

(No Model.)

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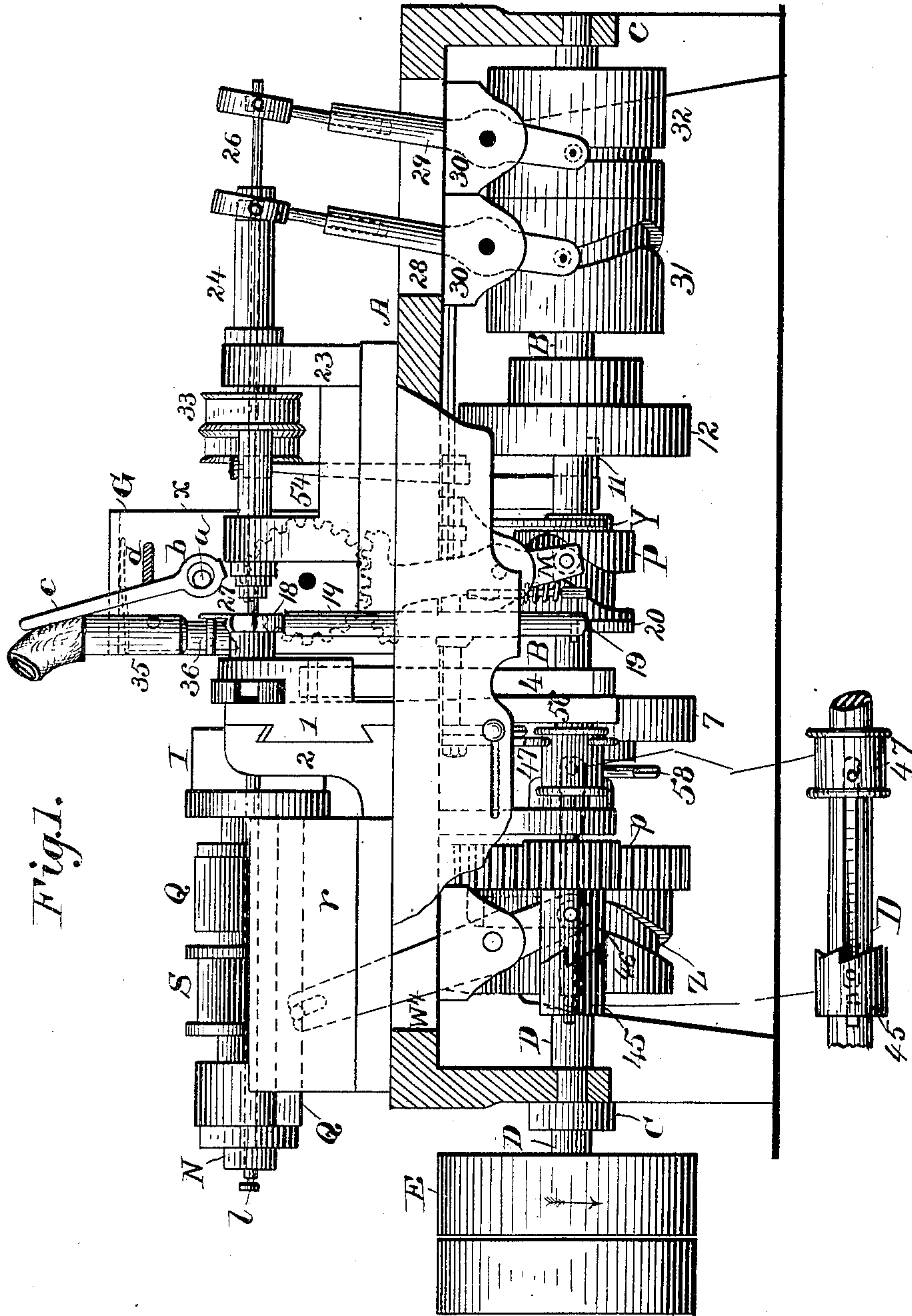
J. C. DAVIS, Dec'd.

C. A. DAVIS, Administratrix.

MACHINE FOR MAKING CIGARETTE MOUTH PIECES.

No. 324,923.

Patented Aug. 25, 1885.



Witnesses
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H. Wilber

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Administratrix
of
Inventor
Job C. Davis
By *Daniel Breed*
Attorney

(No Model.)

4 Sheets—Sheet 2.

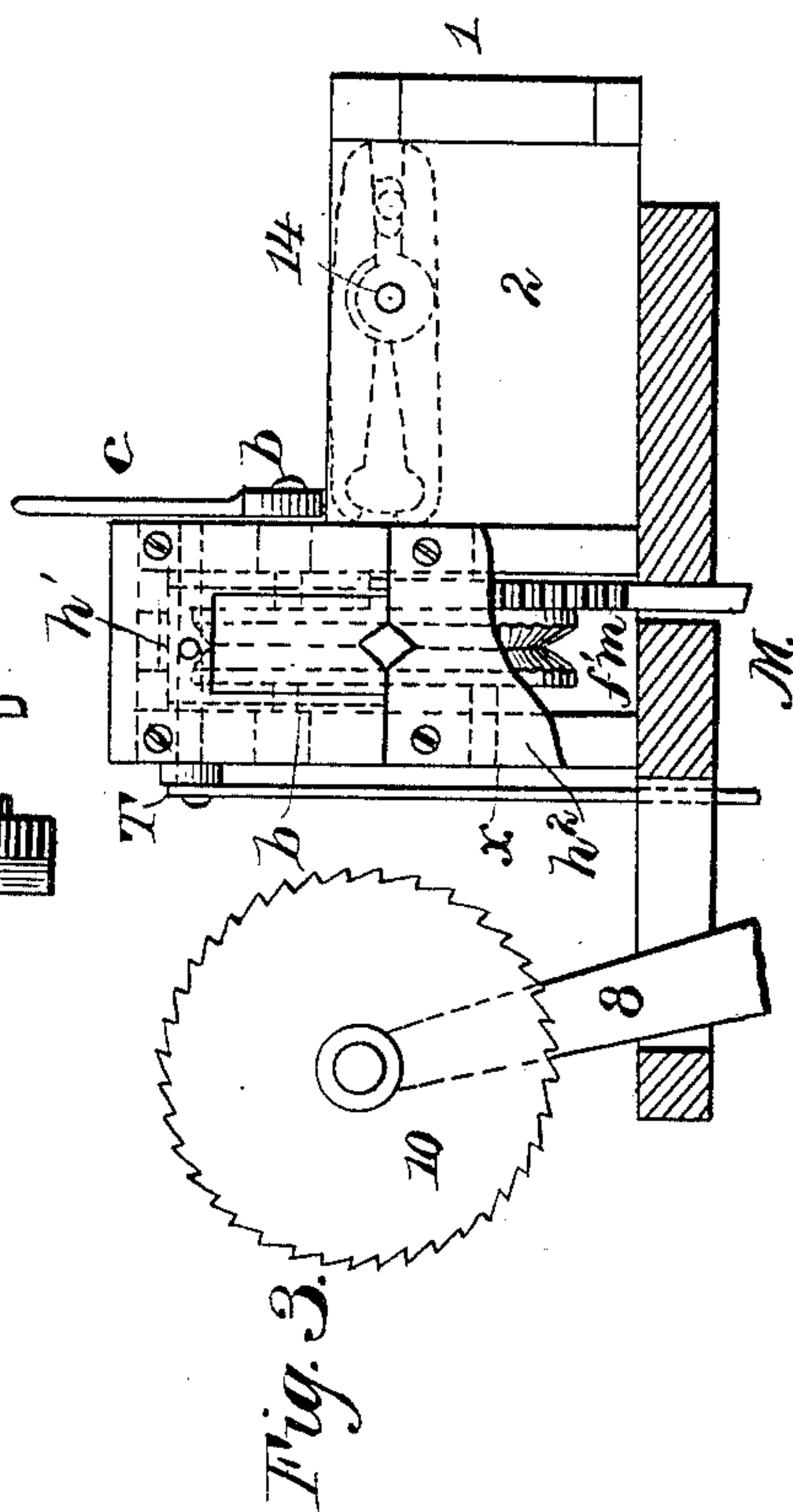
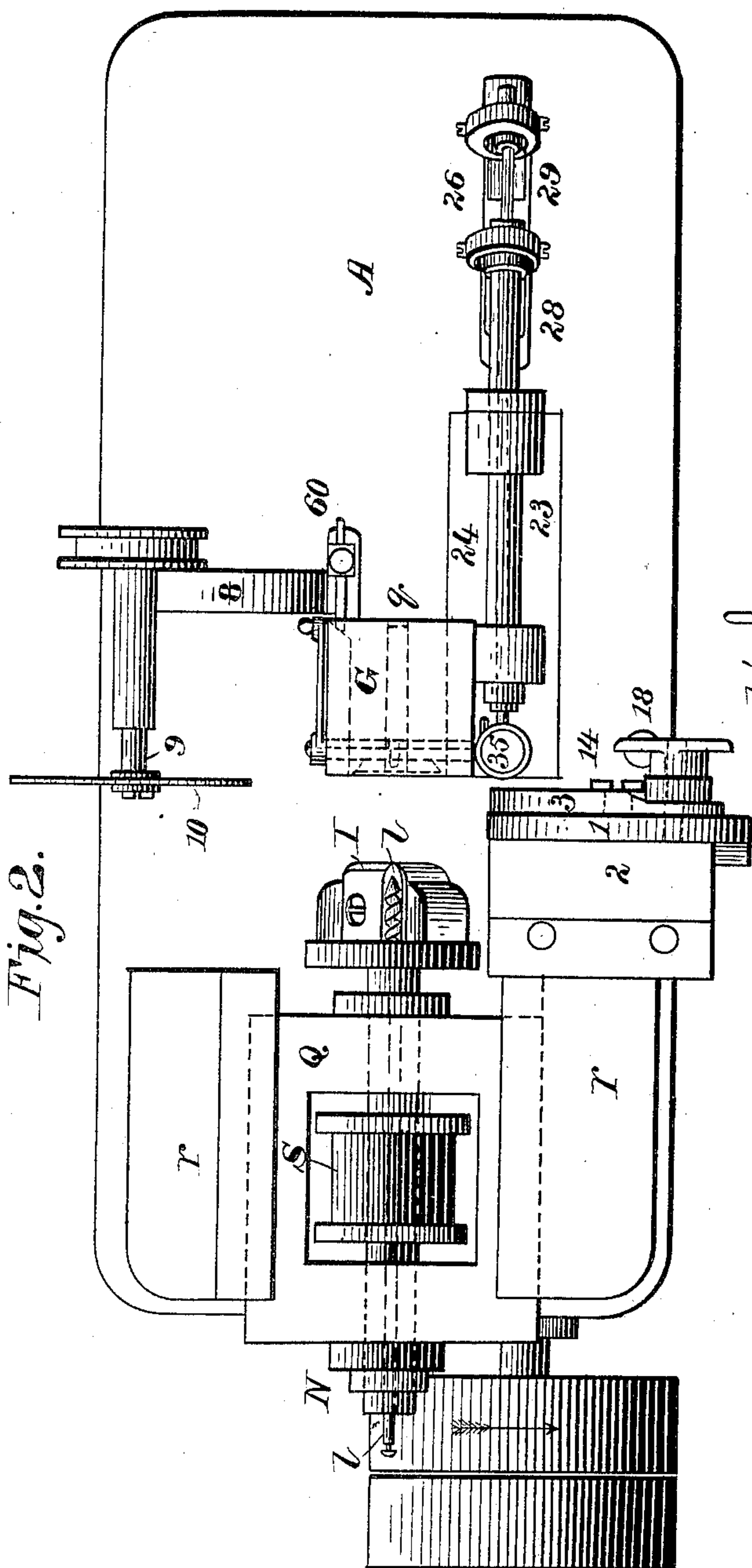
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WITNESSES

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4 Sheets—Sheet 3.

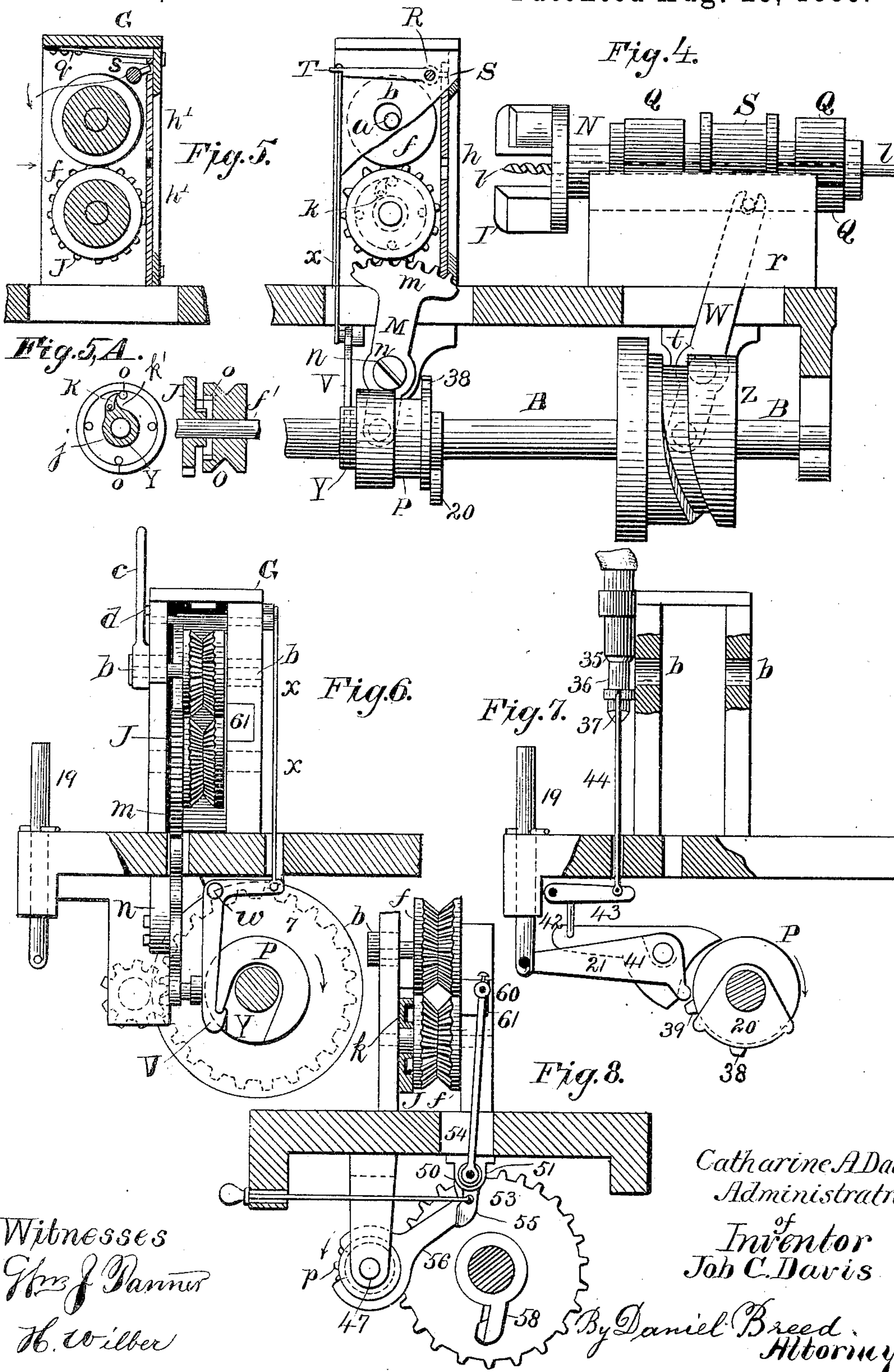
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4 Sheets—Sheet 4.

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Fig. 9.

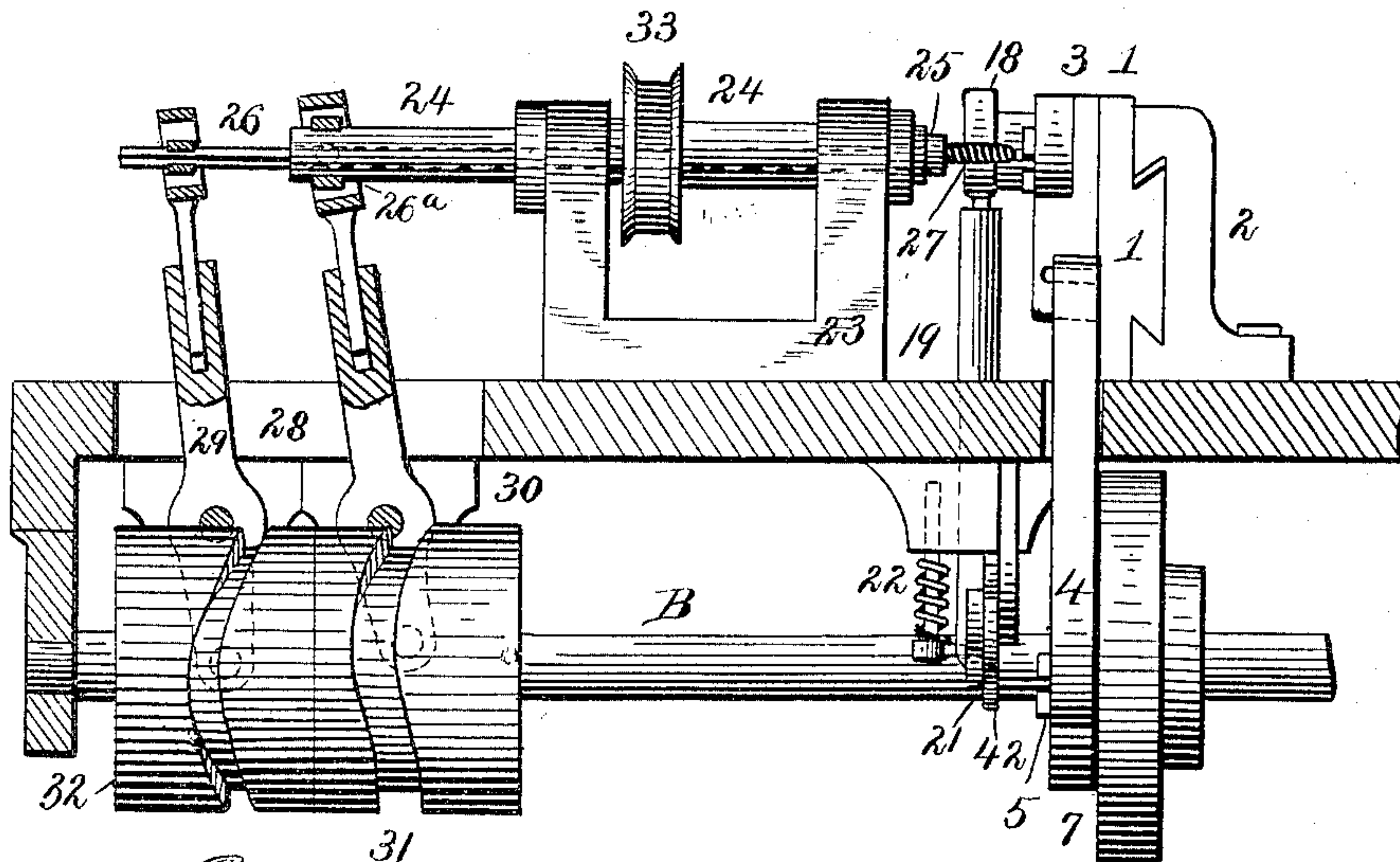


Fig. 10.

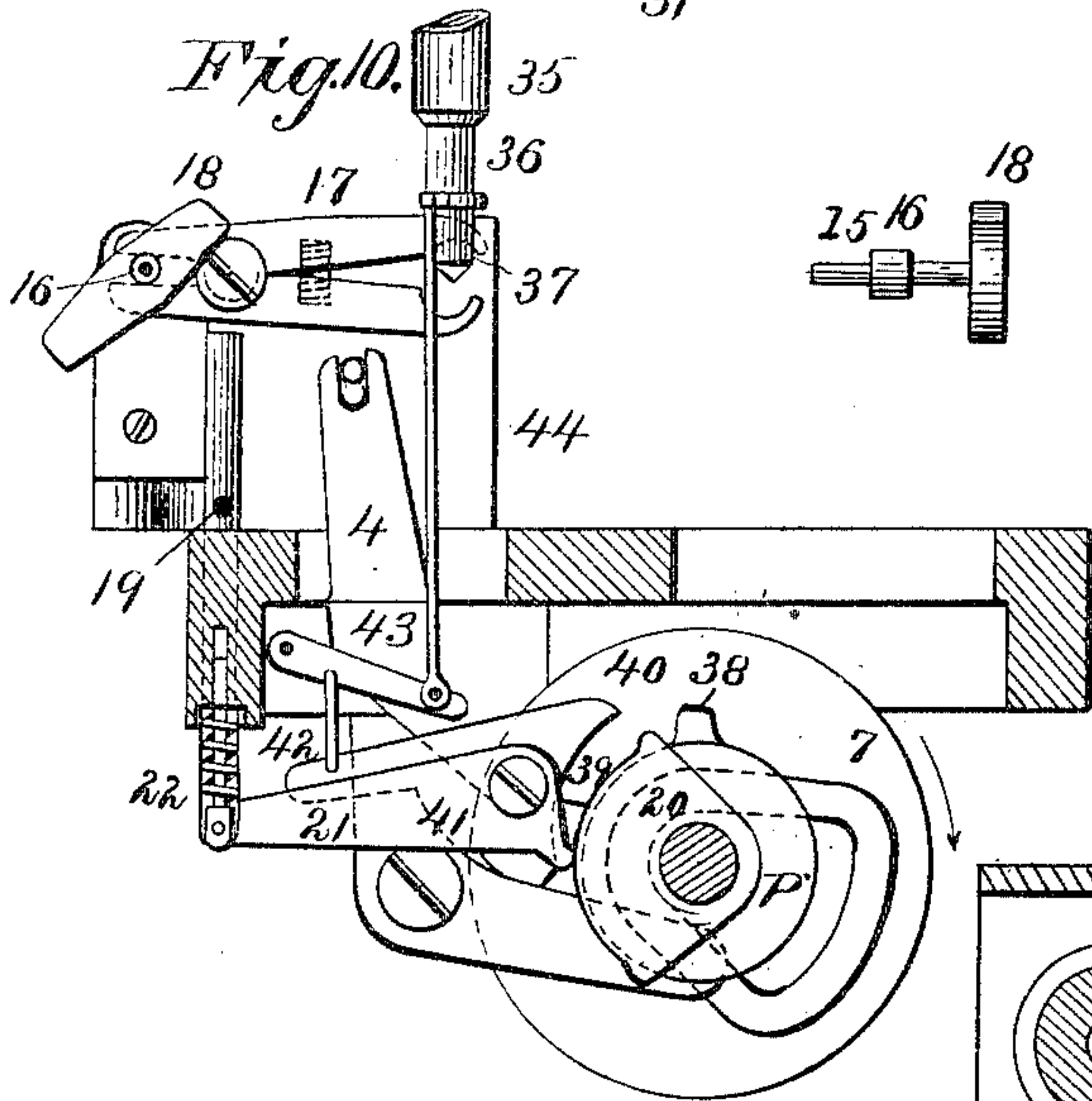


Fig. 11.

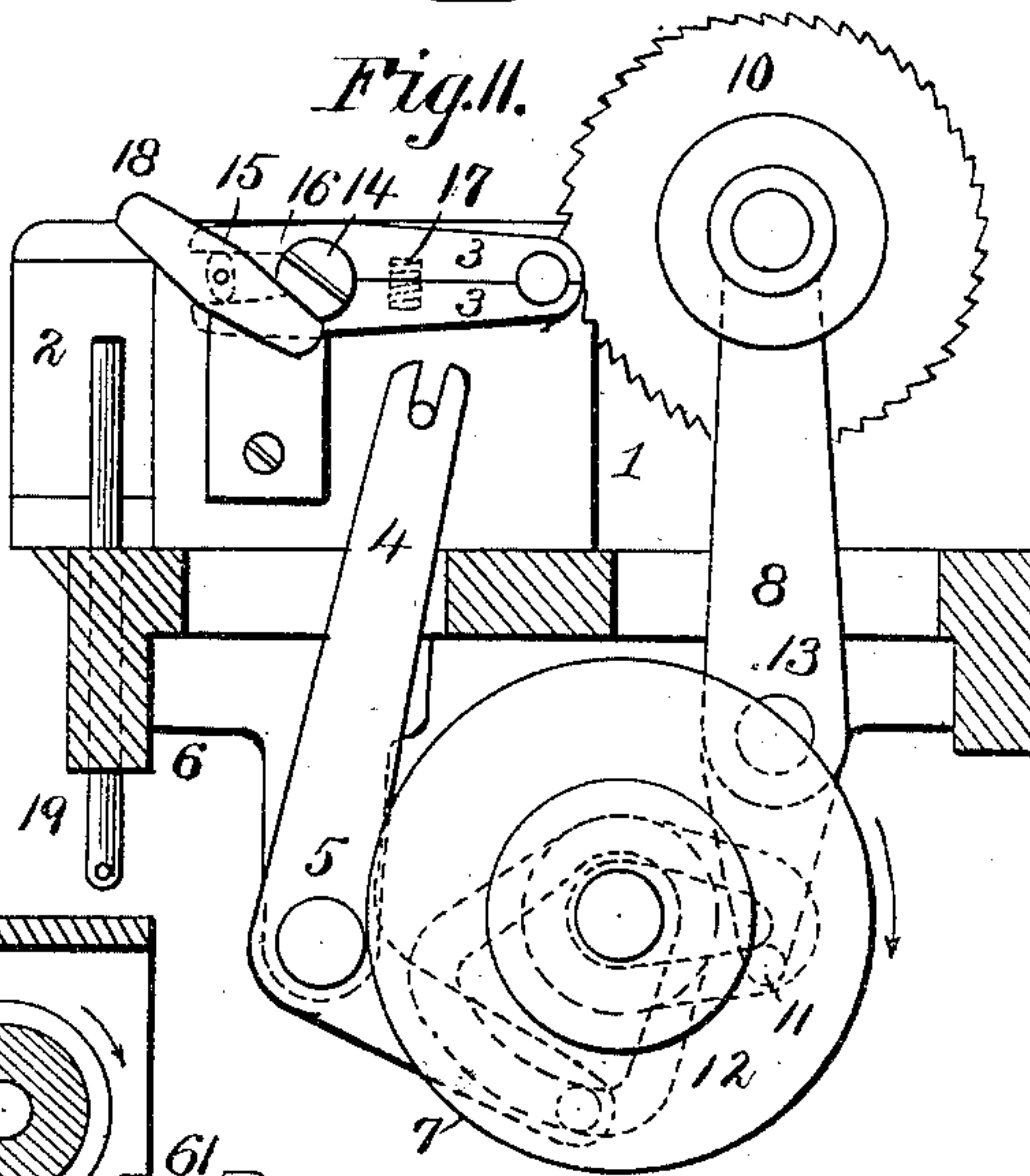
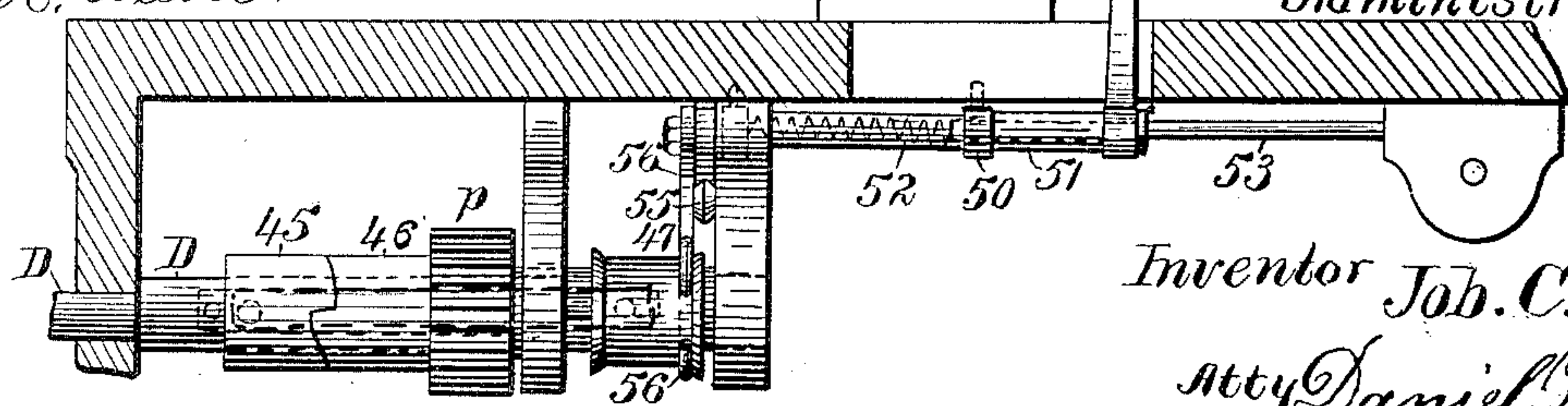


Fig. 12.



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UNITED STATES PATENT OFFICE.

CATHERINE A. DAVIS, OF SAN FRANCISCO, CALIFORNIA, ADMINISTRATRIX
OF JOB C. DAVIS, DECEASED.

MACHINE FOR MAKING CIGARETTE MOUTH-PIECES.

SPECIFICATION forming part of Letters Patent No. 324,923, dated August 25, 1885.

Application filed April 10, 1885. (No model.)

To all whom it may concern:

Be it known that I, CATHERINE A. DAVIS, administratrix of the late JOB C. DAVIS, formerly (while living) a citizen of the United States, then residing at San Francisco, in the county of San Francisco and State of California, represent that said JOB C. DAVIS during his lifetime did invent certain new and useful Improvements in Machines for Making Cigarette Mouth-Pieces; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

The invention relates to an improved machine for working a piece of wood into a cigarette mouth piece or other article, said strip of wood being fed forward automatically to the cutter-head and cutter for externally shaping said mouth-piece. After these tools recede a pair of jaws move forward to seize and hold the piece of wood, while a second cutter or saw removes a single length from the original longer piece of wood. These jaws then bring the embryo mouth-piece into position for boring the larger end to fit a cigarette. The smaller orifice of the yet unfinished end may be bored at the same time or during the first operation of shaping the piece of wood, and, as the mouth-piece is finished, said jaws release the same, which is now automatically expelled from the machine by an air-blast. When one piece is cut from the original long piece of wood, the machine immediately begins to form a second piece externally, while the cut-off piece is being finished, as above described.

In the accompanying drawings, Figure 1 represents an elevation of the machine, part of the table being broken away. Fig. 2 is a top view of the machine. Fig. 3 is a transverse section. Fig. 4 is a detached view of the feed mechanism and turning-tool for shaping the exterior. Fig. 5 represents the clamping-plate for holding the piece of wood. Fig. 5^a shows the construction of the clutch and its connection with roll *f'*. Fig. 6 shows the means by which the clamping device is oper-

ated. Fig. 7 represents the devices for producing the air-blast. Fig. 8 represents an end view of the stop mechanism for throwing the machine out of gear. Fig. 9 represents the compound boring-bit. Fig. 10 shows the devices for moving the nipper-jaws and the air-blast tube for expelling the finished holder. Fig. 11 represents the devices for moving the supporting and traveling nippers, and for throwing the saw in and out of gear. Fig. 12 is a top front view of the stop devices shown in Fig. 8.

In the drawings, A, Fig. 2, is the table, above which are the working-tools, and below the same is B, the principal shaft, having bearings C C, and being driven by a short counter-shaft, D, provided with pulleys E. Upon this shaft is the clutch, which is operated automatically to stop the machine by throwing the mechanism out of action when a piece of wood is used up and the stub is to be thrown out of the machine, as will be more fully described.

The feeding and clamping devices that receive and first act upon the piece of wood consist of a pair of grooved and properly roughened or serrated feed-rollers, *f f'*, mounted one above the other, in an upright frame, G, on the table A, and behind the throat or opening in a plate, *h*, through which the strip of wood is presented to the forming-tool I. Upon the shaft of one of the grooved rollers is loosely mounted a toothed wheel, J, which is connected to the roller *f'* by means of a pawl, *k*, pivoted on the hub *y* at the side of the wheel J, and a set of pins or studs, *o o*, fixed concentrically within a recess, *j'*, in the side of the feed-roller, so that the pawl shall engage with one of the pins when the toothed wheel moves forward, and thus carry the roller with it, but at the backward motion of the toothed wheel the pawl will slip past the pins, and the feed-roller remain at rest. A small spring, *k'*, presses against the underside of the pawl *k*, and keeps it bearing against the projecting rim of the roller *f'*, to insure engagement with the pins *o o*. The movements of the toothed wheel J are produced by a segment-gear, *m*, upon the end of an oscillating lever, M, which is pivoted at *n* in a fixed bearing under the table, and has an intermittent

rocking motion given by a grooved cam, P, upon the principal shaft B. The form of this cam is such that during one revolution of the shaft the toothed segment moves the wheel J forward and produces a feeding movement of the rollers $f f'$, and then moves back again to prepare for the next feed, while the rollers remain at rest and hold the strip of wood to the forming-tool.

The plate h , through which the wood is presented, is made of two sections, h' h^2 , the lower one stationary and the upper one movable, and at certain times in the operation of the machine the movable section h^2 , which has the upper part of the throat or opening for the strip of wood to pass through, is raised up a short distance, so as to increase the size of the throat and let the strip pass readily through while the feed rollers are acting, and is then shut down again as the rollers stop and clamp the strip of wood firmly. This clamping action takes place at the end of each forward movement of the strip of wood, and the projecting part in front of this plate h , which is measured by the extent of motion of the feed rollers, is presented, and held to receive the action of the forming-tool. This clamping-plate is arranged as shown in Figs. 4 and 5 of the drawings, where the required intermittent vertical movement is produced in one direction by the spring g , which acts to hold the upper plate normally down against the fixed lower plate, and in the other direction by the intermittent lifting device, composed of the rock-shaft R, placed behind the plate h in bearings in the upright frame G, and having a tooth or pin, s , that works in a slot in the upper part of the plate. A movement of this rock-shaft to partly rotate it and turn up the pin s toward the vertical position is effected by the lever T, fixed to and extending backward from the end of the rock shaft, and the angular lever V, pivoted at w to a bracket on the under side of the table and connected with the lever T through the medium of the upright rod X, working through a slot in the table. This rod is attached to the shorter arm of lever V, and a cam, Y, fixed on the shaft B, acts against the longer arm of lever V at certain intervals to throw out the arm and draw down the rod X. This cam Y is fixed against the side of the cam P, and the movements of the two are so timed that as the first cam, P, produces the forward movement of the toothed segment and the feeding action of the rollers the second cam, Y, acts to turn the rock-shaft R and lift and hold up the clamping-plate h during the feeding movement. When the required length of material has passed through the opening in the plate h , the long arm of the lever V is released by the cam Y, and the spring g is then free to act and press down the upper part, h' , of the clamp.

The forming-tool I is fixed on the end of the revolving shaft N, that is mounted in bearings in a sliding block, Q, held in guides

70 by means of an oscillating lever, W, which is pivoted at t to a bracket beneath the table, and is actuated by a grooved cam, Z, on the shaft B. The upper end of this lever W is slotted to embrace a pin fixed in the side of the sliding block, while the lower end has a friction-roller and stud that works in the groove of the cam. This cam Z is so formed and timed that the block moves forward and carries the forming-tool to act upon the projecting strip of wood as soon as the feeding movement ceases and recedes with a uniform motion and draws the "former" back again, and then remains stationary until the next feed movement of the strip has taken place. The shaft N has a pulley, S, between the bearings of the sliding block Q, by means of which a continuous rotation of the shaft is produced from a belt and an overhead pulley. The shaft is also made hollow, so that a small central boring tool, l , can be inserted in it to work in connection with the cutter-head, or forming-tool I, and bore the small central hole through the strip of wood while the outside is being turned and shaped. The cutters of this former I on the end of the shaft are made adjustable and changeable, so that any required shape can be given to the outside of the strip of wood presented by the feed-rollers. This cutter-head can be used with or without the central boring-tool.

At one side of the table A, and in a position to move directly across the front of the feed-roller frame G, is a sliding block, 1, held in a fixed standard, 2, and operated with an intermittent reciprocating movement to advance to the front of the frame, and after a momentary stop in that position to recede to its first position at one side of the table. This block carries upon one side a pair of nipper-jaws, 33, pivoted at 14, and its forward and backward movements are produced by the rocking lever 4, pivoted at 5 to the fixed bracket 6 beneath the table, and the grooved cam 7, on the shaft B. The groove in the face of this cam is so formed and timed that as the block Q moves back with the forming tool the block 1, carrying the nippers 3, is caused to advance toward the projecting partly-finished piece and bring the nipper-jaws into position to grasp the piece, and then, after the piece has been seized, the block 1 is drawn back to its first position at the side of the table. In the opposite side of the table is a transverse slot, through which the upper end of a rocking lever, 8, projects, and operates with an intermittent movement toward and away from the front of the feed-roller frame, with an interval of rest. The upper end of this lever carries a bearing for a saw-spindle, 9, on the end of which is a small circular saw, 10, while the lower end of the lever is provided with a stud and friction-roller, 11, that works in the groove of the cam 12 on the shaft B. This lever 8 is pivoted at

13, and is actuated by the grooved cam so as to move and carry forward the revolving saw 10 toward the projecting partly-finished piece as soon as the nipper-jaws, advancing from the opposite side, have seized the piece. These parts operate in this manner to sever the turned and externally-formed portion of the continuous strip and to carry it to one side of the machine, to be finished.

10 The nipper-jaws 3 are formed of two halves pivoted together at 14, and fixed to the side of the sliding block 1, so that their forward ends project a short distance in front, while their rear ends, behind the hinge 14, pass, respectively, above and below a short spindle or stud, 15, upon which is a square or cam shaped part, 16. These jaws are held open by a spring, 17, and they are closed by turning the stud 15 so as to bring the cam 16 across and toward a vertical position between the rear ends of the jaws 3. To turn this stud 15 at the required times, to close and release the jaws in an alternate manner, I fix upon the projecting end of this stud 15 a cross bar or head, 18, with two short arms, and on the table below it, and in the same vertical plane with the cross-bar, I place a short upright rod, 19, that works up through a hole in the table, and is moved by mechanism underneath to have at intervals a short up and down movement. Now, as this rod is in line with the cross-bar 18, the action of the rod, when lifted, will cause it to strike beneath and turn up one or the other end of the cross bar 18, and thus either close or open the jaws. By the arrangement shown in Figs. 9 and 10 of the drawings the jaws will be closed when the rear arm or end of the bar is struck, and will be opened when the front end is turned up, and therefore as the sliding block 1 moves forward and carries the jaws into position to receive the partly-formed piece of wood projecting from the feed-roller frame, the rear end of cross-bar 18 will be brought directly over the rod 19, and at such time the rod is lifted and caused to strike the end of the bar and turn the cam 16 against the rear extensions of the jaws. This brings the jaws together at the time when they are in the required forward position to grasp the projecting piece of wood, and then, after the backward movement of the sliding block 1 is performed, and it is desired to remove the finished piece of work from the jaws 3, the front end of the cross-bar 18 will be in position over the rod 19, and at the proper time this rod rises again and turns the stud and its cam in the contrary direction and releases the jaws, so that the spring 17 throws them open. This rod is lifted at the proper times by the operation of the cam 20 upon the shaft B, and a pivoted lever, 21, attached at one end to the rod, and having a roller at the other end to work against the cam. The downward movement of the rod is effected by a spring, 22.

65 The office of the traveling nippers 3 3, as before stated, is to bring the partly-formed mouth-piece into position at one side of the

machine, to be acted upon by the finishing-tools; but, in addition to this, they are employed to grasp and surround the rim of the mouth-piece while it is being acted upon by the boring and finishing tools, so that the large bore or recess in the end is turned out by the tool without any danger of splitting or breaking the wall or thin rim to be left on the end of the piece. As the nippers firmly grasp and surround the piece at the end, this operation can be rapidly and successfully performed, and a shell or rim of the required thinness can be produced. These finishing-tools are held in bearings in a fixed block, 23, secured upon the table in a position at one side of the sliding block or carriage 1, and they consist of a hollow spindle, 24, having a rotary motion continually in one direction and an intermittent reciprocation in its bearings 23 forward and back. Through this hollow spindle, that carries and operates the boring-tool 25, fixed or formed on its front end, is inserted a smaller spindle, 26, having on its end the small bit or boring-tool 27, to act simultaneously or in connection with the tool upon the larger spindle. These two spindles are connected together by means of a pin, 26^a, working in a longitudinal slot in the interior of the hollow shaft 24, so that both shall rotate together; but the smaller spindle has a greater longitudinal movement or reciprocation than the larger one, that acts only to counterbore the end of the mouth-piece as it is held by the jaws 3 3. The boring movements of the two spindles are produced by means of the oscillating levers 28 and 29, pivoted in brackets 30 30 beneath the table, and actuated by means of the grooved cams 31 32 on the shaft B. These spindles are so placed on the table A that when the sliding block or carriage with the nipper-jaws has completed its backward movement the tools 25 27 shall be in line with the work held in the jaws, and at such time the cams 31 32, acting upon the levers 28 and 29, move or feed forward the two spindles and then draw them back while they are being driven continually by the pulley 33. When the piece is finished by the several instrumentalities, I cause it to be automatically discharged from the machine and the jaws left free to move forward and grasp another piece, which has been receiving the action of the forming-tool on the spindle N while the previously-formed piece is being bored and finished. This discharge of the work from the jaws and out of the machine is effected by employing an air-blast of sufficient pressure, applied at the proper moment to one side of the jaws and against the end of the finished piece, so as to eject the piece from the opening jaws and throw it out of the machine.

The construction and manner of operating this device are shown in Figs. 7 and 10 of the drawings. It consists of a tube or conductor, 35, connected with a suitable air compressor or reservoir, and fixed in an upright position against the side of the feed-roller frame, just

to one side of the traveling nipper-jaws. In the end of this stationary tube is fitted a tube, 36, that is free to slide up and down within the fixed tube, so that at the proper time this lower tube can be brought down close to the nipper-jaws to direct a jet of air horizontally against the end of the piece of work in the jaws, and then moved up again out of the way of the finishing-tools 25 27. At the lower end of this sliding tube an orifice, 37, is provided in one side so as to direct the air-jet horizontally.

To produce the up and down movements of this sliding tube 36, I place upon the periphery of the cam P two projecting fingers, 38 39, to act against a small vibrating plate, 40, that is pivoted at 41, and is connected with a lever, 42, so that at the required moment these parts shall draw down the lever 43, that is connected to and moves the tube 36 by means of rod 44 into position to direct a blast against the end of the mouth-piece, and then move it up out of the way. The friction of one tube within the other serves to hold the part 36 in either position.

The tube 36 may by suitable mechanism (not shown) have a slight rotary movement, by which means the blast of air can be directed in the opposite direction across the front of the feed-roller frame, so that in the intervals of time when it is not acting to throw out the bobbins the blast of air can be employed to blow away the chips and refuse produced by the forming-tool I; but I claim nothing for this rotary movement of tube 36, and have not deemed it necessary to show how it is imparted. The mechanism that operates this tube 36 is so arranged and timed that as soon as the boring-tools 28 29 have completed their backward movement and drawn the boring-tools back clear of the jaws the tube then moves down into position at the side of the jaws, and by causing this to take place in advance of the opening of the jaws the blast of air can be employed to first blow out the bore of the mouth-piece, and then, as the jaws open, to eject the mouth-piece. Thus the work may be delivered in a complete and finished condition without requiring any after-cleaning or handling. The feed-rollers *f f'* are mounted in the upright frame G, and the upper one is rendered adjustable in a vertical direction, so as to regulate itself according to the size of the strip of material passing beneath it. The journals *a* of this roll *f* are set in eccentric bearings *b b*, which can turn in their places in the sides of the frame G, wherein they are fixed. One of these eccentrics *b* projects beyond the frame at one side, and has a short lever-arm, *c*, secured to it, so that the eccentric can be turned by throwing this lever to one side or the other and moving the shaft *a* vertically up and down. Against one side of this lever-arm the pressure of the spring *d* is applied, so as to keep the roller down in position against the other one of the pair. By pressing back the end of this lever *c* the up-

per roller can be raised for the introduction of the strip to be worked, and a yielding pressure is also maintained upon the journal of the roller, by which it accommodates itself to different thicknesses of material.

In order to stop the operation of the machine when the supply of material is exhausted, I have arranged upon the counter-shaft a two-part clutch, 45 and 46, which is thrown out of action by the following automatic mechanism. One of the clutches consists of the sleeve 46, having the pinion *p* on one end, and placed loosely upon the shaft D. The other part is formed of the sliding sleeve 45, locked to the shaft so as to rotate with it at all times, but capable of moving laterally upon it both toward and away from the end of the loose sleeve 46. The sliding part 45 of the clutch is connected with a sliding collar, 47, placed on the shaft upon the other side of pinion *p*, so that when the collar is moved laterally toward one end or the other of the shaft the sliding clutch will be moved by it in the same direction. The sleeves 45 and 47 are connected by means of a rod running from one to the other, and let into a groove in shaft D. This arrangement will be understood from Figs. 1 and 12 of the drawings. To move this clutch, then, at the time when the end of the strip of wood is drawn through the feed-rollers, and thus throw the machine out of action, I place under the table A, in suitable bearings, 50, a small hollow shaft or barrel, 51, having within it a coiled spring, 52, which, by pressing against the end of a fixed rod, 53, entering the barrel at one end, causes the barrel to be thrown forward. On the rear end of this barrel is fixed an upright arm, 54, that projects upward through a longitudinal slot in the table behind the feed-roller frame, and on the forward end of the barrel is attached a depending arm or dog, 55, and also a forked lever, 56, that extends forward and embraces the sliding collar 47 on the pinion-shaft. The barrel thus connects the upright arm with the forked lever that works on the collar of the pinion-shaft, and by drawing back the arm 54 the spring in the barrel is compressed and the forked lever 56 is moved laterally upon its collar to one side, and by releasing the upright arm 54 the spring reacts to throw the lever 56 over to the other end of the collar. In this position the depending arm or dog 55, which is carried along with the forked lever 56, will be brought into line and in the path of a revolving cam finger with an inclined face, 58, fixed upon and turning continuously with the shaft, and at such time the dog will be struck by the revolving finger 58, and by being pressed laterally against the end of the dog 55 this finger will throw the forked lever to one side against the rim of the collar and move this part upon the shaft D in the direction toward the pinion. The effect of this will be to move the sliding clutch 45 away from the part on the end of the sleeve 46, and thus when the forked lever 56 is moved over against

the rim of the collar lying next to the pinion *p*, the depressing dog 55 will be caught by the revolving cam-finger 58, and the clutch will be separated.

5 When a strip of wood is in the feed rollers and the machine is at work, the upright arm is held back and prevented from moving forward under pressure of the spring in the barrel by means of the adjustable stop-pin 60,
10 fixed in the upper end of the arm and projecting forward against the inclined face of a slot or recess, 61, in the inner side of the roller-frame, behind and on a level with the opening between the rollers. While the strip of wood
15 behind the feed-rollers is long enough to run against the side of this upright arm, it will hold the arm to one side of the perpendicular and keep the end of the stop-pin against the incline of the recess; but as soon as the end
20 of the strip is drawn in by the feed-rollers, and it passes by the recess, the end of the stop-pin will slip forward on the incline and follow in behind the end of the strip. The effect of this will be to allow the
25 barrel to move forward and throw the dog 55 into engagement with the revolving finger 58, and by this means open the clutch and stop the machine. I thus provide in a compact and very simple form a combination of mechanism all working automatically and driven
30 from a single shaft to turn out completely finished articles from a long strip of material in a continuous manner.

35 A boy can manage and run several of these machines at the same time, as the only attention required is to keep them supplied with strips of material to work upon.

With very little alteration and adjustment—such as employing different kinds of cutter-
40 heads or forming-tools, and either removing or changing the boring and finishing-tools and changing the feed mechanism to supply the proper length of material at each time of action—I can adapt and employ my machine
45 to produce other hollow wooden articles—such, for instance, as spools and bobbins of different kinds—and many articles having either a cylindrical or irregular shape.

50 Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a machine for making wooden cigarette mouth-pieces and similar articles from a continuous strip of wood, the combination,
55 with the intermittent feeding mechanism that advances a length of material at each movement, of the intermittently-acting clamping device, composed of a fixed and a movable plate, the latter being held normally in position to clamp the piece by means of a spring,
60 and operated to release it by means of a cam on the main shaft, connecting-levers, and a rocking shaft, provided with a pin engaging with the movable clamp, and which grasps
65 and holds the material while the feed is at rest and releases it when the feed acts to ad-

vance the material, substantially as hereinbefore described and specified.

2. In a machine for making cigarette mouth-pieces and similar articles from a strip of
70 wood, the combination, with the nipper-jaws 3 3, that grasp and inclose the piece of work and carry it from the clamp *h'* *h*² into line with the finishing-tool, of the reciprocating boring and finishing tools 25 27, to act against the
75 end of the work while it is held in the jaws, substantially as hereinbefore described, for the purposes set forth.

3. In combination with the traveling nipper-jaws, having alternate opening and closing
80 movements before and at the end of their forward travel, a reciprocating pipe for delivering an intermittently-acting jet or blast of air applied against the article held within the
85 jaws during their opening movement to discharge and eject the finished piece of work from the jaws, substantially as hereinbefore described and specified.

4. The feed-roller *f'*, having the concentric recess *j* in one side and the pins or studs *o o*
90 arranged therein, in combination with the gear *J*, carrying the pawl *k* upon the hub *y* and turning loosely upon the feed-roller shaft, the vibrating segment-gear *m*, having a lever,
95 *M*, pivoted at *n*, and with a cam operating said lever, substantially as set forth.

5. In combination with the shaft *D*, carrying the clutch-sleeve 46, the sliding clutch-sleeve 45, connected with the sliding collar 47,
100 the spring-barrel 51, having the arm 54, with its adjustable stop at one end, engaging with the sliding collar, and the forked arm 56 at the other end, with its depending dog 55, operating in conjunction and combination with
105 the stationary incline 61 and the rotary finger 55 on the principal shaft *B*, and the feeding and forming mechanism, substantially as herein described, to operate as and for the purpose set forth.

6. A machine for working cigarette mouth-
110 pieces and other similar hollow articles from a continuous strip of wood, consisting of the following instrumentalities, operating in connection and combination: a main shaft, *B*,
115 provided with suitable cams for operating the devices hereinafter enumerated, and levers connecting thereto, a pair of intermittently-rotating feed-rollers, *f f'*, a clamping-plate *h*, a rotary spindle *N*, having a forward and back
120 movement toward and away from the material presented in front of the plate *h*, and adapted to carry and operate a cutter-head, *I*, and a boring-tool, *l*, a traveling carriage, 1, carrying a set of nipper-jaws, 3 3, which is operated to
125 open at the forward movement, and then close upon and seize the strip of material as the carriage 2 comes in front of the holding-plate *h*, and remain closed during the return of the carriage, a vibrating saw, 10, which moves
130 forward and severs the material from the continuous strip as soon as it is seized by the nippers 3 3, and the double spindle 24 26, car-

rying the tools 25 27, which have a continuous rotary motion and an intermittent reciprocating movement toward and away from the nipper-jaws, all combined and operated substantially as herein described and specified.

In testimony that I claim the above as the invention of the late JOB C. DAVIS, I here-

unto subscribe my name in the presence of two subscribing witnesses.

CATHERINE A. DAVIS,
Administratrix.

Witnesses:

LEWIS B. HARRIS,
JAMES GARTLAN.