plates mounted to slide vertically in frame A; C and C', engine-cylinders mounted on plates B and B', respectively, and used to operate the device; D, a saw-frame mounted to slide horizontally on plates B and B'; E and F, cog-wheels mounted on plate B so as to slide on vertical shafts G and H and adapted to be actuated by rack-bar d on saw-frame D; I, a beveled gear mounted on the upper end of shaft G; K, a screw-gear mounted on the upper end of shaft H; L, a shaft operated by beveled gear I and operating shaft M; N, a worm gear-wheel operated by screw-gear K and operating shaft M; O and O', shafts operated through beveled gears on shaft M; and P P' P² P³, vertical screw-threaded shafts mounted in the four hollow supporting-posts a of frame A and adapted to be operated by shafts M, O, and O' and to raise or lower bed-plates B and B' through screw-nuts p.

The main frame preferably consists of four hollow channel-iron posts a, supported on

channel-iron base-plates a' and secured together and braced by channel-iron cross-pieces a² and T-iron braces a³, thus forming a light, strong, and portable supporting-frame for the device. The engine bed-plates B and B' are each provided with supporting-brackets b, to which are secured screw-nuts b', engaging shafts P P', &c., so that upon operation of the shafts the bed-plates are carried up or down, according to the direction of rotation. In order to make the up-and-down motion of the bed-plates as frictionless as possible, the brackets b are provided with rollers b², adapted to contact with the posts a. The engine-cylinders C and C' are securely bolted to the bed-plates B and B', respectively, and the cylinder C supplied through an extensible supply-pipe c with steam, compressed air, or other actuating medium, which is perfectly exhausted into cylinder C', through an extensible exhaust-pipe c', so as to utilize the double expansion thereof. At each end the cylinders C and C' are provided with piston-rods c, which are connected with the saw-frame D by means of cross-heads d' working through slots b³ in bed-plates B B'. The saw-frame D may be of any of the well-known constructions, but preferably consists of channel-irons, and the saw-blades d² are provided at one end with lugs d³, engaging the flanges of the channel-irons, and at their other ends with dogs d⁴, through which wedges d⁵ are driven to stretch the blades and hold them in position. The saw-blades d² preferably consists of a blade provided with grooves d⁶, which serve to carry the cutting material to the bottom of the cut in its full sharpness. In order to guide and support the saw-frame, it is mounted upon rollers b⁵ on bed-plates B and B', which may be mounted upon ball or roller bearings to reduce friction. The cog-wheels E and F are rotatably mounted on brackets b⁴, attached to bed-plate B and loosely encompassing shafts G and H, so as to be unaffected by their rotation. To cog-wheel E is attached a plate e, provided with an extension e', carrying a double-acting pawl e², adapted to engage the ratchet-wheel e³, which is rotatably supported on plate e and engages shaft E through its square or polygonal-shaped central opening, so that it is free to slide thereon, but causes the shaft to rotate with

it. The pawl e^2 is pivotally mounted on extension e^1 and has a polygonal-shaped base e^4 , adapted to be engaged by a pronged spring, which serves to hold the pawl out of engagement with the ratchet or to yieldingly hold it in either of its set positions to cause rotation of the ratchets in the desired direction. To facilitate the setting of the pawl, it may be provided with a handle e^6 . On the top of cog-wheel F is rotatably mounted a plate f , provided with an extension f^1 , carrying a double-acting pawl f^2 , adapted to engage ratchet-wheel f^3 , which is rotatably supported on plate f and engages shaft F through its square or polygonal shaped central opening, so that it is free to slide thereon, but causes the shaft to rotate with it. The pawl f^2 is similar in all respects to pawl e^2 , so it needs no further description. The cog-wheel F is provided with segmental slots f^4 , located outside the periphery of ratchet f^3 and is provided with studs f^5 , which may be secured in any desired position therein, so as to engage extension f^1 upon rotation of the cog-wheel and cause plate f to rotate therewith. By adjusting studs f^5 in slots f^4 it will be seen that ratchet f^3 may be caused to rotate through only a portion of the stroke of cog-wheel F. When both studs are adjusted to contact with extension f^1 , there will be no lost motion and the full stroke of the cog-wheel will be utilized; but when the studs are adjusted in their slots at some distance from the extension a corresponding portion of the stroke of the cog-wheel will be inoperative. The shaft G carries at its upper end the beveled gear I, which through shaft L operates beveled gear m , mounted to loosely rotate on shaft M, and shaft H carries at its upper end the screw-gear K, which operates worm-gear N, also loosely mounted on shaft M. Clutches m^1 , splined to shaft M and simultaneously operated by lever m^2 , serve to throw either shaft G or H into operative engagement with shaft M. Shaft M operates shaft O and O' through beveled gears o and o' , which in turn actuate shafts P P', &c., to raise or lower the engine bed-plates B and B' through screw-nuts b^1 .

The operation of the apparatus is as follows:
 50 The stone to be sawed is placed under the saw-frame and supplied with water and cutting material in the usual way. Then the lever m^2 is operated to throw shaft G into operative connection with shaft M and pawl e^2 is thrown, as shown in Fig. 3, so that movement of the saw-frame from right to left will actuate shaft G, while in the movement from left to right the pawl slides over the ratchet without affecting shaft G. This operation
 55 utilizes the full stroke of the rack-bar on the saw-frame for a rapid downward feed, which is continued until the saw-blades come in contact with the stone, at which point it is desirable to decrease the rapidity of the downward feed. To this end shaft H is thrown
 65 into operative connection with shaft M, pawl

f^2 is thrown into a position the reverse of that shown in Fig. 3, so as to utilize the motion of the saw-frame from left to right for the downward feed, and studs f^5 are adjusted in slots f^4 so as to permit a partial rotation of cog-wheel F without affecting plate f , thus utilizing only a portion of the stroke of the rack-bar to operate shaft H to lower the bed-plates and with them the saw-frame. It will be seen that by these means I am enabled to regulate the downward feed of the saw-frame at each stroke in accordance with the qualities of the stone to be sawed. By reversing the position of the pawls e^2 or f^2 in the above-described operations a rapid or slow upward feed may be obtained, although it is thought that it will generally be more desirable to use only the rapid upward feed.

I claim in an apparatus for sawing stone—

1. The combination, with the supporting-frame, of a saw-frame support adjustably mounted thereon; a saw-frame mounted to reciprocate on its support; a rack-bar carried by the saw-frame; a cog-wheel rotatably mounted on the saw-frame support; and adapted to be engaged by the rack-bar; a shaft splined in the cog-wheel; mechanism, connected with the shaft, adapted to actuate the adjusting mechanism of the saw-frame support; and means for reciprocating the saw-frame on its support.

2. The combination, with the supporting-frame, of a saw-frame support adjustably mounted thereon; a saw-frame mounted to reciprocate on its support; a rack-bar carried by the saw-frame; a cog-wheel rotatably mounted on the saw-frame support and adapted to be engaged by the rack-bar; a shaft splined in the cog-wheel; mechanism, connected with the shaft, adapted to actuate the adjusting mechanism of the saw-frame support; and an engine-cylinder, mounted on the saw-frame support, adapted to reciprocate the saw-frame on its support.

3. The combination, with the supporting-frame, of a saw-frame support adjustably mounted thereon; a saw-frame mounted to reciprocate on its support; means for reciprocating the saw-frame; a rack-bar carried by the saw-frame; a cog-wheel adapted to be actuated by the rack-bar; a pawl-carrying plate rotatably mounted to travel with the cog-wheel; a ratchet-wheel rotatably mounted to travel with the pawl-carrying plate; adjustable studs carried by the cog-wheel, adapted to engage the pawl-carrying plate and cause it to rotate with the cog-wheel during a portion of its stroke; and mechanism connecting the ratchet-wheel with the adjusting mechanism of the saw-frame support whereby actuation of the ratchet adjusts the saw-frame support.

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Witnesses:

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