

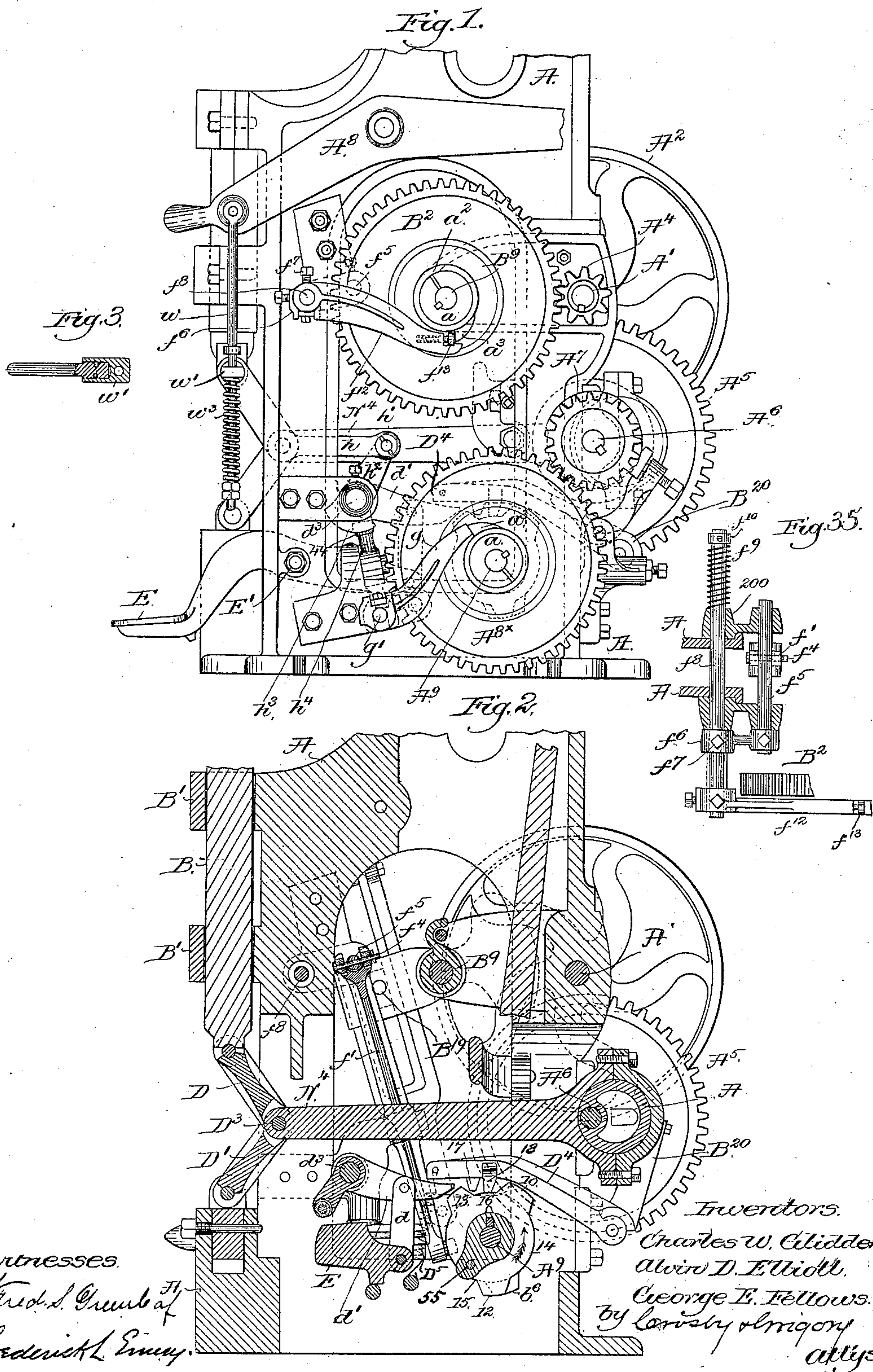
(No Model.)

6 Sheets—Sheet 1.

C. W. GLIDDEN, A. D. ELLIOTT & G. E. FELLOWS.
HEELING MACHINE.

No. 415,670

Patented Nov. 19, 1889.



N. PETERS, Photo-Lithographer, Washington, D. C.

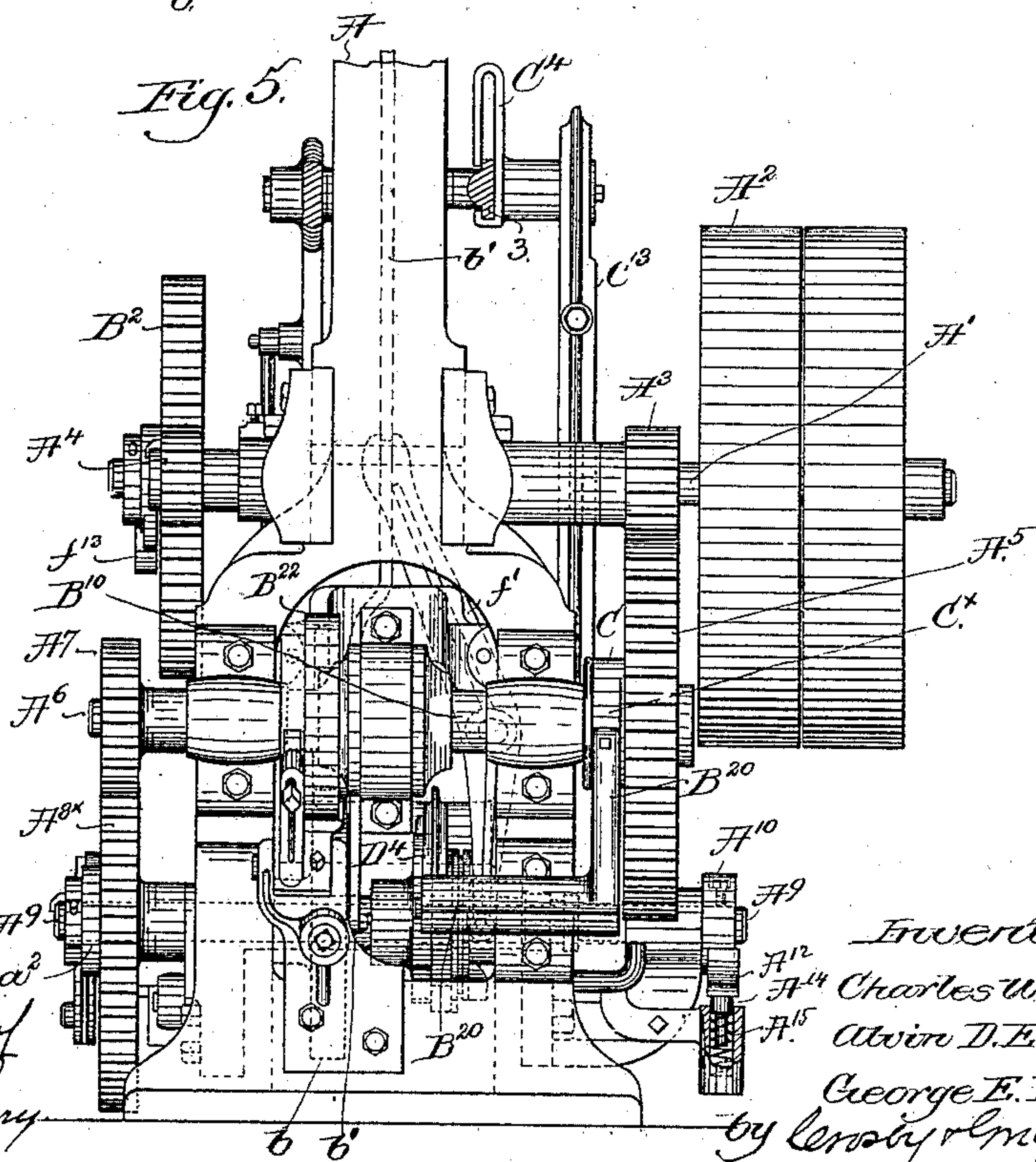
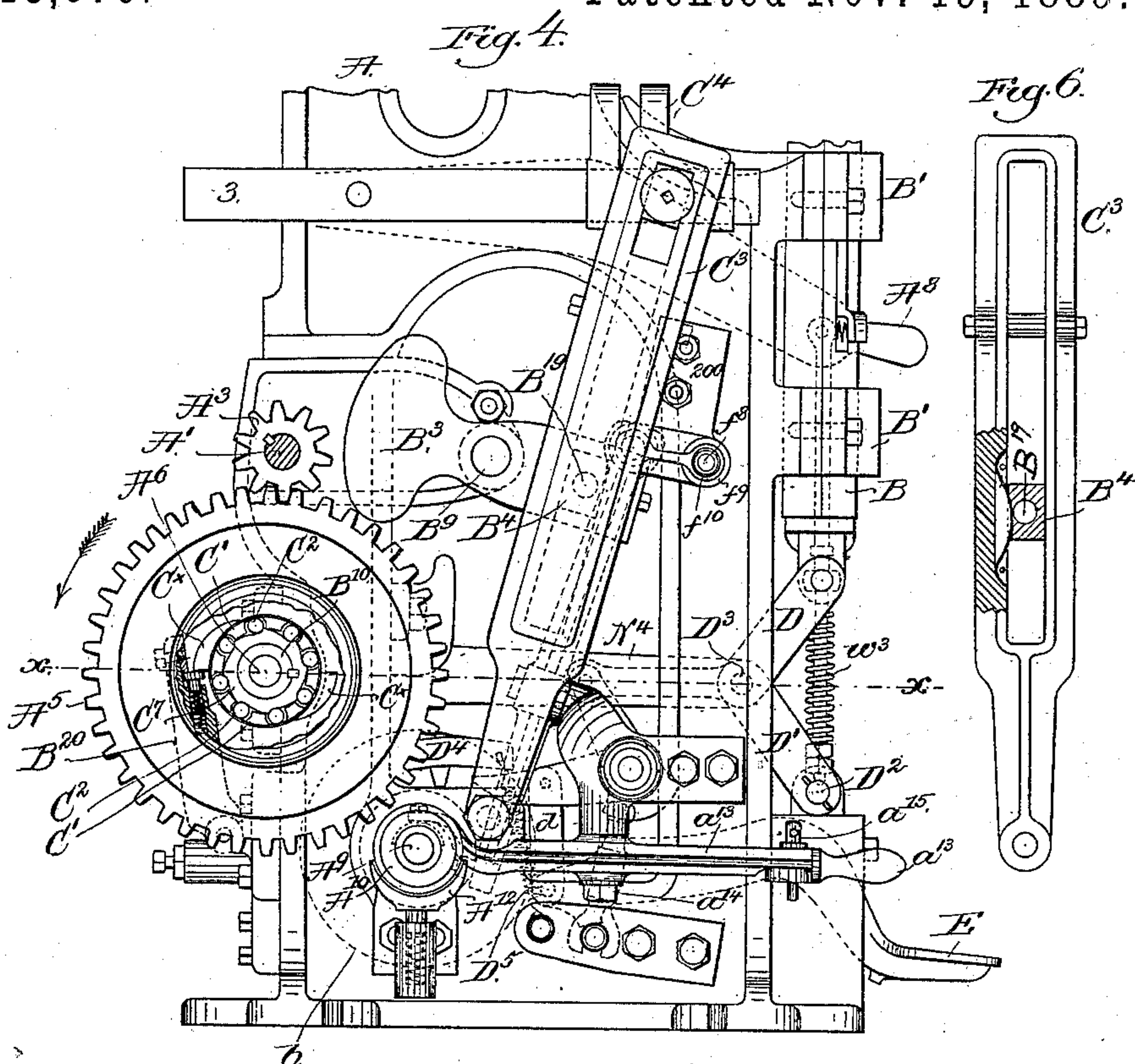
(No Model.)

6 Sheets—Sheet 2.

C. W. GLIDDEN, A. D. ELLIOTT & G. E. FELLOWS.
HEELING MACHINE.

No. 415,670.

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Witnesses.

Fred. S. Greenleaf^d
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Inventors.

Charles W. Ettinger
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George E. Fellows.
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(No Model.)

6 Sheets—Sheet 3.

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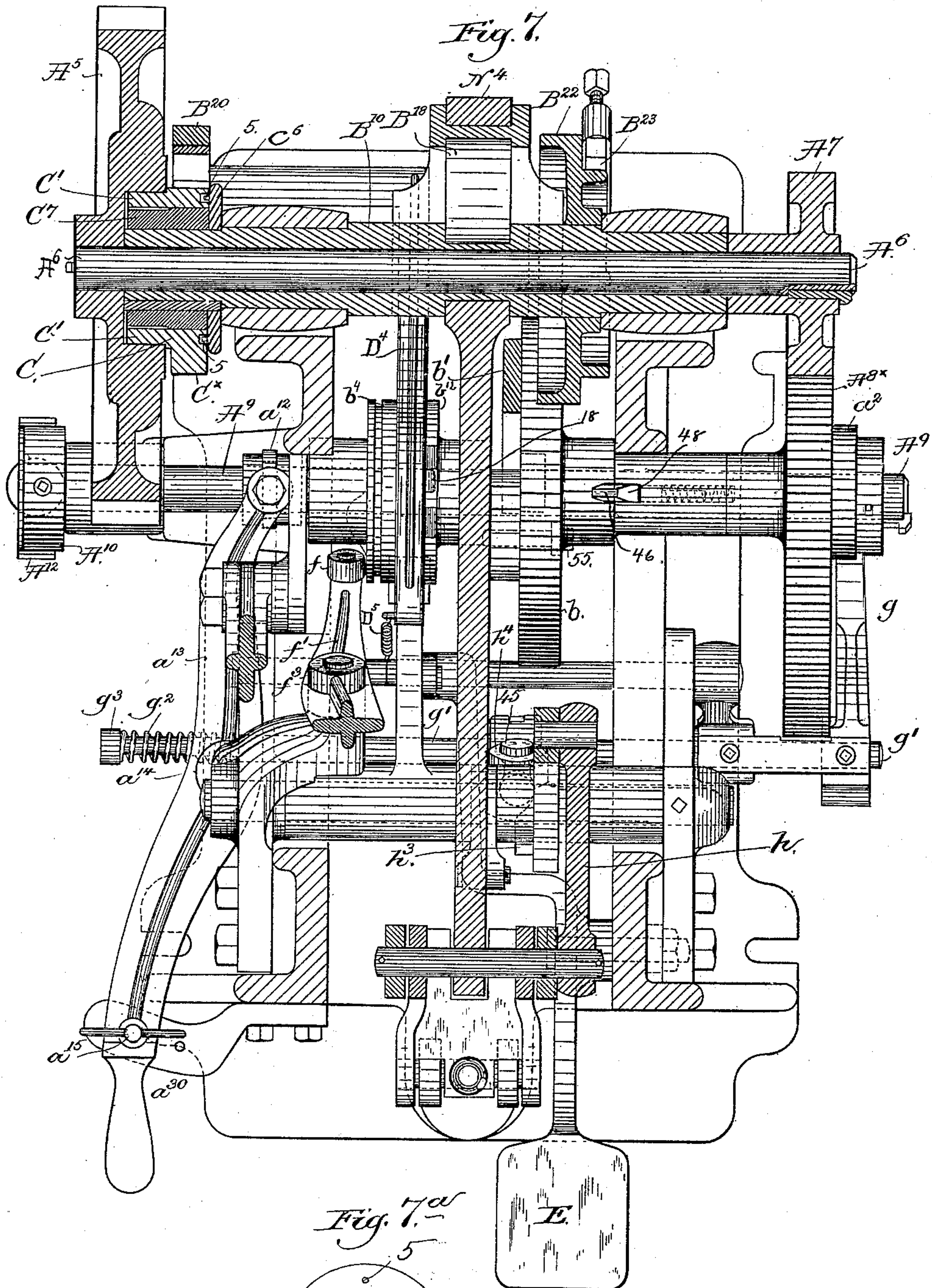
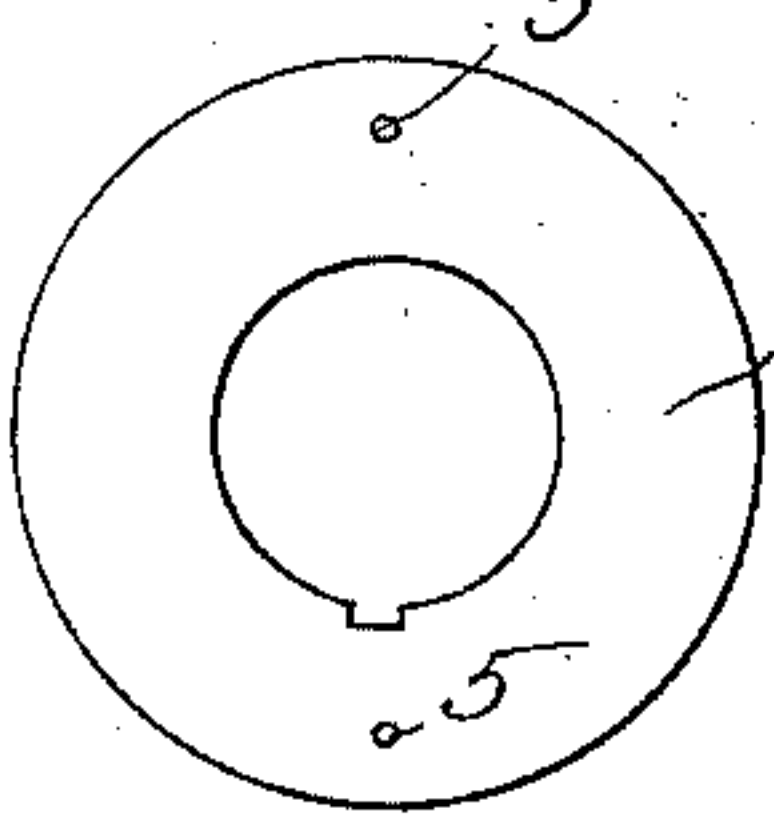


Fig. 7a



Witnesses.

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Marion L. Emery.

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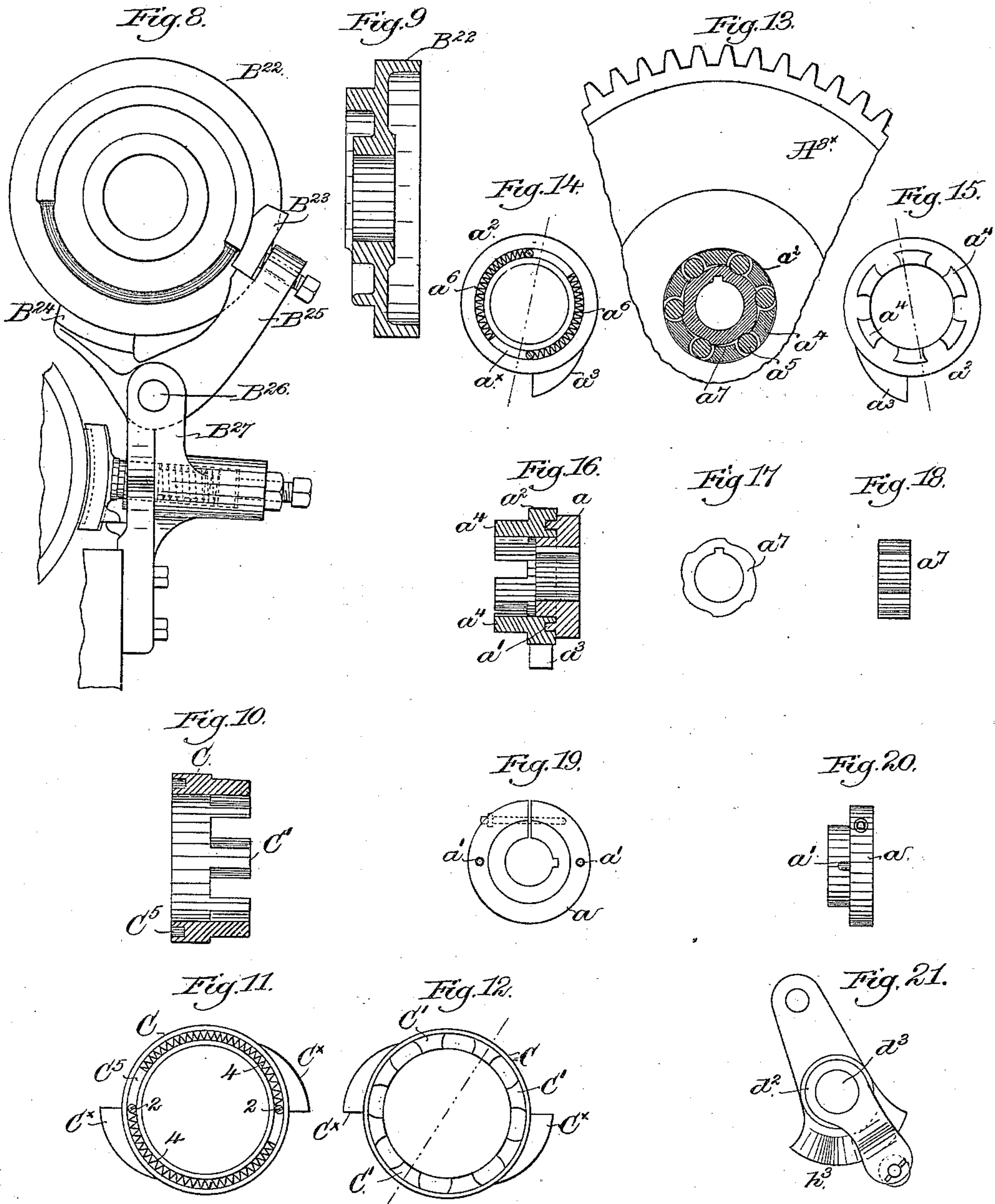
(No Model.)

6 Sheets—Sheet 4.

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Patented Nov. 19, 1889.



Witnesses.

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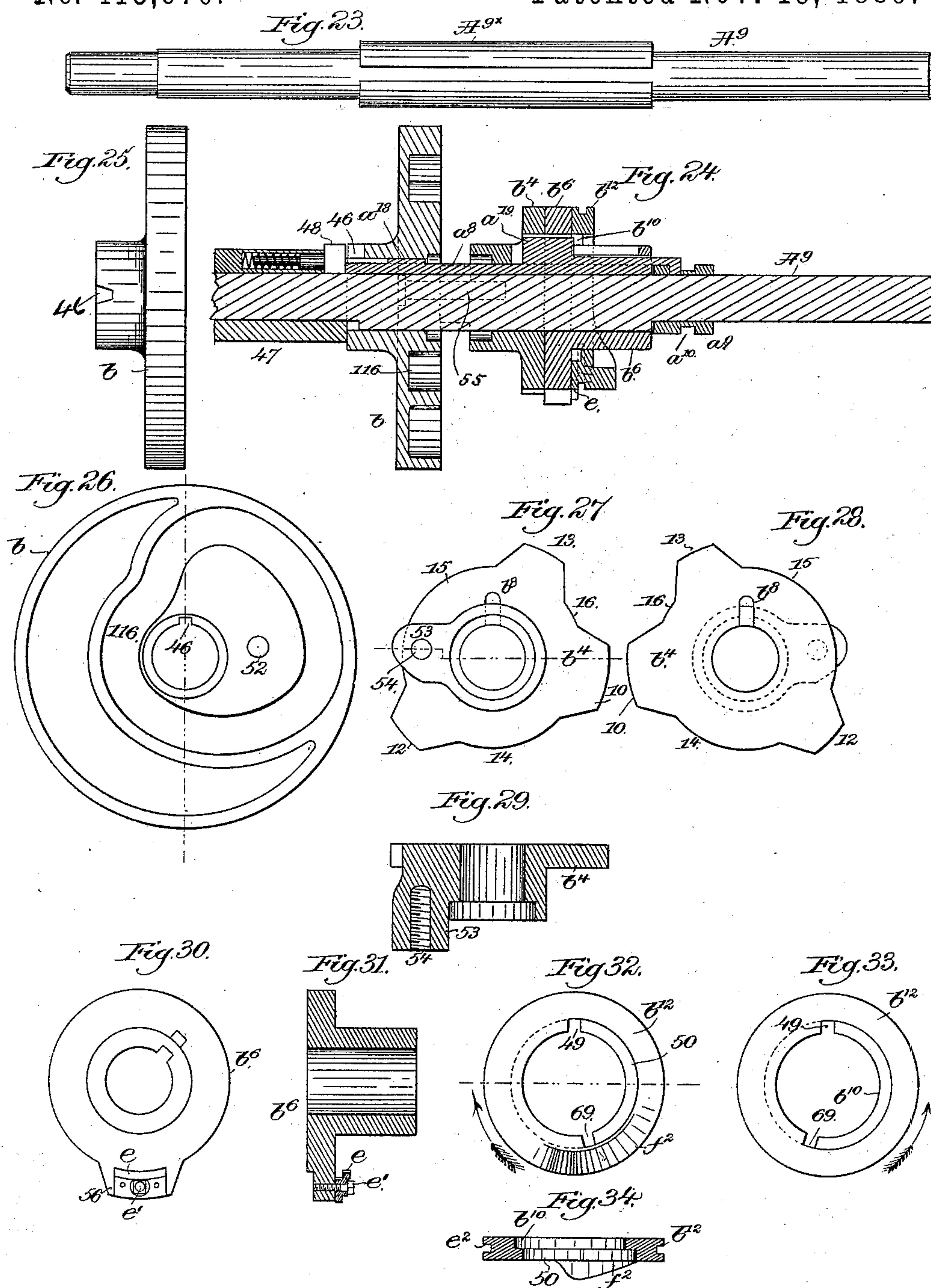
(No Model.)

6 Sheets—Sheet 5.

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Patented Nov. 19, 1889.



Witnesses.
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(No Model.)

6 Sheets—Sheet 6.

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FIG. 36.

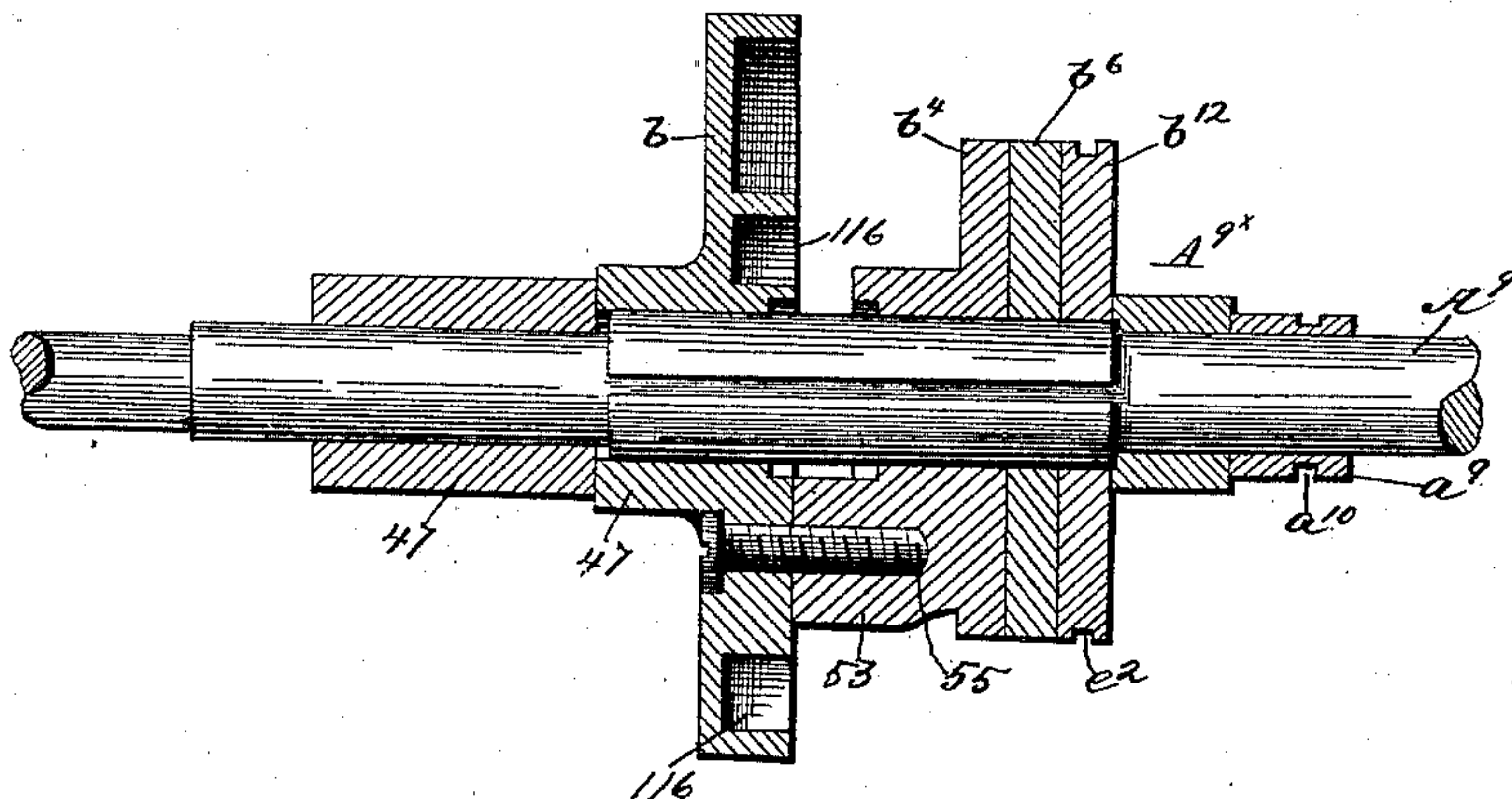
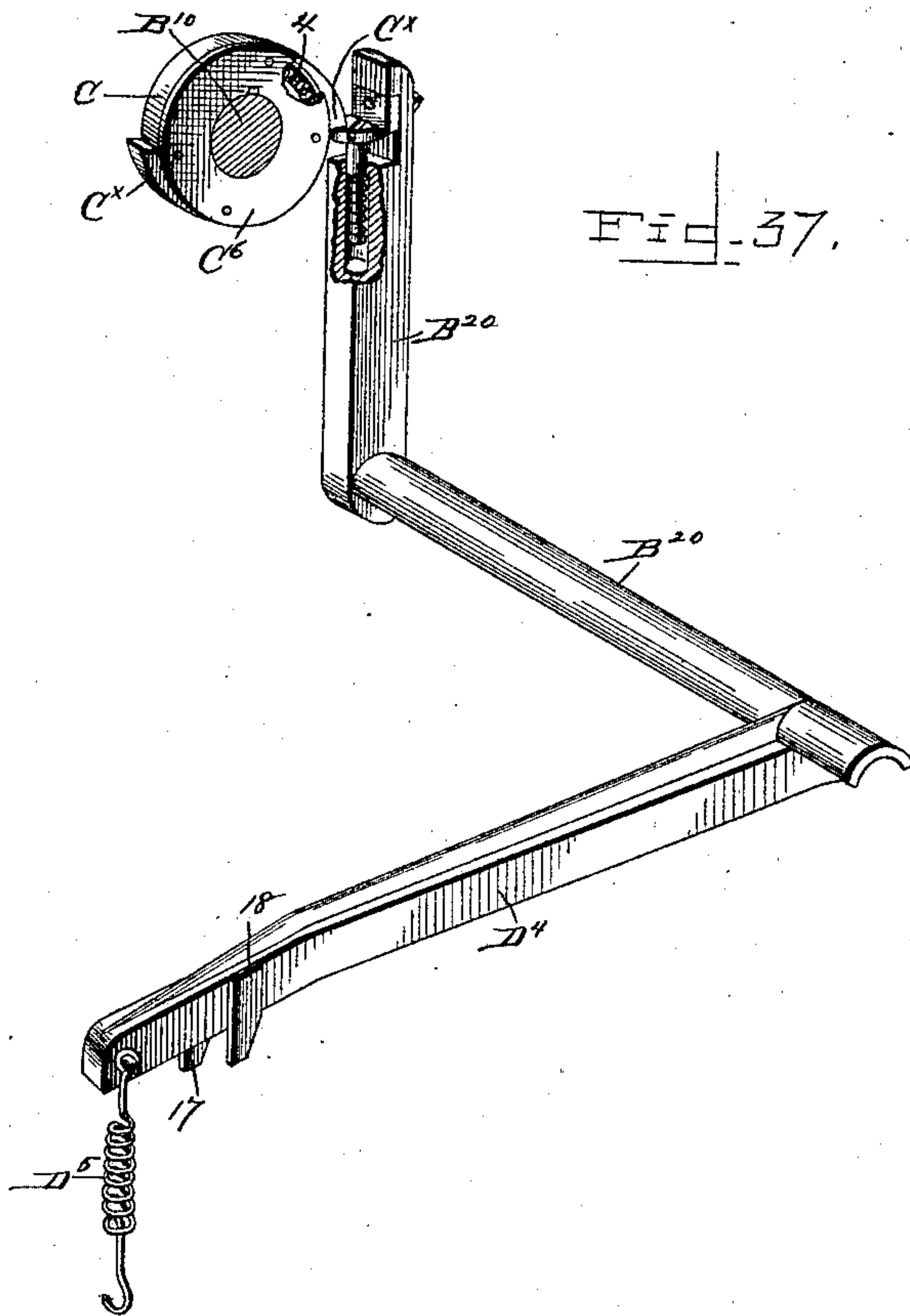


FIG. 37.



Witnesses.

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Geo. J. Hooper.

Inventors

Charles W. Glidden,
Alvin D. Elliott,
George E. Fellows,
by Crosby & Gregory
Attys

UNITED STATES PATENT OFFICE.

CHARLES W. GLIDDEN, OF LYNN, AND ALVIN D. ELLIOTT AND GEORGE E. FELLOWS, OF LAWRENCE, ASSIGNORS TO JAMES W. BROOKS, TRUSTEE, OF CAMBRIDGE, MASSACHUSETTS.

HEELING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 415,670, dated November 19, 1889.

Application filed January 22, 1889. Serial No. 297,205. (No model.)

To all whom it may concern:

Be it known that we, CHARLES W. GLIDDEN, of Lynn, county of Essex, State of Massachusetts, and ALVIN D. ELLIOTT and GEORGE E. FELLOWS, both of Lawrence, county of Essex, State of Massachusetts, have invented an Improvement in Heeling-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention has for its object to improve and simplify the class of heeling-machines shown in United States Patent No. 374,894, December 13, 1887.

Our improvement relates more especially to the operation of the die-bed spindle with relation to the top lift carrier and the trimming mechanism, our improved machine being adapted to not only attach a heel to a shoe, but to blind a top lift upon the heel and to then trim the heel, our machine being also adapted by a slight change in the position of the parts to simply nail through the heel to attach it to the sole, and then to trim the heel during one and the same ascent of the die-bed spindle, the said change from one to the other class of work being made almost instantly.

In the machine herein to be described, when used to nail a heel upon a shoe and to then apply a top lift to and trim the heel, the die-bed spindle is raised and lowered, without stopping, by one rotation of a sleeve carrying a suitable cam or eccentric, and thereafter the said sleeve has two half-rotations, with an interval of rest between each half-rotation, one half-rotation taking place while the top lift is being blinded upon the heel and the heel trimmed, the second half-rotation effecting the lowering of the die-bed spindle, after which the rotation of the said sleeve carrying the eccentric and the rotation of the trimming-shaft is stopped. The machine remains stopped, with the die-bed spindle lowered, until the operator (the shoe to which the heel has been nailed having been removed from the usual shoe holder or last and another shoe having been applied thereon) puts his foot on the starting-treadle and

moves it to actuate a clutch-controlling device and cause a clutch arranged upon a shaft, which is rotated continuously, to start the sleeve having the eccentric by or through which the die-bed spindle is raised. During the first ascent of the die-bed spindle after starting the said sleeve, the said die-bed spindle effects the movement of an arm, which releases the clutch and starts in rotation a cam-shaft provided with several cams, one of which actuates the lever which moves the top-lift slide-bar, while another cam rotating with the said shaft controls the further movements of the die-bed spindle and of a trimming-cam, as will be described. The cam for controlling the movement of the top-lift slide-bar, upon which is mounted the top-lift carrier, is adapted to rotate with the said cam-shaft or to be locked in position and remain stationary while the cam-shaft is rotated, as when nailing through a heel. The trimming-cam for starting the movement of the trimming mechanism is applied to a sleeve splined to the said cam-shaft and movable thereon, so that by moving the sleeve longitudinally the trimming-cam may be brought into operation sooner in the rotation of the said cam-shaft with relation to a projection of an auxiliary cam carried by the said sleeve when the heel is being nailed through, as described, and trimmed than when the heel is being nailed upon the shoe and a top lift is blinded upon the heel before the heel is trimmed.

The features in which our invention consists will be hereinafter described in the specification and pointed out in the claims at the end thereof.

Figure 1 is a partial right-hand side elevation of a heeling-machine embodying our improvements the upper part of the die-bed spindle and the top-lift slide-bar and the parts above the said bar, as well as the trimming-lever and the parts above it, being omitted to save space upon the drawings. Fig. 2 is a partial vertical section of the machine shown in Fig. 1. Fig. 3 is a detail to be referred to. Fig. 4 is a left-hand side elevation of the parts of the heeling-machine shown in Fig. 1; Fig. 5, a rear side elevation of the parts shown in Figs. 100

1 and 4; Fig. 6, a detail of the lever for imparting movement to the trimming mechanism; Fig. 7, an enlarged horizontal section below the dotted line *x*, Fig. 4. Fig. 7^a is a detail of the collar C⁶; Figs. 8 and 9, details of the brake mechanism for the sleeve carrying the cam or eccentric for actuating the die-bed spindle; Figs. 10, 11, and 12, details of the friction-clutch intermediate the sleeve carrying the cam or eccentric referred to and the large toothed wheel on the left-hand end of the main shaft. Figs. 13 to 20, inclusive, are details of the two like friction-clutches surrounding the trimming and the cam shafts, and located between the said shafts and the wheels or gears normally loose thereon and the cam-hub *a*⁷. Figs. 21 and 22 are different views of the lever for moving the arm which releases the clutch to start the movement of the cam-shaft. Fig. 23 is a detail showing the cam-shaft with its enlarged hub provided with a longitudinal key-seat. Fig. 24 is a longitudinal section taken through the cam-shaft and its cam, looking, however, from the rear side of the machine, the cams being shown as in the position occupied by them when the machine is being used to nail a heel to a shoe, blind a top lift on the heel, and then trim the heel, this being done by one full rotation of the cam-shaft and by two semi-rotations with intervals of rest between. Figs. 25 and 26 show different views of the cam which actuates the top-lift slide-bar and its attached parts. Figs. 27 to 29, inclusive, represent, respectively, an inner side and an outer side view and a section of the cam-plate which controls the time and order of the movements given to the die-bed spindle after the same has been started by the operator, and until the heel has been properly attached and trimmed and the machine stopped. Figs. 30 and 31 are a side elevation and section of the auxiliary cam, to be described. Figs. 32 to 34, inclusive, show different views of the trimmer-cam or cam-ring. Fig. 35 is a detail of the shaft *f*⁵ and its attached parts. Fig. 36 is a detail showing the cams *b* and *b*⁴, connected together, and also part of the cam-shaft. Fig. 37 is a detail showing the controlling device and the collar C.

The frame-work A is and may be of suitable shape to support the bearings for the working parts, the upper part of the frame-work broken off and not herein shown, as well as the parts omitted from the upper end of the die-bed spindle B, being substantially the same as in United States Patent No. 374,894. The die-bed spindle B, its bearings B', the toggle-links D D', center-pin D³, lever A⁸, rod *w*, connected to it and moved by the die-bed spindle, the guide *w*¹, (see Figs. 1 and 3,) the spring *w*³ upon the said rod, the guide 3, (see Fig. 4,) the carriage C⁴, fitted to slide thereon, the trimmer-lever C³, the cam *b*, (see Figs. 24 and 26,) the lever *U*¹, moved by it, and the trimming-shaft B⁹ are also the same as in the

said patent, where like letters are employed to represent like parts. The main or power shaft A', having a fast pulley A², driven by a belt in any usual manner, has fast upon it at the inner side of the said pulley (see Fig. 5) a toothed pinion A³, and at its opposite end the said shaft has fast to it a pinion A⁴. The pinion A³ engages and drives continuously a wheel or toothed gear A⁵, normally loose on a shaft A⁶, extended across the frame-work, and having secured to it at its opposite end a pinion A⁷, (see Figs. 5 and 7,) the said pinion in turn engaging and rotating constantly a toothed gear A^{8x}, normally loose on a cam-shaft A⁹, extended across the machine. The pinion A⁴ engages a wheel or toothed gear B², normally loose upon the trimmer-shaft B⁹.

The gearing so far described is kept in motion continuously from the power-shaft A' and its pinion A³, and at intervals the wheel or toothed gear A⁵ is made to actuate, through a suitable clutch, a sleeve B¹⁰, (see Fig. 7,) and the wheels or gears A^{8x} and B² are made, through suitable clutches, to engage and rotate intermittently the shafts on which they normally run loose.

The cam-shaft A⁹ at its opposite end, or at the left-hand side of the machine, has a brake-wheel A¹⁰, which is embraced by a brake-shoe A¹², (see Fig. 4,) faced with leather or equivalent material to come directly in contact with the said wheel A¹⁰, the shank of the brake-shoe being extended into the hub of a bracket A¹⁴, (see Fig. 5,) bolted to the frame-work, the said shoe being acted upon by a strong spring, as A¹⁵, so that the said brake-shoe is forced against the wheel A¹⁰ to prevent the rotation of the cam-shaft through momentum. The opposite end of the trimmer-shaft B⁹ has secured to it a weighted crank B³, having a pin B¹⁹, which enters a shoe B⁴, (see Fig. 6,) which travels in a slot of the pivoted trimming-lever C³, which lever at its upper end embraces a block extended from one side of the carriage, C⁴, which is fitted to slide upon the guide 3, the said carriage in practice having connected to it the usual chain, (not shown,) which is employed to rotate in one and then in the opposite direction the usual trimming-lever and devices, (not shown,) but which in practice are mounted loosely upon the upper end of the die-bed spindle, the said trimming-shaft and the devices engaged by it to rotate the trimming-lever being all substantially as common in United States Patent No. 374,894, while the trimming devices carried by the said trimming-lever at the upper end of the die-bed spindle are and may be in practice the same as in United States Patent No. 166,765.

Each of the three wheels or toothed gears A⁵ A^{8x} B² are provided at their inner side with a chamber for the reception of a clutch device by which the said wheel or gear A⁵ may be made to rotate the sleeve B¹⁰, and the wheels or gears A^{8x} and B² be made to rotate at times the shafts upon which they are

mounted loosely and at other times to leave the said sleeve and shaft at rest.

Referring to Fig. 7, which shows the toothed gear A⁵, it will be seen that the chamber at the side of the gear receives loosely a clutch, consisting, essentially, of a loose collar C, (see Fig. 7,) and shown separately in Figs. 10 to 12. This collar has two like cam projections C^x and a series of fingers C', the opposing sides of which are concaved, so as to hold between them a series of friction-rolls C², the ends of the said fingers and the said rolls being represented in Fig. 4 by breaking away part of the outer face of the wheel or gear A⁵.

The collar C at its rear side (see Figs. 10 and 11) has a circular groove, as C⁵, in which are secured two like pins 2, upon each of which is hooked one end of a like spiral spring 4, the free end of each spiral spring not reaching quite to the pin 2 which holds the other spiral spring, so that a small space is left, as shown in Fig. 11, at the free end of each spiral spring 4 for the reception of a stud, as 5, projecting from a flange or collar C⁶, (shown in section in Fig. 7 and separately in Fig. 7^a.) the said collar being keyed to the sleeve B¹⁰, it having, as shown, integral with it a cam or eccentric B¹⁸, which is surrounded by the strap-like end of a connecting rod or link N⁴, which at its front end is jointed to the center pin D³ of the usual toggle-links D D', employed for raising and lowering the die-bed spindle.

The sleeve B¹⁰ has fixed to it between its ends a hub, as C⁷, the periphery of which (see Fig. 4) is provided with a series of cam-faces or inclines, against which rest the rollers C², carried between the fingers C' of the collar C, the said rollers being all moved down the said inclines and from biting contact with the inner side of the chamber in the wheel or gear A⁵ whenever the collar C (see Figs. 10 to 12) is arrested by a clutch-controlling device, (shown as an elbow-lever B²⁰.) the said lever having an arm D⁴, (see Figs. 2 and 37,) the springs 4 (see Fig. 11) at such time being compressed; but when the collar C is not held by the said clutch-controlling device the springs 4 are free to turn the said collar about the said hub C⁷, the said collar at such time moving the said rollers up the inclines of the hub C⁷ and causing the rollers C² to be engaged between the said hub and the wheel or gear A⁵, so that the said wheel or gear, which is moved continuously, takes the sleeve B¹⁰ with it, thus rotating the cam or eccentric B¹⁸ and moving the die-bed spindle. Normally, the springs 4, acting upon the studs 5, projecting from the collar C⁶, turn the collar C slightly forward about the hub C⁷, or in the direction of the arrow, Fig. 4, thus carrying the friction-rolls C² up the inclined surface of the said hub. The springs 4 are not, however, permitted to act and move the collar as described except when the clutch-controlling device or lever B²⁰ is turned away from the path of rotation of the projection C^x of the

collar C, this movement of the clutch-controlling device in the operation of the machine taking place at different times, as will be described.

The sleeve B¹⁰, carrying the eccentric B¹⁸, has suitably keyed to it a friction-wheel B²², having two surfaces of unequal diameter, as best shown in Figs. 5, 7, 8, and 9, each surface being acted upon by a suitable friction-brake, as B²³ or B²⁴, carried, as herein shown, by a single brake-lever B²⁵, held in place on a stud B²⁶ in a stand B²⁷, the said friction-brakes acting upon the surface of the said friction-hub merely to prevent the rotation of the sleeve B¹⁰ when not being moved positively by the friction-clutch mechanism before described.

In operation the sleeve B¹⁰ must be rotated quickly for one full rotation and then stopped, as when the die-bed spindle is being raised and lowered to nail a heel upon the shoe, the shoe being held upon a last carried by a last-carrying spindle common to United States Patent No. 374,894. The die-bed spindle having been lowered, it remains down long enough to permit the usual top-lift carrier common to the said Patent No. 374,894 to bring a top lift into position between the usual top-lift plate of the nail-box and the heel, after which the sleeve B¹⁰ is again started and moved for half a rotation to lift the die-bed spindle B to blind a top lift upon the nails of the heel, and then the sleeve stops with the spindle elevated long enough to permit the usual trimming mechanism common to the Patent No. 166,765 to come into operation to trim the heel, after which the said sleeve B¹⁰ is again started and turned half a rotation to break the toggle-joint of and lower the die-bed spindle for the removal of the shoe. The sleeve B¹⁰ remains at rest as long as the controlling device or lever B²⁰ acts against one of the projections C^x and arrests the rotation of the collar C.

The arm D⁴ of the clutch-controlling lever has two toes 17 18, to be described. The clutch-controlling lever B²⁰ is acted upon by a spring D⁵, (see Figs. 2 and 4,) connected to the arm D⁴ of the said lever, so that the up-turned rear end of the said lever normally stands in position to be struck by a projection C^x of the collar C in its rotation.

The clutch mechanism between the wheels or gears A⁸ and B² and the cam and trimming shafts are alike, so we will specifically describe but one of the said clutches, designating, however, the like parts of both clutches by the same letters. The cam-shaft A⁹ and the trimmer-shaft B⁹ have fixed to them at the right-hand side of the machine like hubs α , (see Figs. 1, 16, 19, and 20,) each hub having at its inner side two pins α' , substantially like the pins 4, before described, the pins α' entering an annular groove α^x (see Fig. 14) at the outer side of a loose hub α^2 , having a single projection α^3 and being provided with a

series of fingers, as a^4 , between which are placed a series of friction-rolls a^5 . Each annular groove a^x referred to receives in it two spiral springs a^6 , which are held therein substantially as described of the spiral springs 4. The cam-shaft A^9 has a fixed hub a^7 , (see Figs. 13, 17, and 18,) provided with a series of cam-surfaces or inclines, on which the friction-rolls a^5 bear and over which they are moved by the said loose hub a^2 whenever it is desired that the rolls a^5 be caught by the continuously-rotating toothed gears A^{8x} or B^2 to start in rotation either the said cam-shaft or the trimmer-shaft, the said shafts being started whenever one of the projections a^3 of a hub a^2 is released, as will be described.

To start the machine, the operator (a shoe having been jacked or put in place and a heel laid upon the nail-box in usual manner) will put his foot upon the treadle E , pivoted at E' , and will turn the said treadle so that, through the link d , (see Fig. 2,) jointed to it and to an arm d' , projecting from a hub d^2 , mounted loosely upon a stud d^3 , the said arm will be lifted sufficiently to strike against the arm D^4 and turn the controlling device B^{20} upon its fulcrum.

The cam-shaft A^9 near the center of its length is enlarged in diameter, as at A^{9x} , (see Fig. 23,) and is grooved longitudinally to receive a locking device a^8 , (shown as a key,) which is secured at one end (see Fig. 24) to a collar a^9 , having an annular groove a^{10} , which receives a yoke-shaped stud a^{12} , (see Fig. 7,) pivoted upon the inner end of a lever a^{13} , in turn pivoted at a^{14} , (see Fig. 4,) and having co-operating with it a holding device a^{15} , by which the said lever may be held in either one of two positions, one position of the said lever, as shown in Figs. 7 and 24, being that to hold the said locking device a^8 pushed in, so as to lock the cam b to the shaft A^9 , as when the top lift is being blinded on the heel, the other position of the lever a^{13} being that wherein its outer end is moved to the right from Fig. 1, such movement withdrawing the said locking device, freeing the said cam b from the shaft A^9 . The locking device a^8 referred to has two projections, as a^{18} a^{19} . The enlarged part A^{9x} of the cam-shaft A^9 is surrounded loosely by the top-lift carrier-moving cam b , it having at its inner side a cam-groove, as 116, (see Fig. 26,) which receives in it a roller or other stud at the lower end of a lever b' , common to United States Patent No. 374,894, the upper end of the said lever engaging and reciprocating the usual slide-bar of the top-lift carrier, as in the latter patent. The cam b referred to has fixed to it by a bolt 55, (see Figs. 2 and 24,) so as to form a part of it, a cam-plate b^4 , having three projections 10 12 13, two spaces 14 15, and a rest 16.

Viewing Fig. 26 it will be seen that the cam b has a hole 52, and in Figs. 27 and 29 it will be seen that a projection 53 of the cam-plate b^4 has a threaded hole 54. When the cam b

and cam-plate b^4 are mounted in position on the cam-shaft, a bolt 55 (shown by dotted line, Fig. 7, and in section, Fig. 8) is used to enter the said holes 52 and 54 to thus rigidly connect together the said cam b and the cam-plate b^4 , so that when the cam is locked and restrained from rotation the cam-plate b^4 will also remain at rest. The toe 17 of the arm D^4 is nearest the front of the machine and lies immediately over the auxiliary cam b^6 , while the toe 18 stands in the path of the cam-plate b^4 . The hub of the auxiliary cam b^6 is loose on the enlarged part A^{9x} of the cam-shaft A^9 at the left-hand side of the cam-plate b^4 .

When the machine is adjusted into position to be started to nail a heel upon a shoe, the toe 18 stands in the rest 16, (see Fig. 2,) and if the machine is to be operated to nail a heel upon the shoe and to then blind the top lift thereon and trim the heel, the projection a^{18} of the locking device a^8 will be moved to enter the groove or key-seat in the interior of the top-lift cam b , as in Figs. 7 and 24, thus locking it fast to the cam-shaft, and the projection a^{19} of the said locking device will stand in the notch b^8 of the said cam-plate b^4 and a portion of the said projection a^{19} will also stand in the semicircular recess b^{10} at the left-hand side of the ring-cam b^{12} , employed to start the trimming. In this condition of the parts the operator, by putting his foot upon the treadle, will turn the controlling device or lever B^{20} , as described, to release collar C and cause the sleeve B^{20} to be started to raise the die-bed spindle to nail the heel upon the shoe. As the cam-plate b^4 is started in the direction of the arrow thereon in Fig. 2 the projection 10 will engage the toe 18 just before the cam projection C^x on the collar or hub C arrives opposite the end of the said controlling device B^{20} . The cam 10, acting on the toe 18, holds up the inner end D^4 of the lever-controlling device B^{20} , so that the upturned end thereof is kept out of the way of one of the projections C^x on the hub C , thus permitting the sleeve B^{10} , carrying the eccentric, to travel for more than half a rotation; but as soon as the toe 18 arrives at the rear end of the projection 10, the heel having been nailed upon the shoe, the toe 18 drops, permitting the controlling device B^{20} to be turned by the spring D^5 and place the upturned rear end of the said device B^{20} in the path of movement of the said projections C^x , thus arresting the rotation of the hub C and the said sleeve with the die-bed spindle lowered, the said spindle being retained lowered while the top-lift cam b acts upon the lever b' to move forward the top-lift slide-bar carrier having a top lift common to Patent No. 374,894, and place the top lift between the usual top-lift plate and the end of the heel, the toe 18 at such time resting in the first space 14 of the cam; but as soon as the top lift is in position to be blinded upon the heel the projection 12 of the cam-plate b^4 strikes

the toe 18 and turns the lever B^{20} to remove its rear end from that one of the projections C^x , and hub C then engaged by it, thus releasing the hub, so that it places the rolls carried by it in position to be caught by the wheel A^5 and again rotate the sleeve B^{10} to lift the die-bed spindle B and the usual nail-box at the upper end thereof to blind the top lift upon the end of the nails previously driven into the heel. The acting portion of the projection 12 is of such length that it passes from under the toe 18 and lets the end D^4 of the lever B^{20} drop, thus placing the upturned end thereof in position to be engaged by one of the said projections C^x in the rotation of the hub and sleeve; but just before the said sleeve B^{10} completes a half-rotation, the second space 15 of the cam-plate b^4 comes under the said toe 18, the said toe remaining in the said space for a sufficient time during the rotation of the cam-plate b^4 to permit the usual trimming mechanism referred to and carried in usual manner, and the upper end of the die-bed spindle is moved to trim the heel, which done the projection 13 of the cam-plate b^4 again strikes the toe 18 to effect the release of the hub or collar C to again start the sleeve B^{10} to effect the final lowering of the die-bed spindle, the toe 18 by the time the said spindle is lowered dropping into the rest 16. This completes one rotation of the cam-plate b^4 , and during its rotation, as will be understood, the cam projection 12 has automatically moved the lever B^{20} to release the hub C to lift the die-bed spindle, and has then permitted the end D^4 of the said lever to drop, thus again placing the upturned end thereof in position to arrest the hub C just as the sleeve B^{10} completed a half-rotation, thus leaving the die-bed spindle in elevated position while the trimming mechanism operated to trim the heel, which done the third projection 13 came into operation, moved the lever B^{20} to again release the hub C and permit the sleeve B^{10} to make another half-revolution, it at such time effecting the lowering of the spindle.

The hub of the auxiliary cam b^6 has mounted upon it loosely the cam-ring b^{12} , which starts the trimming, and the right-hand side of the said cam-ring is held up snugly against the left-hand side of the auxiliary cam b^6 by means of a gib-plate e , (see Figs. 30 and 31,) attached to the said auxiliary cam by a screw e' , a segmental lip of the said gib-plate entering an annular groove e^2 of the said cam-ring. In practice there is sufficient friction between the auxiliary cam b^6 and the cam-ring b^{12} to prevent the cam-ring from being accidentally pushed ahead in the direction of the rotation of the auxiliary cam, as when the roll f at the lower end of the lever f' is opposite the long inclined part of the projection f^2 of the trimming cam-ring b^{12} , it rotating in the direction of the arrow thereon in Fig. 32. The trimming cam-ring b^{12} is carried forward in unison with the auxiliary cam b^6 ,

while the machine is operating to nail a heel and to then put a top lift thereon and to trim the heel by the left-hand corner of the projection a^{19} of the locking device a^8 , it resting against a shoulder of the recess b^{10} at the right-hand side of the said cam-ring b^{12} , the starting-point of the trimming cam projection f^2 being located nearly midway between the two projections 10 12 of the cam-plate b^4 . The projection 56 of the auxiliary cam b^6 (see Fig. 30) is of substantially the shape and size and stands just to the left of the projection 12 of the cam-plate b^4 , but with the starting end of the projection of the cam b^6 a little in front of the projection 12. The projection on the auxiliary cam is provided to at times act upon the toe 17 of the lever B^{20} ; but when the heel being applied is to have a top lift blinded upon it the projection 56 of the auxiliary cam is unable to strike the toe 17 and turn the lever B^{20} , for the projection 12 acts upon the toe 18 and turns the said lever B^{20} just before the projection 56 of the auxiliary cam arrives in position to act upon the toe 17.

In the operation of the machine, as the projection f^2 of the cam-ring b^{12} arrives opposite the roll f at the lower end of the lever f' , pivoted at f^3 , it vibrates the said lever, throwing its upper end to the right, viewing the machine from its front, the said end being forked, (see dotted lines, Fig. 5) and embracing a suitable stud f^4 (see Fig. 2) upon the slide-rod f^5 . The slide-rod f^5 has attached to it, near its right-hand end, (see Fig. 35,) a yoke f^6 , which by a bolt f^7 is fixed to a second slide-rod f^8 , extending through suitable bearings and surrounded at its end at the left-hand side of the machine by a strong spiral spring f^9 , which normally acts against a fixed collar f^{10} on the said rod f^8 and against one of the bearings 200, in which the said rod f^8 slides, to thus throw the rod f^5 to the left or in a direction opposite that in which it is moved by the said projection f^2 . The rod f^8 has securely fixed to its right-hand end an arm f^{12} , provided at its outer end with a plunger f^{13} , normally thrown out by a spring. The toothed gear B^2 , normally loose on the trimming-shaft, receives loosely within its chambered hub one of the loose hubs a^2 , before described, (see Figs. 1 and 16,) as having a projection a^3 . Before the lever f' is moved by the trimming cam projection f^2 to start the trimming-lever C^3 in usual manner the plunger f^{13} stands in contact with the projection a^3 of the said hub a^2 , as shown in Fig. 1; but as the lever f' is moved by the trimming cam projection f^2 the arm f^{12} is moved laterally from contact with the projection a^3 of the loose hub a^2 , thus permitting the friction-rolls carried by the said hub to be engaged by the interior of the gear B^2 , causing the said gear to start in rotation the trimming-shaft B^9 ; but as soon as the heel or smallest part of the cam projection f^2 of the trimming cam-ring arrives opposite the roller at the lower end of the lever f' the spring f^9 on the slide-rod f^8 imme-

diately acts to throw the said rod and arm f^{12} to the left, thus again placing the plunger f^{13} in the line of travel of the projection a^3 of the loose hub a^2 , so that the said hub is stopped and the friction-rolls are moved inwardly to release the gear B^2 by the time the trimming-shaft has made one complete revolution. The arm g , which co-operates with a like loose hub a^2 , as described, loose on the cam-shaft A^9 to arrest the rotation of the said hub a^2 when it is desired to effect the release of the gear A^{8x} from the cam-shaft A^9 and leave it at rest, is connected to the right-hand end of a slide-rod g' , surrounded at its left-hand end by a strong spiral spring g^2 , which is placed between a shoulder g^3 on the said rod and one of the bearings for the said rod, the spring g^2 normally acting to keep the end of the arm g in the line of movement of the projection a^3 of the loose hub a^2 . The movement of the cam-shaft A^9 should commence just as the die-bed spindle B arrives in its most elevated position, as when the heel has been nailed to the shoe, and it is at this time that the arm g must be moved to release the loose hub a^2 and permit the gear A^{8x} to be operatively clutched to the cam-shaft A^9 . To do this I have applied to the pin D^3 , connecting the links of the toggle-joint, a short link h , which is fitted over a pin h' of an arm h^2 of the hub a^2 , loose on the stud d^3 , before described, the said hub having a cam projection h^3 , (see Figs. 1 and 22,) which acts upon a roller 44 at the upper end of a short lever h^4 , pivoted at 45, the lower end of the said lever being forked and embracing a cross-pin of the slide-rod g' , as described, of the lever f' and its connection with the rod f^3 , the cam h^3 thus moving the slide-rod g' to remove the arm g from the projection a^3 of the hub a^2 . This cam h^3 , acting as described, moves the rod g' to the right, placing the arm g out of the path of movement of the projection a^3 at each rise of the die-bed spindle B , and permitting the said arm g to move into the range of the said projection a^3 at each descent of the said die-bed spindle; but at the second descent of the said spindle, when the arm g is moved inwardly, the projection a^3 of the loose hub a^2 has completed but about half a rotation. Therefore at such time the said projection a^3 does not strike the arm g , for the latter is quickly moved again to the right by the second rise of the die-bed spindle, as when the top lift is being blinded on. This second movement of the slide-rod g' is not one which effects any operation of the machine as so far described, but is a mere incident of the construction of the parts, and the said bar is made to derive its motion from the part of the machine referred to, thus saving the addition of complex devices to the machine, as would otherwise be necessary.

The hub of the top-lift cam b has a notch 46, Fig. 25, in line with the projection a^{18} of the locking device or key a^8 , before described.

One of the bearings 47 in which the cam-

shaft A^9 rotates is provided with a locking dog or device 48, (herein shown as a sliding spring-pressed block.) This locking-dog 48 is pressed back against its spring by the right-hand end of the locking device a^8 , and is so kept pressed back so long as the machine is to be used to nail heels and blind top lifts thereon.

When the machine is to be used to nail a heel, blind top lift, and trim the heel, then the sleeve B^{10} is to have a full revolution without intermediate stopping and then two half-revolutions in succession between the commencement and completion of each heel; but when the heel is only to be nailed through and through and trimmed, I have provided means whereby the said sleeve B^{10} has two half-revolutions in succession—one when the spindle is lifted to nail the heel, and the other when the spindle is lowered. To effect this different movement of the die-bed spindle, the lever a^{18} will be turned in the direction to move the locking device a^8 to the left on the cam-shaft away from the front of the machine, such movement of the said locking device removing its end from the locking-dog 48, permitting the said dog to enter the notch in the hub of the top-lift cam b to lock it to the bearing 47, in which the cam-shaft rotates, so that the said cam b cannot rotate, the same movement of the locking device a^8 to the left withdrawing the projection a^{18} from the seat or groove of the hub of the cam b , thus releasing the said cam from the cam-shaft A^9 , and at the same time the projection a^{19} of the locking device a^8 is drawn out from the key-seat in the cam-plate far enough to enter the slot 49 in the trimming cam-ring b^{12} , so that the right-hand corner of the said projection a^{19} will come into the recess 50 at the left-hand side of the said ring, viewing Fig. 1, such change of position of the projection a^{19} with relation to the cam-ring b^{12} temporarily releasing the ring, and permitting it to make a substantially half-rotation of the hub on the auxiliary cam b^6 , so as to place the projection f^2 , for starting the trimming-lever, at about one hundred and twenty degrees behind the projection 56 of the said auxiliary cam b^6 . Now that the top-lift cam b and the cam-plate b^4 are at rest, the projection on the auxiliary cam b^6 performs the duty heretofore performed by the projection 12 of the cam-plate b^4 —that is, it lifts the inner end D^4 of the lever B^{20} to effect the release of the collar or hub C^x to start the sleeve B^{10} to effect a half-rotation thereof and lower the spindle, the projection of the auxiliary cam b^6 at such time acting upon the toe 17.

When simply nailing through the heel and trimming it, the operator, with his foot on the treadle E , lifts the inner end of the lever B^{20} , as before described, to effect the starting of the sleeve B^{10} ; but the said sleeve for this work is permitted to complete but a half-rotation to thus lift the die-bed spindle, and as

soon as the said spindle has been lifted and the heel nailed to the shoe the cam portion f^2 of the trimming cam-ring b^{12} strikes the roll f of the lever f' , and effects, as before described, the starting of the trimming-lever to trim the heel; and the trimming operation having been completed the cam projection 56 on the auxiliary cam again acts on the toe 17 to lift the inner end of the arm D^4 of the lever B^{20} , to effect the starting of the sleeve B^{10} for its second half-rotation to lower the spindle when the machine is automatically stopped. In this way it will be seen that very much time is saved, and that were it not for the auxiliary cam and the change of position of the trimming-cam with relation to the projection 13, which is made to lower the die-bed spindle, very much time would be lost.

When the locking device a^8 is again returned into the position shown in Fig. 23, the corner of the cam projection a^{19} nearest the cam b passes through the opening or slot 69 of the cam-ring.

I claim—

1. In a heeling-machine, the continuously-driven shaft A^6 and an attached wheel or gear, as A^5 , the actuating-sleeve B^{10} and clutch mechanism between it and the said gear, and the die-bed spindle, combined with a connecting-link joining the said sleeve and the said die-bed spindle, to operate substantially as described.

2. In a heeling-machine, the shaft A^6 and an attached wheel or gear, as A^5 , the actuating-sleeve B^{10} , clutch mechanism between the said sleeve and gear, the die-bed spindle, and the connecting-link joining the said sleeve and the said die-bed spindle, combined with a clutch-controlling device the movement of which effects the release of the said sleeve from the said shaft to leave the sleeve at rest, substantially as described.

3. In a heeling-machine, the shaft A^6 and an attached wheel or gear, as A^5 , the actuating-sleeve B^{10} , clutch mechanism between the said sleeve and gear, the die-bed spindle, and the connecting-link joining the said sleeve and the said die-bed spindle, combined with a clutch-controlling device the movement of which effects the release of the said sleeve from the said shaft and leaves the said sleeve at rest, and with cams to automatically move the said controlling device at stated periods, to operate substantially as described.

4. A heeling-machine containing the following instrumentalities, viz: a constantly-rotating driving-shaft having two pinions fixed to it, a constantly-driven shaft A^6 , a gear A^5 and pinion A^7 fast thereon, a cam-shaft A^9 , a trimmer-shaft, a sleeve B^{10} , having an eccentric, a link, and a die-bed spindle actuated by the said link, gears A^{8x} and B^2 loose, respectively, on the cam-shaft and the trimmer-shaft, clutches between the said loose gears and the said shafts, a clutch between the sleeve B^{10} and the gear A^5 , and means co-operating with the said clutches to effect the in-

termittent rotation of the said sleeve and of the cam and trimmer shafts at the proper times, as and for the purposes set forth.

5. In a heeling-machine, the rotating shaft A^6 , its attached gear A^5 , the sleeve B^{10} , mounted loosely thereon and having an eccentric and a cam-faced hub, the connecting-rod N^4 , the toggle-lever, and the die-bed spindle, combined with a clutch mechanism having a loose hub provided with projections and carrying rollers which rest on the cam-faced hub carried by the sleeve and forming part of the clutch mechanism, and with a controlling device and a treadle to move it to release the said loose hub and permit the clutch to operate and effect the engagement of the gear A^5 with and to rotate the said sleeve B^{10} , substantially as described.

6. In a heeling-machine, the intermittingly-rotating cam-shaft A^9 , the cam b , normally loose thereon to actuate the top-lift carrier, and the connected cam-plate b^4 , combined with the locking device and means to move it, and with a locking-dog to hold the said cam fixedly when the locking device is moved to free the cam from the said shaft, substantially as described.

7. In a heeling-machine, the shaft A^6 , its two pinions, the toothed gears B^2 and A^5 , engaged and rotated by the said pinions, and the shaft A^6 and its pinion A^7 , combined with the gear A^{8x} , the gears B^2 and A^{8x} being normally loose on the trimmer and cam shafts, and with the friction or brake wheel B^{22} and the brake co-operating therewith, substantially as described.

8. In a heeling-machine, the cam-shaft A^9 and a loose cam-ring, as b^{12} , having a cam projection f^2 , the locking device located between the said ring and shaft, and means to move it, the trimmer-shaft, the rotating gear B^2 thereon, and clutch mechanism between the said gear and trimmer-shaft, combined with intermediate devices between the said loose cam-ring and the said clutch to release and to stop the hub of the clutch when it is desired to start or stop the rotation of the trimmer-shaft, substantially as described.

9. In a heeling-machine, the cam-shaft A^9 , the cam-plate b^4 , the auxiliary cam-plate b^6 , the sleeve B^{10} , having an eccentric, the link N^4 , the toggle-joint to which it is connected, the die-bed spindle, the rotating wheel A^5 , and the clutch device having a loose hub provided with two projections, combined with the shaft A^6 and the controlling device or lever having an arm provided with toes 17 18 and acted upon by the said cams, substantially as and for the purpose described.

10. In a heeling-machine, the die-bed spindle, its toggle-joint, the link h , arm h^2 and cam-hub d^2 , and the rotating wheel or gear A^{8x} , the cam-shaft, and the clutch mechanism between the said gear and cam-shaft, combined with the arm g and means between it and the said cam-hub to release the hub of the clutch mechanism to start the cam-shaft

and to arrest the hub of the clutch mechanism to stop the cam-shaft at the desired time in the operation of the machine, substantially as described.

5 11. In a heeling-machine, the cam-shaft having the key-seat, a locking device made as a key to slide in the said seat, the cams b and b^4 , and auxiliary cam b^6 , combined with the cam-ring b^{12} , having its hub grooved to
10 be engaged at different times by different portions of the said locking device, according to its position in the key-seat of the said cam-shaft, substantially as described.

12. In a heeling-machine, a die-bed spindle,
15 its toggle-links, the connecting-rod, the shaft A^6 , the intermittingly-rotating sleeve carry-

ing the eccentric for moving the said die-bed spindle, and a clutch mechanism and a controlling-lever to permit the clutch to engage and effect the rotation of the said sleeve, combined with the cam-shaft and a cam, as b^4 , and an auxiliary cam b^6 , to operate substantially as described. 20

In testimony whereof we have signed our names to this specification in the presence of
25 two subscribing witnesses.

CHARLES W. GLIDDEN.
ALVIN D. ELLIOTT.
GEORGE E. FELLOWS.

Witnesses:

WM. H. J. FITZ GERALD,
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