

(No Model.)

4 Sheets—Sheet 1.

C. R. SMITH.

MACHINE FOR FUSING GOLD UPON COMPOSITION RODS.

No. 532,920

Patented Jan. 22, 1895.

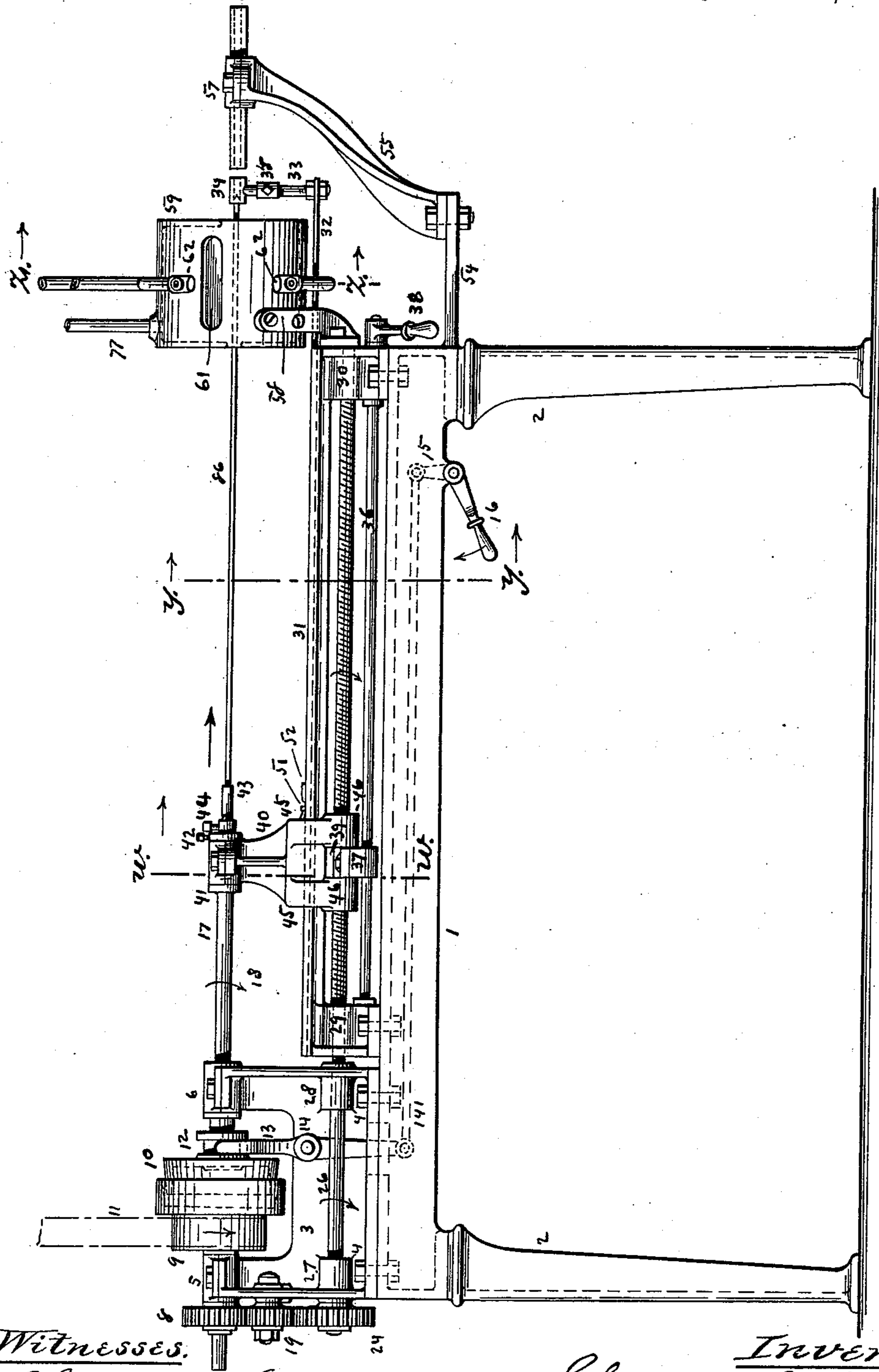


Fig. 1.

Witnesses.

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(No Model.)

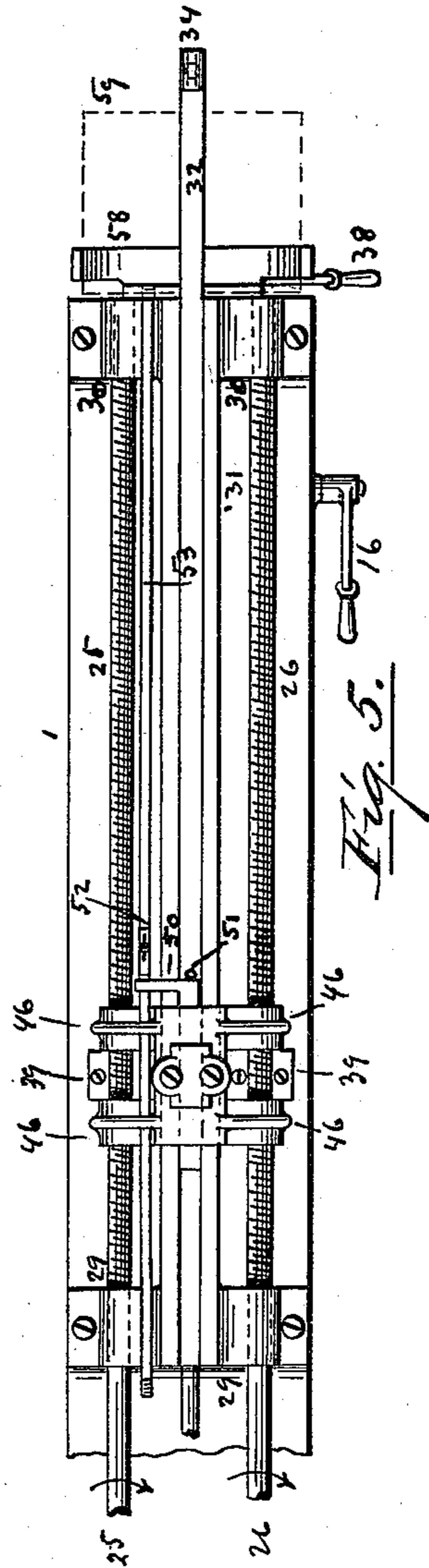
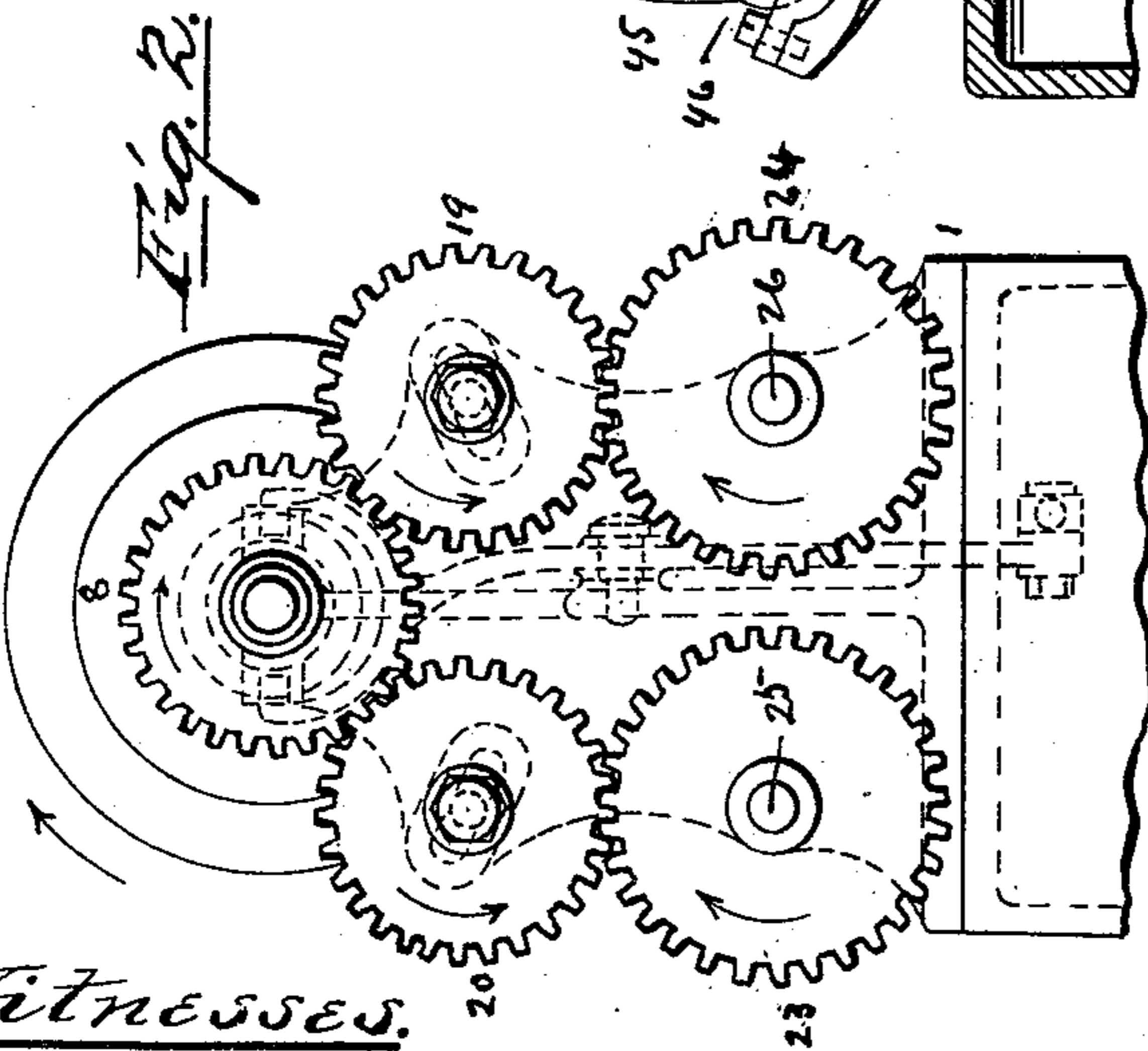
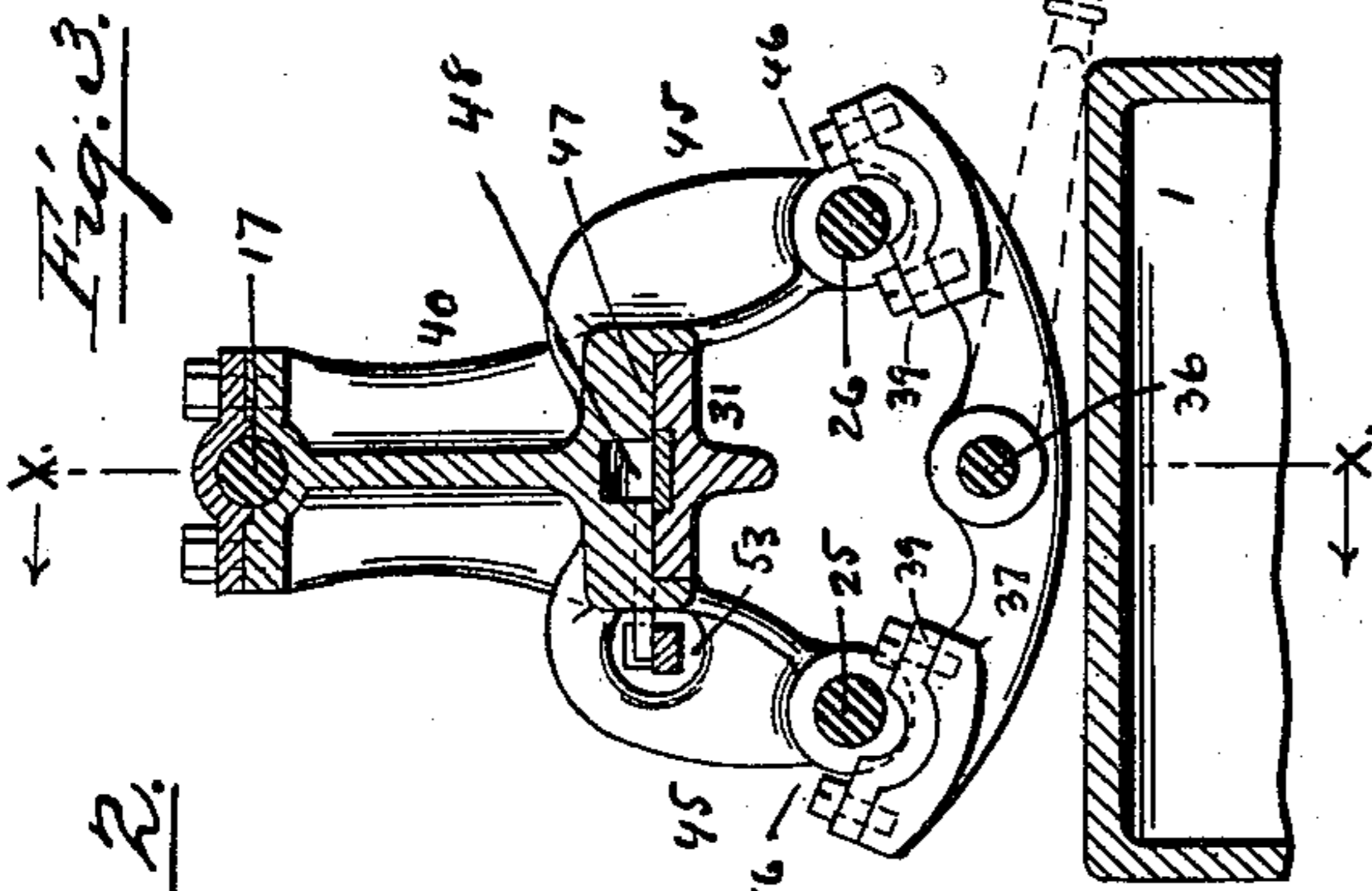
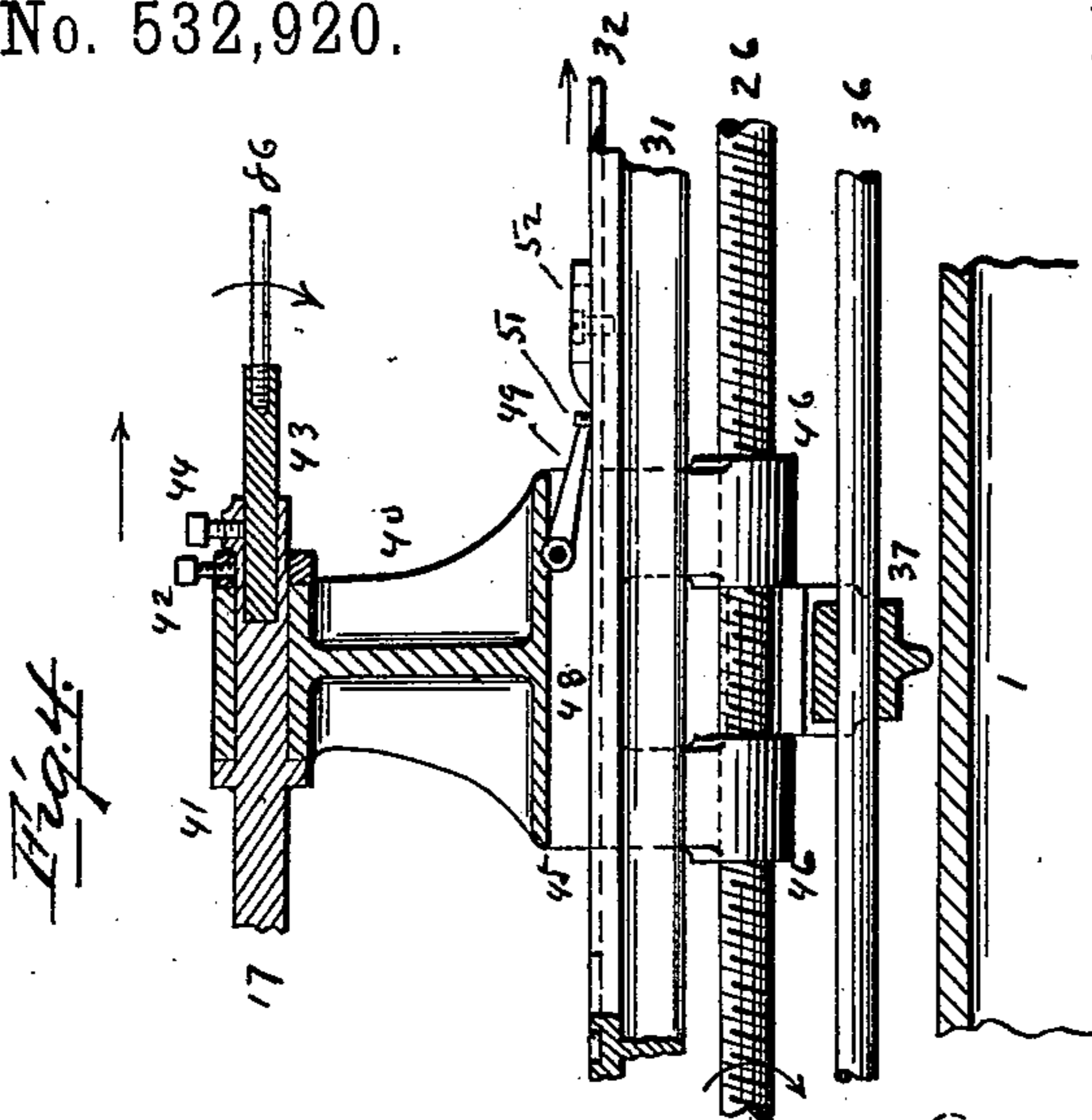
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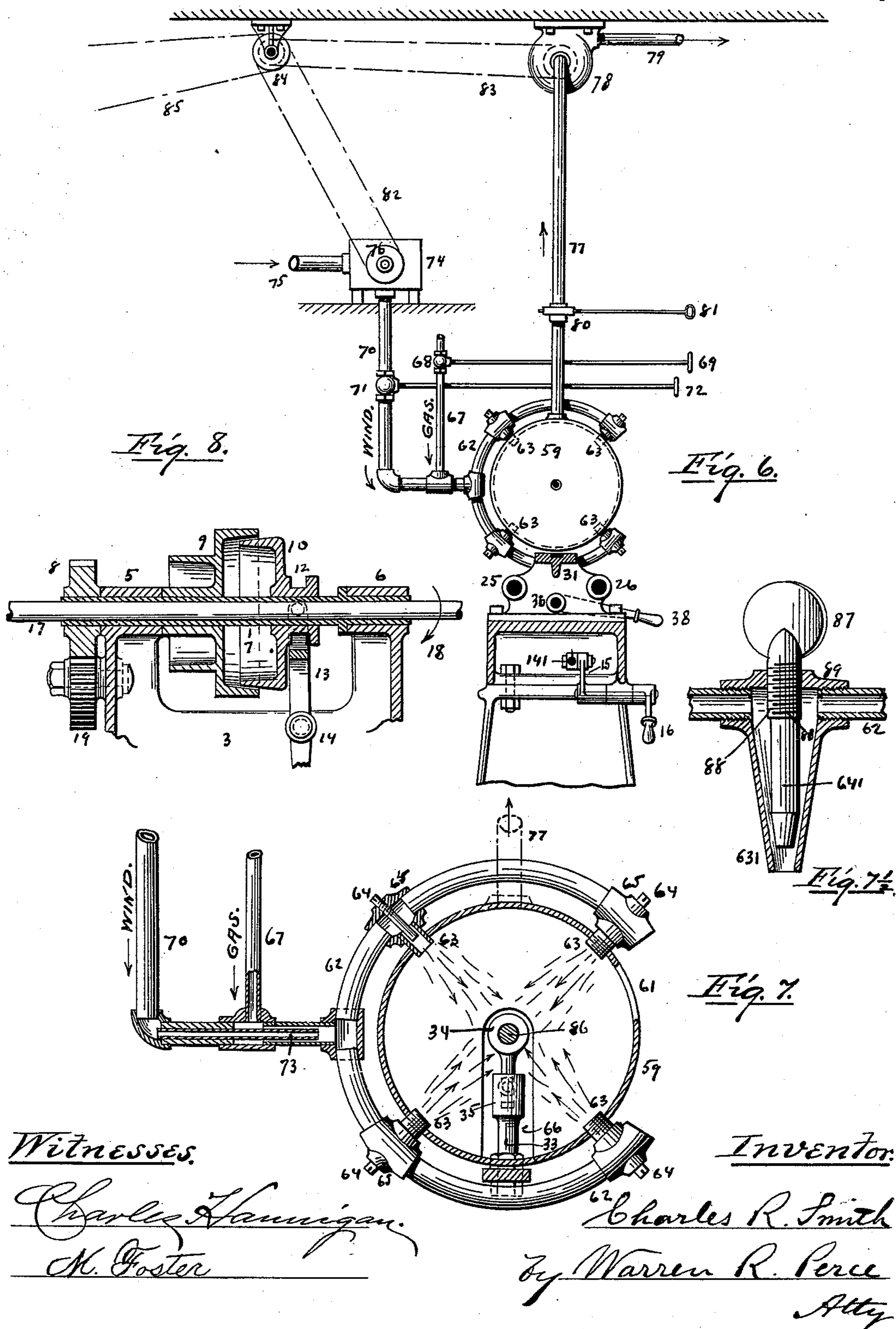
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4 Sheets—Sheet 3.

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4 Sheets—Sheet 4.

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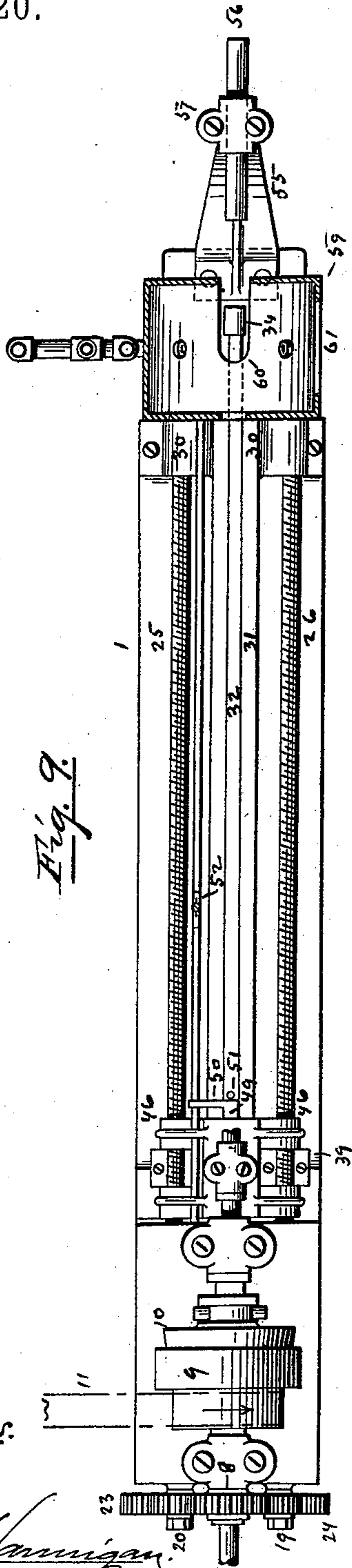


Fig. 9.

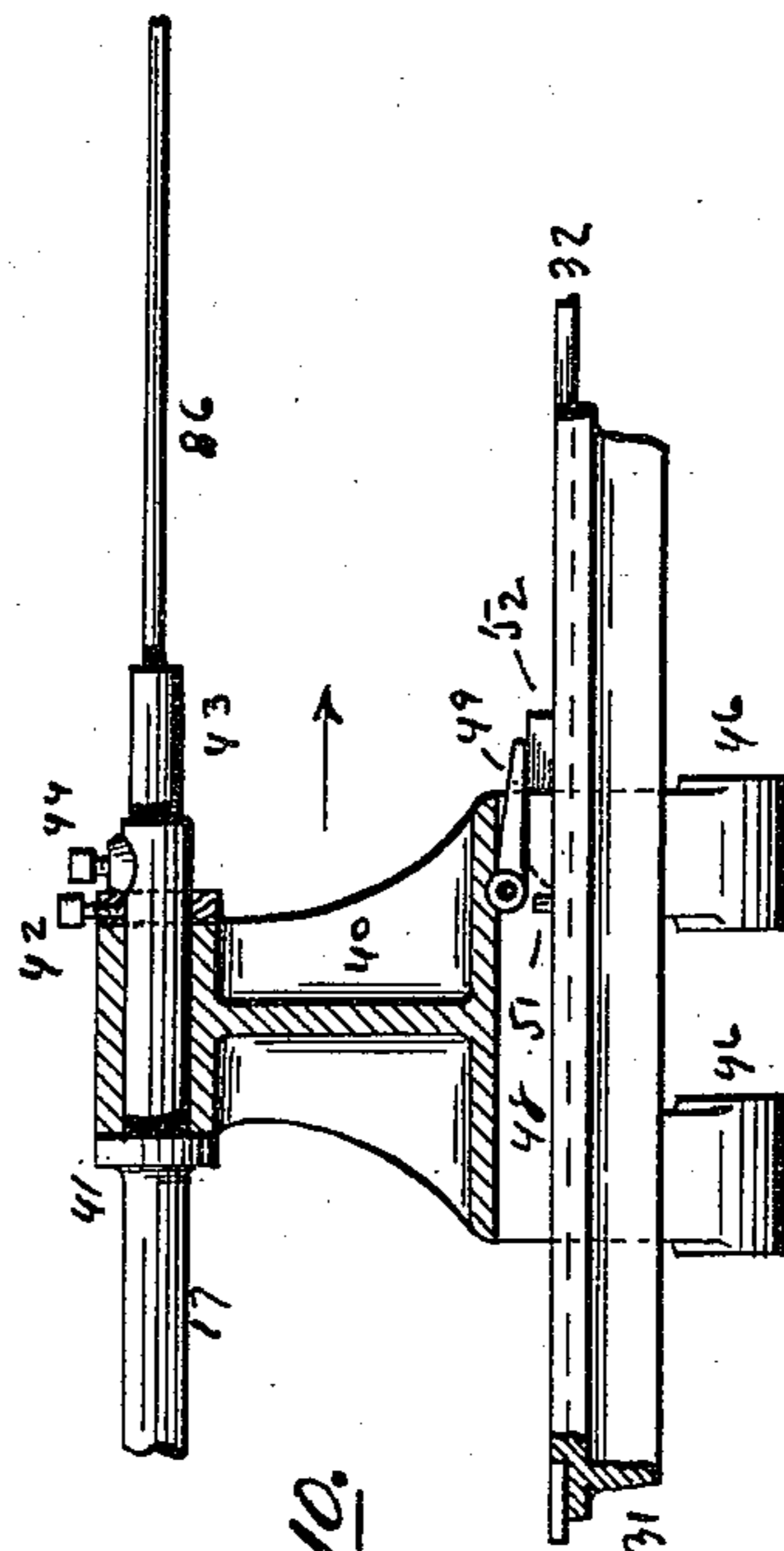


Fig. 10.

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UNITED STATES PATENT OFFICE.

CHARLES R. SMITH, OF PROVIDENCE, RHODE ISLAND.

MACHINE FOR FUSING GOLD UPON COMPOSITION RODS.

SPECIFICATION forming part of Letters Patent No. 532,920, dated January 22, 1895.

Application filed May 1, 1894. Serial No. 509,703. (No model.)

To all whom it may concern:

Be it known that I, CHARLES R. SMITH, of the city and county of Providence, in the State of Rhode Island, have invented a certain new and useful Improvement in Machines for Fusing Gold Upon Composition Rods and for Similar Purposes; and I declare the following to be a specification thereof, reference being had to the accompanying drawings.

Like numerals indicate like parts.

Figure 1 is a front elevation of my invention. Fig. 2 is an end elevation showing the train of gearing. Fig. 3 is a view in elevation and section of the wire-feeding carriage, table and screw-threaded shafts, as seen on line *ww* of Fig. 1. Fig. 4 is a view in elevation and section of the same as seen on line *xx* of Fig. 3. Fig. 5 is a top plan of the same, showing the carriage in the position illustrated in Figs. 1 and 4. Fig. 6 is an end elevation, showing the wind-pipes, gas-pipes, chamber and fans for producing wind-currents. Fig. 7 is a view in elevation and section on line *zz* of Fig. 1. Fig. 7½ is a detail view. Fig. 8 shows in diametrical vertical section the clutch mechanism of the invention. Fig. 9 is a top plan of my invention with the carriage at the beginning of its traverse. Fig. 10 is a detail view.

My invention is a device adapted to be used in fusing gold shells or gold filings upon a composition rod, covered with borax or other suitable flux, for the purpose of producing a seamless gold-plated wire; and it consists in the novel construction and combination of the parts specifically set forth in the claims and hereinafter particularly described, whereby an automatic variable feed is given to the rod to properly present it to the flame and the flame itself is concentrated thereon by a peculiar arrangement of gas-pipes and wind-pipes with means to operate the same and the heat is confined in a chamber at the fusing position.

In the drawings, 1 represents the bed of the machine, which is supported by legs 2 at the proper height.

3 is the head, attached to the bed by bolts 4 and furnished with bearings 5, 6. In these bearings a tubular shaft or sleeve 7 is mounted rotatably. On the tubular shaft 7 is fastened the gear 8, and the clutch pulleys 9, 10, on the former of which is the belt 11. The sliding

pulley of the clutch is wedge-faced on its periphery (see Fig. 8), and has the flanged or grooved collar 12, into which groove the end of the lever 13 extends. This lever is pivoted at 14 to the head 3 and its opposite end is pivotally connected with the rod 141. The rod 141 at its opposite end is pivotally connected with the bell-crank lever 15, which is pivotally mounted on the bed 1 and has the handle 16. When the handle is moved in the direction of the arrow (Fig. 1), the sliding pulley of the clutch is thrown into engagement with the fast pulley and then the belt 11, moving in the direction indicated by the arrow thereon in Fig. 1, causes the tubular shaft to turn and the solid shaft or rod 17 also, the latter being splined to the former so as to slide thereon longitudinally, but to rotate with it in the direction shown by the arrow 18.

The gear rotates the two idle or intermediate gears 19, 20 (Fig. 2), which are mounted adjustably upon studs 21, passing through elongated slots 22, in the head 3, as shown in dotted lines in Fig. 2, and the gears 19, 20 turn the gears 23, 24, which are mounted in the head 3. The gears 23 and 24 are fastened to screw-threaded shafts 25 and 26 (the former having a coarser pitched thread than the latter), and turn them in the same direction as that in which the shaft or rod 17 turns. Said shafts 25 and 26 are mounted in bearings 27, 28 in the head 3 and in bearings 29, 30, upon the bed 1. A T-shaped table 31 is properly supported at a distance above the bed 1 and is centrally grooved longitudinally. In this groove the feed rod 32 is longitudinally movable. At the forward end the feed rod 32 has an upright arm 33, upon the top of which is a short tube or sleeve 34, adjustably held thereon by the collar and set screw 35 (Fig. 1).

A guide rod 36 is supported by the bearings 29, 30. A curved rocker 37 is mounted on the guide rod 36 by a spline connection loosely so as to have a limited oscillation thereon, which is given by the handle 38, which is fastened to said rod. The rocker 37 has at its upper faces near the ends the nut blocks 39, which are bolted thereto. The rocker moves freely along the rod 36, but cannot turn on it, because of the spline connection.

The carriage 40 is mounted at the top on the shaft 17 and is held thereon from hori-

zontal longitudinal displacement by a shoulder or ring 41 of the shaft 17 and by the collar and set screw 42. (See Fig. 4.) The forward end of the shaft 17 is bored to receive the holder 43 held therein by the set screw 44. The carriage 40 is also mounted on the screw threaded shafts 25 and 26 by its downwardly extending arms 45, which terminate with sleeves 46, through which said screw threaded shafts freely pass. The carriage 40 also slides upon the table 31, having a flat bearing surface, as shown at 47. This bottom plate 47 is centrally grooved longitudinally, as seen at 48 (Figs. 3 and 4), and in this groove a pawl 49 is pivotally mounted. (See Figs. 4 and 10.) The rocker 37 by oscillation may have either of its arms brought up between the sleeves 46 of the carriage on either side, as desired, whereupon the nut block 39 on that side engages with the screw-threaded shaft 25 or 26, as the case may be.

The pawl 49 has its free end bent at a right angle to form an extension 50. At its bend it bears against a stud or pin 51 of the feed rod 32, when the pawl is in the position shown in Fig. 4. A tripping block 52 is fastened by a screw to the rod 53, which extends from the bearings 29 and 30 and when the extension 50 of the pawl 49 by the forward movement of the carriage 40 rides up the inclined face of the tripping block 52, the pawl 49 is raised above the stud pin 51 and clears it, as shown in Fig. 10.

At the forward end of the machine are the bracket 54 and arm 55, fastened to said bracket. A tube or sleeve 56 is supported by the arm 55 and is secured in place by the cap 57, bolted as shown. Supported by braces 58 is the chamber 59. This chamber is shown in Fig. 9, in diametrical horizontal section to illustrate the opening 60 at the bottom thereof. It also has the aperture 61 (Fig. 1). The chamber has, extending around its back, top and bottom, the circularly bent pipe 62, having discharge tubes or vents 63, directed so as to converge at the center, as seen in Fig. 7. In these vents 63 are plugs 64 of a smaller diameter. They are mounted in collars 65 by screw threads and can be thrust into or withdrawn from the vents 63 to any desired extent to vary the divergence of the current. The chamber 59 has another aperture 66, seen in Fig. 7.

67 is the gas-pipe, whose valve 68 is controlled by the handle 69. 70 is the wind-pipe, having a valve 71 operated by the handle 72. From the wind-pipe 70 a smaller pipe 73 extends into the gas-pipe 67 and is of smaller diameter than that of the gas-pipe. (See Fig. 7.)

74 is the air chamber, having an inlet pipe 75 and a rotary fan 76 to force in air. An exhaust pipe 77 extends up from the chamber 59 near one side thereof. (See Figs. 1, 6 and 7.) At the top of this pipe 77 is a suction fan 78 and a discharge pipe 79. A damper 80, operated by the handle 81, opens or closes the pipe 77. The fans 76 and 78 are

revolved by belts 82 and 83, respectively, from a pulley 84, which is driven by a belt 85.

The rod to be plated is shown at 86 and at its inner end is screwed into or otherwise fastened to the holder 43 and its outer end is supported in and through the tubular sleeve 34.

The operation of my improved mechanism is as follows: The parts of the device are at the beginning of the operation in the position shown in Fig. 9. The carriage 40 is brought to the end of the screw threaded shafts 25 and 26 nearest the pulleys 9, 10, and the feed rod 32 is moved to the position shown in said Fig. 9, so that its stud or pin 51 is in contact with the end of the pawl 49. The rocker 37 is so adjusted that its appropriate nut block 39 is engaged with the rear screw threaded shaft 25, which has the coarser pitch of screw thread. The rod 86 to be plated, properly coated with the fluxing material and with the gold shell or filings to be fused on said rod, is held at the inner end by the holder 43 and at the other end is supported loosely by the tubular sleeve 34. The upright arm 33, upon which said sleeve is mounted, is brought within the aperture 60, as seen in Fig. 9. The gas is lighted at the vents 63. All is now ready for the operation to begin. It is necessary first that the forward end of the rod 86, which is to be plated, should be heated and moved at a greater speed than that afterward required for the rod at points farther along its surface, as this end heats more rapidly, because the heat is carried by conduction only in one direction, that is, toward the opposite end; and unless the rod were moved quickly enough, when this forward end is subjected to the flame, the gold would melt too fast and drop off. The clutch pulleys 9, 10, being thrown into engagement by the proper movement of the handle 16, the gears and screw threaded shafts connected therewith are rotated and the engagement of the rear nut block 39 of the rocker 37 with the coarse screw threaded shaft 25, causes the carriage 40 to move forward and its pawl 49, bearing against the stud or pin 51 of the feed rod 32, carries the tubular sleeve 34 forward at the same rate of speed and thus the forward support of the rod 86 is maintained. When, however, the bent extension or arm 50 is brought by the carriage 40 (to which the pawl 49 is attached) into contact with the tripping block 52, (the position shown in Fig. 1,) said extension or arm 50 rides up the inclined face of said tripping block 52, and the pawl 49 is lifted out of contact with the stud or pin 51 and above it, as shown in Fig. 10. The result is that the feed rod 32 no longer has any forward movement but remains in the position where it was when freed from the engagement of its pin 51 by the pawl 49. It will be seen by Fig. 1 that the sleeve 34 is now in a position considerably outside the chamber 59 and that the rod 86, whose forward end is now cooled somewhat, is in a position where it can enter the fixed tubular sleeve 56. The rod 86 has now advanced to

such a position that the heat is conducted toward both ends. Therefore the rod at the part where the fusing takes place heats less rapidly and requires a slower movement forward. This change in speed is obtained by raising the handle 38 of the guide rod 36, which, being splined to the rocker 37, causes said rocker to turn so as to disengage the rear nut block 39 from the screw threaded shaft 25, but to bring its front nut block 39 into engagement with the screw threaded shaft 26. As this shaft has a finer pitched screw thread, the carriage now advances more slowly. The rod 86 is fed through the flame, through the sleeve 34, which is now stationary, and through the fixed tubular sleeve 56, until the whole length of the rod has been subjected to the flame and the gold thereon has been properly fused.

The chamber 59 has several important uses. It serves to confine the heat within a limited space and so promotes the comfort of the operator, who is protected thereby. The front aperture 61 permits a view of the rod in the fusing position. The exhaust pipe 77 is placed on the side of the chamber nearer the carriage 40 and when the damper 80 is open to allow the discharge of air which is drawn out by the suction fan 78, the heat of the flame is drawn toward that side of the chamber and so facilitates the more rapid heating of the rod 86 as it advances toward the jets of flame, while at the same time it facilitates the cooling of that portion of the rod 86 which has been fused.

The small pipe 73 discharges air under pressure into the current of gas from the gas pipe 67, and both air and gas flow together into the bent pipe 62 and out of the vents 63. The force and heat of the flame are thus readily controlled, while the size of the jet is determined by the plugs 64.

Instead of depending upon the coarser or finer pitch of the threads on the screw shafts 25 and 26 to vary the feed of the rod as described, the same result may be secured by changing the gears 23 and 24, or either of them, as may be desired. The less the diameter of these gears the more rapid will be the rotation of their respective shafts. In this change of gearing, the intermediate gears 19, 20 must be adjustable, as indicated in Fig. 2, in order to allow them to engage with the substituted gears.

In Fig. 7 $\frac{1}{2}$ I show a modified form of the vent and the plug therein. In this figure 62 represents the bent pipe, as before, which partially extends around the chamber 59, but the vent 631 is tapering and the plug 641 has a tapering tip and is provided with a thumb piece 87, by which its screw thread 88 is turned in the cap piece 89. It is apparent that by this contrivance the discharge from the vent 631 may be entirely cut off by the plug 641, or may be allowed and regulated to any desired degree.

I claim as a novel and useful invention and desire to secure by Letters Patent—

1. In a machine for fusing gold upon rods, the combination of a rotatably mounted sliding rod, having a gear, two properly mounted screw threaded shafts, having gears deriving power from the gear first mentioned, a carriage loosely mounted on said sliding rod but movable with it longitudinally, and provided with arms resting upon both of said screw threaded shafts but not engageable therewith, a guide rod mounted parallel with and below said shafts and having a handle to oscillate the same and a rocker mounted by a spline connection on said guide rod so as to travel thereon but to oscillate therewith and having at its ends nut blocks, respectively engageable, at will, with either of said screw threaded shafts for the purpose of rotating and longitudinally moving a gold-covered rod, attached at one end to said sliding rod and resting at its opposite end on a suitable support and to give said gold-covered rod a variable feed motion, substantially as specified.

2. The combination in a machine, of an upper rod, a lower rod and two screw threaded shafts, all mounted parallel with each other in suitable bearings, a carriage adapted to travel upon said upper rod and upon said shafts but not engageable therewith, a rocker engageable with said carriage and mounted by a spline connection upon the lower rod so as to slide freely thereon but to rotate therewith and having nut blocks at its ends, which are engageable respectively, at will, with either of said screw threaded shafts when said guide rod is rotated, substantially as shown.

3. In a machine for fusing gold upon a rod, the combination of a carriage, a rotatable sliding rod, on which said carriage is in part mounted and which is adapted to support and rotate the rod first mentioned, two screw threaded shafts upon which also said carriage is adapted to travel without engaging therewith, a guide rod adapted to be oscillated, a rocker movable on said guide rod and rotatable therewith and provided with nut blocks engageable, at will, respectively with either of said shafts to move said carriage, a pawl mounted on said carriage, a sliding feed rod having a support for the rod first mentioned and also having a stud or pin, with which said pawl is in contact, and a tripping block, arranged to lift said pawl out of contact with said stud or pin when said pawl rides up on said tripping block in the progress of the travel of the carriage, substantially as specified.

4. In combination with a machine for fusing gold upon a rod and provided with means for feeding and supporting said rod, a chamber in which the fusing is done, provided with an aperture through which to see the work, and partially surrounded by a bent pipe having vents arranged to discharge mingled air

and gas under pressure and an exhaust pipe adapted to draw the heat upon that part of the rod which is approaching the flame substantially as specified.

- 5 5. In combination with a gas supply and a wind supply, an outlet pipe from the latter inserted in an outlet pipe from the former and of a less diameter, a bent conduit pipe for the mingled air and gas and provided with vents

to discharge the same and plugs movable and adjustable in said vents of a less diameter than said vents, substantially as and for the purpose specified.

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Witnesses:

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