

3. Sheets—Sheet 1.

MACHINE FOR FINISHING HEELS OF BOOTS OR SHOES.

Patented Jan. 22, 1889.

Fig:1.

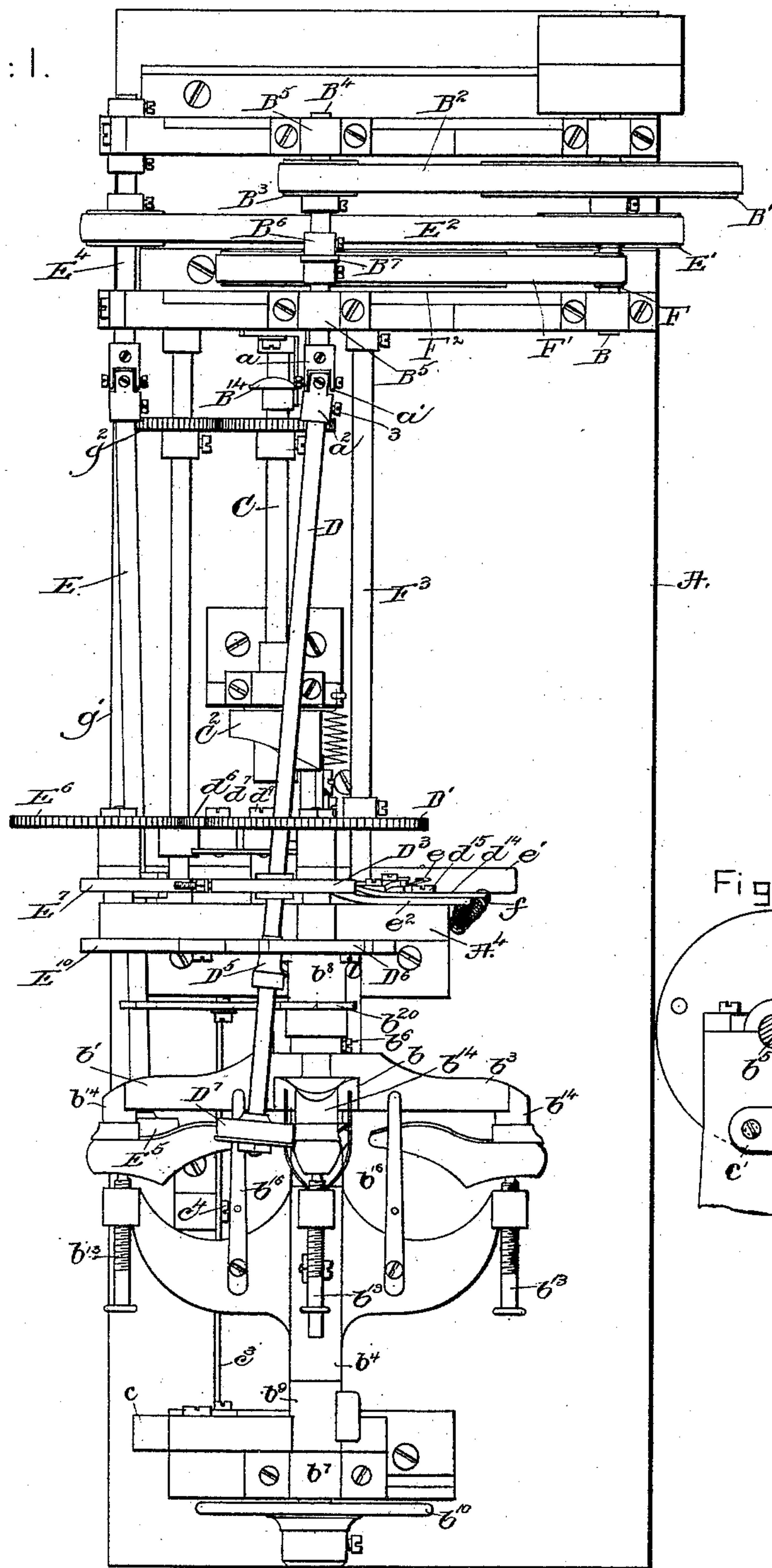
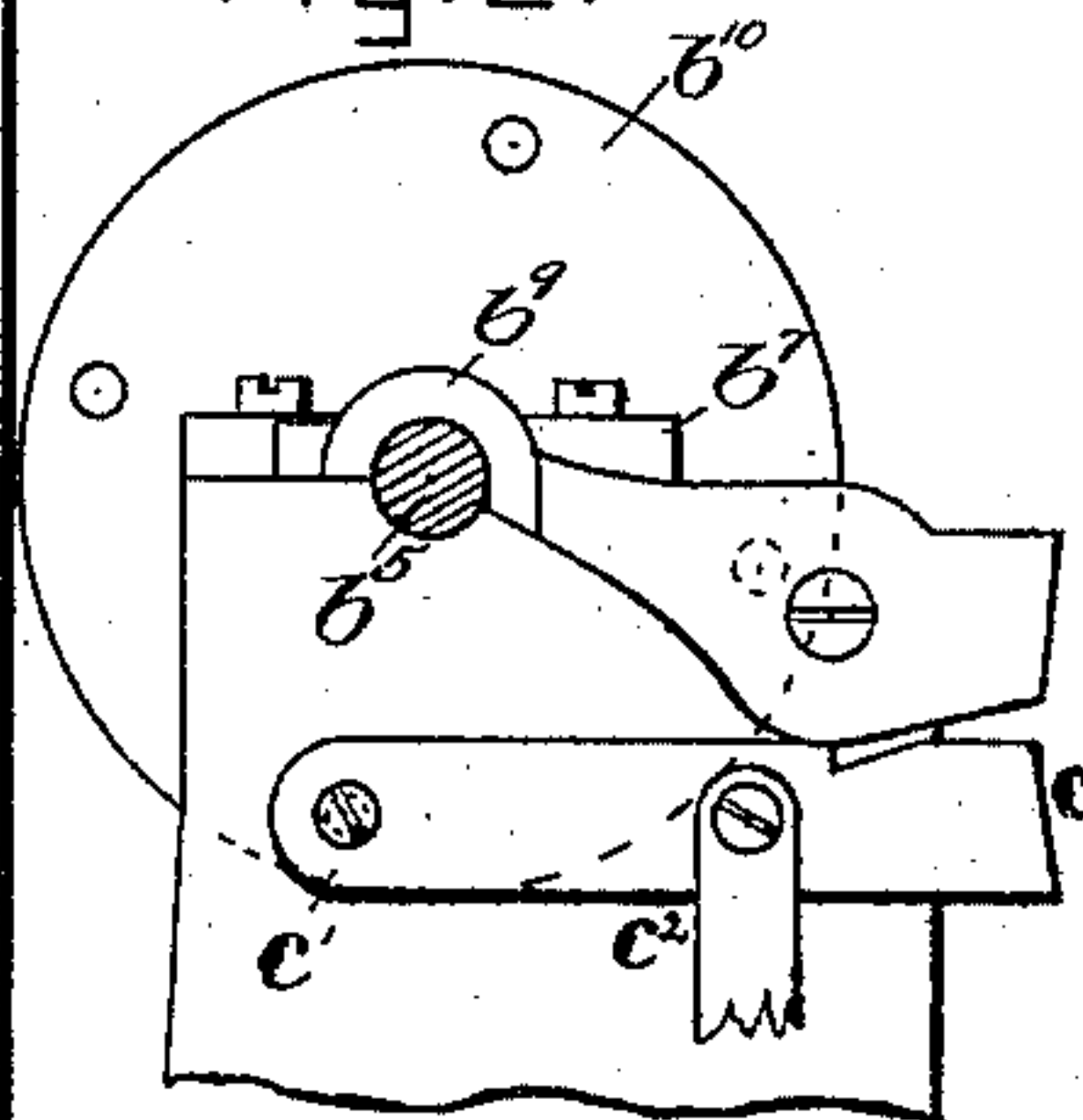


Fig: 2.



Inventory:

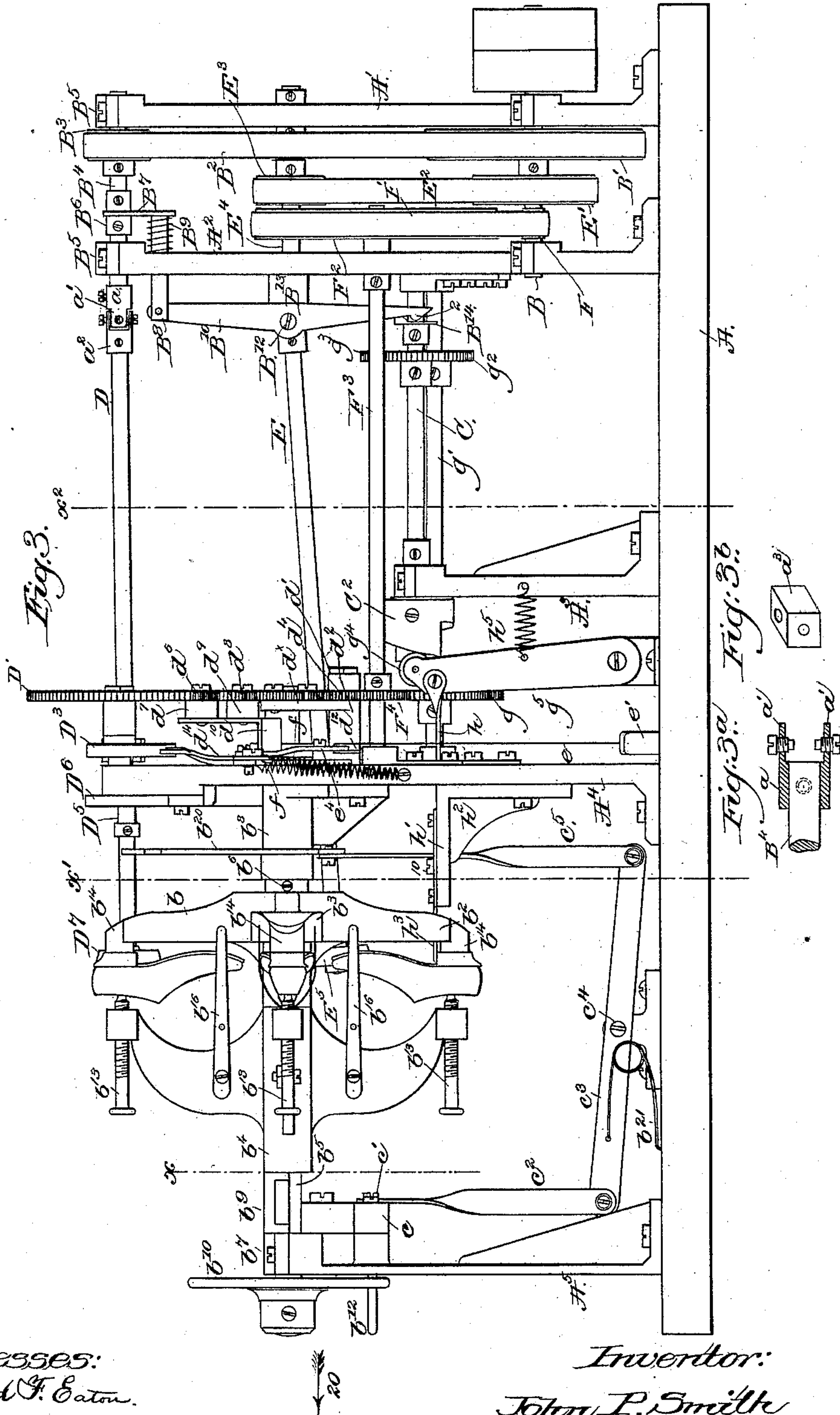
John P. Smith.
by Leroy & Gregory attys.

J. P. SMITH.

MACHINE FOR FINISHING HEELS OF BOOTS OR SHOES.

No. 396,620.

Patented Jan. 22, 1889.



Witnesses:
Howard F. Eaton.

Frederick H. Emery.

Inventor:

John P. Smith
by Lemley & Gregory attys.

(No Model.)

3 Sheets—Sheet 3.

J. P. SMITH.

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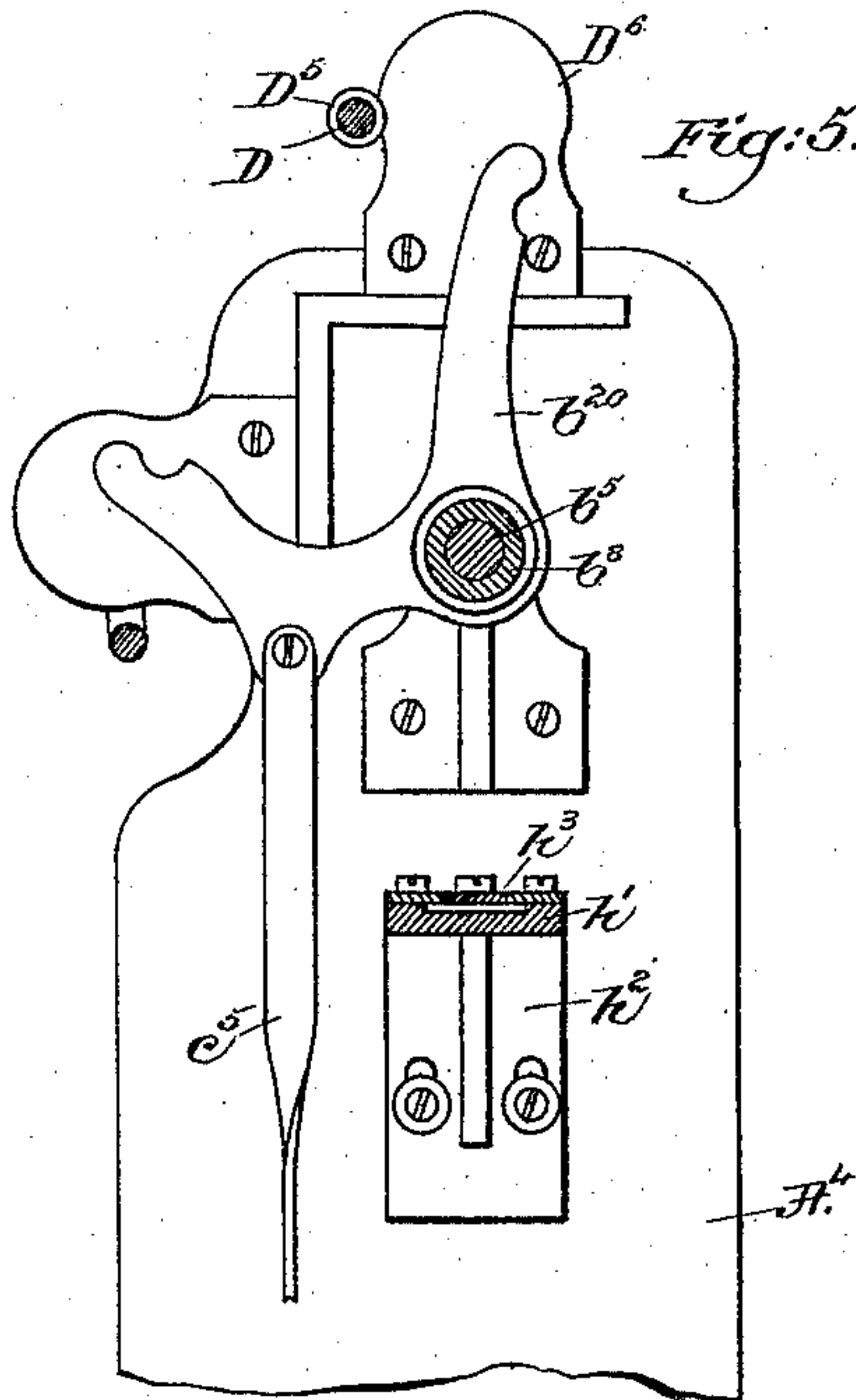
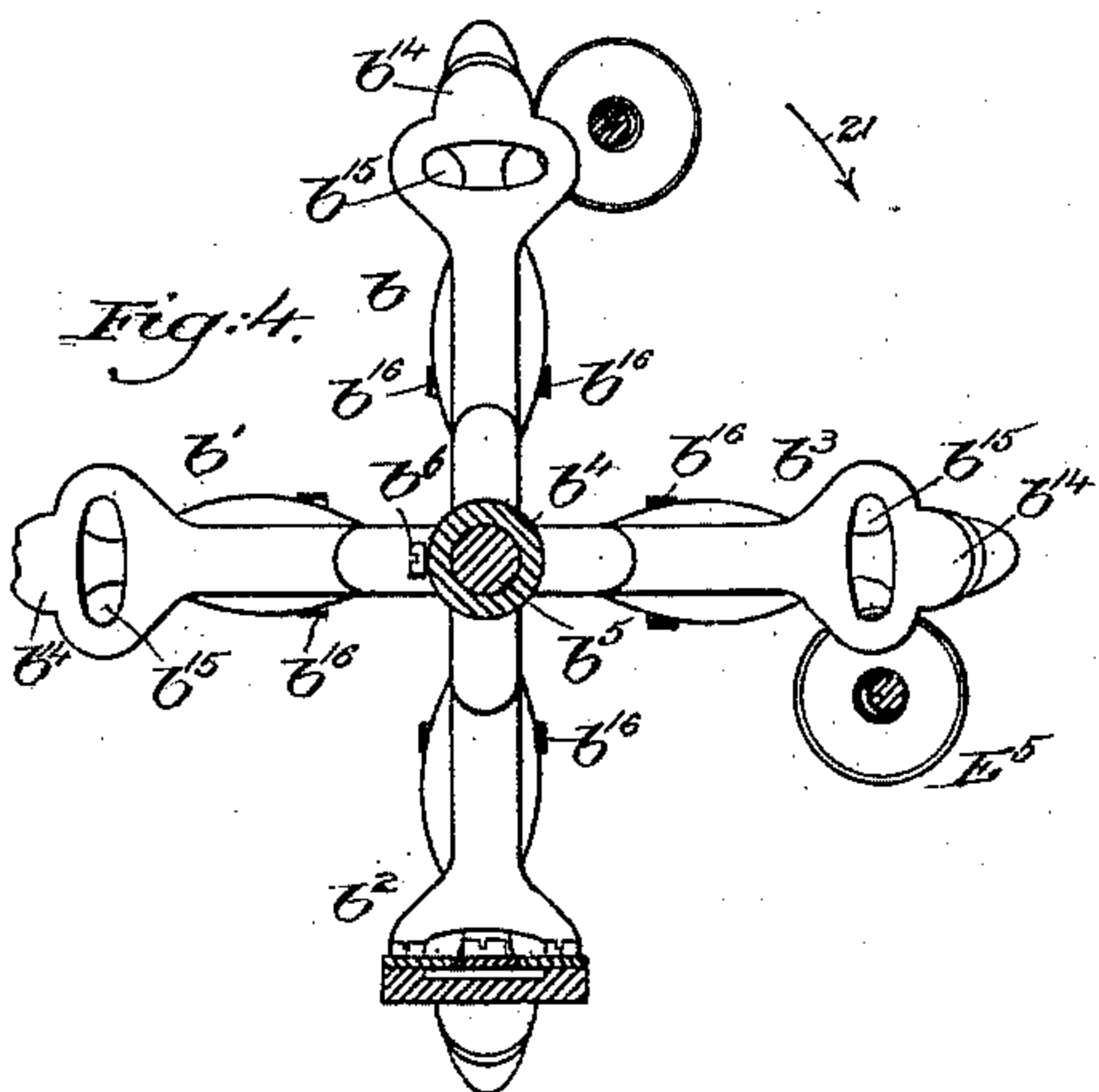
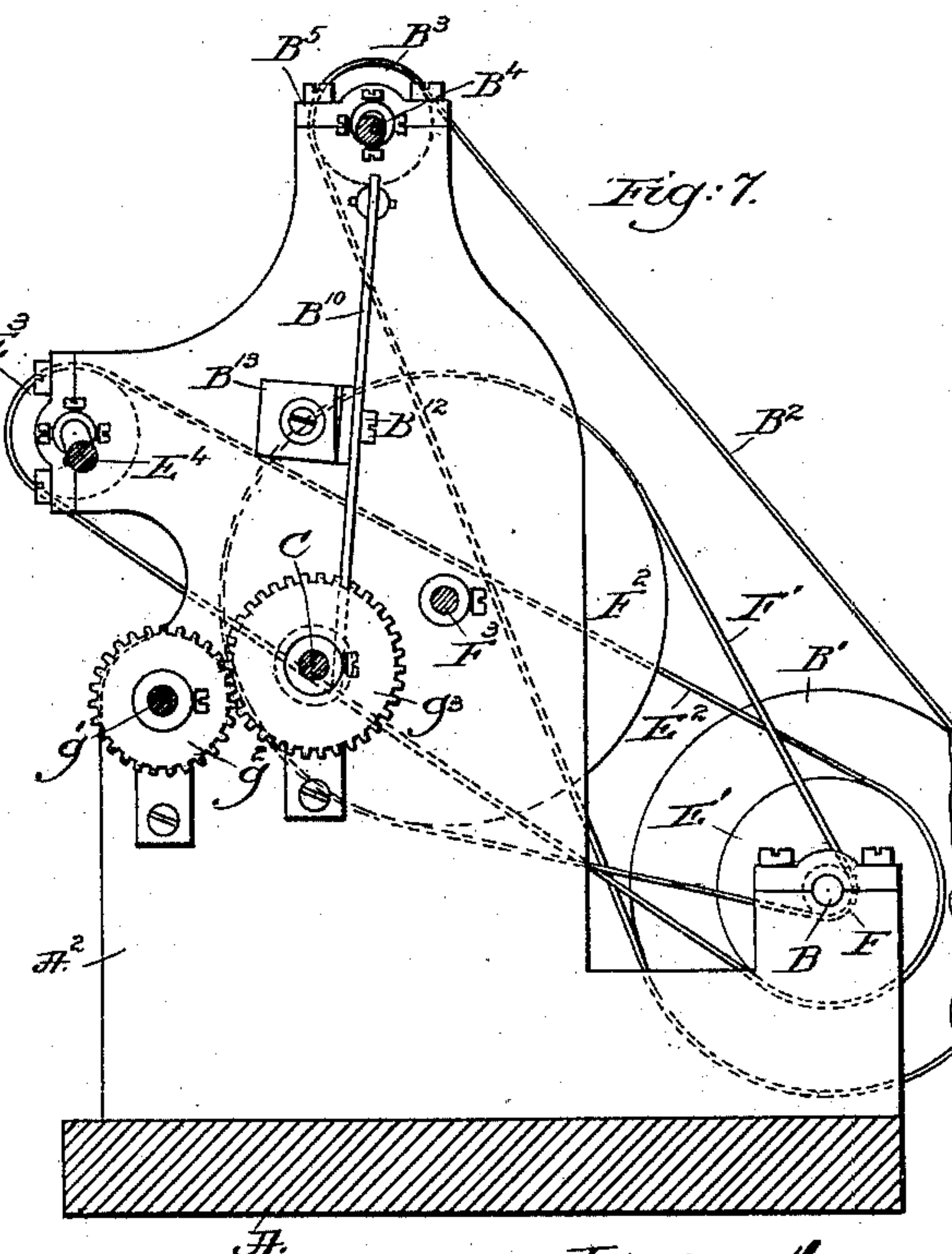
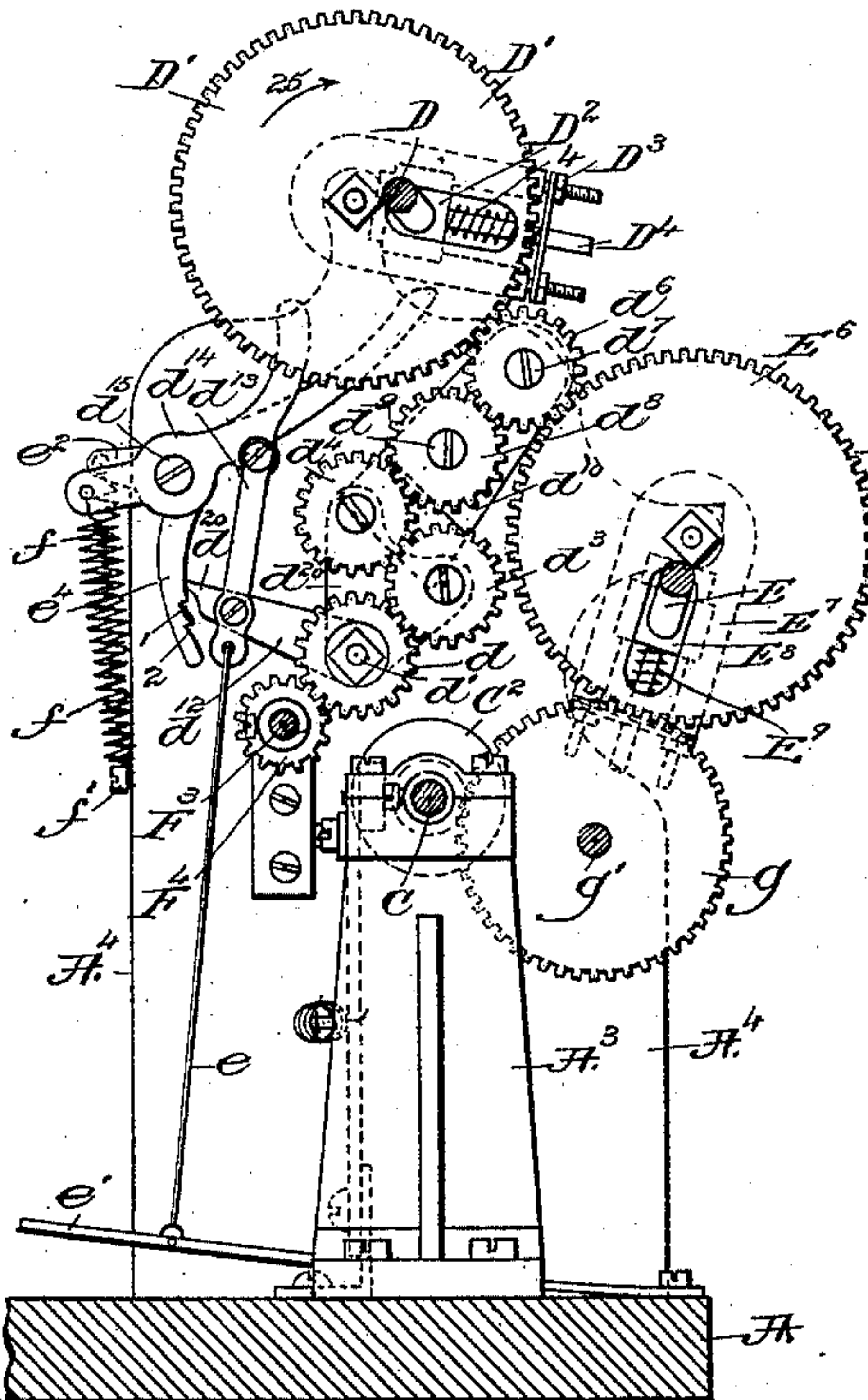


Fig. 6.



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UNITED STATES PATENT OFFICE.

JOHN P. SMITH, OF EXETER, NEW HAMPSHIRE.

MACHINE FOR FINISHING HEELS OF BOOTS OR SHOES.

SPECIFICATION forming part of Letters Patent No. 396,620, dated January 22, 1889.

Application filed February 7, 1888. Serial No. 263,305. (No model.)

To all whom it may concern:

Be it known that I, JOHN P. SMITH, of Exeter, county of Rockingham, and State of New Hampshire, have invented an Improvement in Machines for Treating Boots or Shoes, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

10 This invention has for its object the production of a machine upon which to perform in succession several operations, all tending toward the completion of a heel, one operation taking place automatically after the
15 other—as, for instance, the heel of one shoe being trimmed and welted while another is being scoured and the third breasted, and the successive operations taking place simultaneously, the machine having a series of jacks, the number of which is one more than the
20 number of simultaneous operations, to thereby enable the operator to take off a shoe having a finished heel and apply to the machine another shoe the heel of which is to be trimmed
25 and subsequently treated without stopping the operation of the machine or of various tools acting upon a series of heels of shoes held in place upon the remaining jacks.

My invention in machine, for treating the
30 heels of boots or shoes consists, essentially, in a shaft capable of sliding longitudinally in bearings or boxes secured to the frame of the machine and a plurality of jacks secured thereto, combined with a plurality of tools to
35 act on the heels of the boots or shoes held by the said jacks, gearing, substantially as will be described, to operate said tools, and with lifting devices to move each rotating tool away from the heel being treated preparatory to
40 moving the said shaft longitudinally in order to enable the jacks to be rotated, whereby a jack containing a shoe which has been acted upon by one tool may be brought into position to be acted upon by a second tool.

45 Other features of my invention will be pointed out in the claims at the end of this specification.

Figure 1 is a top or plan view of a machine containing my improvements. Fig. 2 is a detail to the left of the section-line xx , Fig. 3. Fig. 3 is a side elevation of the machine

shown in Fig. 1; Figs. 3^a and 3^b, details to be referred to. Fig. 4 is a sectional detail in the line x' , Fig. 3, looking to the left. Fig. 5 is a sectional detail in the line x' , Fig. 3, looking
55 to the right. Fig. 6 is a sectional detail in the line x^2 , Fig. 3, looking to the left, the shaft D and guide-arm D³ being in position opposite to that shown in Fig. 1; Fig. 7, a like section looking to the right. 60

The machine herein shown as embodying my invention has a bed-plate, A, upon which is erected suitable standards or uprights, as A', A², A³, A⁴, and A⁵, to support the working parts. The power-shaft B has fast upon it,
65 outside the frame-work, usual fast and loose pulleys. This shaft carries a pulley, B', which drives a belt, B², extended over a pulley, B³, rotating a short shaft, B⁴, free to slide to a limited extent in bearings B⁵, the said shaft having
70 secured to it between its bearings a grooved collar, B⁶, which is embraced by a yoke, B⁷, having a stud, B⁸, which, extended through a spring, as B⁹, is jointed to the upper end of a lever, B¹⁰, having its fulcrum at B¹² on a
75 stand, B¹³, the lower end of the said lever having a cam or other projection, as 2, (see Fig. 3,) which is acted upon by a cam, as B¹⁴, attached to the main shaft C of the machine.

The short shaft B⁴ has secured to its inner
80 end a sleeve or collar, as a , (shown separately in Fig. 3^a,) provided with two lugs or ears, as a' , and the right-hand end of the shaft D has fastened to it by a suitable screw a like collar, a^2 , having like ears, and each of these
85 ears receives through it a screw, as 3, having a point, the four screws entering the four sides of a square block, as a^3 , (shown separately in the detail, Fig. 3^b,) the two collars, the block, and the screws forming a universal
90 joint or connection between the shafts B⁴ and D of very great strength, the chief strain between the shafts being taken by the ears and the block, rather than by the screws, as in ordinary forms of universal joint. 95

The shaft D is extended through a slot in a gear, D', and thence through a bearing or box, as D², which is free to slide in a guide arm or yoke, D³, connected with the hub of the gear D', the said bearing or box being
100 acted upon by a suitable spring, 4, surrounding a guide, D⁴. The shaft D beyond the

bearing D^2 and toward the jack to be described is provided with a conical or tapering sleeve, as D^5 , which will be attached thereto in an adjustable manner. This conical sleeve
 5 bears against a pattern-plate, as D^6 , made fast to the upright A^4 , it being of such shape as to constitute a "former" to act as a guide for the shaft D and its attached heel trimming and welting tool D^7 , which is and may
 10 be of any usual shape, it being attached to the shaft in any usual manner and carried about the heel to be trimmed from breast to breast, the adjustment of the said sleeve upon the said shaft enabling the operator to adapt
 15 the trimming-tool to heels of the same shape, but varying in size, and also acting to cause the trimming-tool to approach more or less the center of the heel as the shaft D is moved longitudinally. As the shaft D , referred to, is
 20 being rotated, it is also carried about the heel from breast to breast by and through the guide-arm D^3 , and the gear D' driven by gearing, as will be described, the spring 4, referred to, during such motion of the shaft D
 25 about the heel being trimmed, through its action on the box or bearing D^2 , keeping the sleeve D^5 , referred to, against the pattern plate or former D^6 .

The machine shown contains four jacks, b
 30 b' b^2 b^3 , all radiating from a common sleeve, b^4 , secured to a shaft, as b^5 , by a set-screw, as b^6 , (see Fig. 4,) the shaft b^5 being mounted in bearings b^7 b^8 , fixed with relation to the framework and being free to both slide and rotate
 35 therein, it being free to slide when the stop-lever b^9 is lifted from between the bearing b^7 and the end of the sleeve b^4 , (see Fig. 1,) and being free to rotate when the disk b^{10} , fixed to the said shaft b^5 , has been moved, as to the
 40 left in Fig. 3, far enough to remove it from contact with the pin b^{12} , the said disk having in practice as many holes through it as there are jacks, the sleeve containing all the jacks being rotated by hand, so as to bring one jack
 45 into position after another when the disk b^{10} is disengaged from the pin b^{12} . Each jack consists, essentially, of two arms, one of which contains a clamping-screw, as b^{13} , while the other arm contains a rest or seat, b^{14} , for the
 50 outer end of the heel; the arms carrying the said seats being provided with openings, as b^{15} , (see Fig. 4,) to permit the passage there-through of the heel-breasting knife, to be described, as each shoe, having been treated,
 55 arrives in position to be breasted.

One of the arms of each jack also has attached to it guiding-arms, as b^{16} , preferably made as springs, between which are tapering spaces, to thus receive between them and
 60 clamp the shoe at each side at or near its toe, to thus constitute guides to hold the shoe true with relation to the jack, in order that the heel may be breasted square across, or at substantially right angles to the length of the
 65 shoe.

The bearing b^8 , referred to, receives upon it an elbow-lever, b^{20} , (shown best in Fig. 5,)

which, when the stop-lever b^9 , before referred to, is lifted to permit the jack to be moved longitudinally, acts through intermediate mechanism, to be described, against the rotating tool-shafts D and E to move them out of the way of the arms of the jack, said elbow-lever and stop-lever forming part of a stopping mechanism, the other parts being a lever, as c ,
 70 (see Fig. 2,) pivoted at c' , and having attached to it a link, c^2 , jointed to a spring-actuated lever, c^3 , pivoted at c^4 , the opposite end of the lever having pivoted to it a link, c^5 , which is attached (see Fig. 5) to one arm of the elbow-lever b^{20} .
 75

During the outward movement of the shafts referred to by the elbow-lever b^{20} the spring 4 above the bearings or boxes in which the said shafts are held is compressed, and as
 80 soon as the jacks have been returned into operative position and the stop-lever b^9 brought into position between the end of the sleeve of the jack and the bearing b^7 the spring b^{21} , attached to the lever c^3 , comes into
 85 operation and positively returns the elbow-lever b^{20} into its normal position.
 90

The power-shaft B has upon it a pulley, E' , which, by a belt, E^2 , extended over a pulley, E^3 , fixed to a short shaft, E^4 , rotates through
 95 a universal-joint connection the shaft E , before referred to, the latter shaft at its forward end being provided with a scouring tool or wheel, E^5 , if the heels are to be first trimmed and then scoured and thereafter breasted.
 100

The universal-joint connection between the shaft E^4 and E is just the same as described between the shafts B^4 and D , and in practice the shaft E is extended through a slot in a gear, E^6 , mounted upon a suitable stud on the
 105 upright A^4 , the hub of the said gear having an attached forked arm or yoke, E^7 , in which slides a box or bearing, E^8 , acted upon by a spiral or other spring, as E^9 , the function and purpose of which are to keep the said shaft against
 110 the pattern-plate or former E^{10} , so that as the said shaft with the scouring-wheel E^5 attached is rotated it is also carried about the said former and about the heel from breast to breast, it scouring the heel of one shoe while
 115 the cutting-tool before described is trimming the heel of another shoe, or it may be trimming and welting the heel of another shoe. The power-shaft B also has fast upon it a small pulley, F , which, by a belt, F' , extended over a larger pulley, as F^2 , fast on a shaft, F^3 , rotates the said shaft, it sustaining a toothed gear, as F^4 , which constitutes the driving-gear for the series of gears to be described, which rotates the two gears D' and
 120 E^6 , before described.
 125

The toothed driving-gear F^4 , referred to, engages an intermediate gear, d , loose on a stud, d' , secured to the upright A^4 , the said stud at the rear of the loose gear d , supporting a
 130 sleeve, d^2 , having an arm or arms, d^x , upon which are pivoted two gears, as d^3 d^4 , the loose gear d engaging and driving positively the gear d^3 , the gear d^3 in turn engaging and ro-

tating the gear d^4 , the gear d^3 rotating in one and the gear d^4 rotating in the other direction at the same speed.

Between the slotted gears D' and E^6 is an intermediate gear, d^6 , mounted upon a stud, d^7 , the gear d^6 being in turn engaged by an intermediate gear, d^8 , loose on a stud, d^9 , supported in a bracket, d^{10} , attached to the upright A^4 . The sleeve d^2 has at one end an arm, d^{12} , provided with a toe, d^{20} . This arm is jointed to a link, d^{13} , carried upward and connected to an elbow-lever, d^{14} , pivoted at d^{15} , the upper end of the lever being extended up within the range of movement of the slotted arm or yoke D^3 . The lower end of the link d^{13} is connected by rod e with a treadle, e' .

The screw d^{15} , serving as a fulcrum for the elbow-lever, d^{14} , also supports an elbow-lever, e^2 , one end of which is turned upward and also left in the range of movement of the slotted arm or yoke D^3 , the said end being bent in a direction opposite to that of the end of the lever d^{14} , so that when the slotted arm or yoke moves in one direction, as indicated by arrow 25, Fig. 6, it at the end of its stroke meets the upper end of the lever e^2 , and at the end of its stroke in the opposite direction the upper end of the lever d^{14} .

The lower end or arm, e^4 , of the lever e^2 has two notches, (see Fig. 6,) number one of which engages the toe d^{20} of the arm d^{12} when neither of the two gears d^3 or d^4 is to engage the intermediate gear, d^8 . The second notch in the arm e^4 engages the toe d^{20} , when the gear d^4 is to engage the intermediate gear, d^8 , and rotate the slotted gears in one direction, as to the right, the treadle at such time being depressed.

Fig. 6 of the drawings shows the parts in the position they will assume just after the slotted arm D^3 has been brought into position to act upon the upper end of the elbow-lever e^2 and move it sufficiently to release its notched arm e^4 from the toe of the arm d^{12} , this occurring when the stroke of the tools has been completed in one direction. As soon as the disengagement has been effected, the spring f , attached to a stud, f' , and also to the end of the lever d^{14} , acting through the link d^{13} , referred to, lifts the end of the arm d^{12} of the sleeve d^2 and immediately throws the gear d^4 into engagement with the intermediate gear, d^8 , as in Fig. 6, when, during the further rotation of the main shaft E^3 , the reversal of the gears D' and E^6 will be instantly commenced, carrying the tools in the opposite direction around the heel to the starting-point, when the slotted arm or yoke D^3 acts upon the upper end of the lever d^{14} and pushes it down against the stress of the spring f , and through the link d^{13} forces the toe d^{20} down into engagement with the notch number one in the lower end or arm, e^4 , of the elbow-lever e^2 , the said lever thereafter acting to again hold the sleeve d^2 and the gears d^3 d^4 , carried by it, each out of engagement with the intermediate gear, d^8 . The gears d^3 d^4 , the arm d^{12} ,

and sleeve d^2 , to carry them, and the two levers d^{14} e^2 constitute the main parts of what I shall call the "reversing mechanism." The slotted gear E^6 engages a toothed gear, g , fast on a shaft, g' , having a toothed wheel, g^2 , which engages a larger toothed wheel, g^3 , fast on the cam-shaft C , before described. This cam-shaft at its front end is provided with a cam-hub, C^2 , which acts upon a roller or other stud, g^4 , carried at the upper end of a lever, g^5 , to which is jointed the rear end of a carrier, h , fitted to slide in suitable guideways, h' , of a bracket, h^2 , to the upright A^4 , the said carrier having adjustably attached to it by a suitable screw, as 10, a breasting-knife, h^3 , the said breasting-knife deriving its movement from the cam-hub C^2 , the roller g^4 being normally kept against the said cam-hub by a spiral or other spring, as h^5 .

In order that the operation of my improved machine may be clearly understood, let it be supposed that the jacks occupy the position shown in Figs. 3 and 4 and are empty—that is, without boots or shoes. The operator now applies a boot or shoe to the jack b' , and when properly fixed on said jack lifts the lever b^9 from the shaft b^5 and slides or draws the shaft toward the end of the machine—that is, in the direction indicated by arrow 20, Fig. 3—until the disk or wheel b^{10} has been disengaged from the rod or pin b^{12} . The operator now gives the shaft a quarter-turn in the direction of arrow 21, Fig. 4, and then moves it back into its normal position, (shown in Fig. 3,) thus placing the heel of the boot or shoe on the jack b' in position to be acted upon by the trimming and welting tool D^7 and when in this position the shaft is locked or prevented from rotating by the lever b^9 , which is turned by the operator to engage the said shaft. The machine is now started and the trimming and welting of the shoe on the jack b' are accomplished, and while the shoe on the jack b' is being trimmed and welted the operator applies an untreated boot or shoe to the jack b^2 , which by the partial rotation of the shaft has been brought into the position previously occupied by the jack b' . When the boot or shoe on the jack b' has been trimmed and welted, the shaft is given another quarter-turn, as described, thus bringing the boot or shoe on the jack b' in position to be acted on by the scouring-tool E^5 , while the boot or shoe on the jack b^2 is in position to be acted upon by the trimming and welting tool, the said tools being removed from operative position while the shaft is being rotated by the elbow-lever b^{20} , as described. While the boots or shoes on the jacks b' b^2 are being respectively scoured and trimmed and welted the operator applies a boot or shoe to the jack b^3 , and when the scouring and trimming have been completed the shaft is given another quarter-turn to bring the boot or shoe on the jack b' , which is now trimmed, welted, and scoured, in position to be acted on by the breasting-knife h^3 , the boot or shoe on the jack b^2 which has been trimmed and welted being

brought into position to be acted upon by the scouring-tool, and the boot or shoe on the jack b^2 being moved into position to be trimmed and welted. While the boots or shoes on the
 5 jacks b' b^2 b^3 are being respectively breasted, scoured, and trimmed and welted, the operator applies a boot or shoe to the jack b . When the operations of breasting, scouring, and trimming and welting have been accom-
 10 plished on the shoes held by the respective jacks b' b^2 b^3 , the shaft is given a quarter-turn and the boot on the jack b brought into position to be trimmed and welted, that on the jack b^2 to be breasted, and that on the jack b' ,
 15 which has been successively trimmed and welted, scoured, and breasted, into position to be removed from the machine and an untreated boot or shoe placed on the jack b' .

The boot or shoe which has passed through
 20 the respective operations described may then be placed on another machine and burnished and beaded; or the burnishing and beading tools may be substituted for the trimming and scouring tools on the present machine, or the
 25 trimming and welting and scouring may be effected on one machine and the burnishing, beading, and breasting accomplished on another machine.

I have not shown in my application a rotary oscillating brush; nor do I claim the employment of a brush in any form in my machine.

I claim—

1. In the herein-described machine for treating
 35 the heels of boots or shoes, the rotating shaft b^5 , capable of sliding longitudinally in bearings or boxes secured to the frame of the machine, and a plurality of jacks secured thereto, combined with a plurality of tools to
 40 act on the heels of the boots or shoes held by the said jacks, gearing, substantially as described, to operate said tools, and with lifting devices to move the rotating tools away from the said heels preparatory to moving the said
 45 shaft longitudinally, in order to enable the jack to be rotated, whereby a jack containing a shoe which has been acted upon by one tool may be brought into position to be acted upon by a second tool, substantially as described.
 50 2. In the herein-described machine for treating the heels of boots or shoes, a shaft capable of sliding in its bearings, and a plurality of jacks secured thereto, combined with a plurality of tools to act on the heels of the boots
 55 or shoes held by the said jacks, gearing, substantially as described, to operate said tools, and with a stop mechanism to move the operating-tools away from the said boots or shoes to permit the said shaft to be moved
 60 longitudinally to remove the jacks out of the path of movement of the said tools, thereby enabling a jack containing a shoe which has been acted upon by one tool to be brought into position to be acted upon by a second
 65 tool, and provided with a guard or clamp for the toe of the boot or shoe, substantially as described.

3. In a machine for treating the heels of boots or shoes, a power-shaft and a driving-shaft, F^3 , and two tool-carrying shafts, D E ,
 70 rotated by the said power-shaft, guide arms or yokes D^6 E^{10} for the tool-shafts, gears D' E^6 , connected to the said yokes, an intermediate gear, d^6 , to mesh with the gears D' E^6 , a second intermediate gear, d^8 , in mesh with
 75 the gear d^6 , a gear, F^4 , on the driving-shaft, and a gear, d , in mesh therewith, combined with a driving-gear, d^3 , and a reversing-gear, d^4 , and with levers connected to and so as to operate the said driving and reversing gears, sub-
 80 stantially as described.

4. In a machine for treating the heels of boots or shoes, a jack consisting of an arm, as b , provided with a seat having an opening,
 85 b^{15} , and a breasting-knife adapted to enter the said opening, substantially as described, combined with a second arm and a clamping device carried thereby, and by which the heel of a boot or shoe is held to its seat, substan-
 90 tially as described.

5. In a machine for treating the heels of boots or shoes, a jack consisting of an arm, as b , provided with a seat having an opening,
 95 as b^{15} , and a second arm and a clamping device carried thereby, and by which the heel of a boot or shoe is held to its seat, combined with a clamp consisting of spring-arms, as b^{16} , to engage the toe of a boot or shoe, as and for the purpose specified.

6. In a machine for treating the heels of
 100 boots or shoes, the combination, with a sliding shaft, of a jack mounted thereon and having an arm provided with a seat for the heel of a boot or shoe, and having an open-
 105 ing, as b^{15} , a breasting-knife adapted to enter the said opening and breast the heel, and a cam for moving the said breasting-knife, substantially as described.

7. In a machine for treating the heels of boots or shoes, the combination, with a shaft,
 110 of a jack mounted to slide thereon and consisting of an arm, as b , provided with a seat, and a second arm, a clamping device carried thereby, and by which the heel of a boot or shoe is held to its seat, a clamp to engage the
 115 toe of a boot or shoe, and a breasting-knife and cam for moving the same to operate substantially as described.

8. In a machine for treating the heels of boots or shoes, a cam-shaft, as C , provided
 120 with a cam and a breasting-knife, combined with a spring-controlled lever connected to the said breasting-knife and acted upon by the said cam to automatically produce reciprocations of the breasting-knife, substantially
 125 as described.

9. In a machine for treating the heels of boots or shoes, a tool-shaft provided with a sleeve or collar having lugs or ears, as a' , a
 130 second shaft having a sleeve or collar provided with lugs or ears, and a square block, as a^3 , to unite the shafts, combined with a cam-shaft, as C , having a cam, as B^{14} , and with a lever connected to the said second shaft and

acted upon by the said cam to produce a longitudinal movement of the said second shaft, substantially as and for the purpose specified.

10. In a machine for treating the heels of boots or shoes, a former, and a tool-shaft adapted to travel over said former, combined with a conical sleeve mounted on said shaft and adjustable thereon to enable heels of the same shape, but varying in size, to be operated upon, substantially as described.

11. In a machine for treating the heels of boots or shoes, a former and a tool-shaft adapted to travel over said former, combined with a conical or tapering sleeve adjustably mounted on the said tool-shaft to enable heels of the same shape, but varying in size, to be operated upon, substantially as described.

12. In a machine for treating the heels of boots or shoes, a jack-carrying shaft capable of longitudinal movement and a tool-carrying shaft provided with a tool to act on a boot or shoe held by the jack, combined with a stop mechanism consisting, essentially, of a lever, as b^9 , to engage the jack-carrying shaft and prevent its longitudinal movement, and a lever, as b^{20} , to engage the tool-carrying shaft and move it out of the path of movement of the jack, and connections, substantially as described, between said levers, substantially as and for the purpose specified.

13. In the herein-described machine for treating the heels of boots or shoes, a reversing mechanism consisting, essentially, of a loose gear, as d , a sleeve, as d^2 , having gears d^3 d^4 , and an arm, d^{12} , combined with a lever, as d^{14} , connected to the said arm, and with a second lever, as e^2 , to be engaged by the arm d^{12} , substantially as and for the purpose specified.

14. In the herein-described machine for treating the heels of boots or shoes, a reversing mechanism consisting, essentially, of a loose gear, as d , a sleeve, as d^2 , having gears d^3 d^4 , and an arm provided with a toe or projection, combined with a lever, as d^{14} , connected to the said arm, and with a second lever, as e^2 , provided with notches to be engaged by the said toe or projection, substantially as described.

15. In a machine for treating the heels of boots or shoes, a reversing mechanism consisting, essentially, of a loose gear, as d , a sleeve, as d^2 , having gears d^3 d^4 and an arm, a lever, as d^{14} , connected to said arm, and a second lever, combined with a support, as D^3 , for a tool-shaft, and gearing, substantially as described, to produce rotation of the tool-shaft, the said support alternately acting on the levers d^{14} e^2 to alternately cause the gears d^3 d^4 to be engaged with the gearing rotating the tool-shaft, substantially as described.

16. In a machine for treating the heels of boots or shoes, a jack-carrying shaft capable of longitudinal movement, and a tool-carrying shaft having bearings in a movable support, combined with a stop mechanism consisting, essentially, of a lever, as b^9 , to engage the jack-carrying shaft and prevent its longitudinal movement, and a lever, as b^{20} , to engage the tool-carrying shaft and move it out of the path of movement of the jack, and connections, substantially as described, between said levers, substantially as and for the purpose specified.

17. In a machine for treating the heels of boots or shoes, a jack-carrying shaft capable of longitudinal movement, and a tool-carrying shaft provided with a tool to act on a boot or shoe held by the jack, combined with a stop mechanism consisting, essentially, of a lever, as b^9 , to engage the jack-carrying shaft and prevent its longitudinal movement, and a lever, as b^{20} , to engage the tool-carrying shaft and move it out of the path of movement of the jack, and means, substantially as described, to prevent rotation of the jack-carrying shaft when the lever b^9 is in engagement with the said jack-carrying shaft, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN P. SMITH.

Witnesses:

WARREN C. EVANS,
WM. H. BELKNAP.