

No. 684,972.

Patented Oct. 22, 1901.

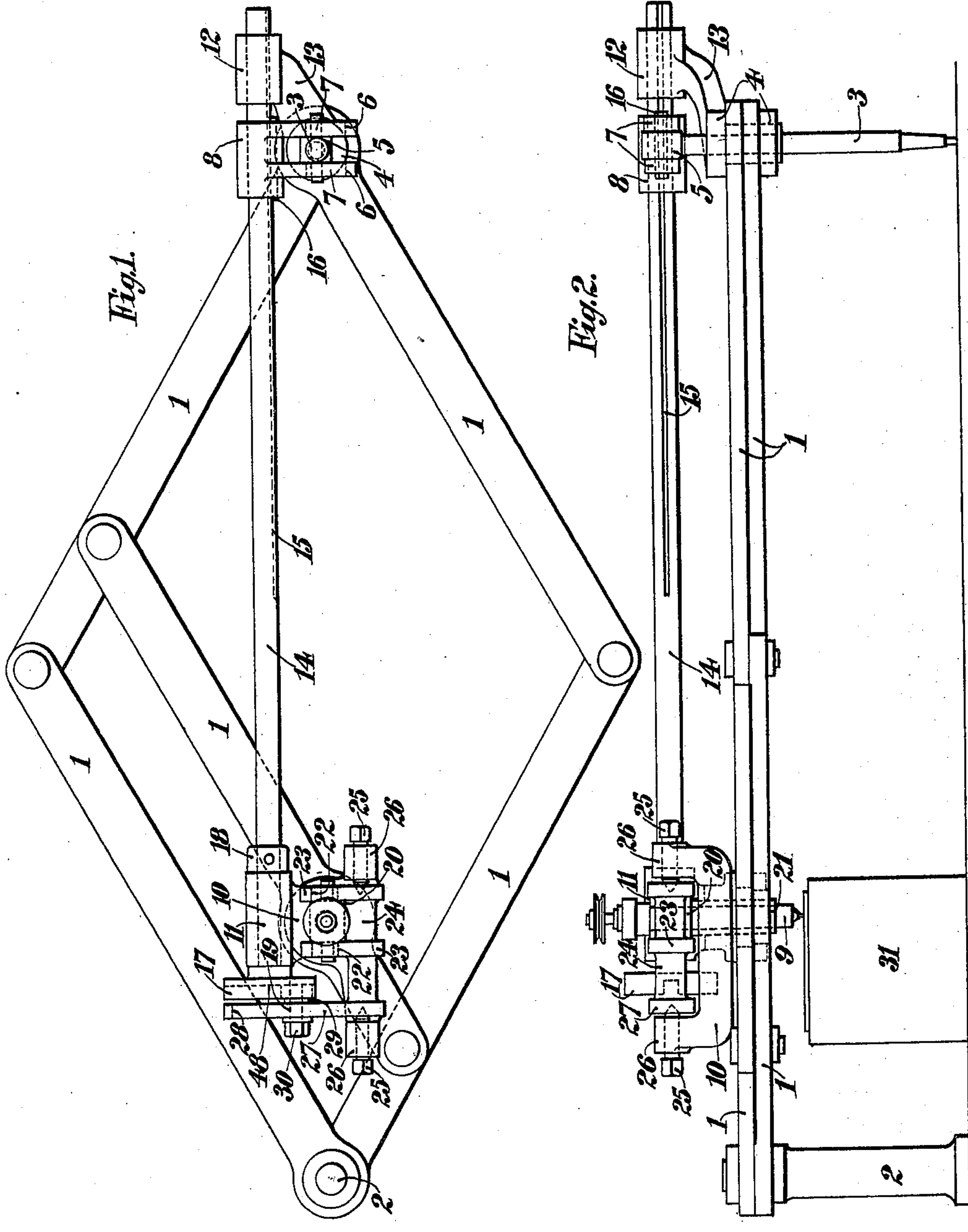
M. BARR.

THREE DIMENSION PANTOGRAPH ENGRAVING MACHINE.

(Application filed Aug. 6, 1900.)

(No Model.)

3 Sheets—Sheet 1.



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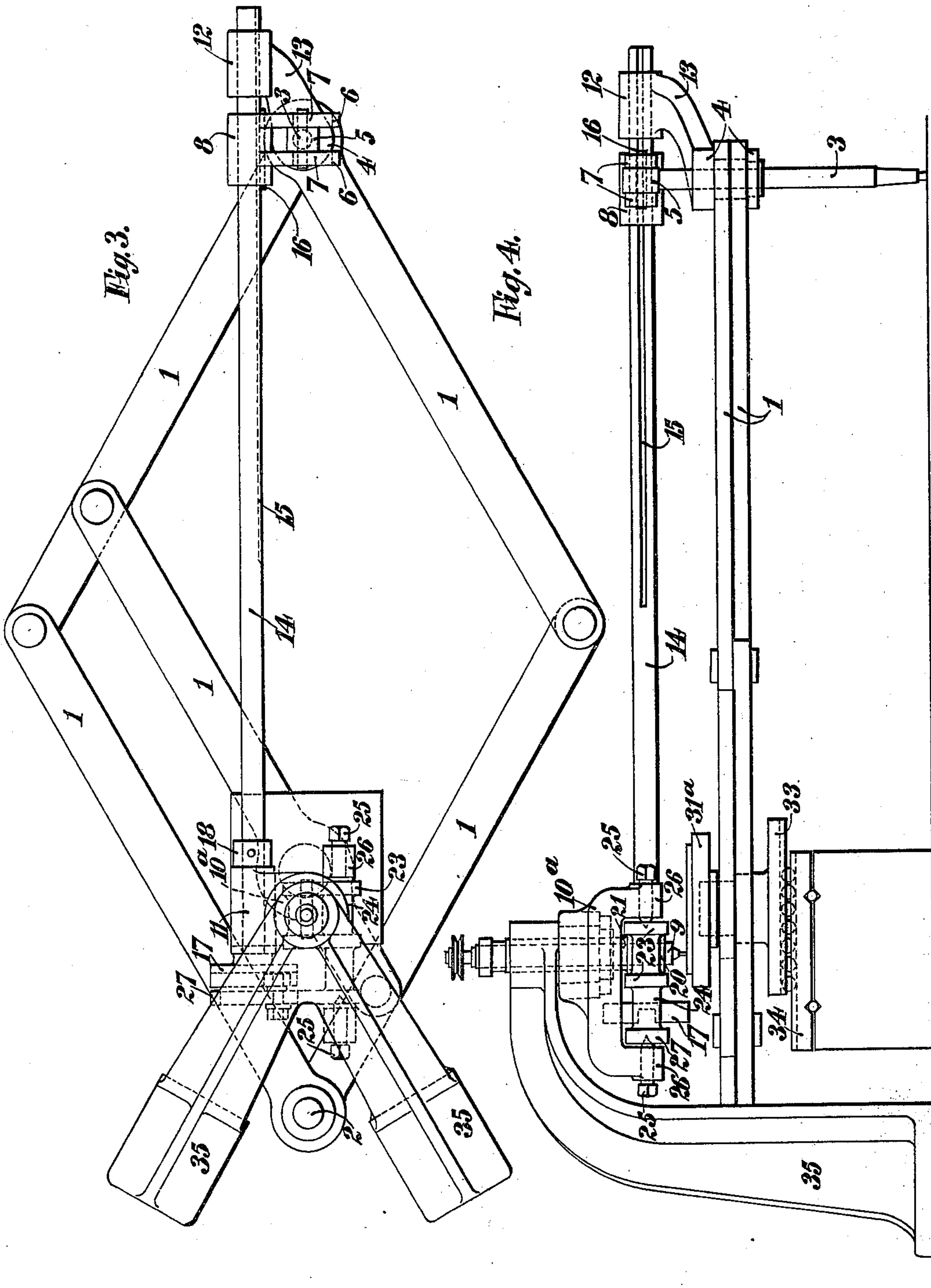
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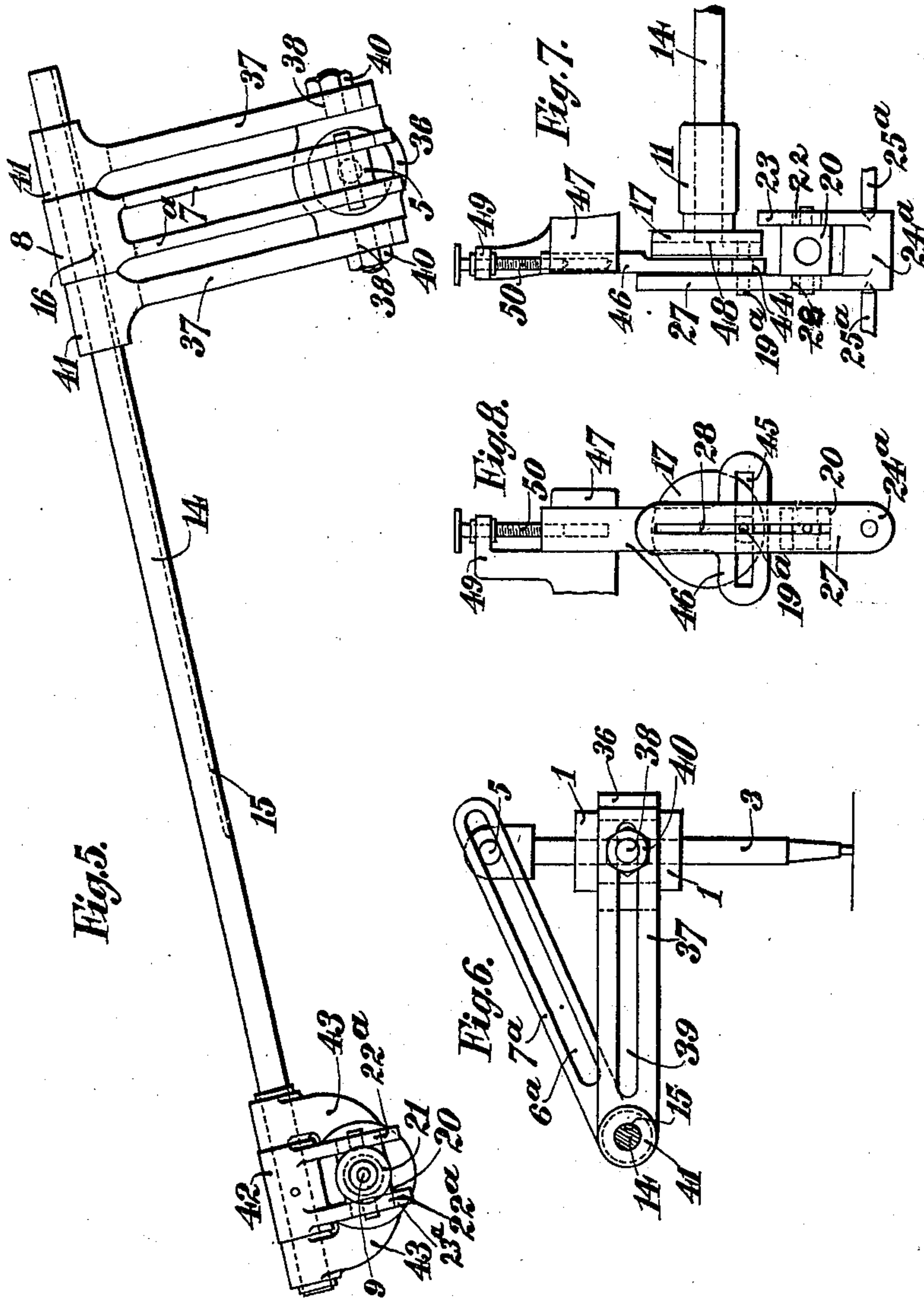
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# UNITED STATES PATENT OFFICE.

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## THREE-DIMENSION PANTOGRAPH ENGRAVING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 684,972, dated October 22, 1901.

Application filed August 6, 1900. Serial No. 26,073. (No model.)

*To all whom it may concern:*

Be it known that I, MARK BARR, of Broadheath, in the county of Chester, England, have invented certain new and useful Improvements in Three-Dimension Pantograph Engraving-Machines; and I 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.

The present invention relates to improvements in three-dimension pantograph engraving-machines. An engraving-machine that can deal only with a plane surface in both pattern and work has a two-dimension capacity—that is, it can deal with length and breadth; but an engraving-machine the tracer-rod and tool of which have each a capacity for vertical motion such as would be required in engraving the intaglio or the cameo contours of a medal has a third-dimension capacity; hence the term “three-dimension” engraving-machine.

Referring to the accompanying figures, which are to be taken as part of this specification and read therewith, Figure 1 is a plan, and Fig. 2 a front elevation, illustrating the present invention. Fig. 3 is a plan, and Fig. 4 a front elevation, of a modified construction of the same invention. Fig. 5 is a plan, and Fig. 6 an end elevation from the right hand of Fig. 1, of a modification of the same invention. Fig. 7 is a plan, and Fig. 8 an end elevation, of a modification in the mechanism between the rocking rod and quill-tube illustrated in Figs. 1 and 2.

Referring to Figs. 1 and 2, 1 1 1 1 represent the ordinary pantograph-linkage above mentioned.

2 is a supporting-pillar for one end of it. It also serves as the center for the linkage to turn about.

3 is the tracer-rod at the opposite end. This rod 3 has a capacity for vertical movement in either direction through a sleeve 4, carried by the respective end of the linkage 1. The top end of the rod 3 carries a cross-head 5, which engages in slots 6 6 in arms 7 7, springing to the front from a boss 8 and at right angles therewith, as shown in Fig. 1.

9 is the quill of the engraving-tool.

10 is a bearing-block capable of turning freely about the axis of the quill 9, it being carried by the same member of the pantograph-linkage.

11 is a bearing carried by the bearing-block 10.

12 is a bearing carried by an arm 13, projecting outwardly of the boss 8 and upwardly from the sleeve 4. The two bearings 11 and 12 and the boss 8 are axially alined with each other on one side of the vertical plane that passes through the axes of the tracer-rod 3, the quill 9, and the pillar 2.

14 is a rod passed through the bearing 12, the boss 8, and the bearing 11, all of which are bored to receive it with a working fit. 15 is a longitudinal slot in the said rod, and 16 is a spline fast to the boss 8 and standing in the slot 15. The opposite end of the rod 14 is capable of turning only about its axis in the bearing 11, longitudinal motion therein being prevented in the one direction by a crank-disk 17 and in the other by a collar 18, both fast on the said rod, while the boss 8 and the bearing 12 are capable of sliding to and fro upon the rod 14.

19 is a diametrical slot in the outer face of the crank-disk 17, and 19 is a pin the end of which engages in the said slot with a working fit.

20 is a cross-head carried by the tube 21, that carries the quill 9 in the same way that the tracer-rod carries its cross-head 5. The respective ends of the cross-head 20 engage in slots 22 22 in arms 23 23, springing to the rear from the rod 24, to which they are fast in the same way that the arms 6 6 are fast to the boss 8. The rod 24 is capable of turning upon a pair of center screws 25 25, adjustable in screw-threaded sockets 26 26, carried by the bearing-block 10.

27 is a lever fast by one end on the rod 24, from which it projects to the rear at right angles.

28 is a longitudinal slot in the said lever, through which the pin 19 is passed and held in the desired position along the length of the slotted portion of the lever by means of a collar 29, fast on the pin 19, on one side of the lever 27 and a screw-threaded nut 30 on the other.



The action of the invention constructed as above described is as follows: Each rise and drop of the tracer-rod 3 as the tracing-point passes up and down the intaglio and down and up the cameo contours of the pattern rocks the rod 14 in the bearings 11 12 accordingly. The rocking motion of the said rod is communicated to the lever 27 by the pin 19 and by the rod 24 and its arms 22 to the quill 9, so that the rise and fall of the latter in the work 31 on the work-table 32 corresponds exactly in time and proportionally with the rise and fall of the tracer-point above described. The ratio of reduction of the third dimension is adjusted as may be desired by adjusting the position of the pin 19 along the slotted lever 27.

Figs. 1 and 2 show the pantograph-linkage 1 as communicating the lateral movements of the tracer-rod 3 to the quill 9, while Figs. 3 and 4 show the same pantograph-linkage 1 as communicating the lateral movements of the same tracer-rod 3 to the work-table 31<sup>a</sup>, which is capable of motion in any lateral direction upon the base 32 by means of a pair of slides 33 34 of the usual construction. The bracket-piece 10<sup>a</sup> is inverted and made fast to the standard 35.

According to the modification illustrated in Figs. 5 and 6 the adjustability for ratio of reduction between pattern and work is located at the tracer-rod end of the machine. The respective end of the pantograph-linkage 1 is connected to a block 36, adjustable along a pair of arms 37 37 by means of a pin 38, projecting from each side of the said block 36 and engaging in a slot 39 in the respective arm. Each pin is prolonged outside the respective arm 37 and is screw-threaded to receive a nut 40, by means of which the block 36 is held securely in its adjusted position. The opposite end of each arm 37 carries a socket 41, which slides on the respective end of the rod 14 to support it in the same way as does the bracket 13 of Figs. 1 and 2. The tracer-rod 3 slides up and down through the block 36, its cross-head 5 engaging in slots

6<sup>a</sup> 6<sup>a</sup> in a pair of arms 7<sup>a</sup> 7<sup>a</sup>, springing from the boss 8. The cross-head 20 of the quill-tube 21 engages in slots 22<sup>a</sup> 22<sup>a</sup> in arms 23<sup>a</sup> 23<sup>a</sup>, fast to the socket 42 on the respective end of the rod 14 to which it is fixed. The said end of the rod 14 turns in bearings 43 43, supported by the respective end of the pantograph-linkage in substantially the same way as the bearings 26 26 of Figs. 1 and 2.

The motion of the pin 19 in Figs. 1 and 2 is arcual. The modification illustrated in Figs. 7 and 8 provides for it being vertical. The pin 19<sup>a</sup>, that engages by its respective ends in the diametrical slot 48 in the crank-disk 17, has a central square 44 on it, which it can ride up and down a vertical slot 45 in a plate 46, which is carried in a fixed guide 47, in which it is adjustable by a screw 50, turning without longitudinal motion in a stationary bracket 49 and engaging in the plate 46. The cross-head 20 engages by one end in a slot 22 in an arm 23 and by the other in the slot 28 in the lever 27. Both this arm 23 and the lever 27 are made fast to the piece 24<sup>a</sup>. This combination of cross-head 20, arm 23, and piece 24<sup>a</sup> pivot on a pair of center screws 25<sup>a</sup>.

I claim—

The combination of pantograph-linkage; tracer capable of a vertical sliding motion through one end of it; rod adapted to rock in bearings carried by the respective ends of the said linkage; cross-head and slotted-arm connection between the tracer-rod and the respective end of the rocking rod; and a connection adjustable for ratio of reduction, between the quill-tube and the respective end of the rocking rod adapted to transfer the rocking motion of the said rod to the said quill-tube converting it into a vertical one in so doing.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

MARK BARR.

Witnesses:

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