

(No Model.)

3 Sheets—Sheet 1.

G. B. LAMB & A. C. CAMPBELL.
WIRE DRAWING MACHINE.

No. 487,844.

Patented Dec. 13, 1892.

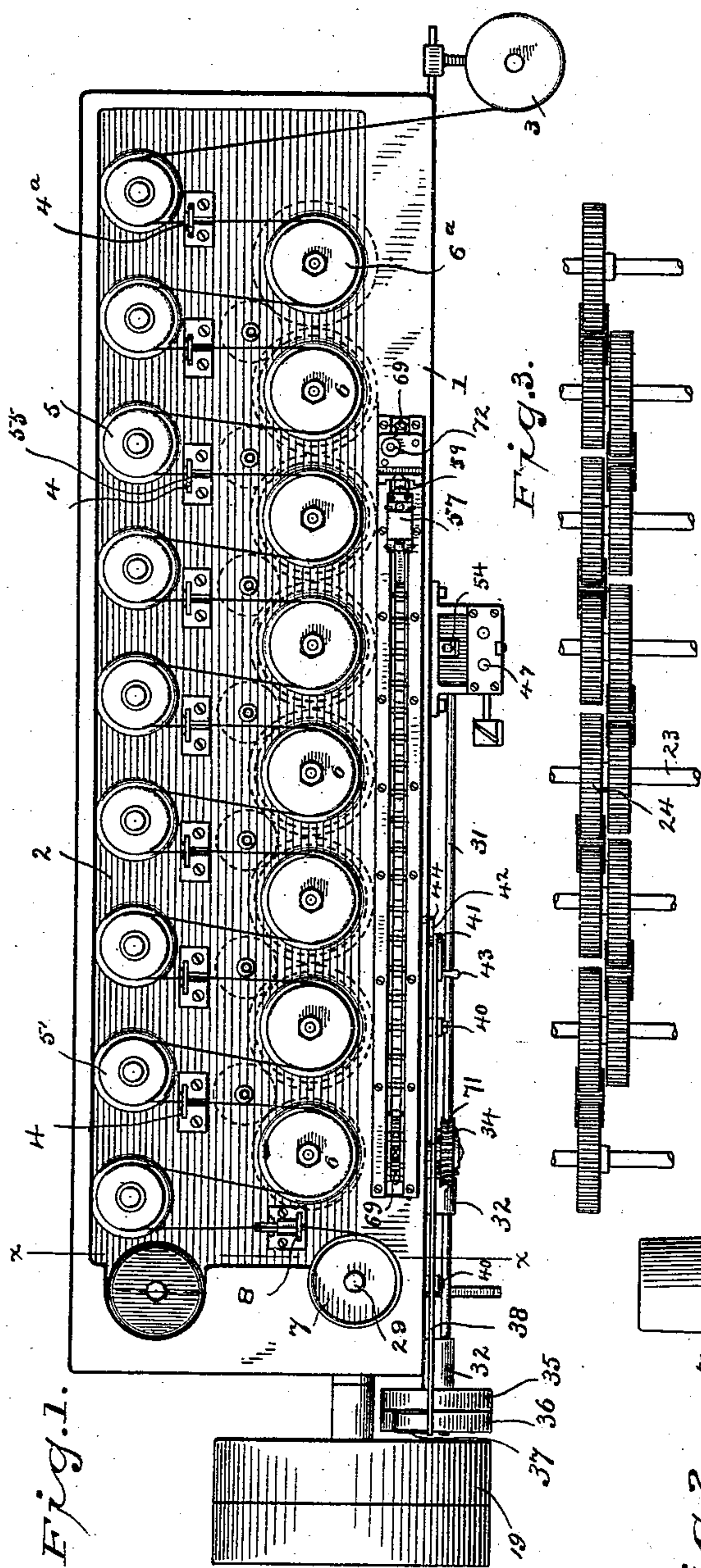


Fig. 1.

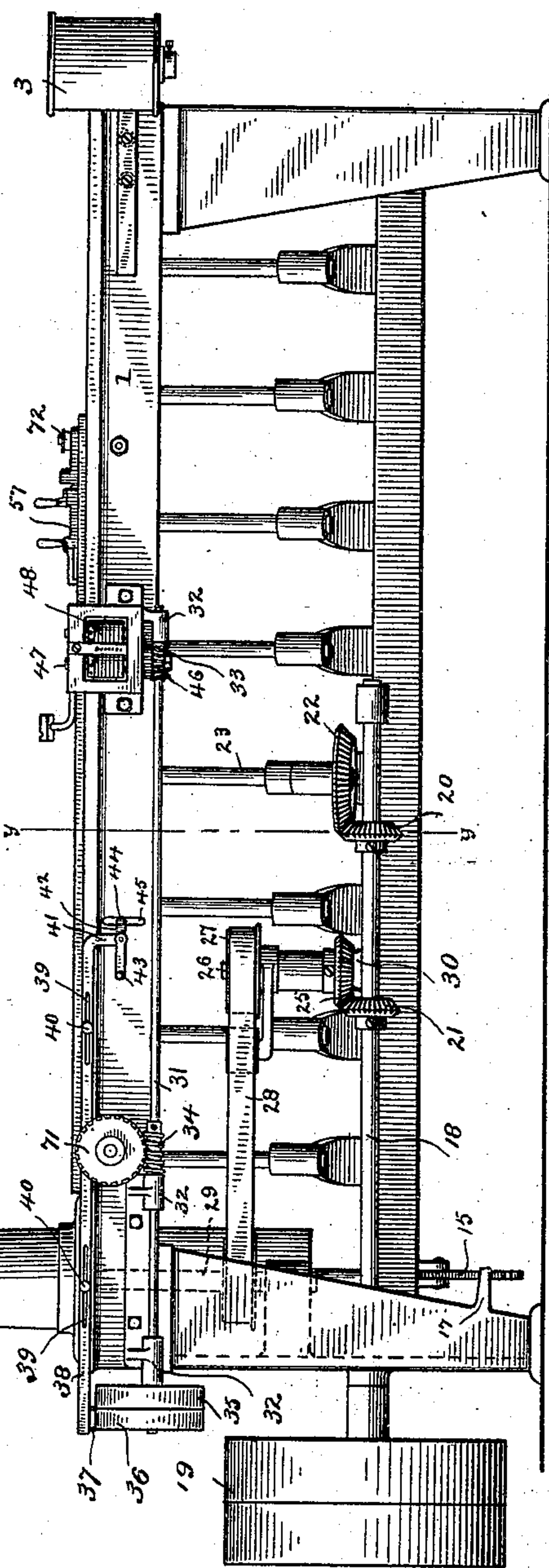


Fig. 2.

WITNESSES

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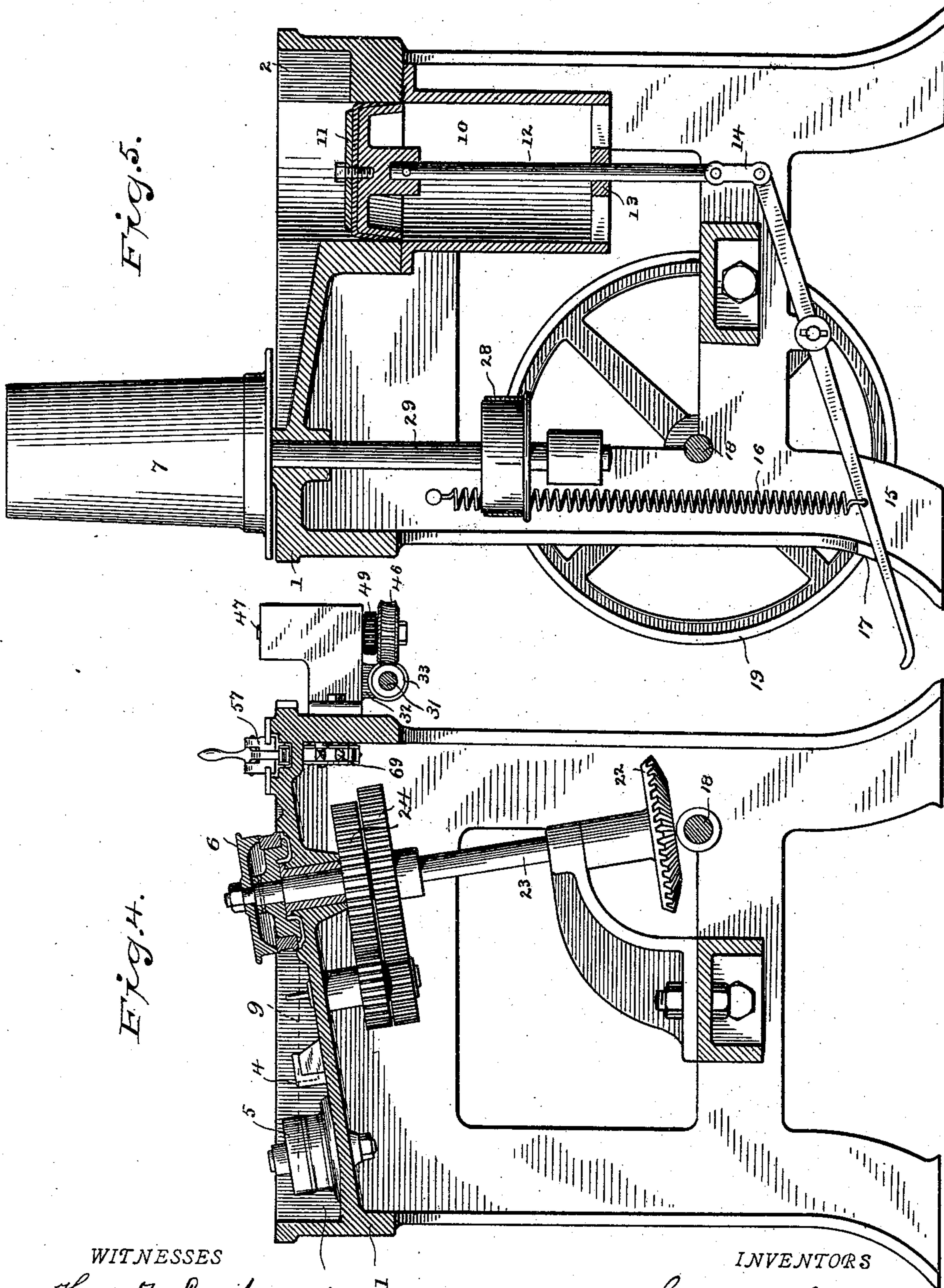
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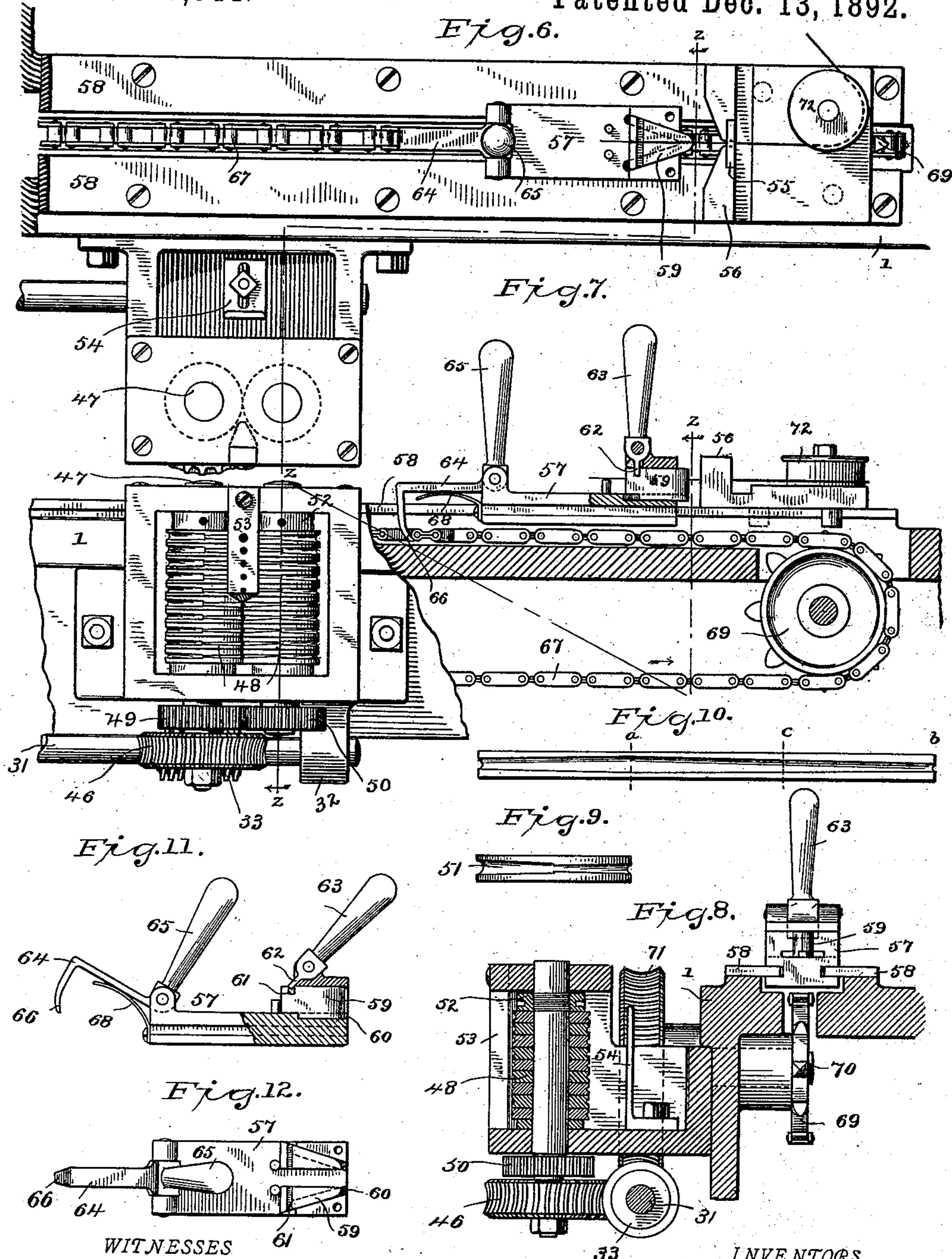


Fig. 11.

Fig. 9.

Fig. 8.

Fig. 12.

WITNESSES

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UNITED STATES PATENT OFFICE.

GEORGE B. LAMB AND ANDREW C. CAMPBELL, OF WATERBURY, CONNECTICUT, ASSIGNORS TO THE WATERBURY MACHINE COMPANY, OF SAME PLACE.

WIRE-DRAWING MACHINE.

SPECIFICATION forming part of Letters Patent No. 487,844, dated December 13, 1892.

Application filed February 29, 1892. Serial No. 423,192. (No model.)

To all whom it may concern:

Be it known that we, GEORGE B. LAMB and ANDREW C. CAMPBELL, citizens of the United States, residing at Waterbury, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Wire-Drawing Machines; and we do hereby 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.

Our invention has for its object to generally improve the details of construction of machines for drawing wire.

With these ends in view we have devised the simple and novel construction of which the following description, in connection with the accompanying drawings, is a specification, numerals and letters being used to designate the several parts.

Figure 1 is a plan view of the machine complete; Fig. 2, a side elevation; Fig. 3, an elevation of the gears detached, which are shown in dotted lines in Fig. 1; Fig. 4, a section, on an enlarged scale, on the line *yy* in Fig. 2, looking toward the right; Fig. 5, a section, on an enlarged scale, on the line *xx* in Fig. 1, looking toward the left; Fig. 6, a plan view, on an enlarged scale, of the pointing and drawing-in devices; Fig. 7, a side elevation corresponding therewith; Fig. 8, a section on the line *zz* in Fig. 6, showing the gripping-jaws in elevation, one set of pointing-dies being in section. (See, also, same line in Fig. 7.) Fig. 9 is an elevation of one of the pointing-dies detached; Fig. 10, a diagram showing one of the pointing-dies laid out in plan. Fig. 11 is a side elevation, partly in section; and Fig. 12 is a plan view of the slide by which the gripping-jaws are carried.

The operative parts of the machine are carried by a bed 1, said bed being provided with a chamber 2, which holds the lubricant.

3 denotes a reel which carries the wire to be reduced, and 7 the block upon which it is wound after being drawn or reduced. Just before the wire reaches the block it passes through a finishing-die 8, whose holder is so arranged that the wire is lubricated before passing

through the die, but not after, so that the wire passes to the winding-block clean and dry.

4 denotes the die-holders, 5 the guide-rollers, and 6 the drawing-rollers, all of said parts being arranged at an angle to the plane of the machine.

The dotted line denoted by 9 in Fig. 4 indicates approximately the lubricant-line in the chamber when the machine is in use. It will be seen that the drawing-dies in die-holders 4 and the guide-rollers are wholly submerged, so that in passing from one drawing-roller to another the wire enters and leaves the lubricant at an angle to its surface, thus doing away with special lubricating devices and insuring the perfect lubrication of the wire and dies during the passage of the wire through the machine. Motion is imparted to the drawing-rollers by a train of gearing shown in elevation in Fig. 3 and indicated by dotted lines in Fig. 1.

In practice we preferably make each drawing-roller run faster than the preceding one—say, for example, that each drawing-roller runs twenty per cent. faster than the one next preceding it. The percentage of gain in length when drawing wire from one size or gage to the next smaller size or gage varies from twenty-two to forty per cent., so that by speeding each drawing-roller to run twenty per cent. faster than the one preceding it we are always sure of sufficient slip, which is necessary in this class of machines.

It will of course be understood that the guide-rollers and the drawing-rollers may be of any ordinary or preferred construction. In practice we ordinarily use guide-rollers and drawing-rollers of substantially the construction illustrated in the drawings, the construction of one of the drawing-rollers being shown in section in Fig. 4.

In order that the bed of the machine may be clear, so as to give free access to the guide-rollers and the dies when threading up, we provide a reservoir 10 underneath the lubricant-chamber and communicating therewith, which is made cylindrical in form and of sufficient size to contain all the lubricant in the chamber when it is desired to draw it off.

11 is a piston in said chamber, having a rod 12, which extends downward through a guide 13 and is connected by a link 14 to a treadle 15, the treadle being pivoted to a convenient portion of the framework of the machine.

16 is a spring the action of which is to draw the treadle upward, and consequently to draw the piston downward, so that all of the lubricant in the chamber will run into the reservoir. After threading up the operator presses downward upon the treadle, which raises the piston up and forces the lubricant in the reservoir upward out into the chamber. After the lubricant has been forced out of the chamber the treadle is locked in its lowered position by a suitable detent or catch 17. (See Figs. 2 and 5.)

Motion is imparted to the train of gearing carrying the drawing-rollers and to the block in any ordinary or preferred manner. In the drawings we have shown these parts as driven from a shaft 18, said shaft being driven by a belt (not shown) running over a pulley 19 at the outer end thereof. Shaft 18 is provided with bevel-gears 20 and 21, said gear 20 engaging a bevel-gear 22 on a vertical shaft 23, to the upper end of which is attached a gear 24, belonging to the train by which the drawing-rollers are carried. Bevel-gear 21 meshes with a bevel-gear 25 on a vertical shaft 26, having at its upper end a belt-pulley 27, from which a belt 28 extends over a corresponding pulley on the shaft 29, by which the block 7 is carried. Shaft 26 is supported by a bracket 30, which is attached to any suitable portion of the framework of the machine.

31 denotes a horizontal shaft supported in brackets 32, which is provided with worms 33 and 34 and at its outer end with a fast belt-pulley 35 and a loose pulley 36. The belt (not shown) which runs over these pulleys is controlled by a belt-shifter 37, having an arm 38, provided with slots 39, through which pins 40 pass, by which it is held in place and guided in use. The inner end of arm 38 is turned down, as at 41, and has pivoted thereto a lever 42, having at one end a handpiece 43 and at the other end a pin 44, (see dotted lines, Figs. 1 and 2,) which engages a vertical slot 45 in the side of the bed. Worm 33 engages a worm-gear 46 on a vertical shaft 47, which carries one of the pointing-drums 48 and a pinion 49, engaging a similar pinion 50 on the shaft of the other pointing-drum. These pointing-drums are provided with grooves 51, which register with each other, as clearly shown in Fig. 7, and are cut to the required size to reduce an end of wire to a size that will enable it to be passed through one of the dies in the series.

In practice the drums consist of a series of disks locked in position on the shafts by nuts 52, which engage threaded portions of the shafts, as clearly shown in Fig. 8. The shape of the grooves will be clearly understood from Fig. 9, in connection with Fig. 10. The largest portion of the grooves is indicated

by *a*, the smallest portion by *b*, and the intermediate portion by *c*, the size of the grooves in the several disks diminishing downward in regular progression. The end of the wire to be pointed is passed through the required hole in a series in a guide 53, and as soon as the rotation of the drums brings the largest portion of the grooves into proper position the wire will enter the enlarged portion of the groove until the end of the wire comes in contact with a stop 54 back of the drums. At this instant the drums will have rotated far enough so that the wire will be acted upon by the tapering portion of the grooves, which will force the wire out of the device, reducing it as it goes. After pointing, the end of the wire is passed through a die 55 (see Fig. 6) and the die placed in a suitable die-holder 56. The wire is then ready to be operated upon by the drawing-in device, which we will now describe.

57 denotes a slide moving on ways 58 upon the bed. This slide is provided with parallel-moving jaws 59, having on their under sides ribs engaging grooves 60, which converge toward the end of the slide. At the rear ends of the jaws are slots 61, which are engaged by a tongue 62 upon a hand-lever 63 suitably pivoted to the slide. At the rear end of the slide is pivoted an engaging arm 64. This engaging arm is in shape of a bell-crank lever, one arm of which is a hand piece 65, the other arm being provided with a hook 66, which is adapted to engage a sprocket-chain 67. Beneath the lower arm is a spring 68, the action of which is to hold the hook in the disengaged position when not in use, as clearly shown in Fig. 11. The chain is carried by sprocket-wheels 69, one of which is carried by a shaft 70, which also carries a worm-gear 71, engaging worm 34 on shaft 31.

In starting the machine the operator manipulates the belt-shifter and throws the belt (not shown) upon the fast pulley 35 on shaft 31. The wire is then pointed, as already described, passed through a die 55, which is placed in die-holder 56, and the end of the wire placed between jaws 59 on slide 57. The operator then moves the jaws forward by means of hand-lever 63 until they grip the wire firmly. Hook 66 is then engaged with the sprocket-chain, and the wire is drawn through the die as far as may be required, ordinarily the length that the slide will be carried by the chain. The operator then removes the die from die-holder 56 and places it in the first die-holder 4, which we have specifically indicated by 4^a, the wire being first passed partially around the first guide-roller 5. The wire is then passed once and one-half times around the first drawing-roller 6, which we have specifically indicated by 6^a. The wire is then repointed, as before, the wire being passed through the next smaller hole in guide 53 and into the next smaller pair of grooves in the pointing-drums. After pointing, the end of the wire is passed through the next

smaller-sized die, which is placed in die-holder 56, and the drawing-in operation repeated as before, it being simply necessary after each drawing-in operation to disengage hook 66 from the sprocket-chain and move the slide back to its former position by hand. After the second drawing-in operation the wire is passed around the second guide-roller, then once and one-half times around the second drawing-roller, when it is repointed, if necessary, the end passed through the third die, and a third drawing-in operation performed. It will of course be understood that it may or may not be necessary to repoint the wire before passing it through each die. A drawing-in operation is necessary before the wire can be passed around each succeeding drawing-roller. It is not, however, necessary to always use the drawing-in device, as after the first few larger-sized dies are threaded the drawing-in operation can frequently be performed by pulling the wire through with a pair of pinchers. As a rule it is necessary to repoint the wire each time, and except in the case of the last and smaller-sized dies to repeat the drawing-in operation in connection with each die. 72 denotes a roller pivoted directly in front of die-holder 56, over which the wire is passed before being operated upon by the drawing-in device.

Having thus described our invention, we claim—

1. In a wire-drawing machine, a lubricant-chamber, dies arranged therein, means for drawing the wire through said dies, a reservoir under said chamber and communicating therewith, a piston in said chamber, and suitable means for operating said piston, so that the lubricant may be withdrawn from the chamber by a downward movement of the piston and forced outward into the chamber again by an upward movement of the piston.

2. The combination, with the lubricant-chamber, dies arranged therein, and means for drawing the wire through said dies, of a reservoir communicating with said chamber, a piston in said reservoir, a treadle and connections for raising and lowering the piston,

a spring acting to draw the treadle upward, and a detent for locking the treadle downward against the power of the spring.

3. The combination, with the lubricant-chamber, of a series of drawing-rollers, a series of guide-rollers opposite thereto, and a series of dies intermediate the drawing-rollers and the guide-rollers, one of said series of rollers and said dies being arranged below the plane of the other series of rollers and lying at an angle to the plane of the machine, so that in passing from one drawing-roller to another the wire enters and leaves the lubricant at an angle to its surface.

4. The combination, with the bed, of a sprocket-chain, sprocket-wheels by which it is carried, mechanism for imparting motion thereto, a slide 57, carrying jaws 59, a hand-lever 63 for operating said jaws, a pivoted engaging arm having a hook to engage the chain, and a spring to hold the hook out of engaging position.

5. The combination, with the bed and sprocket-chain, mechanism for imparting movement thereto, and a die-holder and dies, of slide 57, having grooves which converge toward the end of the slide, jaws having ribs engaging said grooves and slots at the rear end, a pivoted hand-lever having a tongue engaging said slots, whereby parallel movement is imparted to the jaws in opening and closing, and an engaging arm adapted to connect the slide with the chain, substantially as described.

6. The combination, with the block, reel, drawing-rollers, guide-rollers, and die-holders 4, of die-holder 56, suitable dies adapted to engage the several die-holders, roller 72 in front of die-holder 56, and a slide carrying suitable jaws, by which the end of wire may be drawn through the several dies before threading up.

In testimony whereof we affix our signatures in presence of two witnesses.

GEORGE B. LAMB.

ANDREW C. CAMPBELL.

Witnesses:

F. B. SAMMIS,

GEO. W. ROBERTS.