

No. 698,832.

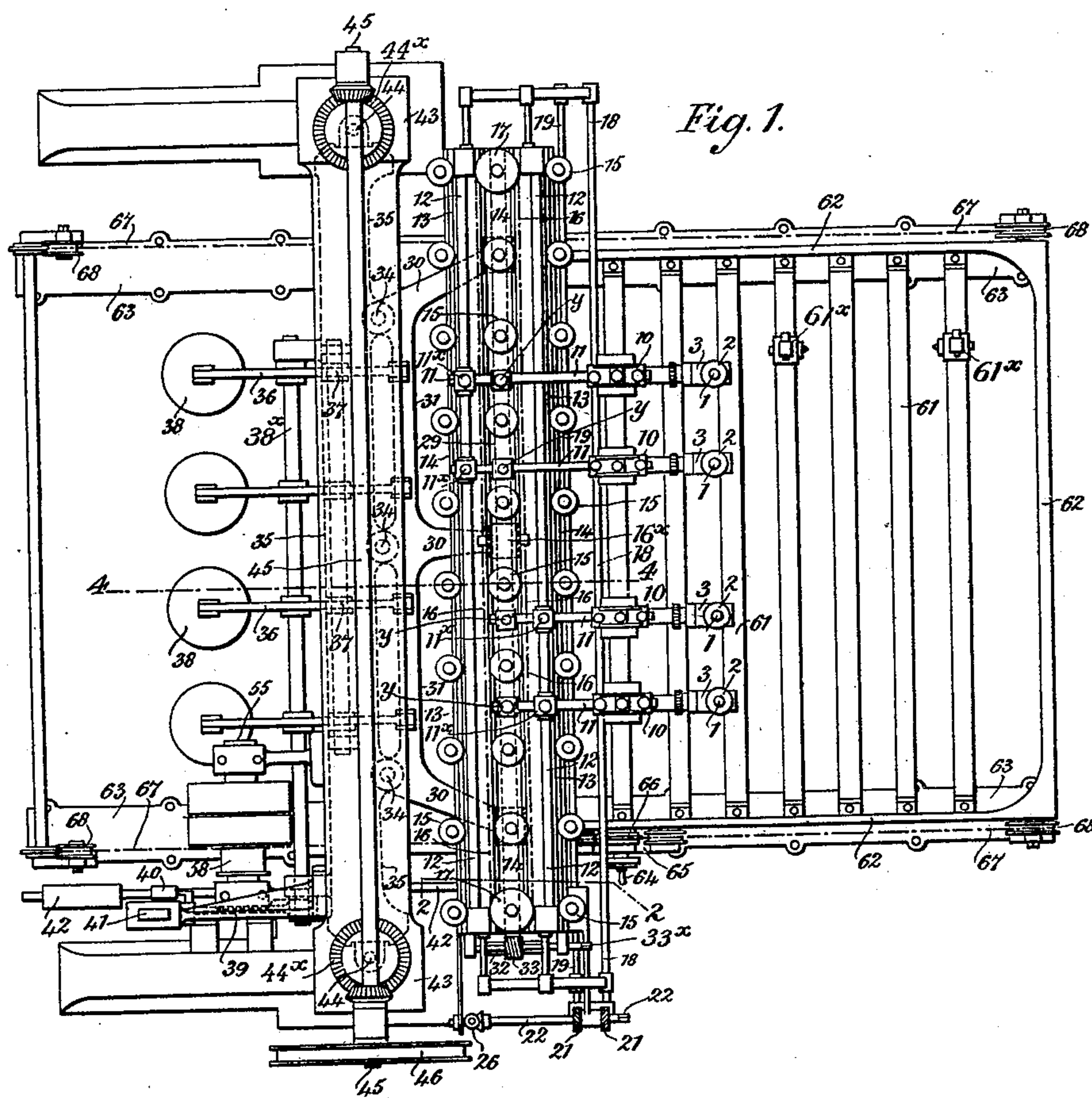
Patented Apr. 29, 1902.

J. GATES.
CARVING OR COPYING MACHINE.

(Application filed Feb. 10, 1902.)

3 Sheets—Sheet I.

(No Model.)



Witnesses.

A. M. Parkins.
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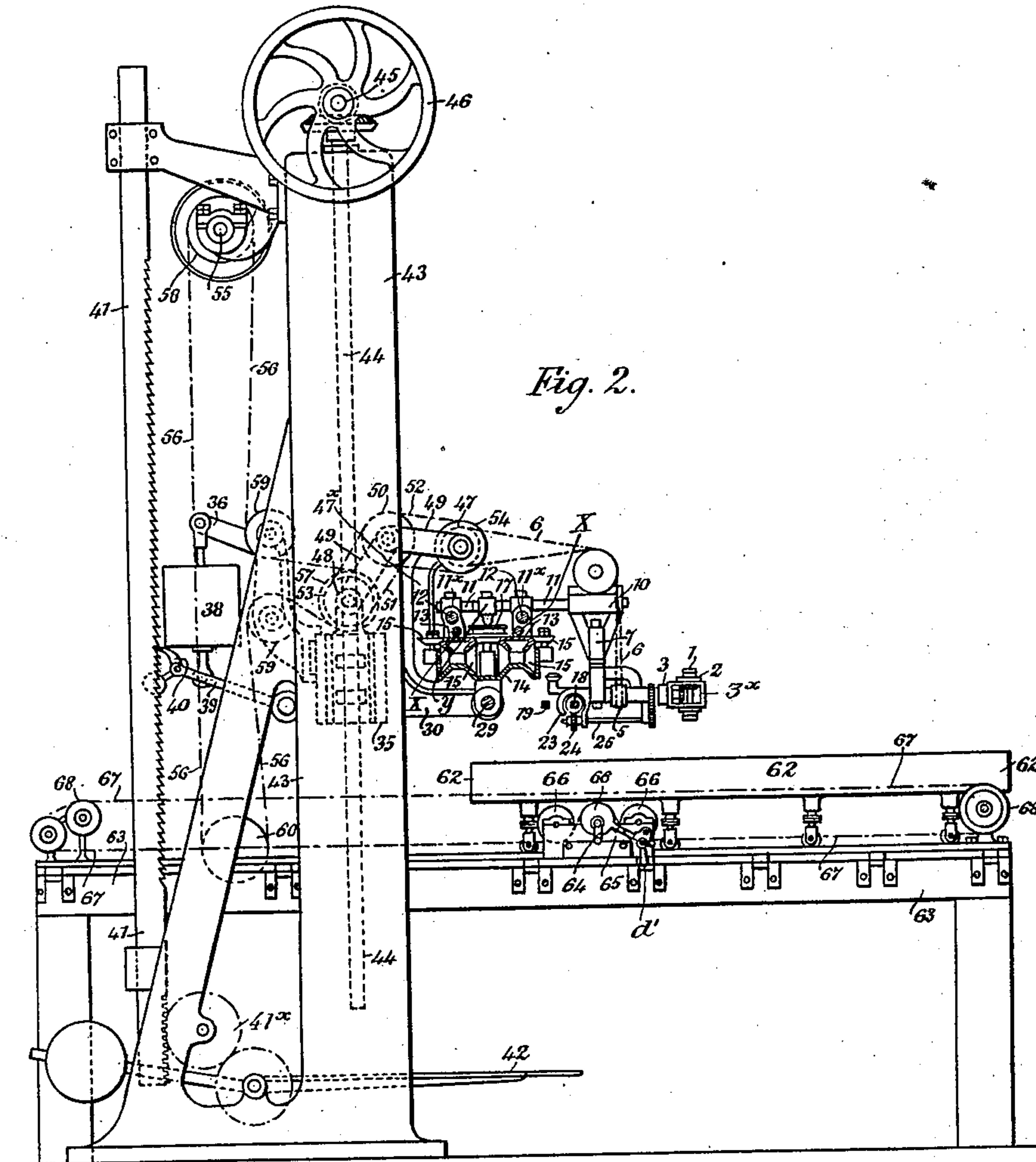
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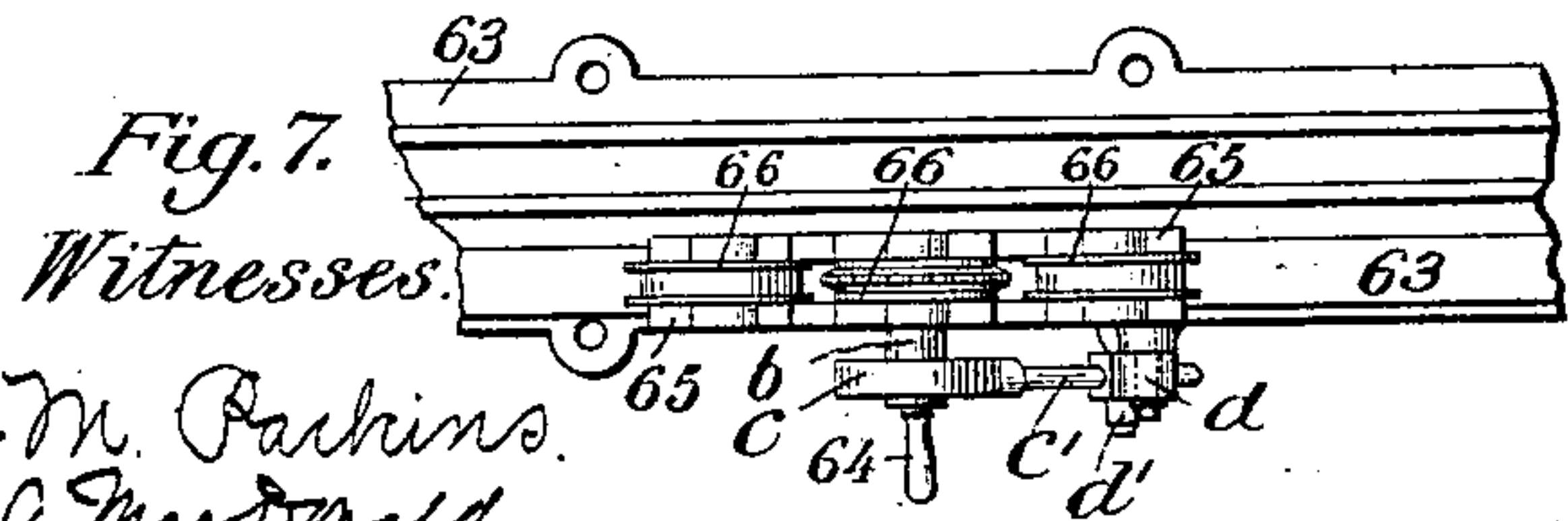
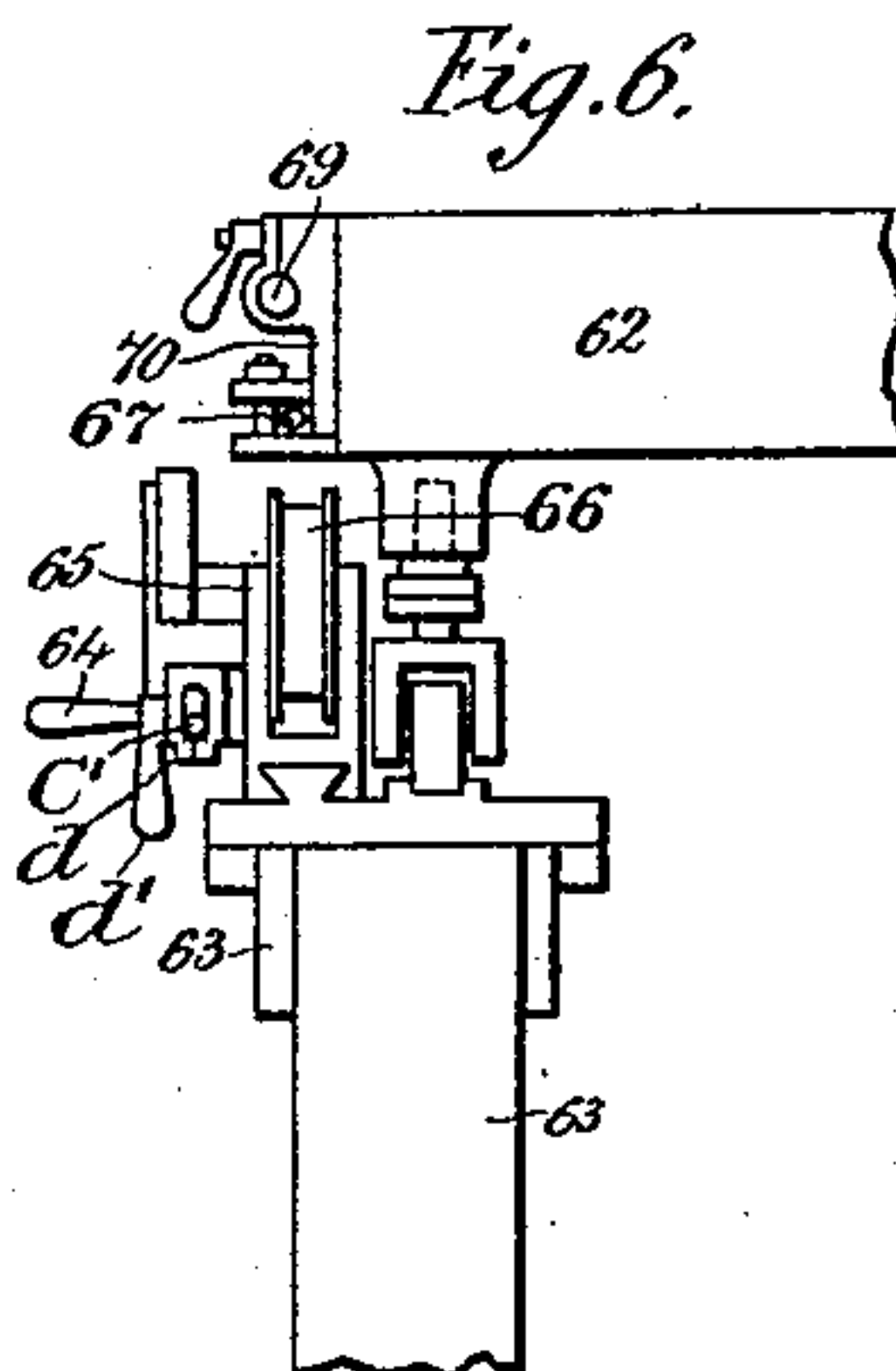
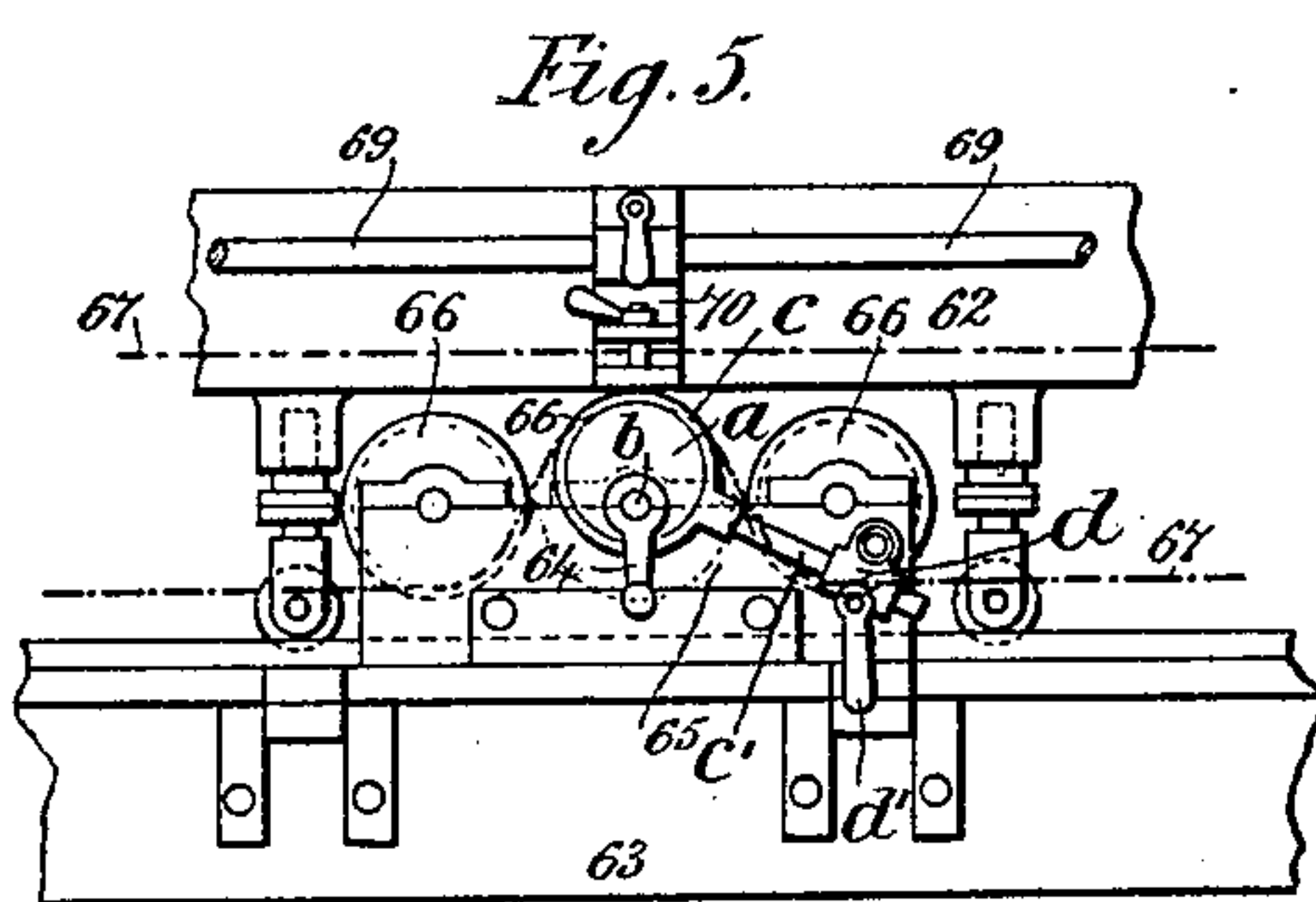
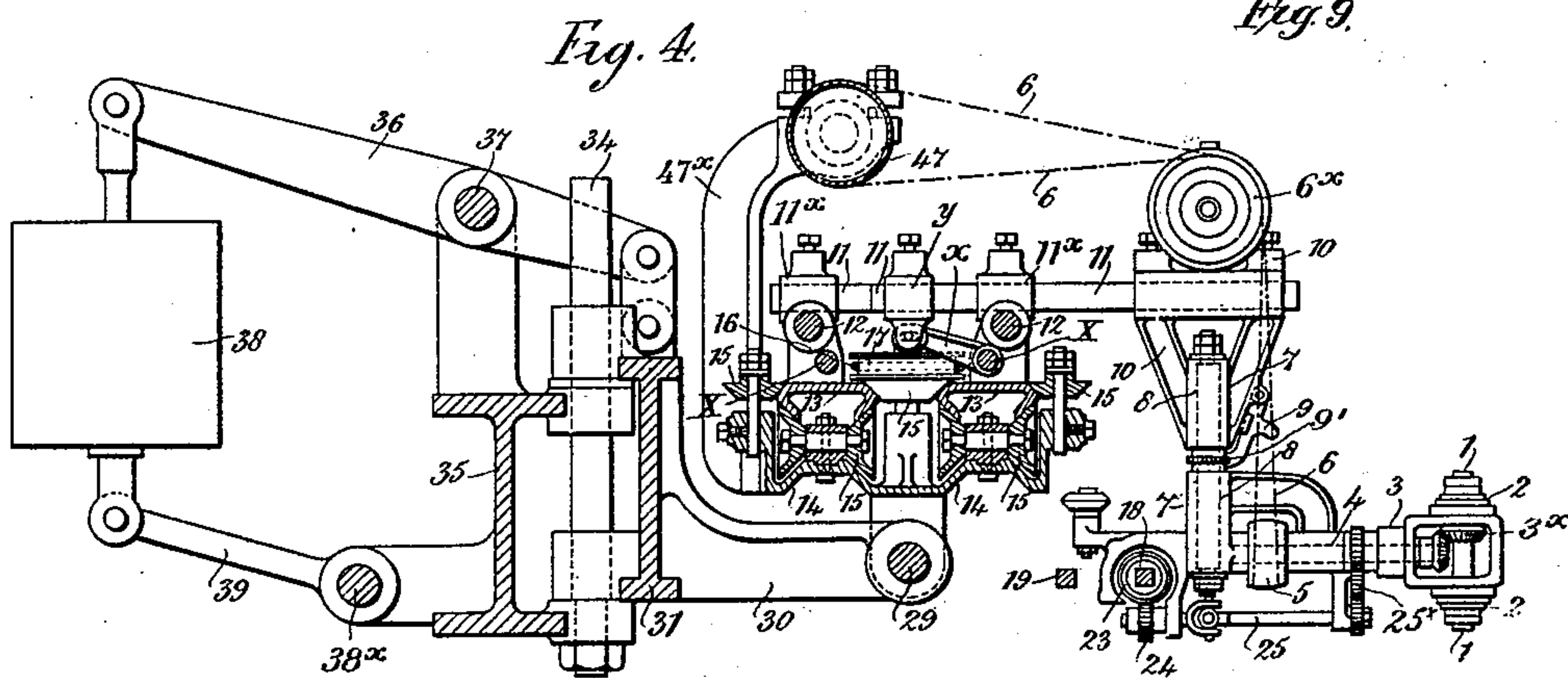
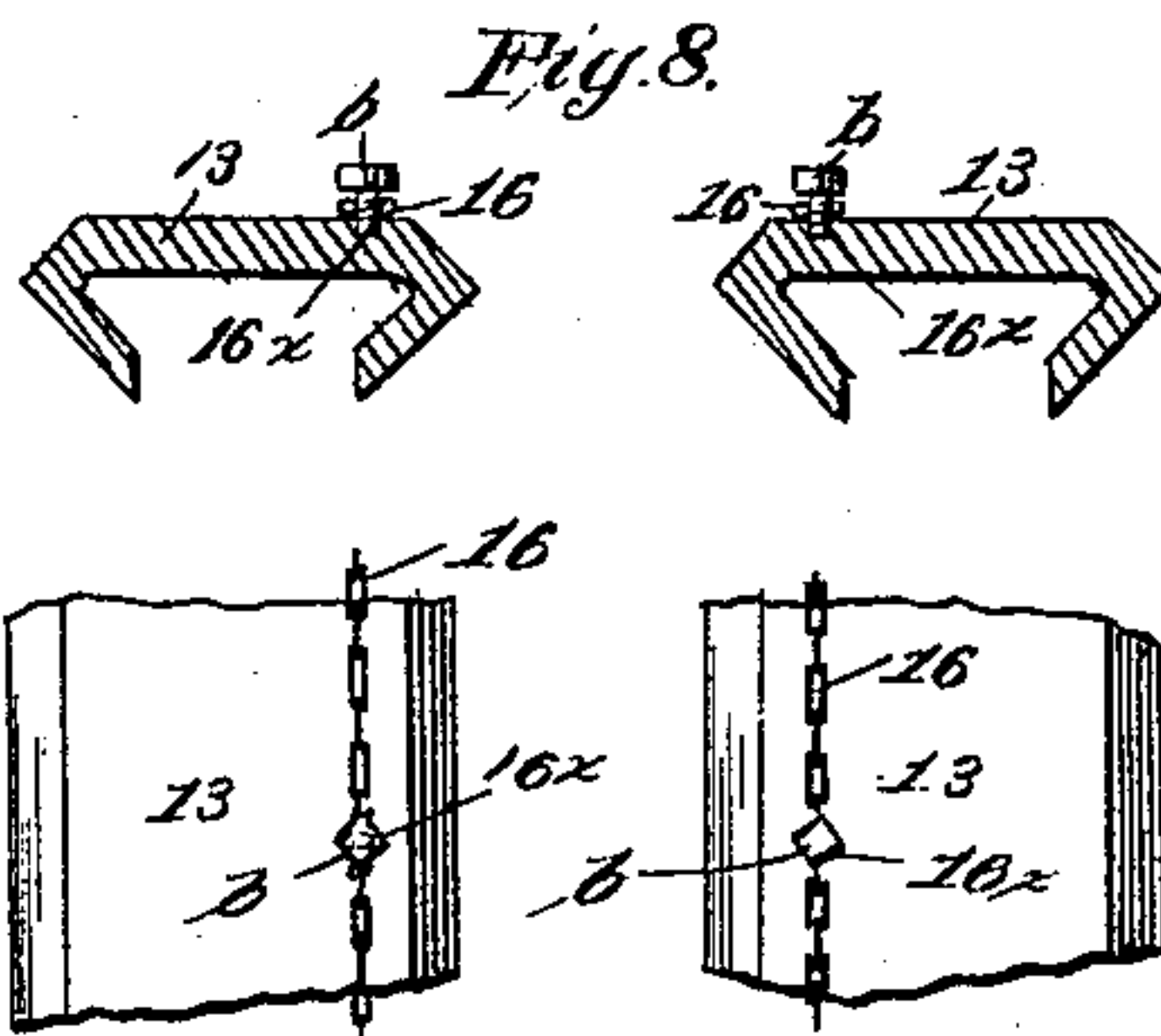
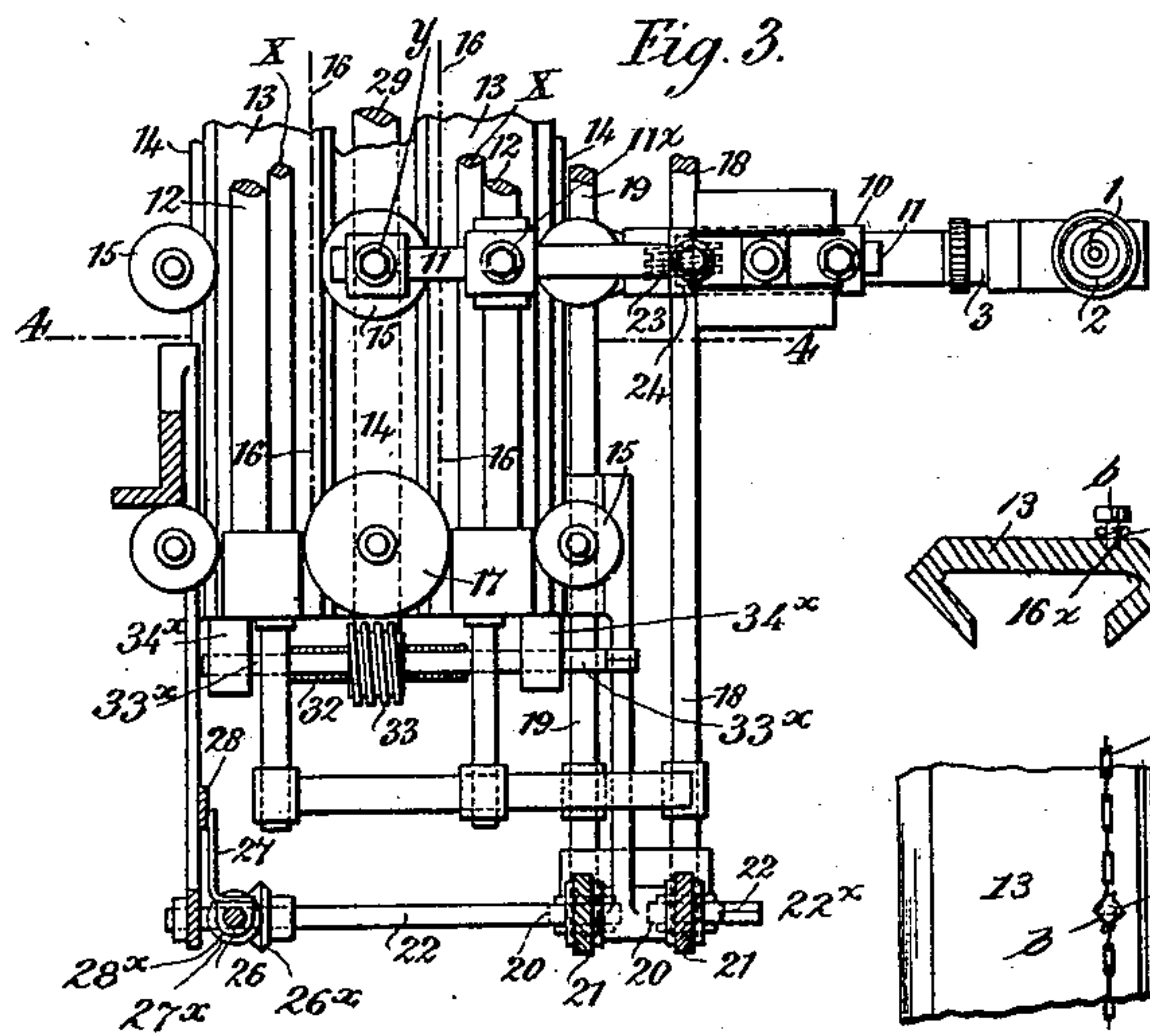
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3 Sheets—Sheet 3.



Witnesses:
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UNITED STATES PATENT OFFICE.

JOHN GATES, OF TUFUELL PARK, ENGLAND.

CARVING OR COPYING MACHINE.

SPECIFICATION forming part of Letters Patent No. 698,832, dated April 29, 1902.

Application filed February 10, 1902. Serial No. 93,444. (No model.)

To all whom it may concern:

Be it known that I, JOHN GATES, carver, a subject of the King of Great Britain, residing at 57 Yerbury road, Tufuell Park, in the county of Middlesex, England, have invented certain new and useful Improvements in Carving or Copying Machines, of which the following is a specification.

According to this invention the tools are in pairs, moving in opposite directions toward or away from the center line of the work, so that only a half-pattern is necessary, and the machine also is so arranged that the tools can be turned in any direction.

Figure 1 is a plan, and Fig. 2 an end elevation, of a machine constructed according to this invention. Some of the parts are omitted in Figs. 1 and 2 in order to better illustrate other parts. Fig. 2 is partly in section on the line 2 2 of Fig. 1. Fig. 3 is a part plan to a larger scale. Fig. 4 is a section on the line 4 4, Figs. 1 and 3. Figs. 5, 6, and 7 are part side and front elevations and a plan showing a detail of the table. Fig. 8 is a view, on an enlarged scale and in transverse section, showing the manner in which the chain may be secured to the slides. Fig. 9 is a detail plan view of the same.

Only two pairs of tool-holders are shown; but it will be understood that any number of pairs may be employed, according to the width of the work and the number of copies to be made simultaneously.

Each tool-holder 1 is free to rotate in bearings 2, carried by a sleeve 3, and is driven through bevel-gear 3^x by a shaft 4, working inside the sleeve. Each shaft 4 has fixed to it a pulley 5, driven by an endless band 6, passing over a suitable guide 6^x. The bearings of the shaft 4 are fixed to a sleeve 7 on a spindle 8, so that the tool-holder 1 can be turned in a horizontal plane about the spindle 8, and it is retained in any desired position by the pawl 9 on the bracket 10, which engages with a ratchet-wheel 9', fixed to the sleeve 7. The spindle 8 of each tool-holder is fixed to a bracket 10, adjustably clamped to the horizontal rod 11. The rods 11 are clamped by devices 11^x to bars 12, carried by a pair of slides 13, working in grooves in a table 14, being supported and guided by beveled rollers 15, which bear on correspond-

ingly-beveled surfaces at their four edges or corners. The two slides are fixed at 16^x to an endless chain 16, passing around pulleys 17 at the ends of the table, so that they move together, but in opposite directions. One rod 11 of each pair is clamped to one of the bars 12, while the other rod 11 of each pair is clamped to the other bar 12. One of the bars 12 is attached to one of the slides 13, while the other bar 12 is attached to the other slide 13. (See Fig. 4.) In order to strengthen or steady the rods 11, rods X are attached to opposite ends of the slides 13, and each rod 11 is connected by a brace *x* to one of the rods X. Preferably a clamping device *y* is employed to connect each rod 11 to its brace *x*.

In Figs. 8 and 9 I have shown one way in which the chain 16 may be attached to the slides 13. Any suitable device may be employed for this purpose; but it may be done by means of bolts *b*, extending through links of the chain and into screw-threaded sockets in the slides.

18 and 19 are a pair of square shafts free to turn in bearings at the two ends of the table. The shafts 18 and 19 have fixed to one end right and left hand skew-gear pinions 20, Fig. 3, gearing with corresponding pinions 21 on the shaft 22. This shaft can be turned by a handle fitting onto its front end, which is square at 22^x, and by this means the shafts 18 and 19 can be simultaneously turned in opposite directions. The shafts 18 and 19 pass through worms 23, free to turn in bearings carried by the sleeves 7 and gearing with worm-wheels 24 on flexible shafts 25. These shafts are connected by a train of wheels 25^x to the sleeves 3, so that by turning the shaft 22 the tools of all the pairs are simultaneously caused to incline more or less toward or away from each other. The rear end of the shaft 22 has fixed to it a bevel-pinion 26^x, gearing with a bevel-pinion 27^x, fixed to a vertical screw 26, gearing with a nut 28^x on an indicator 27, which moves up and down on a scale 28 and shows the inclination of the tools.

The table 14 is pivoted to a shaft 29, fixed to brackets 30, projecting from a longitudinal beam 31. The shaft 29 has fixed to it a worm-wheel 32, Fig. 3, gearing with a worm 33 on a shaft 33^x, carried in bearings 34^x on the table, so that by turning this worm the

table, and with it the tools, can be tilted in either direction. The beam 31 is free to move up and down on guide-rods 34, fixed to a second beam 35, and is hung from levers 36, pivoted by a rod 37 to the beam 35 and carrying counterbalance-weights 38. The weights 38 are also pivoted to levers 39, pivoted at one end by means of a bar 38^x to the beam 35, and one of the levers 39 (not carrying a weight) at its other end carries a pawl 40, gearing with a vertical rack 41, connected by toothed pinions 41^x to the weighted treadle 42. By depressing this treadle the rack 41 is drawn downward and the beam 31, and with it the table and tools, are raised, the beam 35 remaining stationary. The beam 35 is free to move up and down in guides 43, its ends being supported by vertical screws 44, which can be turned simultaneously through bevel-gear 44^x by the shaft 45 and wheel 46.

The endless bands 6, by which the tools are driven, all pass around a drum 47, working in bearings carried by brackets 47^x, rising from the table 14 and connected to a shaft 48 on the beam 35 by a pair of links 49, which are jointed together, the joint-pin having fixed to it two pulleys 50 for two belts 51 and 52, which also pass around pulleys 53 and 54 on the shaft 48 and drum 47, respectively. The shaft 48 is driven from the main shaft 55 of the machine by a belt 56, which passes around a pulley 57 on it, a pulley 58 on the main shaft, two guide-pulleys 59 on the beam 35, and a pulley 60 on the ground, so that the beam can be raised and lowered without altering the tightness of the belt.

The table on which the work is carried consists of a number of slats 61, movable in a frame 62, so that the work can either be supported on the surface of the table or pivoted between two slats in such a manner that it can be rotated. 61^x indicates the devices between which the work may be pivoted. The table is supported on guides 63, running from front to back of the machine, and can be moved by a handle 64 on a slide 65, which can move to and fro on one of the guide-frames 63 and be clamped in any position which may be convenient. The handle 64 is secured to a shaft *b*, to which one of the chain-wheels 66 and the eccentric *a* are also secured. The shaft *b* turns in bearings in the slide 65.

c indicates an eccentric-strap surrounding the eccentric *a* and carrying a rod *c'*, which extends through a clamp *d*, pivoted to the slide 65.

d' indicates a handle for tightening the clamp. When the clamp is loose, the handle 64 may be turned freely, the rod *c'* moving back and forth in the clamp; but when the clamp is tightened the rod *c'* is held stationary, and the handle 64 can turn.

The central chain-wheel 66 drives an endless chain 67, passing around guide-pulleys 68 at the front and back of the machine. The chain can be clamped to a bar 69 on the work-table by means of a double clamp 70, mov-

able along the chain and along the bar. The object of this arrangement is to prevent the clamp from fouling the guide-pulleys whatever may be the position of the slide. By this arrangement the work-table may be moved back and forth to any desired position by simply turning the handle 64 and may be fixed in any position by means of the clamping devices *d d'*.

If a pattern is employed, the driving-belt of one of the tool-holders of each pair is removed, and the pattern is followed by the tool or by a pointer which may be substituted for the tool. The work or tools, or both, are moved by the various handles.

What I claim is—

1. In a carving-machine, the combination of tool-holders arranged in pairs, means for simultaneously moving the tool-holders of each pair laterally toward or away from each other, a pair of transverse shafts, means for rotating the shafts, gearing connecting one of the shafts to one of the tool-holders of each pair, and gearing connecting the other shaft to the other tool-holder of each pair.

2. In a carving-machine, the combination of tool-holders arranged in pairs, means for simultaneously inclining the tool-holders of each pair toward or away from each other, a pair of transverse shafts, means for rotating the shafts, gearing connecting one of the shafts to one of the tool-holders of each pair, and gearing connecting the other shaft to the other tool-holder of each pair.

3. In a carving-machine, the combination of tool-holders arranged in pairs, two slides each carrying one tool-holder of each pair, means for simultaneously moving the slides in opposite directions, a pair of transverse shafts, means for rotating the shafts, gearing connecting one of the shafts to one of the tool-holders of each pair, and gearing connecting the other shaft to the other tool-holder of each pair.

4. In a carving-machine, the combination of tool-holders arranged in pairs, means for simultaneously moving the tool-holders of each pair laterally toward or away from each other, and means for simultaneously inclining the tool-holders of each pair toward or away from each other.

5. In a carving-machine, the combination of tool-holders arranged in pairs, two slides each carrying one tool-holder of each pair, means for simultaneously moving the slides in opposite directions, and means for simultaneously inclining the tool-holders of each pair toward or away from each other.

6. In a carving-machine, the combination of tool-holders arranged in pairs, means for simultaneously moving the tool-holders of each pair laterally toward or away from each other, a table supporting the tool-holders, a pivot for the table, and means for turning the table about its pivot.

7. In a carving-machine, the combination of tool-holders arranged in pairs, means for

simultaneously inclining the tool-holders of each pair toward or away from each other, a table supporting the tool-holders, a pivot for the table, and means for turning the table about its pivot.

8. In a carving-machine, the combination of tool-holders arranged in pairs, means for simultaneously moving the tool-holders of each pair laterally toward or away from each other, means for simultaneously inclining the tool-holders of each pair toward or away from each other, a table supporting the tool-holders, a pivot for the table, and means for turning the table about its pivot.

9. In a carving-machine, the combination of tool-holders arranged in pairs, two slides each carrying one tool-holder of each pair, means for simultaneously moving the slides in opposite directions, a table supporting the slides, a pivot for the table, and means for turning the table about its pivot.

10. In a carving-machine, the combination of tool-holders arranged in pairs, two slides each carrying one tool-holder of each pair, means for simultaneously moving the slides in opposite directions, means for simultaneously inclining the tool-holders of each pair toward or away from each other, a table supporting the slides, a pivot for the table, and means for turning the table about its pivot.

11. In a carving-machine, the combination of tool-holders, a beam supporting the tool-holders, a second beam, vertical guides for the first beam fixed to the second beam, means for lifting the first beam relatively to the second, and means for raising the second beam.

12. In a carving-machine, the combination of tool-holders, a beam supporting the tool-holders, a second beam, counterbalanced levers pivoted to the second beam and supporting the first, a pawl carried by one of the levers, a rack with which the pawl engages, and means for lowering the rack.

13. In a carving-machine, the combination of tool-holders arranged in pairs, means for simultaneously moving the tool-holders of each pair laterally toward or away from each other, a table supporting the tool-holders, a pivot for the table, means for turning the table about its pivot, a beam supporting the pivot, a second beam supporting the first, means for lifting the first beam relatively to the second, and means for raising the second beam.

14. In a carving-machine, the combination of tool-holders arranged in pairs, means for simultaneously inclining the tool-holders of each pair toward or away from each other, a table supporting the tool-holders, a pivot for the table, means for turning the table about its pivot, a beam supporting the pivot, a second beam supporting the first, means for lifting the first beam relatively to the second, and means for raising the second beam.

15. In a carving-machine, the combination of tool-holders arranged in pairs, means for simultaneously moving the tool-holders of

each pair laterally toward or away from each other, means for simultaneously inclining the tool-holders of each pair toward or away from each other, a table supporting the tool-holders, a pivot for the table, means for turning the table about its pivot, a beam supporting the pivot, a second beam supporting the first, means for lifting the first beam relatively to the second, and means for raising the second beam.

16. In a carving-machine, the combination of tool-holders arranged in pairs, two slides each carrying one tool-holder of each pair, means for simultaneously moving the slides in opposite directions, a table supporting the slides, a pivot for the table, means for turning the table about its pivot, a beam supporting the pivot, a second beam supporting the first, means for lifting the first beam relatively to the second, and means for raising the second beam.

17. In a carving-machine, the combination of tool-holders arranged in pairs, two slides each carrying one tool-holder of each pair, means for simultaneously moving the slides in opposite directions, means for simultaneously inclining the tool-holders of each pair toward or away from each other, a table supporting the slides, a pivot for the table, means for turning the table about its pivot, a beam supporting the pivot, a second beam supporting the first, means for lifting the first beam relatively to the second, and means for raising the second beam.

18. In a carving-machine, the combination of tool-holders arranged in pairs, means for simultaneously moving the tool-holders of each pair laterally toward or away from each other, a table supporting the tool-holders, a pivot for the table, means for turning the table about its pivot, a beam supporting the pivot, a second beam, counterbalanced levers pivoted to the second beam and supporting the first, a pawl carried by one of the levers, a rack with which the pawl engages, and means for lowering the rack.

19. In a carving-machine the combination of tool-holders arranged in pairs, means for simultaneously inclining the tool-holders of each pair toward or away from each other, a table supporting the tool-holders, a pivot for the table, means for turning the table about its pivot, a beam supporting the pivot, a second beam, counterbalanced levers pivoted to the second beam and supporting the first, a pawl carried by one of the levers, a rack with which the pawl engages, and means for lowering the rack.

20. In a carving-machine, the combination of tool-holders arranged in pairs, means for simultaneously moving the tool-holders of each pair laterally toward or away from each other, means for simultaneously inclining the tool-holders of each pair toward or away from each other, a table supporting the tool-holders, a pivot for the table, means for turning the table about its pivot, a beam support-

ing the pivot, a second beam, counterbalanced
levers pivoted to the second beam and sup-
porting the first, a pawl carried by one of the
levers, a rack with which the pawl engages,
5 and means for lowering the rack.

21. In a carving-machine, the combination
of tool-holders arranged in pairs, two slides
each carrying one tool-holder of each pair,
means for simultaneously moving the slides
10 in opposite directions, a table supporting the
slides, a pivot for the table, means for turn-
ing the table about its pivot, a beam support-
ing the pivot, a second beam, counterbal-
anced levers pivoted to the second beam and
15 supporting the first, a pawl carried by one of
the levers, a rack with which the pawl en-
gages, and means for lowering the rack.

22. In a carving-machine, the combination

of tool-holders arranged in pairs, two slides
each carrying one tool-holder of each pair, 20
means for simultaneously moving the slides
in opposite directions, means for simulta-
neously inclining the tool-holders of each pair
toward or away from each other, a table sup-
porting the slides, a pivot for the table, means 25
for turning the table about its pivot, a beam
supporting the pivot, a second beam, counter-
balanced levers pivoted to the second beam
and supporting the first, a pawl carried by
one of the levers, a rack with which the pawl 30
engages, and means for lowering the rack.

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Witnesses:

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