

No. 743,608.

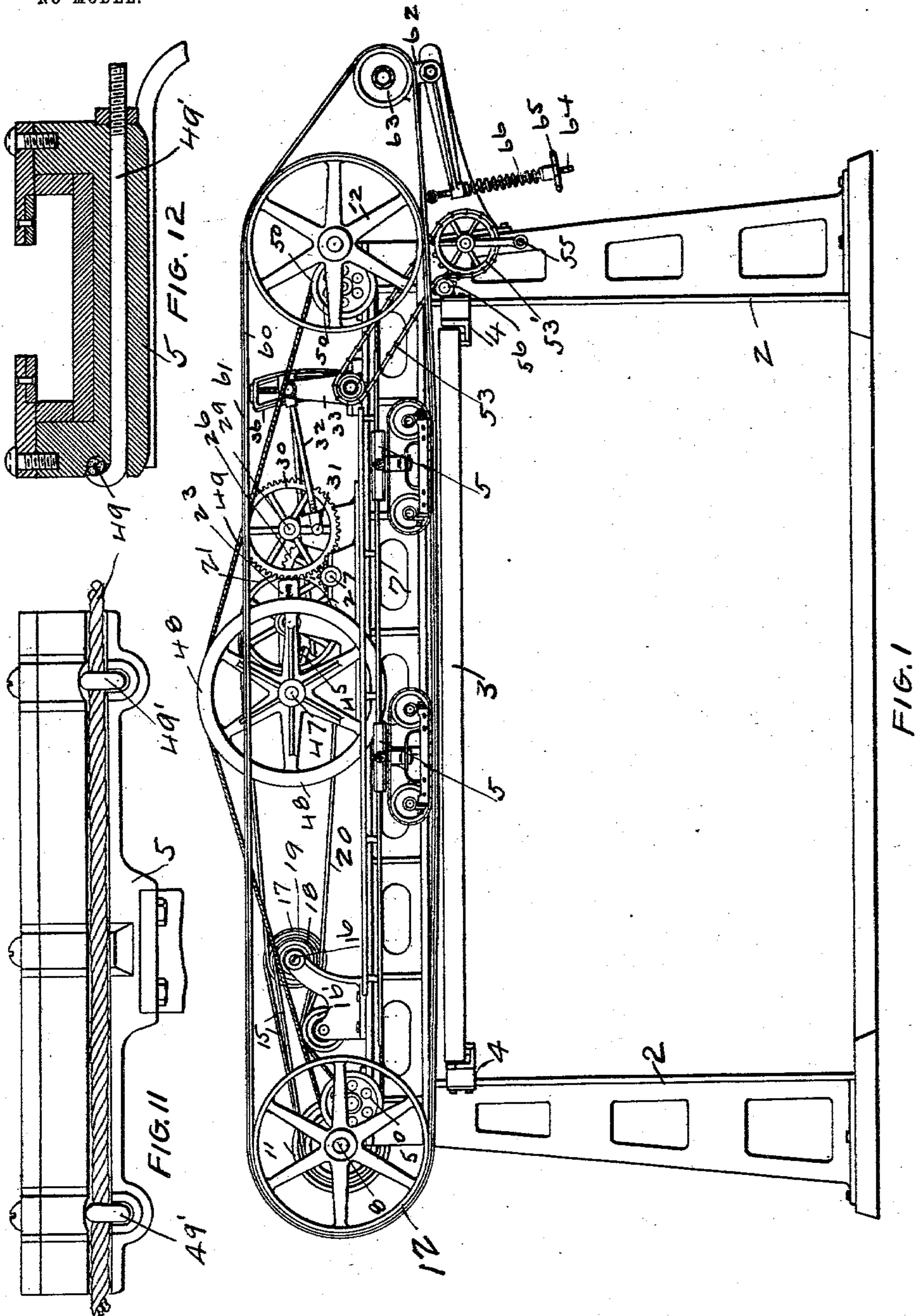
PATENTED NOV. 10, 1903.

C. S. YARNELL.
RUBBING AND POLISHING MACHINE.

APPLICATION FILED DEC. 29, 1902.

NO MODEL.

3 SHEETS—SHEET 1.



Witnesses
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O. G. Hanson.

Inventor
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His Attorneys

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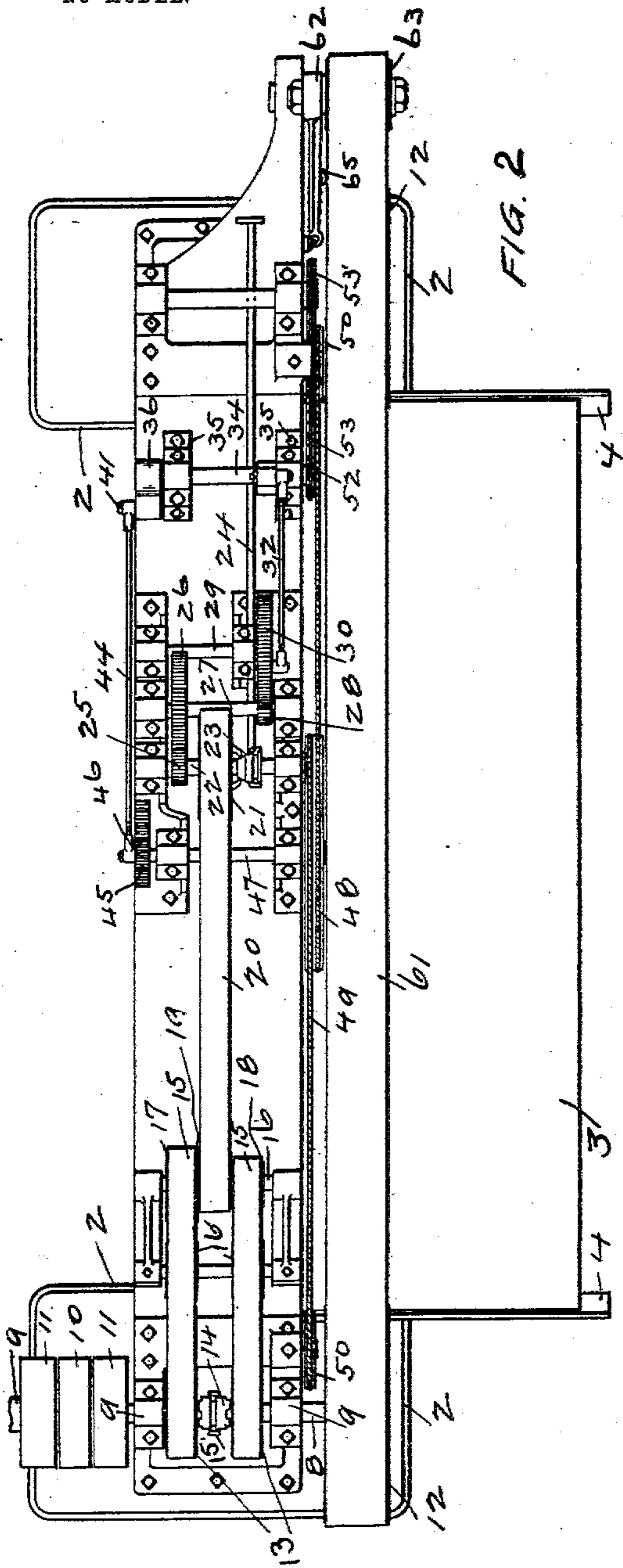


FIG. 2

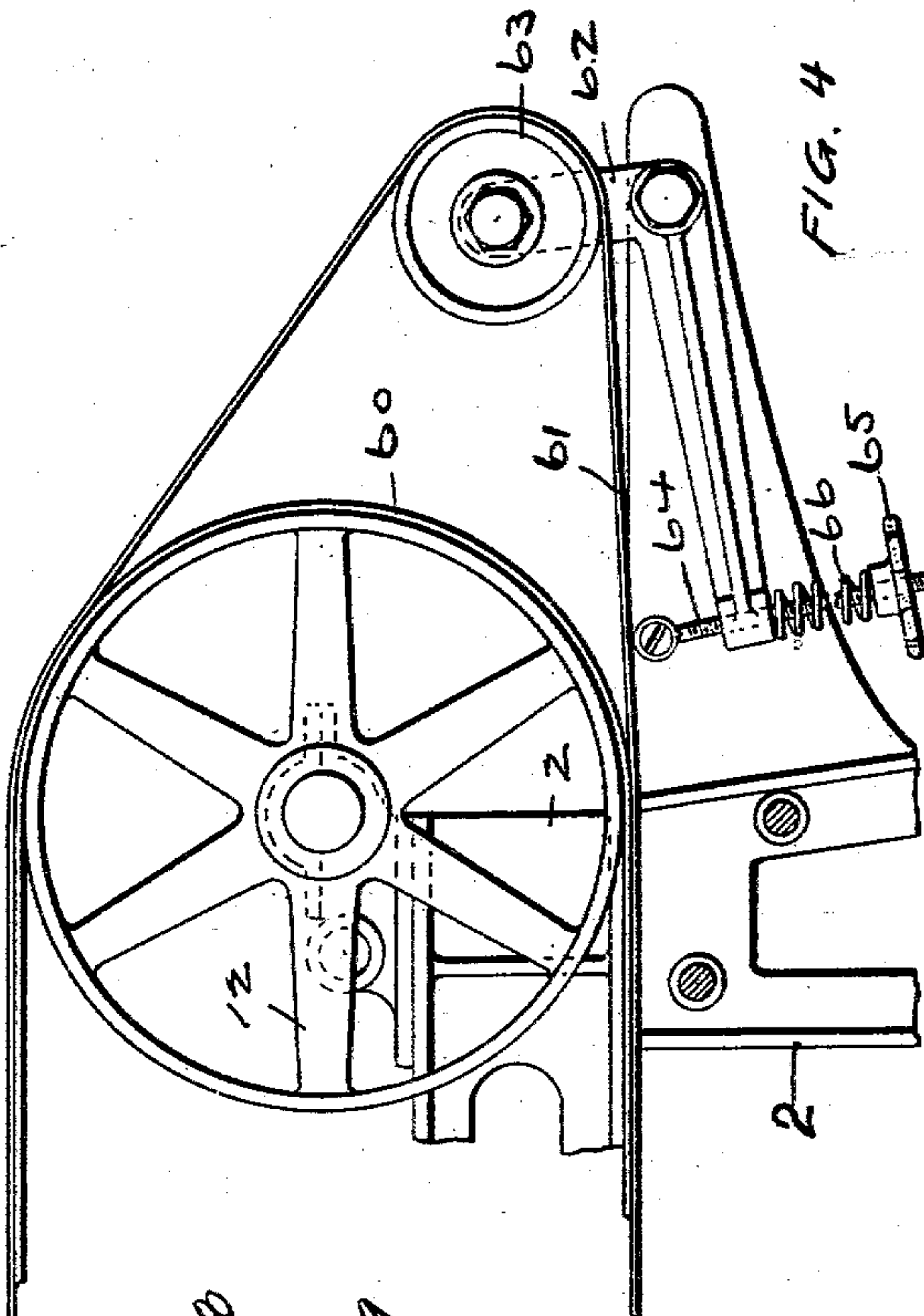


FIG. 4

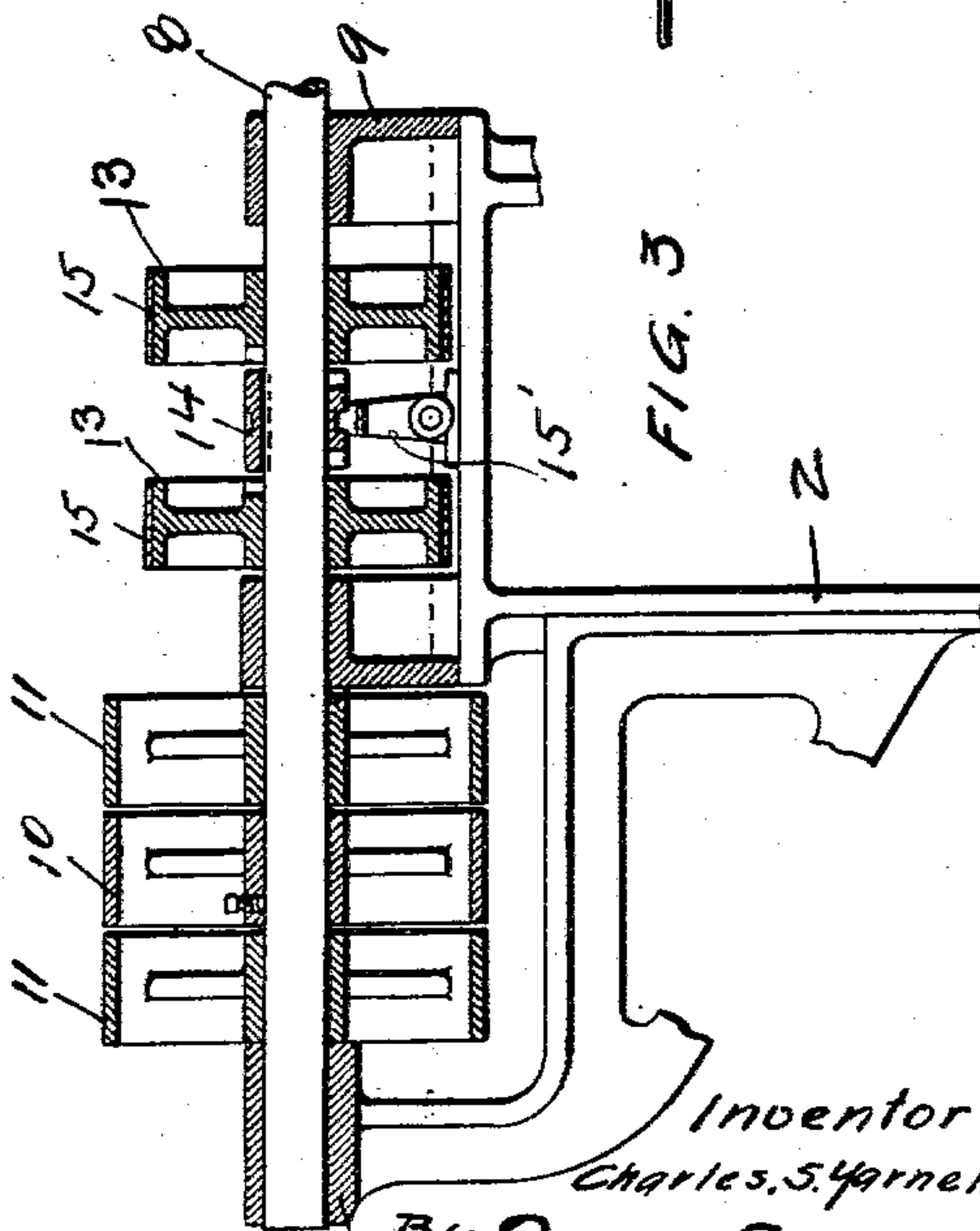


FIG. 3

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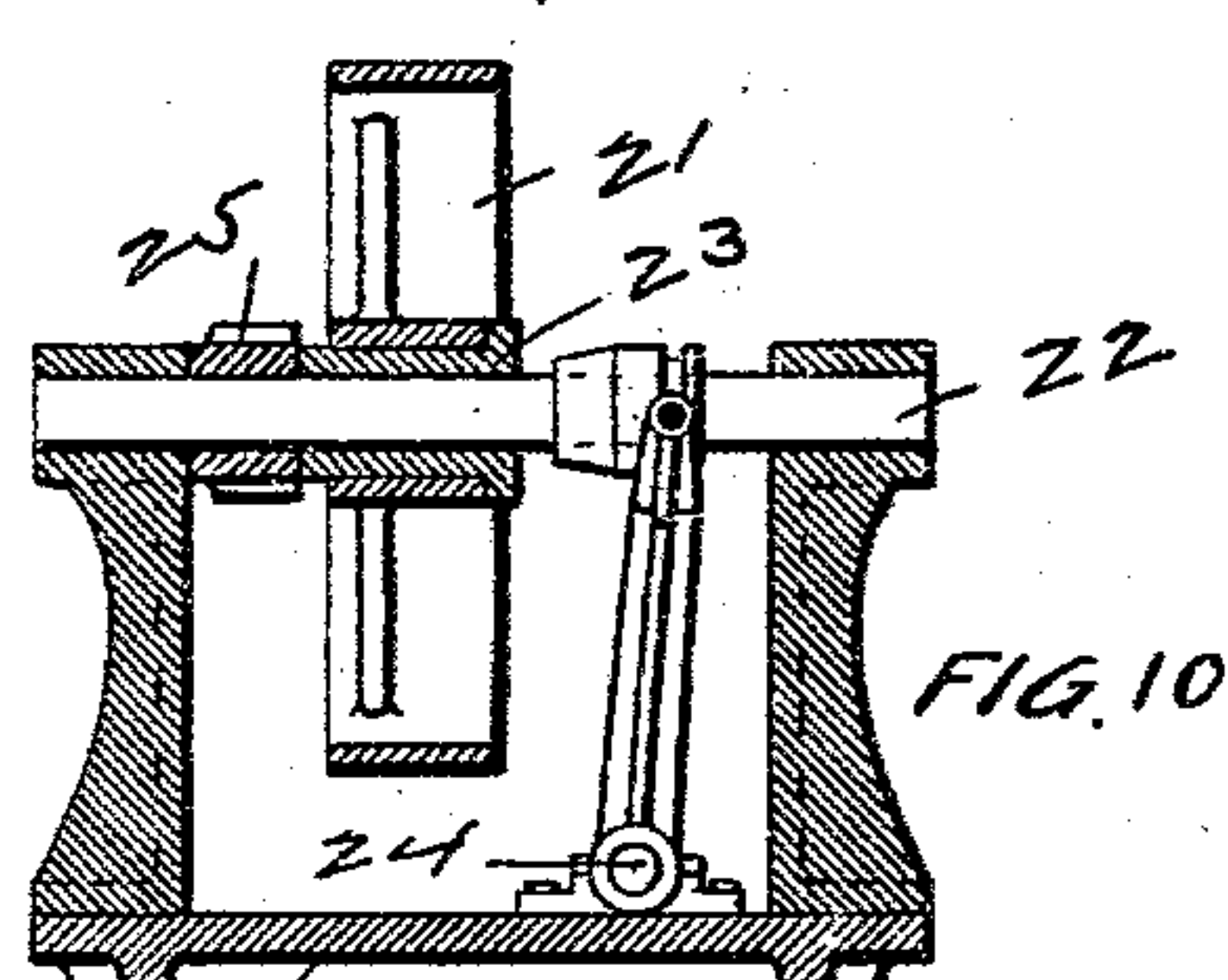
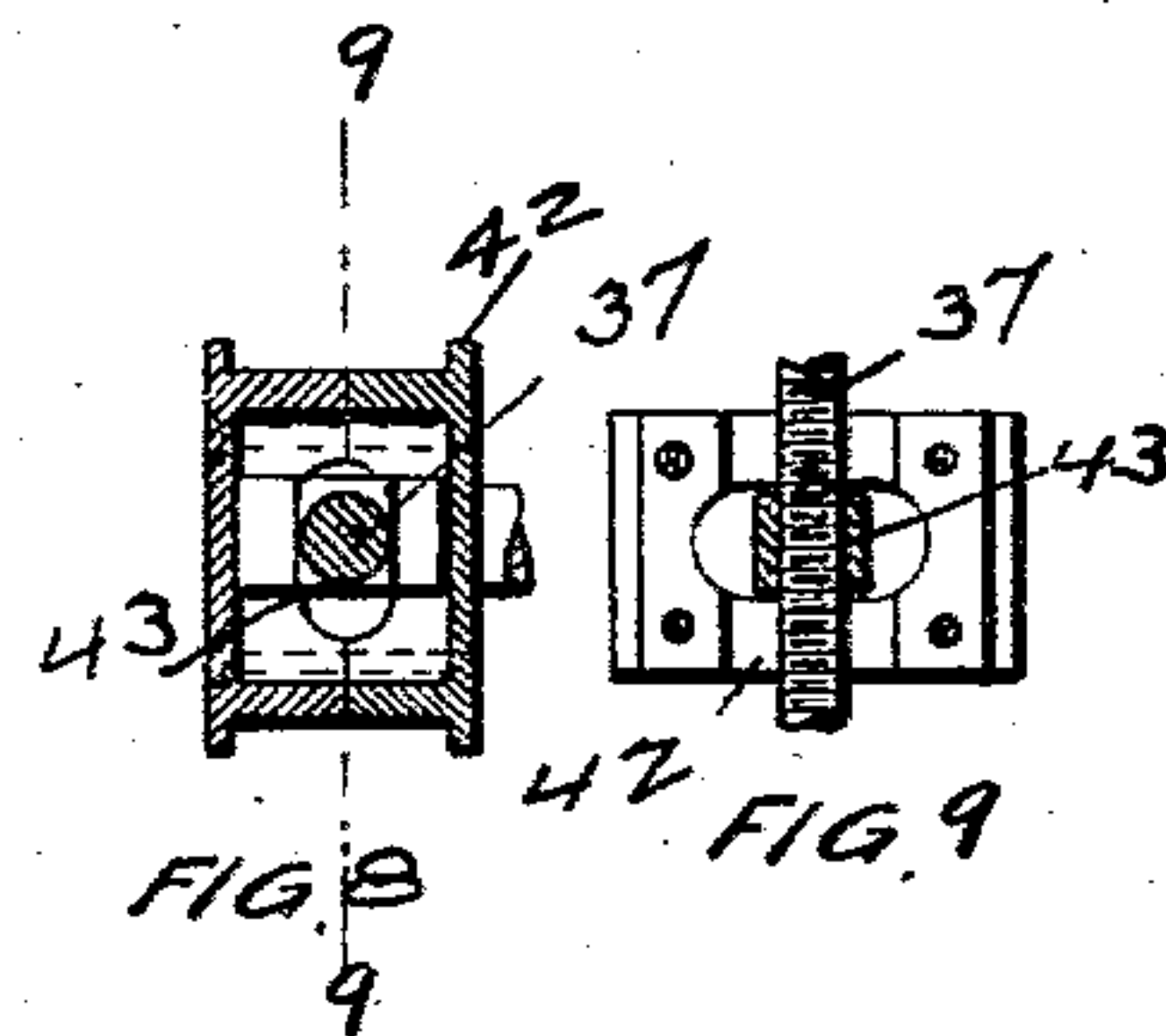
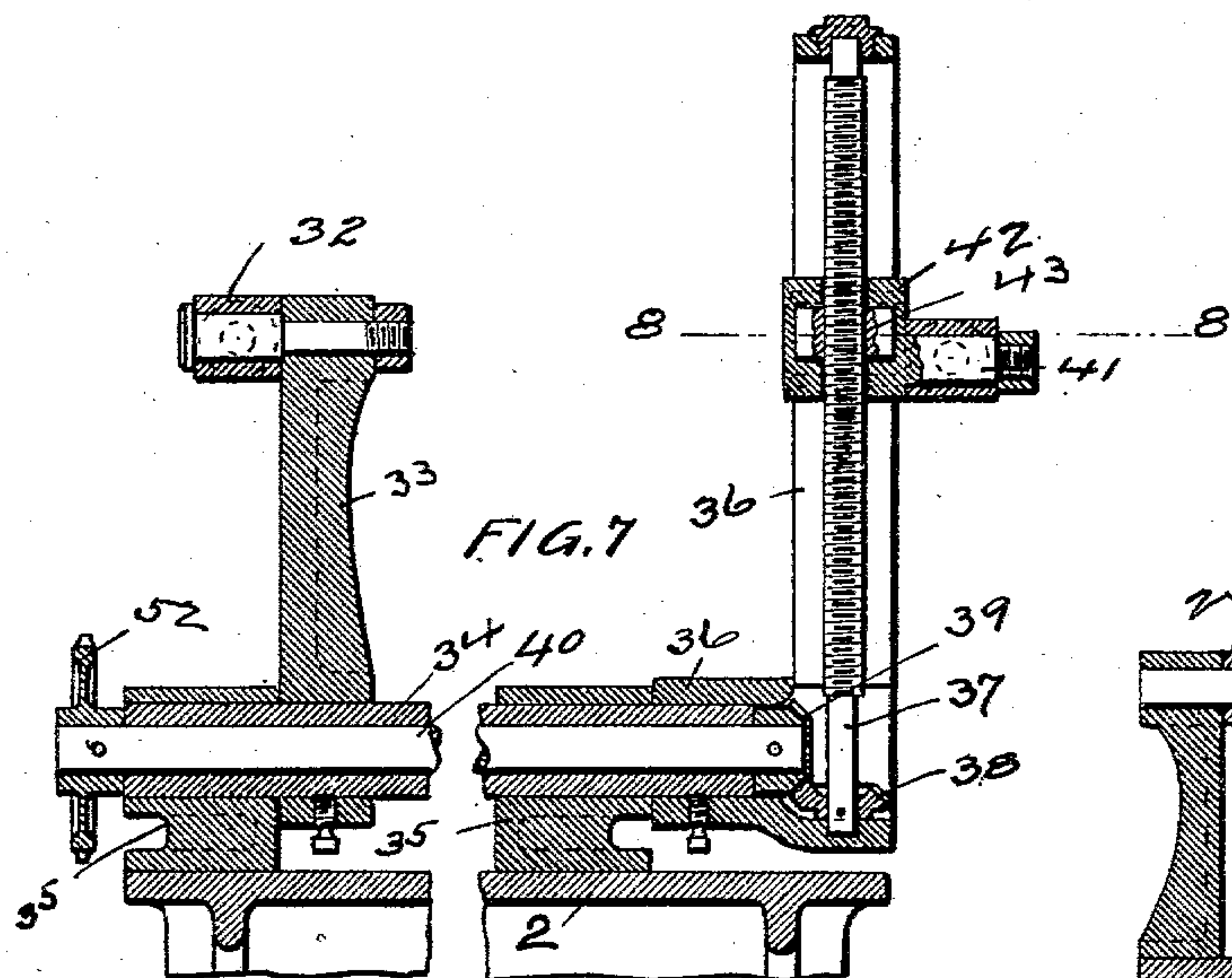
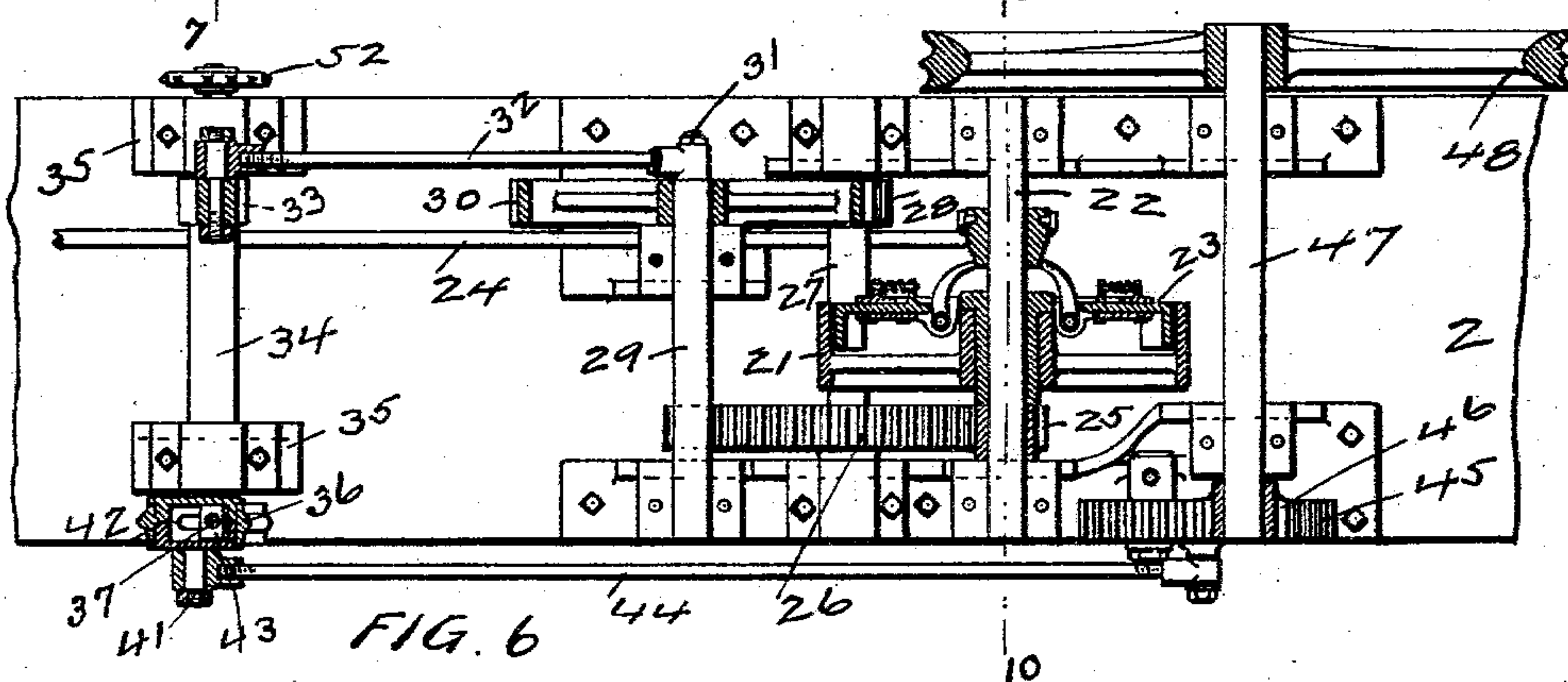
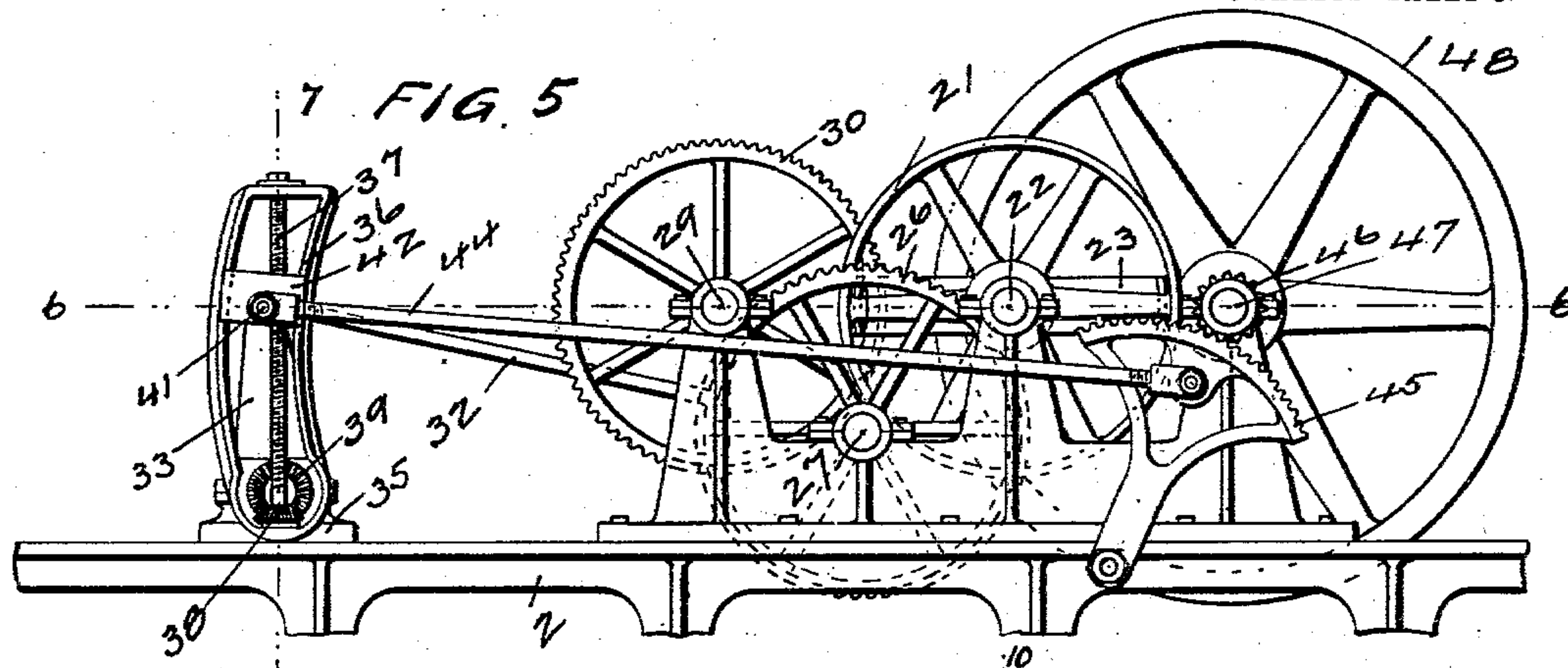
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3 SHEETS—SHEET 3.



Witnesses.
E. J. Stange
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UNITED STATES PATENT OFFICE.

CHARLES S. YARNELL, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR TO MOORE CARVING MACHINE COMPANY, OF MINNEAPOLIS, MINNESOTA, A CORPORATION OF MINNESOTA.

RUBBING AND POLISHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 743,608, dated November 10, 1903.

Application filed December 29, 1902. Serial No. 136,946. (No model.)

To all whom it may concern:

Be it known that I, CHARLES S. YARNELL, of Minneapolis, in the county of Hennepin, State of Minnesota, have invented certain new and useful Improvements in Rubbing and Polishing Machines, of which the following is a specification.

This invention relates to rubbing and polishing machines, and particularly to machines designed for rubbing and polishing surfaces of wood, although the machine is capable without reconstruction of being used for polishing surfaces of other materials.

My present invention is designed particularly as an improvement upon the rubbing and polishing machine shown and described in Letters Patent No. 685,328, granted October 29, 1901, to Henry P. Gale; and the objects of my present invention are, first, to improve the construction of the Gale machine by providing a supporting-belt and a polishing-belt with a belt-tightener arranged in conjunction with the polishing-belt, whereby the slack in the polishing-belt is taken up and the puckering or wrinkling of that belt while in operation is avoided; second, to provide improved means for regulating the stroke of the reciprocating heads; third, to provide means for reversing the travel of the polishing-belt.

To these ends my invention consists generally in the constructions and combinations hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, forming part of this specification, Figure 1 is a front elevation of my improved machine. Fig. 2 is a plan view of the same. Fig. 3 is a detail section taken lengthwise of the driving-shaft. Fig. 4 is an enlarged section showing the belt-tightener arranged in connection with the polishing-belt. Fig. 5 is a detailed elevation showing the means for adjusting the stroke of the reciprocating head. Fig. 6 is a horizontal section on line 6 6 of Fig. 5. Fig. 7 is an enlarged detailed section on line 7 7 of Fig. 5. Fig. 8 is a detail on line 8 8 of Fig. 7. Fig. 9 is a detail on line 9 9 of Fig. 8. Fig. 10 is a section on line 10 10 of Fig. 6.

Figs. 11 and 12 are details of the means for securing the reciprocating heads to the operating-cable.

In all of the drawings, 2 represents the frame of the machine, which consists, preferably, of a suitable base and two upright standards supporting a horizontal bed-plate carrying the operating parts of the machine. An adjustable work-table 3 is supported upon suitable bearings 4 upon the standards of the machine, and this table is adapted to be moved horizontally beneath the working parts of the machine. It is also preferably arranged to be vertically adjustable by suitable means. (Not shown.) I employ a polishing-belt and one or more reciprocating heads 5, said heads being preferably of substantially the same construction as the reciprocating head shown and described in the Gale patent, hereinbefore referred to. I do not need, therefore, to describe the particular construction of the reciprocating heads. As here shown, these heads are arranged upon a suitable vertically-adjustable guide-bar 7, by means of which they may be raised or lowered, so as to bring them into or out of contact with the polishing-belt. Any preferred construction may be used for raising and lowering or guiding the reciprocating heads.

For applying power to the machine I preferably arrange a driving-shaft 8, mounted in suitable bearings 9 upon the frame of the machine and provided with a fast pulley 10 and two loose pulleys 11. By means of straight and cross belts applied to these pulleys and a suitable belt-shifter the shaft 8 may be driven in either direction. The shaft 8 carries a suitable pulley 12, that supports and drives the polishing-belt. By reversing the driving-shaft and the pulley 12 the movement of the polishing-belt may be reversed at will. Arranged loosely upon the shaft 8 are the two loose pulleys 13, and between them is a clutch 14, provided with a suitable operating-lever 15', and this clutch is adapted to secure either of the pulleys 13 to the driving-shaft 8. Belts 15 are arranged upon the pulleys 13, and these belts extend to a shaft 16, provided with pulleys 17 and 18, which are engaged by said

belts 15. (See Fig. 1.) The pulley 17 is considerably larger than the pulley 18, so that when the clutch 14 is in engagement with one of the pulleys 13 the shaft 16 is driven at a greater speed than when this clutch is in engagement with the other pulley 13. The shaft 16 is also provided with a pulley 19, and a belt 20 engages this pulley and extends to a pulley 21 upon a shaft 22. The pulley 21 is loose upon the shaft 22; but it may be connected therewith by means of a suitable clutch 23, arranged to be operated by a rod 24. The rod 24 may be operated by any suitable means—such, for instance, as a suitable treadle. The shaft 22 is provided with a pinion 25, that engages with a gear 26 upon a shaft 27, and this shaft is provided with a pinion 28, which engages a gear 30 upon a shaft 29. The gear 30 is provided with a crank-pin 31, to which is connected a rod 32, which extends to a crank-arm 33, arranged upon a rock-shaft 34. (See Fig. 7.) The rock-shaft 34 is mounted in bearings 35 upon the frame of the machine and carries at its opposite end a slotted crank-arm 36. A threaded shaft 37 is mounted in bearings in the slotted crank-arm 36, this shaft 37 being provided with a beveled pinion 38, connected with a similar pinion 39 upon a shaft 40, arranged within the rock-shaft 34, said rock-shaft being made hollow to receive the shaft 40. A crank-pin 41 is arranged upon a block 42, and this block is arranged within the slot in the crank-arm 36. Arranged within the block 42 is a nut 43, that is engaged by the threaded shaft 37. By turning the shaft 37 the block 42 is adjusted lengthwise of the crank-arm 36, and thereby the crank-pin 41 is moved nearer to or farther from the center of the rock-shaft 34, and hence the stroke of said crank-pin is shortened or lengthened. A rod 44 is connected to the crank-pin 41 and has its opposite end connected to a rocking toothed sector 45, which is in engagement with a pinion 46 upon a shaft 47, carrying the large pulley 48. A cable 49 is arranged upon the belt-pulley 48 and has its opposite ends secured thereto. This cable passes over the idler-pulleys 50. The reciprocating heads 5 are connected to the cable 49, preferably by the hook-bolts 49'. (See Figs. 4 and 12.) By means described power will be applied through the shaft 8 and through one of the belt-pulleys 13 and belt 15 to the pulley 21, and when this pulley is clutched to the shaft 22 said shaft will be driven. The speed at which the shaft 22 is driven will depend upon which of the belt-pulleys 13 is connected to the power-shaft 8. From the shaft 22 power is applied to the gear 30 upon the shaft 29 and through the rock-shaft 34 and crank-arm 36 to the rocking sector 45 and to the shaft 47, carrying the pulley 48. It will be noted that by this means the shaft 47 is given an oscillating movement, and by this means through the cable 49 the heads 5 will be reciprocated. As these heads are above the pol-

ishing-belts and as they are arranged to be brought in contact with the inside of said belt and to press said belt upon its work, the adjustment of the stroke of the reciprocating heads is very important, owing to the irregular shape of the articles that it is desired to polish. For operating the adjustable block 42, carrying the crank-pin 41, I prefer to provide the shaft 40 with a sprocket-wheel 52, to which is connected a chain 53, that passes around under the sprocket-wheel 53, the shaft of which is provided with a hand-crank 55. The sprocket-chain 53 also preferably passes over an idler-sprocket 56. By turning the hand-crank 55 the shaft 40 may be rotated in either direction, and thereby through the threaded shaft 37 the block 42 may be adjusted toward or from the center of the rock-shaft 34, and the movement of the sector 45, and consequently the stroke of the reciprocating heads, may by this means be quickly adjusted while the machine is in operation.

In polishing many articles, such as round or oval table-tops, it is necessary to adjust frequently the stroke of the reciprocating heads, and it is important to do this without stopping the machine. By this means the reciprocation of the heads is always under the control of the operator and may be regulated at will. In some instances I prefer to employ two belts, one a supporting-belt 60, the other a sandpaper belt 61. The sandpaper belt is arranged outside of and is supported by the belt 60. I have found that where these two belts are in close contact throughout, and particularly when the reciprocating heads are moving in the opposite direction to the movement of the belts, whatever slack there may be in the sandpaper belt will cause said belt to wrinkle and pucker between the reciprocating head and the supporting-pulley. This is objectionable, as it tends to destroy the sandpaper belt. For this purpose I prefer to make the sandpaper belt 61 longer than the supporting-belt 60 and to provide a belt-tightener consisting of a pivoted crank-arm 62, carrying a pulley 63, that is arranged within the belt 61, the opposite end of the crank-lever being engaged by a pivoted threaded rod 64, carrying a hand-wheel 65, and with a spring 66, arranged between the hand-wheel and lever. By this means an adjustable spring tension is provided upon the sandpaper belt and any slack in the belt will by this means be taken up and the wrinkling or puckering of the belt will be entirely avoided.

I have found in polishing wood by means of a polishing-belt that when the polishing operation is nearly completed there will be a slight fuzz occasioned by adhering fibers, which lie in the direction of the movement of the belt. For the purpose of removing these fibers I have found it desirable to provide means for reversing the direction of travel of the polishing-belt and to do this while the reciprocating pressure-heads are in operation. I accomplish this in my present

machine by providing the driving-shaft with the fast and loose pulleys described and also providing straight and cross belts for operating said driving-shaft. By this means when the surface of the wood has been sufficiently polished the motion of the polishing-belt may be reversed and the belt can be given a few turns in the opposite direction, thereby removing any adhering fibers and leaving the surface perfectly clean and smooth. By securing the reciprocating heads to the cable by means of the hook-bolts 49' I am enabled to quickly release said heads and adjust them to any desired position upon the cable. It will also be understood that through the clutch-pulley 23 I am enabled to stop the reciprocating motion of the heads at any time, so that if it is desired to operate the polishing-belt while the heads remain stationary this may be done. It will also be understood that by means of the two driving-belts 15 and the clutch 14 I am enabled to reciprocate the heads either at a fast or a slow speed. The short belts 15, extending from the pulleys 13 to the pulleys 17 and 18 upon the driving-shaft 16, preferably pass over the idler-pulleys 15', which provide means for securing a longer wrap upon the pulleys 17 and 18.

I claim as my invention—

1. The combination, in a rubbing and polishing machine, with a suitable supporting-belt, of a polishing-belt arranged outside of said supporting-belt, a belt-tightener arranged between said belts and engaging said polishing-belt, and means for reversing at will the movement of said belts.

2. The combination, in a rubbing and polishing machine, with a supporting-belt, pulleys for supporting and driving said belt, a sandpaper belt arranged upon said supporting-belt, a belt-tightener arranged between said belts and engaging said sandpaper belt, and means for pressing the sandpaper belt to its work.

3. The combination, in a rubbing and polishing machine, with a suitable supporting-belt and means for mounting and driving said belt, of a sandpaper belt arranged outside of said supporting-belt, a belt-pulley arranged between said belts and engaging said sandpaper belt, means engaging said supporting-belt and thereby pressing the sandpaper belt to its work, and means for reversing at will the movement of said belts.

4. The combination, in a rubbing and polishing machine, with a suitable supporting-belt and means for mounting and driving said belt, of a sandpaper belt arranged outside of said supporting-belt, a belt-pulley engaging said sandpaper belt, means engaging said sup-

porting-belt and thereby pressing the sandpaper belt to its work, and means for reversing at will the movement of said belts.

5. The combination, in a rubbing and polishing machine, with a rubbing or abrading belt and means for supporting and driving the same, of a reciprocating head having means for pressing said belt to its work, and means for reversing at will the movement of said belt.

6. The combination, in a rubbing and polishing machine, with a supporting-belt and means for supporting and driving the same, of a sandpaper belt arranged upon said supporting-belt, a reciprocating head arranged within said supporting-belt and adapted to press said sandpaper belt to its work, and means for reversing at will the movement of said belts.

7. The combination, in a rubbing and polishing machine, with a polishing-belt, of a reciprocating head arranged to engage said belt and press it to its work, suitable mechanism for reciprocating said head, and means for regulating the throw of the head without stopping the machine, substantially as described.

8. The combination, with the polishing-belt, of a reciprocating head, suitable gearing for operating said head, a rock-shaft provided with a crank-arm having a crank-pin and forming a connecting means in said gearing, and means for adjusting the crank-pin on said crank-arm, substantially as described.

9. The combination, with the polishing-belt, of the reciprocating head, gearing for operating said head, the rock-shaft 34 provided with the crank-arms 33 and 36 forming a connecting member in said gearing, rods 32 and 44 connected to said crank-arms, and means for adjusting the crank-pin to which one of said rods is connected, substantially as described.

10. The combination, with the polishing-belt, of the reciprocating head, the rock-shaft 34 provided with the crank-arms 33 and 36, rods 32 and 44 connected to said crank-arms, a threaded shaft arranged in one of said crank-arms, a shaft passing through the shaft 34 and adapted to operate said threaded shaft, an adjustable block arranged upon said threaded shaft and a crank-pin upon said block to which said rod 32 is connected, substantially as described.

In witness whereof I have hereunto set my hand this 26th day of December, 1902.

CHARLES S. YARNELL.

In presence of—

A. C. PAUL,

C. G. HANSON.