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T. GILL.

MACHINE FOR TRUING JEWEL SETTINGS.

No. 485,410. Patented Nov. 1, 1892.

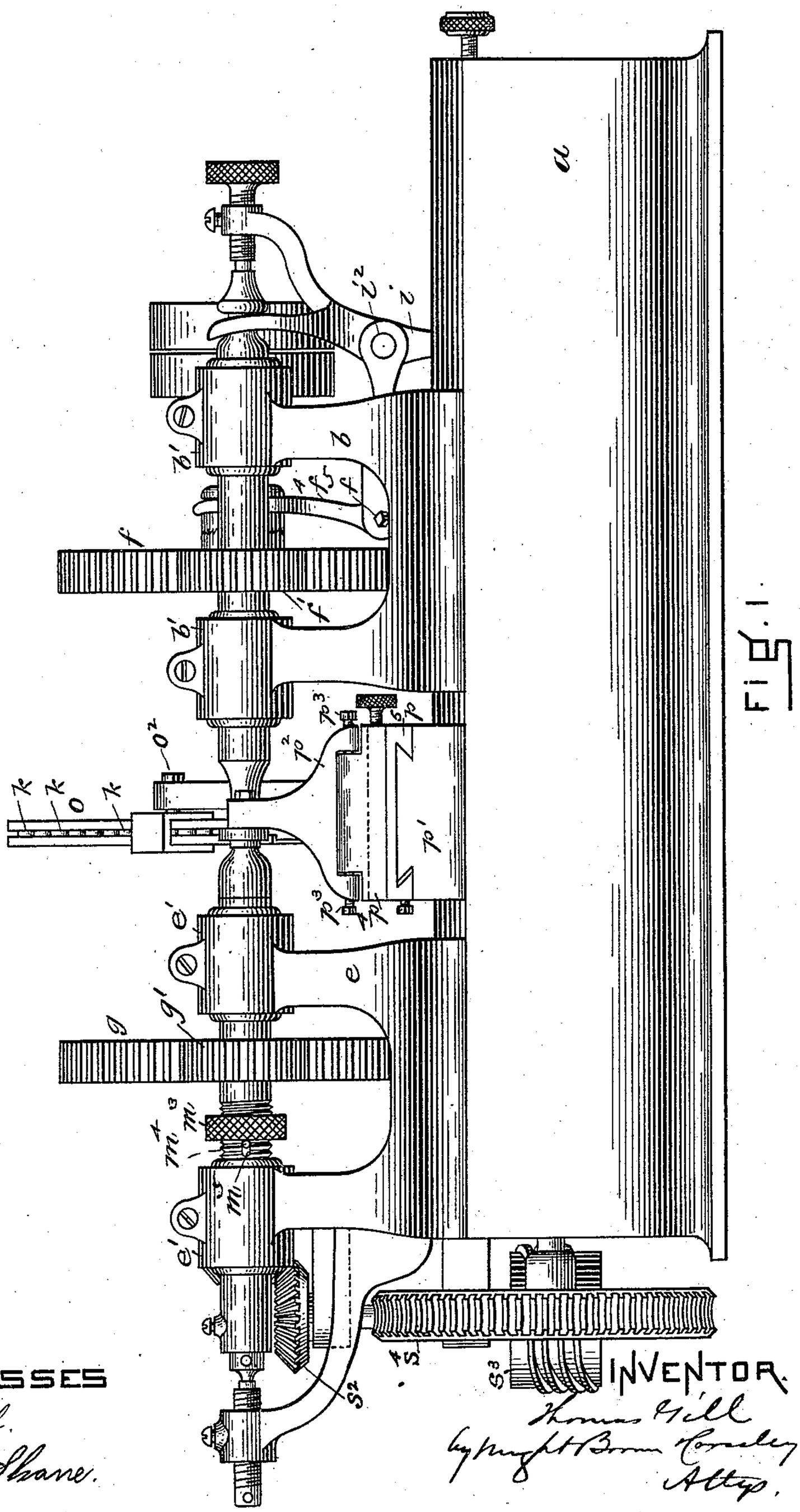

Fig. 1.

WITNESSES

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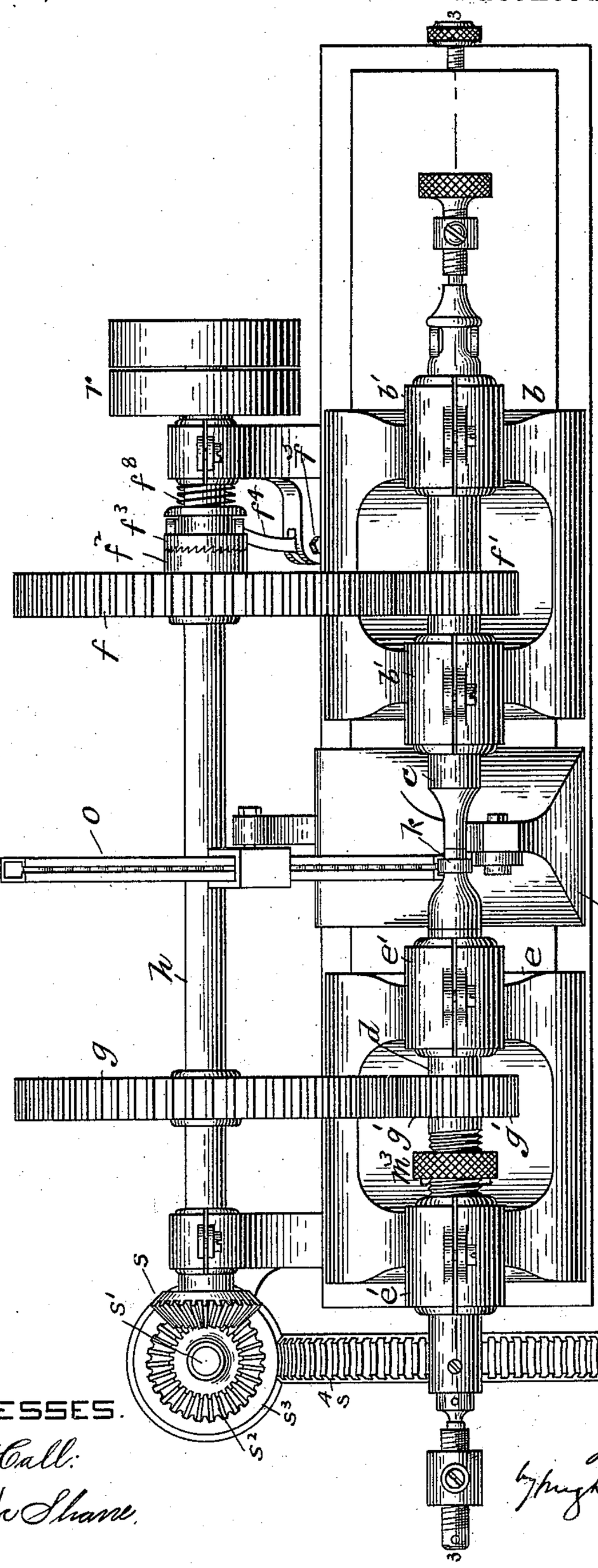

Fig. 2.

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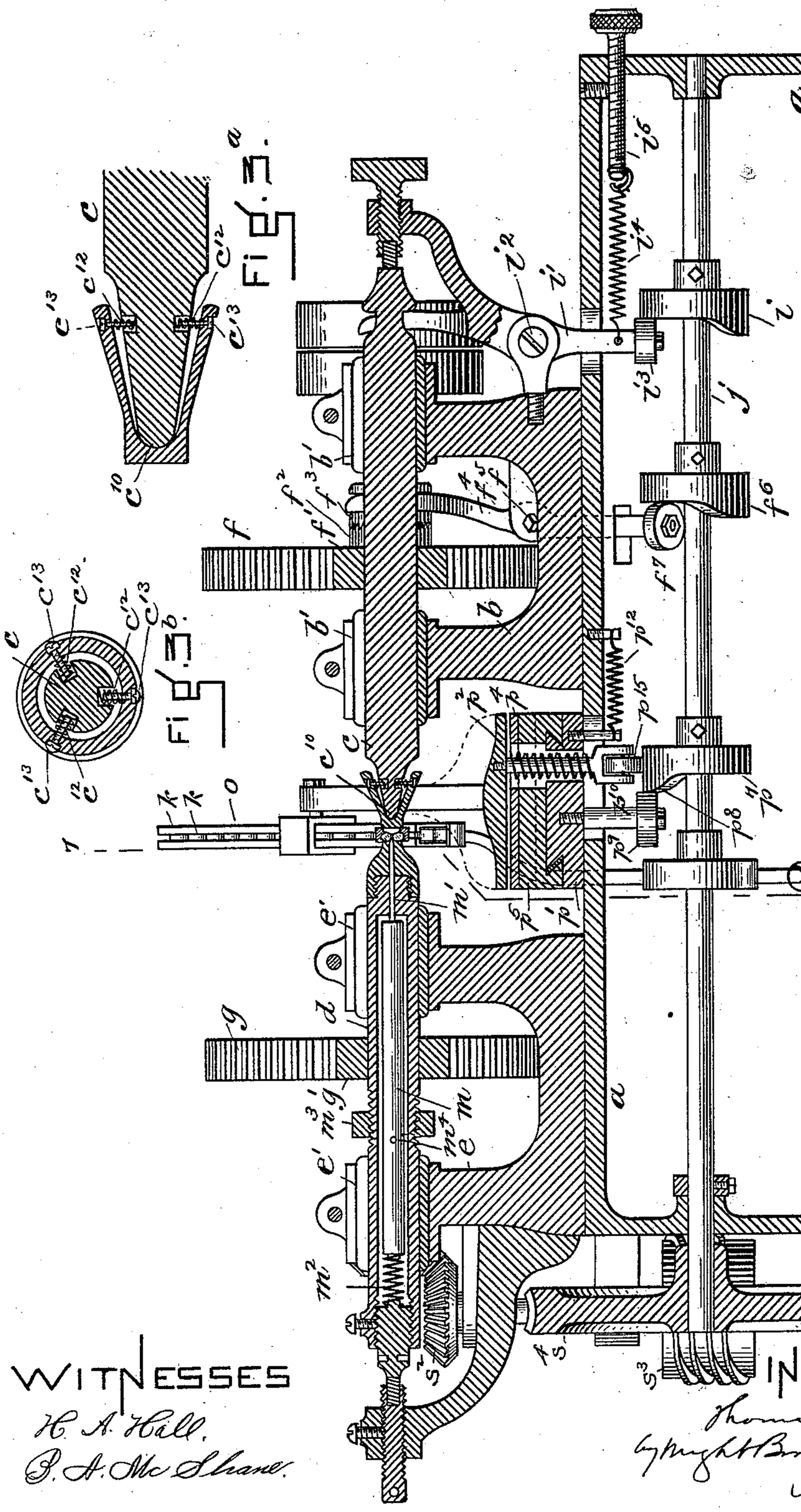

Fig. 3.

Fig. 3a.

Fig. 3b.

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MACHINE FOR TRUING JEWEL SETTINGS.

No. 485,410. Patented Nov. 1, 1892.

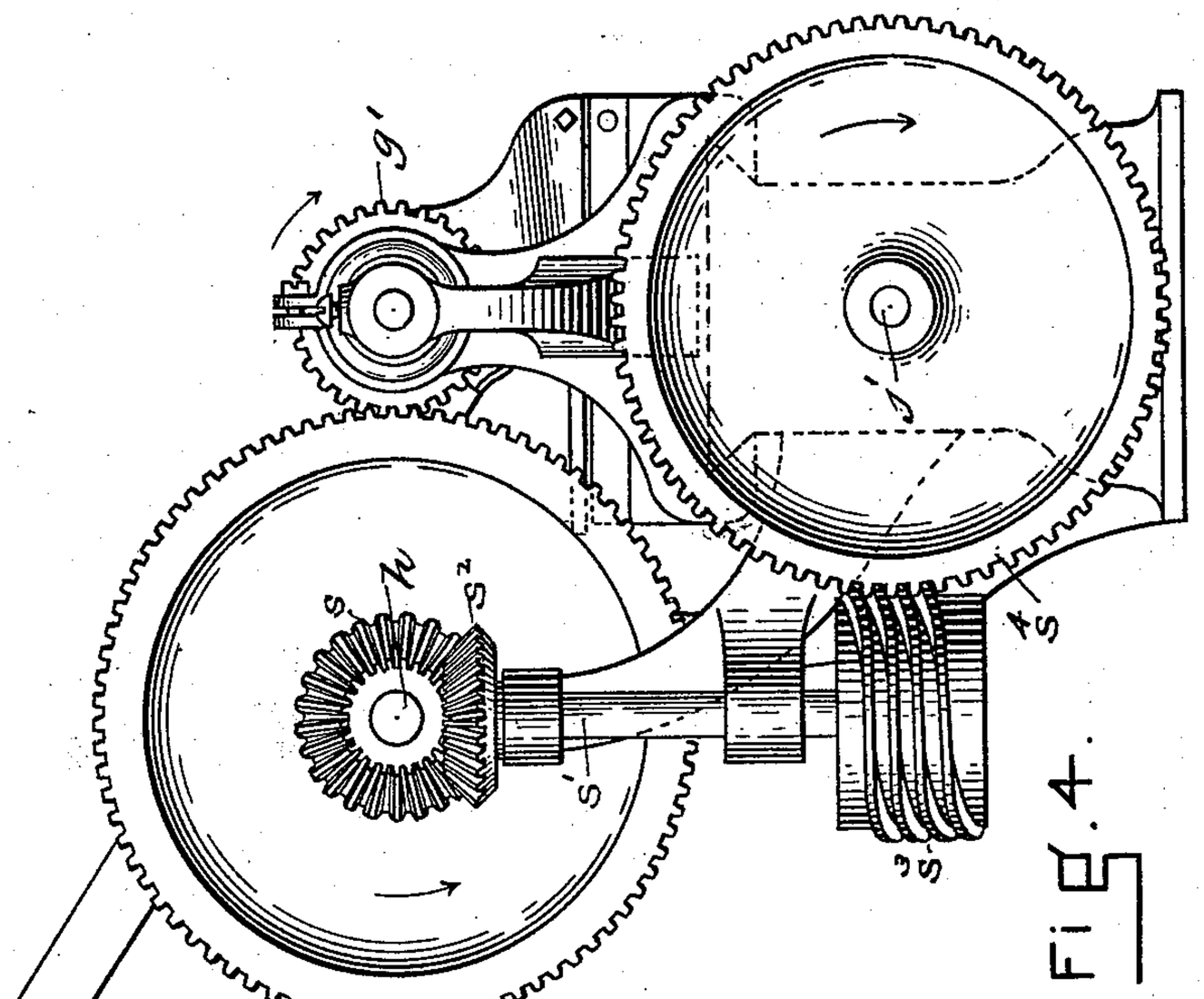

Fig. 4.

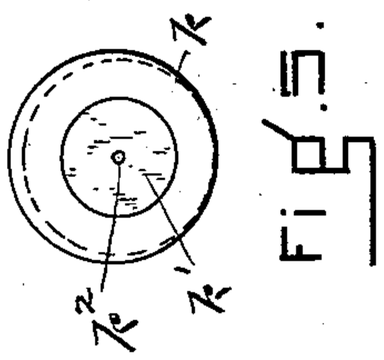

Fig. 5.

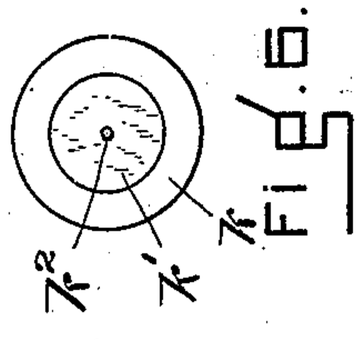

Fig. 6.

WITNESSES

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MACHINE FOR TRUING JEWEL SETTINGS.

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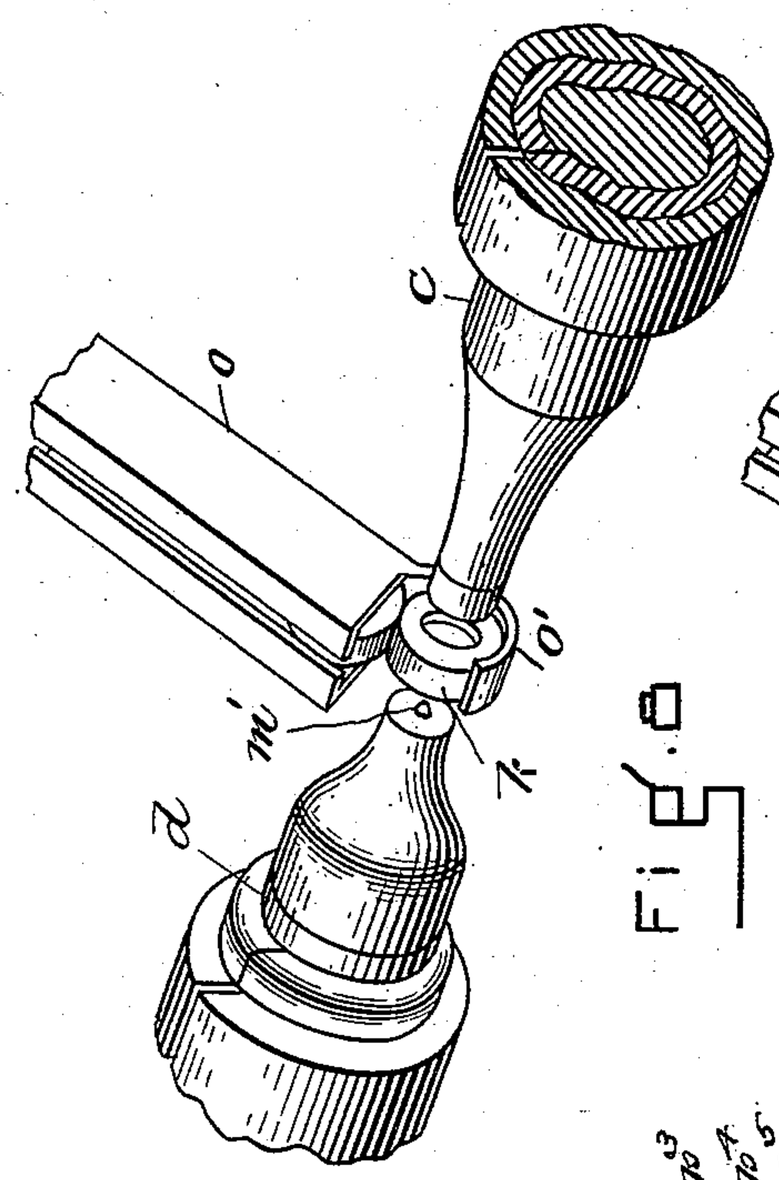

Fig. 8.

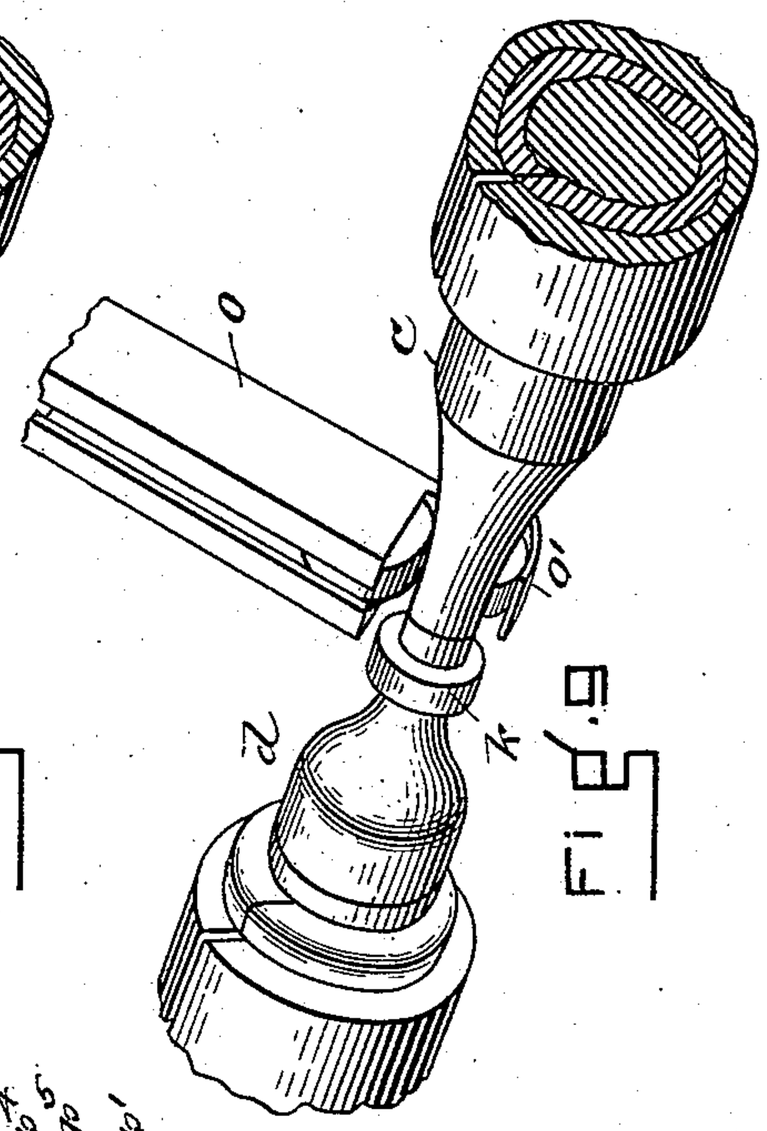

Fig. 9.

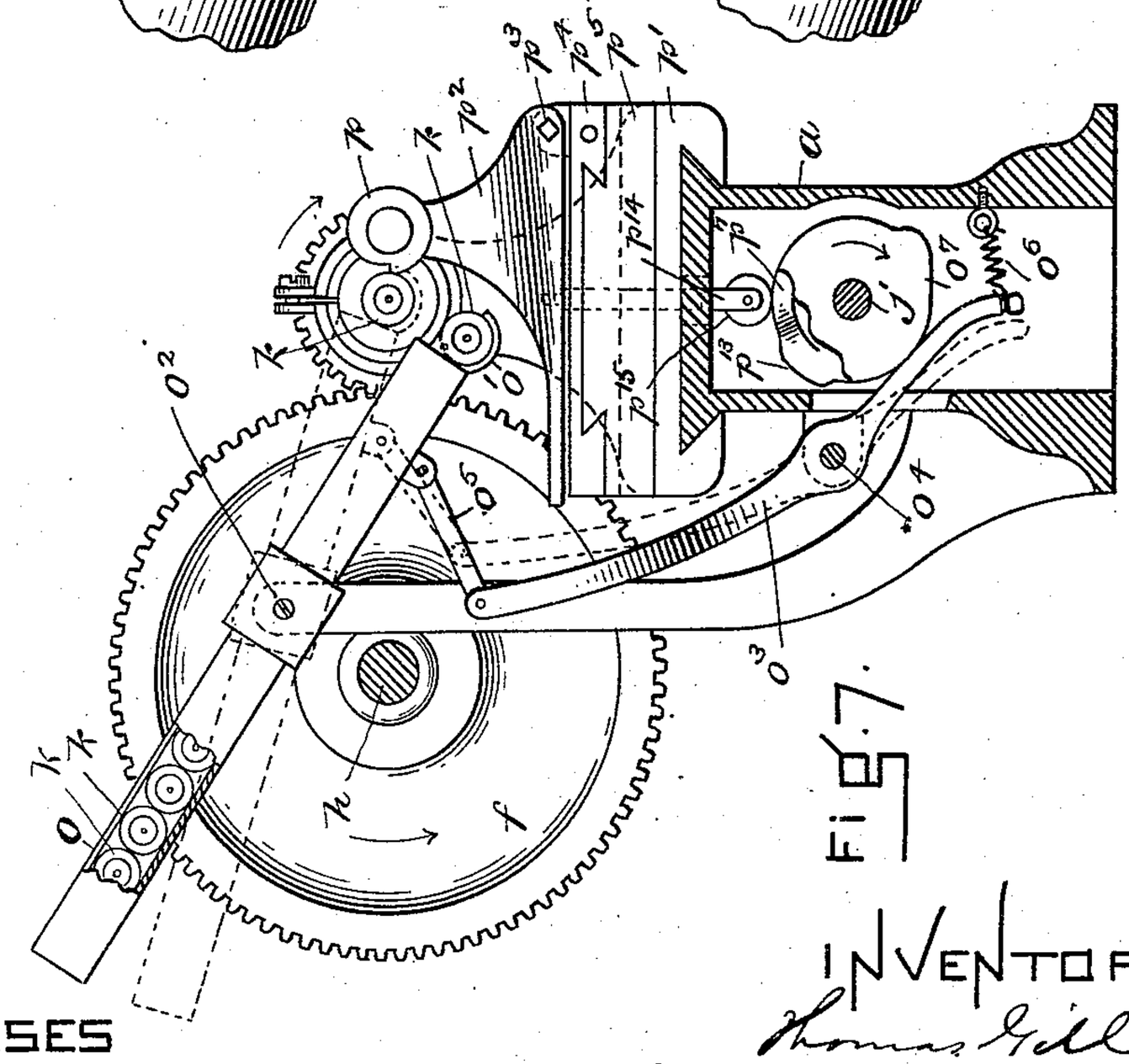

Fig. 7.

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UNITED STATES PATENT OFFICE.

THOMAS GILL, OF WALTHAM, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO JOHN STARK, OF SAME PLACE.

MACHINE FOR TRUING JEWEL-SETTINGS.

SPECIFICATION forming part of Letters Patent No. 485,410, dated November 1, 1892.

Application filed March 28, 1892. Serial No. 426,742. (No model.)

To all whom it may concern:

Be it known that I, THOMAS GILL, of Waltham, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Machines for Truing Jewel-Settings, of which the following is a specification.

This invention has for its object to provide a machine adapted to turn the periphery of a watch-jewel setting in such manner as to make said periphery absolutely true and concentric with the arbor-receiving orifice formed in the jewel.

In preparing jewels for application to watch and clock movements the jewel, which has been previously drilled to receive the arbor, is inserted in a metal setting of cylindrical form, said setting being suitably compressed or upset at its ends to engage it with the jewel. Heretofore much difficulty has been experienced in locating the orifice in the jewel at the exact center of the periphery of the setting, or, in other words, providing the jewel with a setting the periphery of which is absolutely concentric with the orifice in the jewel.

My invention consists in the improvements hereinafter described, whereby the jewel and its setting are centered by the orifice in the jewel preparatory to the operation of turning off the periphery of the setting, so that said periphery will be formed concentric with said orifice, as I will now proceed to describe.

In the accompanying drawings, forming part of this specification, Figure 1 represents a front elevation of a machine embodying my invention. Fig. 2 represents a top view of the same. Fig. 3 represents a section on line 3 3, Fig. 2. Figs. 3^a and 3^b represent enlarged sectional views. Fig. 4 represents an end view of the machine. Figs. 5 and 6 represent end views of a jewel and its setting, on an enlarged scale, Fig. 5 showing the setting with its periphery eccentric to the orifice in the jewel, while Fig. 6 shows the setting after it has been trued by the action of my improved machine. Fig. 7 represents a section on line 7 7, Fig. 3, looking toward the right. Fig. 8 represents a perspective view showing the chucks or centers which engage the jewel and setting, said chucks being shown as separated and a jewel and setting interposed between them. Fig. 9 represents a perspective view of the parts shown in Fig. 8, showing the setting grasped by the centers and ready for the turning or truing operation.

The same letters of reference indicate the same parts in all the figures.

In the drawings, *a* represents the supporting frame or base, to which is affixed a frame *b*, having bearings *b' b'*, in which is journaled a spindle *c*, said spindle being adapted to both rotate and move lengthwise in said bearings.

d represents another spindle, which is located in a line with the spindle *c* and is journaled in bearings *e' e'* on a frame *e*, which is affixed to the bed *a*. The spindles *c* and *d* are both positively rotated in the same direction by means of gears *f g*, affixed to a shaft *h*, and pinions *f' g'*, affixed, respectively, to the spindles *c* and *d* and meshing, respectively, with the gears *f* and *g*. The spindle *c* is movable endwise toward and from the spindle *d*, its endwise movement being effected by means of a cam *i*, affixed to a shaft *j*, a lever *i'*, pivoted at i^2 to an ear affixed to the frame *b*, said lever being engaged at its upper end with the spindle *c* and provided at its lower end with a trundle-roll i^3, bearing against one side of the cam *i*, and a spring i^4, connected at one end with lever *i'* and at its opposite end with an adjusting-screw i^5, engaged with the supporting-bed *a*. The cam *i* is formed to give the spindle *c* a movement through the lever *i'* in the direction indicated by the arrow in Fig. 3, thus moving the spindle *c* away from the spindle *d*. When the projecting part of the cam *i* recedes from the roll i^3, the spring i^4 moves the lever *i'* and spindle *c* to the position shown in Fig. 3, thus causing the spindle *c* to co-operate with the spindle *d* in grasping a jewel-setting.

To prevent the spindle *c* from rotating when it is withdrawn or moved backwardly, I make the gear *f*, that communicates motion from the shaft *h* to said spindle, normally loose upon said shaft and provide a clutch member f^2 on the hub of the gear *f*, a sliding clutch member f^3, which is engaged with the shaft *h* by means of a key or feather, so that it necessarily rotates with the shaft and is free to slide thereon, a lever f^4, pivoted at f^5 to a fixed support, one end of said lever being bifur-

cated and engaged with a groove in the sliding clutch member, a cam f^6, affixed to the shaft j, said cam bearing against a trundle-roll f^7 on the lever f^4, and a spring f^8, Fig. 2, arranged to normally engage the sliding clutch member f^3 with the clutch member f^2. The cam f^6 is timed so that when the spindle c is moved outwardly said cam will act on the lever f^4 in such manner as to separate the sliding clutch member f^3 from the member f^2, so that the rotary movement of the spindle c will cease. When the spindle c moves back to its operative position, the cam f^6 releases the lever f^4 and permits the spring f^8 to connect the clutch members f^3 f^2.

m represents a rod which is movable lengthwise within the spindle d, the latter being hollow, as shown in Fig. 3, and is provided at one end with a centering-pin m', which projects through an orifice in the end of the spindle d and is made conical at its outer end, which is reduced to a fine point in order that it may enter the orifice k^2 in the jewel k', inclosed by the setting k. (See Figs. 5 and 6.) The rod m is pressed lengthwise, so as to normally project the centering-pin m' from the end of the spindle d by means of a spring m^2, Fig. 3. The extent to which the outer end of the centering-pin projects from the end of the spindle d may be determined by means of an adjusting-nut m^3, engaged with a threaded portion of the exterior of the spindle d and a pin m^4, which passes through the rod m and through slots m^5, Fig. 1, in the spindle d, said pin bearing upon one side of the nut m^3, as shown in Figs. 1 and 2, and being held in contact with said nut by the spring m^2. By turning said nut in one direction or the other the centering-pin may be caused to project more or less, as will be readily seen. The pointed end of the pin m' is adapted to enter the orifice in the jewel, which, with its setting, is interposed between the spindles c d, as hereinafter described, and thus center the jewel or locate it so that its orifice will be exactly in the axial line of the spindles c d, the centering-pin being supported laterally by the spindle d by the closeness of its fit in the orifice of said spindle, so that its pointed end in entering the orifice in the jewel is capable of giving the jewel and its setting the slight lateral movement that may be required to bring the orifice of the jewel into exact coincidence with the axial line of the spindles c d.

o represents a chute for the reception of a number of jewel-containing settings k. Said chute is formed as indicated in Figs. 1, 7, 8, and 9 and provided at its lower end with a trough o', which is open at its sides and is adapted to contain the lowest setting in the column or procession in the chute, the latter being inclined, so that the settings will enter the trough o' by gravitation. The chute o is oscillated by mechanism presently described, so that the trough o' will alternately stand between the spindles c d, as shown in Fig. 8, and below said spindles, as shown in Figs. 7 and 9, the chute being elevated to the position shown in Fig. 8 when the spindle c is withdrawn, and depressed to the position shown in Figs. 7 and 9 after the spindle c is moved forward to its operative position. It will be seen that the trough b' is formed to permit the spindle c in moving forward to its operative position to move the jewel-setting k in said trough laterally into contact with the end of the spindle d and the centering-pin m', projecting therefrom, as shown in Fig. 9. After this operation the chute o swings downwardly and the column of settings is moved by gravitation, so that the next setting in the chute falls into the trough o', and is there arrested until the chute again assumes the position shown in Fig. 8.

The mechanism for oscillating the chute o, as here shown, is as follows: The chute is pivoted at o^2 to a fixed standard on the supporting-frame. o^3, Fig. 7, represents a lever which is pivoted at o^4 to a fixed support and is connected at its upper end with the chute by a link o^5. The lower portion of the lever o^3 is held by a spring o^6 in contact with a cam o^7, affixed to the shaft j. Said cam is so formed and timed that it moves the lever o^3 to the position shown in dotted lines in Fig. 7, and thus raises the lower end of the chute when the spindle c is withdrawn, and then permits the spring o^6 to restore the lever to the position shown in full lines, thus depressing the chute after the setting has been engaged with the spindles and centering-point. When a jewel-setting is grasped and rotated by the spindles c d, its periphery is turned off and made concentric with the orifice in the jewel by means of a cutter p, supported by a slide p', which is movable lengthwise of the spindles c d on the bed a, so that the cutter commences to act at one edge or side of the setting and moves along the periphery thereof to the opposite edge or side in a direction parallel with the axis of the setting. The cutter p is attached directly to a lever p^2, which is pivoted at p^3 to an ear on a slide p^4. Said slide is adapted to move lengthwise of the spindles c d on another slide p^5, which is adapted to move crosswise of said spindles on the slide p'. The object of the slides p^4 p^5 is simply to permit the cutter to be adjusted both toward and from the axis of the work and parallel therewith. The slide p' is moved to carry the cutter along the work, as above described, by means of a cam p^8 on a disk or body p^7, affixed to the shaft j, said cam acting on a roll p^9 on a stud p^{10}, affixed to the slide p'. A spring p^{12}, attached at one end to a stud on the slide p' and at the other end to a fixed support, gives the slide p' and cutter p their return movement when the cam p^8 retreats. The object of the pivoted lever or arm p^2, which directly supports cutter p, is to enable said cutter to be raised during its return movement. This result is accomplished by means of a cam p^{13}, Fig. 7, on the disk p^7, and a stud p^{14}, affixed

to the lever p^2 and provided with a roll p^{15}, bearing on the disk p^7 and arranged to be raised by the cam p^{13}, said cam being timed to raise the lever p^2 and cutter p while the slide p' is being moved by the spring p^{12}.

The machine may be driven by a belt running from a driving-shaft on a pulley r on the shaft h and suitable connections between the shafts h and j, said connections comprising a bevel-gear s on shaft h, a shaft s', having a bevel-gear s^2, meshing with s, a worm s^3, affixed to shaft s', and a worm-gear s^4, affixed to shaft j and meshing with said worm.

The operation is as follows: The spindle c being retracted, the chute o is raised, as in Fig. 8, thus interposing a setting and its contained jewl between the two spindles. The spindle c is then advanced, as shown in Fig. 9, and thus caused to move the setting into contact with the spindle d and engage the orifice of the jewel with the centering-pin, so that the jewel is centered while it is being clamped between the spindles. The jewel-setting is now grasped and rotated by the spindles and the lower end of the chute falls, thus permitting another setting to drop into the trough o' for the next operation. The cutter p now advances along the periphery of the rotating setting and turns the same to the required diameter, leaving the periphery exactly concentric with the hole in the jewel. When the turning operation is completed, the cutter p is raised and returned to its starting-point, the spindle c being at the same time withdrawn and releasing the completed setting. This completes one cycle of movement, which is repeated with every jewel-setting.

I do not limit myself to the details of mechanism here shown, and may vary the same in many particulars without departing from the spirit of my invention, an essential feature of which is a device to insure the coincidence of the orifice in the jewel with the axis or center of rotation of the device which rotates the jewel and setting and presents the periphery of the setting to a cutter.

Figs. 3, 3^a, and 3^b show the spindle c, provided with a self-adjusting or rocking tip c^{10}, which bears against one side of the jewel-setting and is adapted to rock or tip to a sufficient extent to conform to any variation in the thickness of the setting. It sometimes happens that the sides of a jewel-setting are not exactly parallel, so that the setting would be thicker at one part than at another. It is therefore important to have the bearing-surface of one of the spindles self-adjusting, so that a firm bearing of both spindles on the opposite sides of the setting may be insured. To this end I reduce the body of the spindle, as shown in Figs. 3 and 3^a, and give the reduced portion a tapering form. On the reduced portion I place the tip c^{10}, which has an internal cavity adapted to receive the said reduced portion, said cavity having a greater taper than the reduced portion, so that the tip can rock or oscillate, and thus enable its outer end to occupy various inclinations. The tip c^{10} is normally held with its outer end in a vertical position by means of springs c^{12}, interposed between the rear end of the tip and the reduced portion of the spindle, said springs being supported by rods c^{13}, the inner ends of which bear upon the reduced portion of the spindle, while their outer ends are free to play in orifices formed in the tip.

I claim—

1. In a machine for truing jewel-settings, the combination, with two jewel grasping and rotating spindles in line with each other, of a centering device supported by one of said spindles and adapted to engage the orifice of a jewel and cause the same to coincide with the axis of rotation of the said devices and a cutter to which the setting is presented by said devices, as set forth.

2. In a machine for truing jewel-settings, the combination of two spindles adapted to grasp between them and rotate a jewel-setting, a centering-pin supported by one of said spindles and adapted to engage the orifice of a jewel, the spindle supporting the centering-pin having no other projection outside the radial line of the end of the said pin, and a cutter arranged to act on a setting rotated by said spindles, as set forth.

3. In a machine for truing jewel-settings, the combination of a spindle, a centering-pin longitudinally movable in said spindle and yieldingly projected therefrom, another spindle arranged in a line with the first-mentioned spindle and adapted to co-operate therewith in grasping and rotating a jewel-setting and in engaging the orifice in the jewel with said centering-pin, and a cutter arranged to act on the rotating setting, as set forth.

4. In a machine for truing jewel-settings, the combination of a spindle, a centering-pin longitudinally movable in said spindle and yieldingly projected therefrom, a longitudinally-movable spindle arranged to co-operate with the centering-pin in centering a jewel and its setting and with the other spindle in grasping and rotating the centered setting, and a cutter to which the setting is presented by said spindles, as set forth.

5. In a machine for truing jewel-settings, the combination of a spindle, a centering-pin longitudinally movable in said spindle and yieldingly projected therefrom, a longitudinally-movable spindle arranged to co-operate with the centering-pin and with the other spindle, as described, a carrier, substantially as described, for presenting the settings to said spindles, and a cutter to which the settings are presented by the spindles, as set forth.

6. In a machine for truing jewel-settings, the combination of a hollow spindle, a spring-pressed centering-pin movable longitudinally in said spindle and located in the axial line thereof, another spindle movable longitudinally with its axis in line with the centering-pin, mechanism for rotating said spindles, a

pivoted chute adapted to contain a series of settings, a cutter arranged to act on a setting rotated by said spindles, and operating devices, substantially as described, whereby the chute is oscillated, the movable spindle is moved lengthwise toward and from the hollow spindle, and the cutter is moved along the work.

7. The combination, with the spindle having the centering-pin, of the co-operating spindle having a rocking or self-adjusting tip adapted to conform to the inclined sides of a setting, said tip having a tapered cavity fitting over the end of its spindle, and springs interposed between the sides of the spindle and the inside of the cavity.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 19th day of March, A. D. 1892.

THOMAS GILL.

Witnesses:
JOHN STARK,
C. F. BROWN,