

(No Model.)

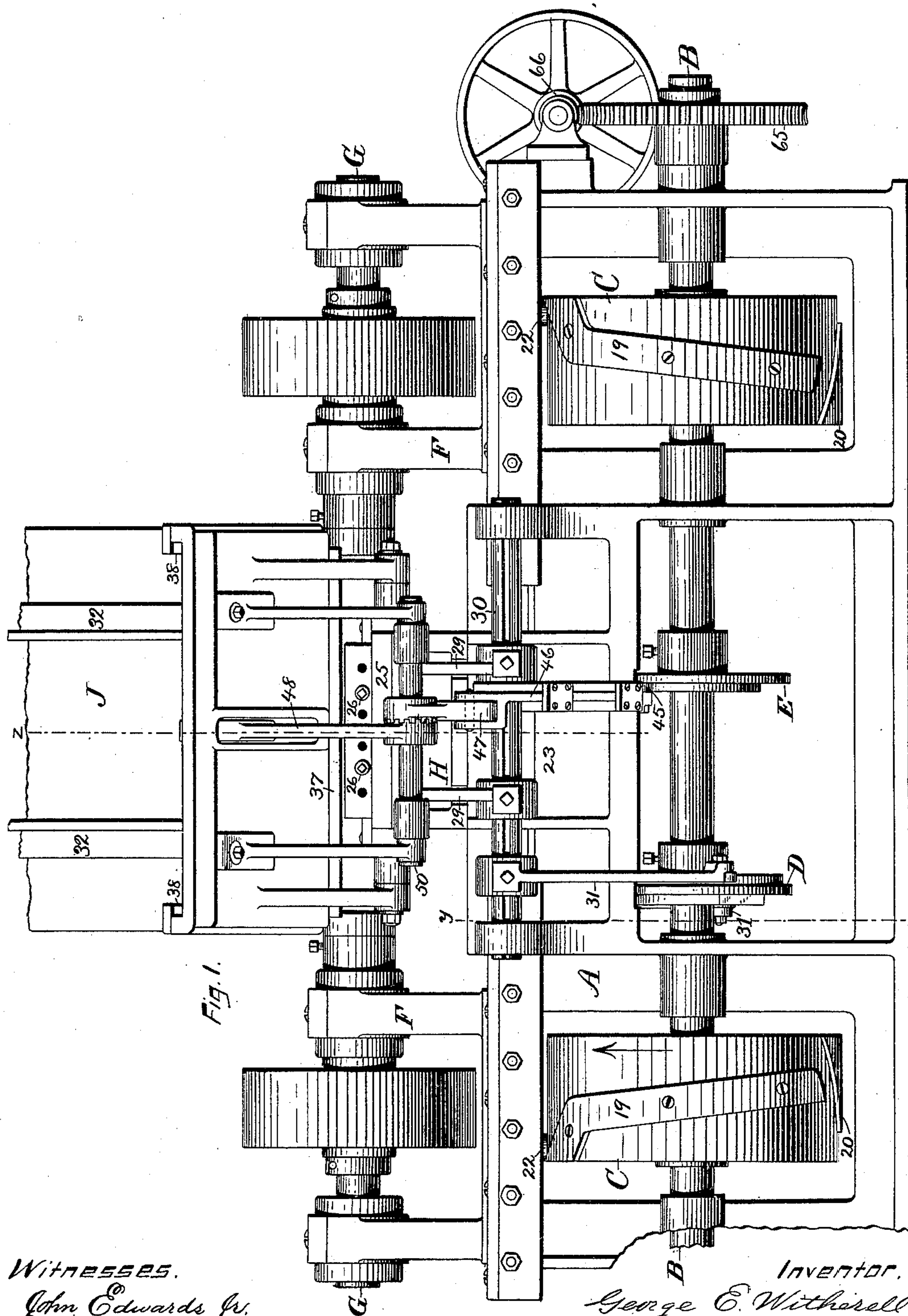
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G. E. WITHERELL.

MACHINE FOR DRESSING THE ENDS OF SCREW BLANKS.

No. 409,441.

Patented Aug. 20, 1889.



WITNESSES.

John Edwards Jr.  
Dov. H. Pierce

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George E. Witherell.  
By James Shepard.

Att'y.

(No Model.)

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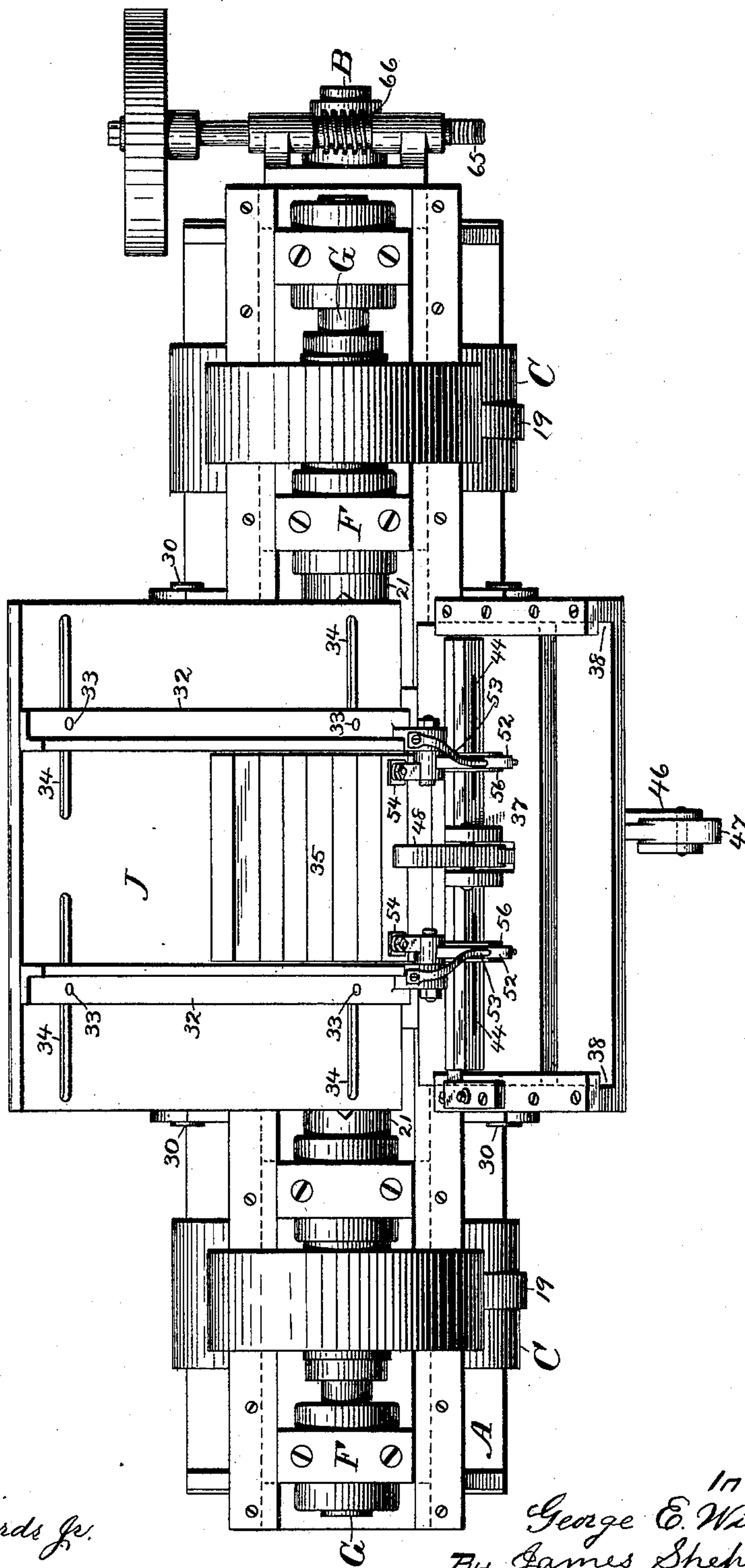
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Fig. 2.



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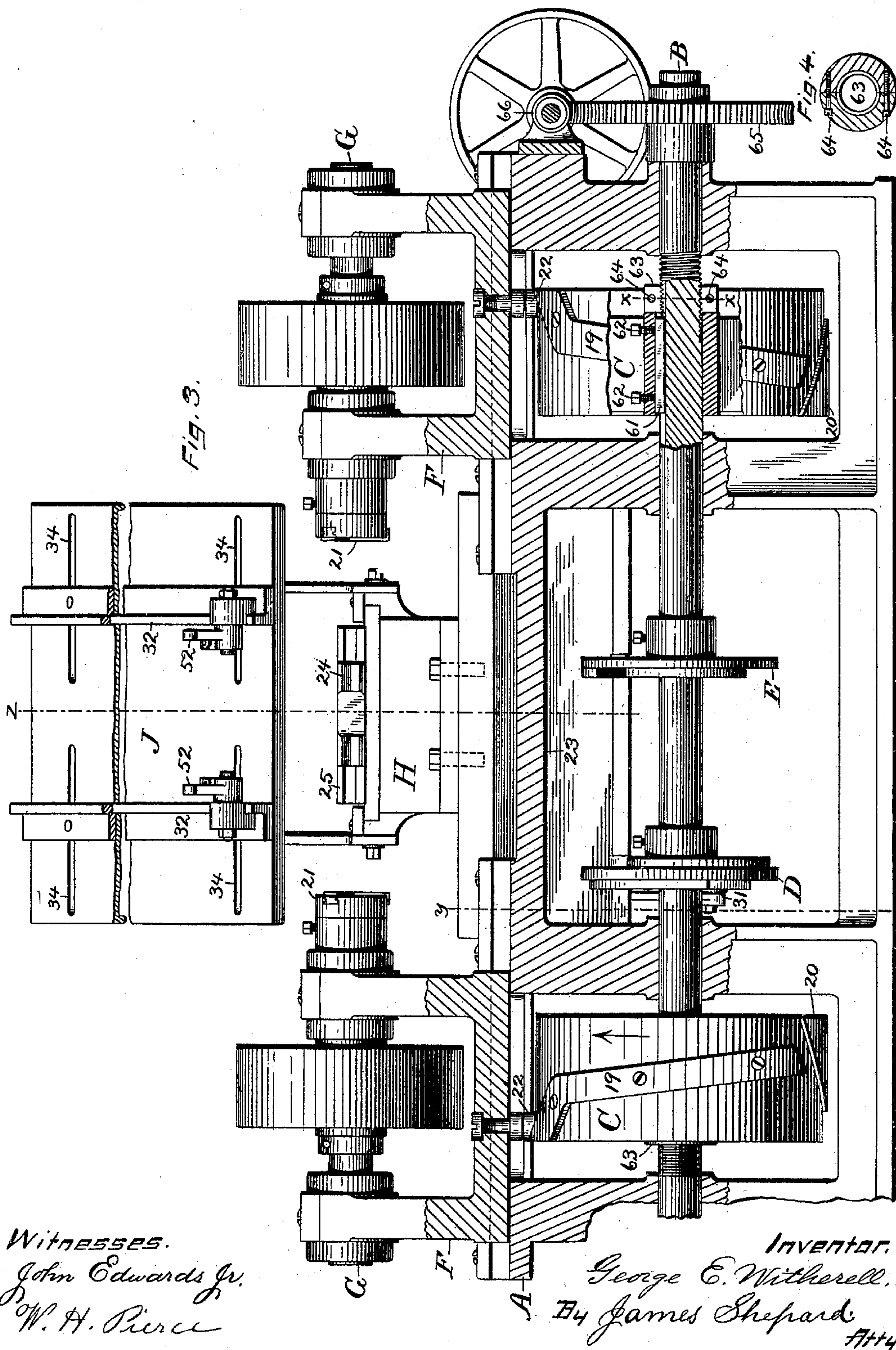
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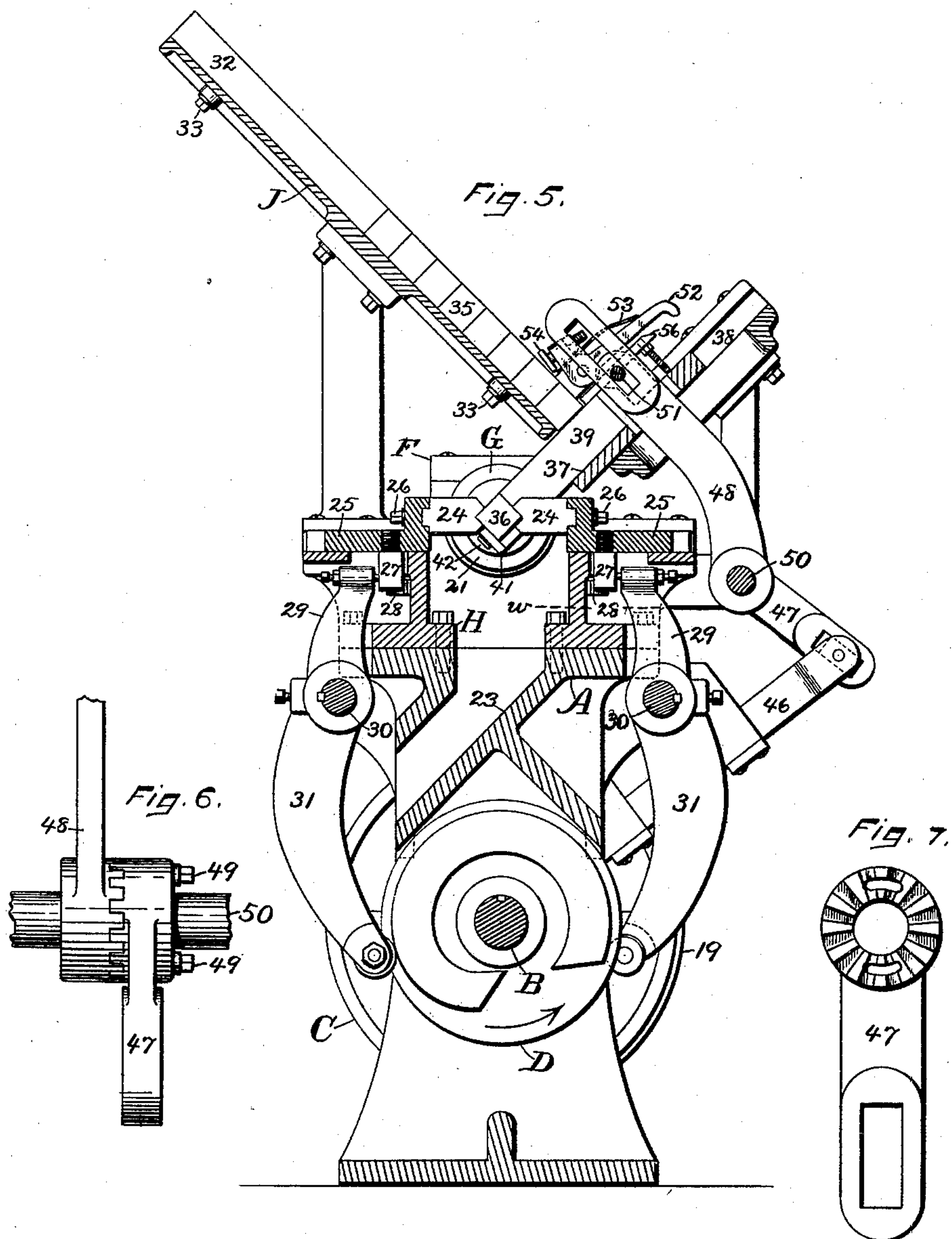
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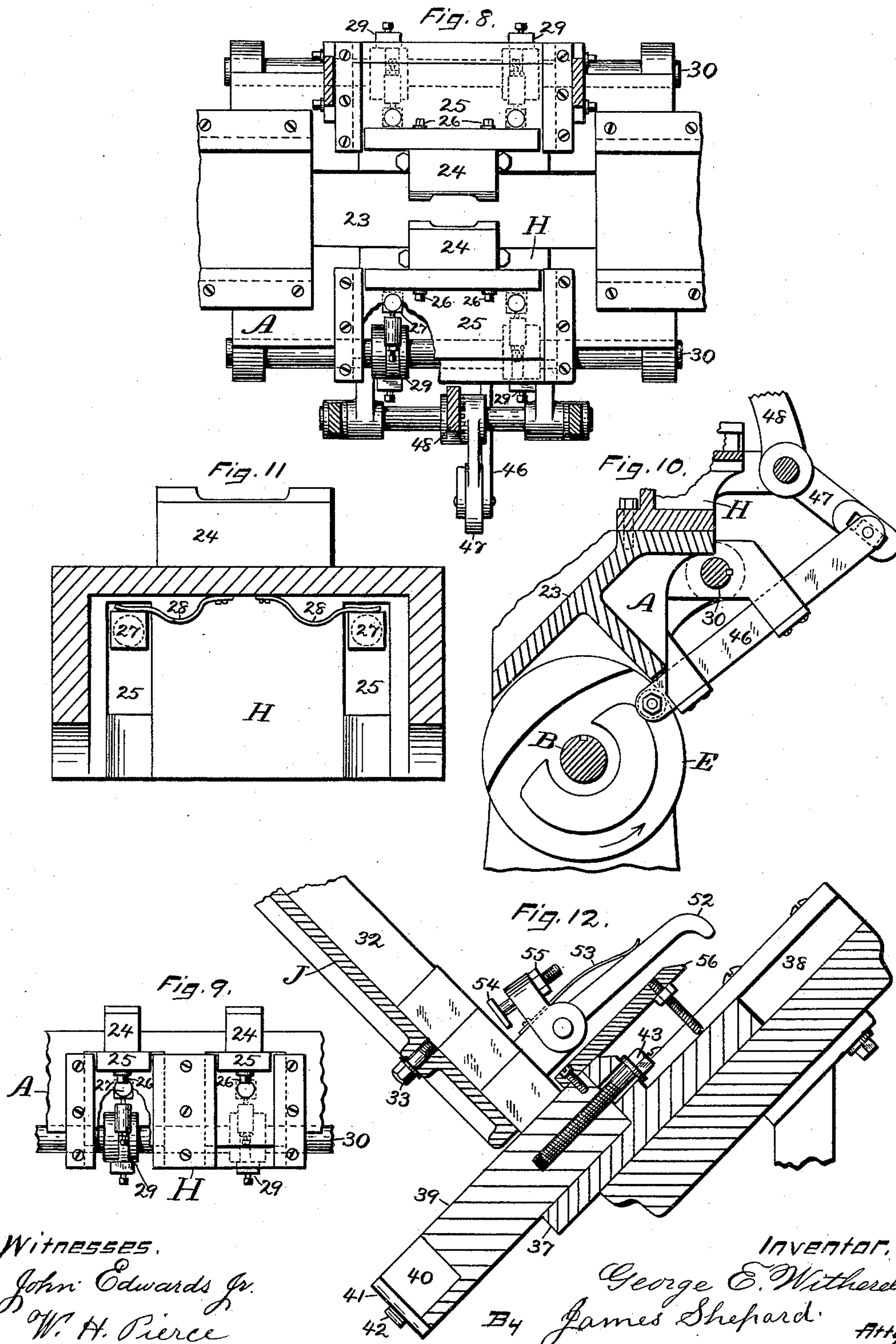
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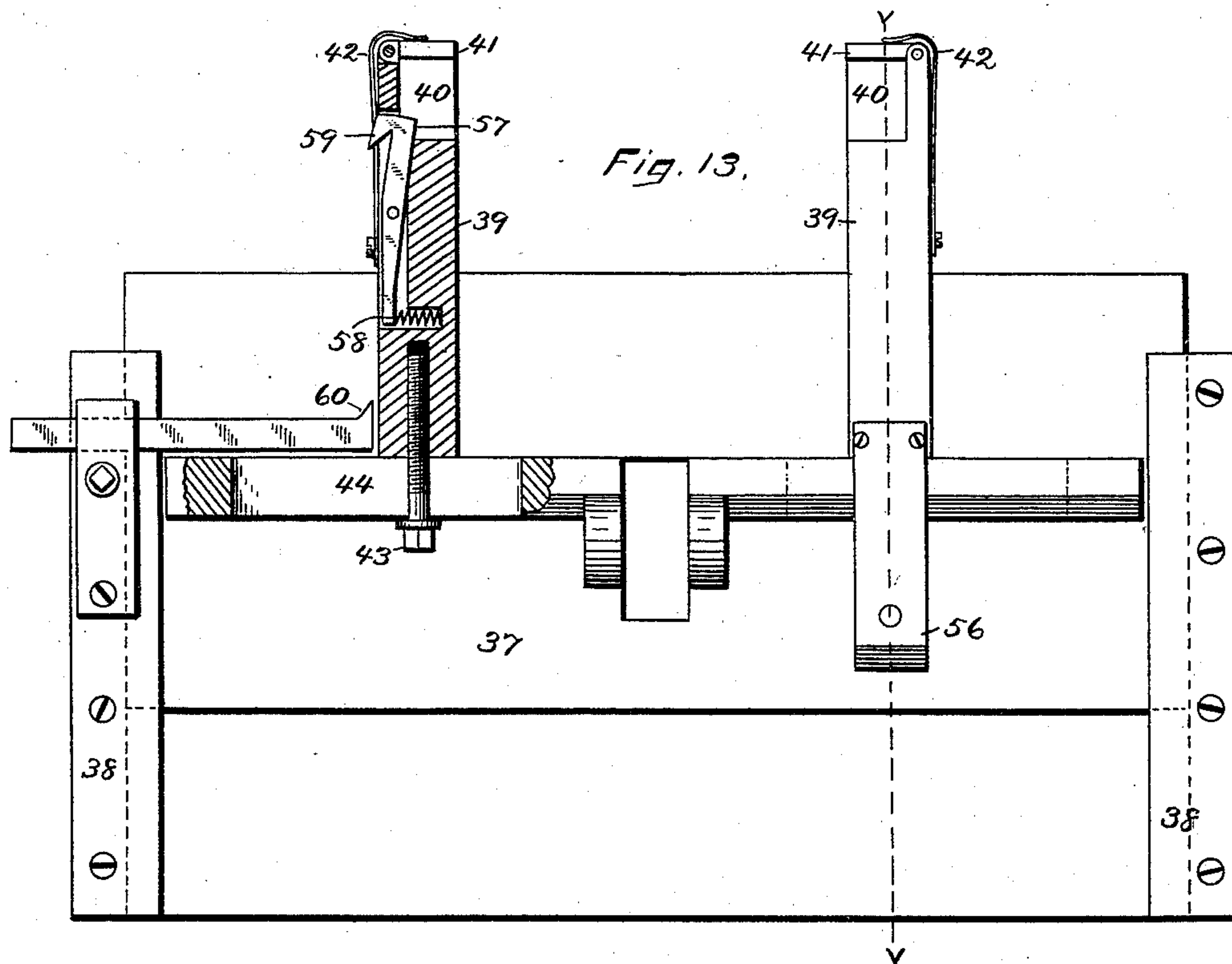


Fig. 14.



Fig. 15.



Fig. 16.



Fig. 17.



Fig. 18.



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# UNITED STATES PATENT OFFICE.

GEORGE E. WITHERELL, OF HARTFORD, CONNECTICUT, ASSIGNOR TO THE  
HARTFORD MACHINE SCREW COMPANY, OF SAME PLACE.

## MACHINE FOR DRESSING THE ENDS OF SCREW-BLANKS.

SPECIFICATION forming part of Letters Patent No. 409,441, dated August 20, 1889.

Application filed March 9, 1889. Serial No. 302,603. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE E. WITHERELL, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Machines for Dressing the Ends of Screw-Blanks, of which the following is a specification.

My invention relates to improvements in machines for dressing the ends of screw-blanks and other articles; and the objects of my improvement are to produce an automatic machine, to simplify its construction, and in general to increase its efficiency.

In the accompanying drawings, Figure 1 is a front elevation of my machine. Fig. 2 is a plan view thereof. Fig. 3 is a partial vertical section in the axial line of the main shaft and a partial front elevation. Fig. 4 is a transverse section of a detached clamp-nut on the line *xx* of Fig. 3. Fig. 5 is a transverse section of said machine, in which the line *z* of Figs. 1 and 3 indicates the plane of section for the upper part of the machine and its frame, while the cam-shaft and other parts are on the plane of section indicated by the line *y* in said figures. Fig. 6 is a detached front elevation of the adjustable hub of the carrier-operating lever. Fig. 7 is a side elevation of one part of said hub and lever, said Figs. 6 and 7 being on an enlarged scale. Fig. 8 is a plan view of the holding-jaws and connected parts of my machine, the hopper and carrier being removed. Fig. 9 is a like view of the holding-jaws upon one side of the machine, showing a modified construction. Fig. 10 is a vertical section of detached parts on the line *z* of Figs. 1 and 3. Fig. 11 is an enlarged reversed plan view showing the under side of the holding-jaw, the frame on which said jaws are mounted being sectioned on the line *w*, Fig. 5. Fig. 12 is an enlarged transverse vertical section of detached parts connected with the hopper and carrier, the plane of section being indicated by the line *v v*, Fig. 13. Fig. 13 is an enlarged plan view, partly in section, of the carrier and the ways in which it slides; and Figs. 14, 15, 16, 17, and 18 illustrate various pieces of work, the ends

of which may be dressed or formed by my machine.

A designates the main portion of the frame, the top of which forms the bed of the machine; B, the cam-shaft bearing cam-pulleys C and cams D E. The cam-pulleys C may have differently-formed cams attached to them, according to the work to be performed.

19 designates the side-acting cams attached thereto, having a steep incline at their forward ends and a lesser incline of greater length for their remaining portion; and 20 designates the side-acting cams for forcing in the opposite direction.

F designates the frames of two lathe-spindles G, bearing suitable tools 21 for cutting or dressing the ends of the blanks into the desired form, said spindles being provided with ordinary driving-pulleys to be driven in any ordinary manner. The frames of these lathe-spindles are arranged to slide longitudinally in proper ways in the lathe-bed and in alignment with each other. Upon their under sides there is a projection 22, Figs. 1 and 3, preferably in the form of a stud furnished with a roller, which projections 22 are acted upon by the side-acting cams 19 and 20 of the cam-pulleys C, whereby a revolution of the cam-shaft B will move the lathe-spindles simultaneously to and from each other, and then allow them to remain at rest until the shaft revolves far enough to bring the cams into action again. The lathe-bed A has a central opening formed in it at a point about midway of its length, and cast in said bed is a rearwardly-inclining wall or apron 23, which extends from the front side of the lathe-bed backwardly and downwardly to the rear of the machine, thereby forming a chute or incline for conducting blanks down through the bed of the machine and delivering them upon the floor or into a suitable receptacle at the rear.

Upon the main frame and lathe-bed A, I arrange a supplemental bed H for the holding-jaws 24, said jaws being mounted upon slides 25, which move to and from each other in suitable ways or guides in said supplementary bed H. The jaws 24 are secured to



the slides 25 by means of bolts 26, whereby jaws of different forms may be attached to said slides for use with different forms of blanks. Projecting downwardly from the slides 25 there are rigid studs 27, which studs are acted upon in a direction to open the jaws by means of springs 28, Figs. 5 and 11, and in a direction to force the jaws together by the levers 29, the upper ends of said levers being preferably provided with an adjusting-screw in direct contact with the studs 27 to vary the throw of said slides. These levers 29 are mounted upon rock-shafts 30—one upon each side of the machine—each slide being provided with two of the studs 27, each of which studs is acted upon by one of the levers 29, as indicated by the broken lines in Fig. 8, in which one of said levers and a part of one stud are shown in full lines, while the others are indicated by broken lines. These levers 29 may be adjusted to different points along the rock-shafts 30. Said shafts are actuated to throw the jaws inwardly by means of the levers 31 and cam D, said cam being alike upon both of its sides, one of which sides is shown in Fig. 5, so that one side acts upon one of the levers 31 for moving one rock-shaft and the other side of said cam acts upon the other of said levers for moving the rock-shaft upon the other side of the machine, thereby moving the rock-shafts for simultaneously forcing the holding-jaws inwardly toward each other.

Supported upon a suitable frame above the holding-jaws I arrange the hopper J. The main portion of this hopper is in the form of an inclined apron, which forms its bottom, to which are attached adjustable side pieces 32, for adjusting the hopper to accommodate blanks of different lengths. These side pieces 32 are held and adjusted in position by means of screws or bolts 33, which pass through longitudinal slots in the bottom of the hopper, said slots being shown at 34, in Figs. 2 and 3.

In Figs. 2 and 5, 35 designates one of the several blanks within the hopper, and 36 in Fig. 5 designates a blank between the holding-jaws. These blanks are pieces of a square bar cut into suitable lengths. Underneath the lower end of the hopper, and moving at right angles thereto, I arrange the carrier 37, which moves in ways 38. This carrier is provided with two arms 39, having a socket 40, Fig. 13, at their lower ends, the lower end of which socket is closed by the spring-pressed fingers 41, said fingers being hinged to said arms and pressed toward the socket by the springs 42. These arms 39 are secured to the carrier 37 by means of bolts 43, Figs. 12 and 13, said bolts passing through slots, one of which is shown at 44 in Fig. 13, the ends of the slot for the other arm being indicated by the transverse broken lines. The carrier is reciprocated by means of the cam E, Figs. 1, 3, and 10, on the cam-shaft B, one side of which forms in effect a grooved cam that acts

upon a friction-roller 45, Fig. 1, on the end of a sliding bar 46, the roller at the lower end of said bar being indicated by a broken circle in Fig. 10. The upper end of this sliding bar is connected by a pin-and-slot connection to the carrier-lever 47 and 48, 47 indicating the lower member and 48 the upper member of said lever. Each member of this lever is provided with a hub, the sides of which are toothed, as shown most clearly in Figs. 6 and 7, the toothed sides being made to engage each other when the two members are fastened together by the bolts 49, Fig. 6. These bolts pass through slots in one member into a threaded hole in the other member. By loosening the bolts and slipping the toothed faces of the hub along more or less the angle at which the two members stand to each other may be adjusted, so that the lever will throw the carrier down a greater or less distance, in order to carry the blank to a central position between the jaws. This lever 47 and 48 is mounted to turn upon the shaft 50. The upper member 48 is slotted and connected to the carrier by a pin 51, Fig. 5, which passes through said slot.

At the lower end of the hopper, and secured to the side pieces 32, I arrange an angle-lever 52, the longer member of which is pressed downwardly by means of a spring 53, while its shorter member bears an adjustable clamp 54. This clamp 54 is made adjustable by passing through a threaded hole in said angle-lever, and it may be held in its adjusted position by a set-nut 55, Fig. 12.

Upon the carrier 37, and moving therewith, is an extension-piece, whose upper end is beveled to form a cam 56.

In some cases the blanks may vary in length, in which case I prefer that they shall be gaged from one end within the carrier, so as to be placed between the jaws with one end in a given position with reference to the movement of the lathe-spindle. I therefore provide one of the arms with a latch 57, Fig. 13, pivoted to said arm 39 and pressed upon by a spring 58, with a tendency to project its opposite end into the socket 40 of said arm. I provide the outer side of this latch as its lower end with a hook 59, and I secure to one of the carrier-ways or other stationary support a cam 60, for engaging said hook when the carrier is raised to a position underneath the hopper, which cam acts upon said hook to withdraw the lower end of the latch from the socket.

If desired, instead of a single pair of jaws arranged in the middle of one slide 25, as first described, it may be desirable to use two pairs of said jaws and slides for grasping the blanks at two different points of their length, each slide moving in ways or guides of its own. In Fig. 9 I have illustrated such a construction, showing one of the jaws and slides in each pair. These jaws will be operated by the same mechanism as before described, differing only in that the levers 29 act upon two



different slides instead of acting at the two ends of one slide.

It is often desirable to adjust the cam-pulleys C C lengthwise upon the cam-shaft and to secure them in their adjusted position. For this purpose the shaft and pulley-hub are grooved longitudinally and provided with a spline or key 61, as shown for the right-hand pulley in Fig. 3. The pulley-hub is provided with set-screws 62, for tightening said key. A portion of the cam-shaft by the side of said pulleys is also threaded and provided with a clamp-nut 63, which is bound upon the shaft or loosened thereon by means of the screws 64, Figs. 3 and 4.

In order to adjust the cam-pulley, the screws 62 and 64 are loosened, the pulleys slipped endwise on the shaft to the desired point, the clamp-nut 63 turned up against the end of the pulley-hub, when the parts are secured in place by tightening the screws. The clamp-nut should be placed upon that end of the pulley-hub against which the greatest pressure of the cams is brought to bear, which greatest pressure will be exerted when the cams are forcing the lathe-spindles to their work. The spline and grooves prevent the slipping of the cam-pulleys in a rotary direction upon the shaft, while the clamp-nuts will hold them against a longitudinal movement thereon. A series of blanks being placed in the hopper, the parts before described will act to move the carrier upward underneath the hopper, withdraw the lower end of the latch 57, so that both sockets in the carrier-arm immediately under the hopper are opened, into which the lower blank will drop and be supported at its two ends. The cam E then throws the slide 46 upwardly, and through the lever 47 48 moves the carrier and its arms downward to present the blank to a point between the holding-jaws. As the carrier moves downwardly the hooked end of the latch 57 is withdrawn from the cam 60, the spring 58 forces the lower end of said latch into the socket 40, whereby that end of the blank is pressed upon to carry its opposite end firmly against the side wall of the socket on that side to bring a given end of all the blanks into a given position, even if they vary somewhat in length. As the carrier reaches its lowermost position the cam 56 passes out from under the end of the longer arm of the angle-lever 52, when the spring 53 depresses said arm and withdraws the adjustable holding-clamp 54 from the blanks, so that the blanks in the hopper all fall down until they are stopped by resting upon the upper side of the carrier-arms 39, the position of the parts at this time being best represented in Figs. 5 and 12. The jaws now under the influence of their cams and levers are brought together to grasp the blank, as shown in Fig. 5. They may be properly adjusted by means of the screws in the upper ends of levers 29 to center the blanks thus held. The carrier then rises and the

spring-pressed fingers 41 yield outwardly, slip by the ends of the blank, and are returned into their former position by the springs. The carrier in its upward movement soon brings the cam 56 under the end of the long arm of the angle-lever 52, thereby firmly pressing the adjustable holding-clamp 54 against the lowermost blank but one in the hopper, and if properly adjusted pinching it so tightly as to hold it and all the blanks above it from moving downwardly in the hopper until said holding-clamp is released. As soon as the sockets 40 of the carrier are raised so as to come under the hopper, (the latch 57 being withdrawn, as before described,) the bottom blank, which is the only one at liberty to fall, drops into said sockets. The cams 19 upon the cam-pulleys C move the lathe-spindles toward each other, so that the cutters or other tools in said spindles, operating on each end of the blank, cut or work said ends into the desired form. The cams 19 are made steep at the beginning of their action, so as to move the spindles the fastest when they are coming up to their work or when they are doing but little work, and are then made of a less incline to give a slower movement in doing their principal work. The cams 20 then withdraw the spindles. As soon as the lathe-spindles have fully withdrawn from their work, and before the cam-pulleys bring the spindles back again to their work, the cam D operates to release the holding-jaws and permit them to open under the influence of their springs 28, when the blank falls from between them upon the rearwardly-inclined wall 23 in the lathe-bed, down which it slides and drops out at the rear of the machine. The carrier again descends, presents another blank to the holding-jaws, the jaws close upon the blank, and the operations before described are repeated.

Figs. 14, 15, and 16 represent blanks which have been dressed or turned only for a short portion of their length on each end. They are designed for use in making machine-screws by subsequently turning down and threading other portions. The invention, however, is applicable to a great variety of work, not confined merely to dressing the ends, but for turning or reducing a considerable portion at each end while the middle portion is held between the holding-jaws. Examples of this kind of work are illustrated in Figs. 17 and 18.

I have illustrated the holding-jaws of a proper form for holding blanks that are square in cross-section; but the form of the jaws may be varied to suit the work—as, for instance, for holding the hexagonal work shown in Fig. 16 or the round work shown in Fig. 18. Of course the cutting or milling tools and the cams upon the cam-pulleys may be varied at pleasure in accordance with the work to be performed. I have also illustrated the cam-shaft B as arranged for being driven by means of the gear-wheel 65 and worm 66; but any suitable means may be employed for driving



the cam-shaft without departing from my invention.

I claim as my invention—

1. The combination of a lathe-bed, two lathe-spindles, their sliding frames and operating-cams, with the holding-jaws sliding between said spindles, the levers 29, mounted on rock-shaft 30, the levers 31, and cam D, substantially as described, and for the purpose specified.

2. In a machine for operating upon blanks, the combination of the holding-jaws arranged to slide to and from each other, the four levers 29, acting at four different points on said jaws, the rock-shafts on which said levers are mounted, the levers 31, and operating-cam, substantially as described, and for the purpose specified.

3. In a machine for operating upon blanks, the combination of the holding-jaws, levers 29, having adjusting-screws at their upper ends, rock-shafts on which said levers are mounted, the levers 31, and operating-cam, substantially as described, and for the purpose specified.

4. The combination of a lathe-bed, two lathe-spindles, their sliding frames, a pair of holding-jaws sliding between said spindles, operating mechanism for said sliding frames and jaws, and the rearwardly-inclined apron 23, formed in said bed immediately under the opening between said jaws, substantially as described, and for the purpose specified.

5. In a machine for operating upon blanks, the combination of the sliding lathe-frame, the cam-pulley having slotted hub, the cam-shaft having a longitudinal groove and threaded portion, the key 61, and adjustable clamp-nut 63, substantially as described, and for the purpose specified.

6. The combination of the longitudinally-moving spindles, the holding-jaws, mechanism for operating said jaws and spindles, the carrier 37, having holding-arms adjustable thereon, and mechanism for operating said carrier, substantially as described, and for the purpose specified.

7. In a machine for operating upon blanks, the carrier-arms having the sockets 40 and spring-pressed fingers 41, substantially as described, and for the purpose specified.

8. In a machine for operating upon blanks, the carrier having arms 39, provided with sockets, the spring-pressed hooked latch 57 projecting into one of said sockets, the cam 60, and mechanism for reciprocating said carrier, substantially as described, and for the purpose specified.

9. The combination of the longitudinally-moving spindle, the holding-jaws, mechanism for operating said jaws and spindles, the carrier arranged to slide to and from a point between said holding-jaws, the cam D, slide 46, and the carrier-operating lever, one end of which is connected with said slide and the other with said carrier, substantially as described, and for the purpose specified.

10. In a machine for operating upon blanks, the combination of the holding-jaws, the carrier, its operating-lever 47 and 48, made in two parts with adjustable hubs, and operating mechanism, substantially as described, and for the purpose specified.

11. In a machine for operating upon blanks, the combination of the hopper set upon an incline, a carrier arranged to slide on inclined ways at an angle to said inclined hopper, the holding-jaws, and operating mechanism for said carrier and jaws, substantially as described, and for the purpose specified.

12. In a machine for operating upon blanks, the hopper consisting of the inclined bottom J and side pieces 32, laterally adjustable thereon, substantially as described, and for the purpose specified.

13. In a machine for operating upon blanks, the combination of the hopper having adjustable side pieces and the carrier having adjustable arms with sockets for receiving the ends of the blanks, substantially as described, and for the purpose specified.

14. In a machine for operating upon blanks, the combination of the hopper, the carrier moving under the lower end thereof, the holding-clamp for pressing upon the bottom blank but one and holding it and the blanks above it from falling when the sockets of the carrier are under said hopper, and operating mechanism, substantially as described, and for the purpose specified.

15. In a machine for operating upon blanks, the combination of the hopper, the angle-lever having the adjustable clamp in one arm, the carrier having the cam 56 for acting upon the other arm of said angle-lever, and mechanism for operating said carrier, substantially as described, and for the purpose specified.

16. The combination of the longitudinally-moving lathe-spindles, the holding-jaws, the hopper made adjustable to accommodate blanks of different lengths, the carrier having holding-arms, also made adjustable to and from each other, and operating mechanism, substantially as described, and for the purpose specified.

17. The combination of the longitudinally-moving lathe-spindle, the holding-jaws, the hopper, the holding-clamp for the blanks within said hopper, the carrier, and operating mechanism, substantially as described, and for the purpose specified.

18. In a machine for operating upon blanks, the combination of the hopper having adjustable side pieces, the holding-clamps mounted on and adjustable with said side pieces, the carrier, the adjustable carrier-arms 39, having cams 56 adjustable therewith, and operating mechanism, substantially as described, and for the purpose specified.

19. In a machine for operating upon blanks, the combination of the hopper, the holding-clamps, the carrier moving under said hopper and having arms 39, provided with sockets at their lower ends, and operating mechanism



anism, whereby the solid body portions of said arms pass under the hopper and catch the blank when released by said clamping mechanism, substantially as specified.

5 20. In a machine for operating upon blanks, the combination of the holding-jaws, the carrier-arms having the sockets 40 and spring-

pressed fingers 41, and operating mechanism, substantially as described, and for the purpose specified.

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