

No. 713,256.

Patented Nov. 11, 1902.

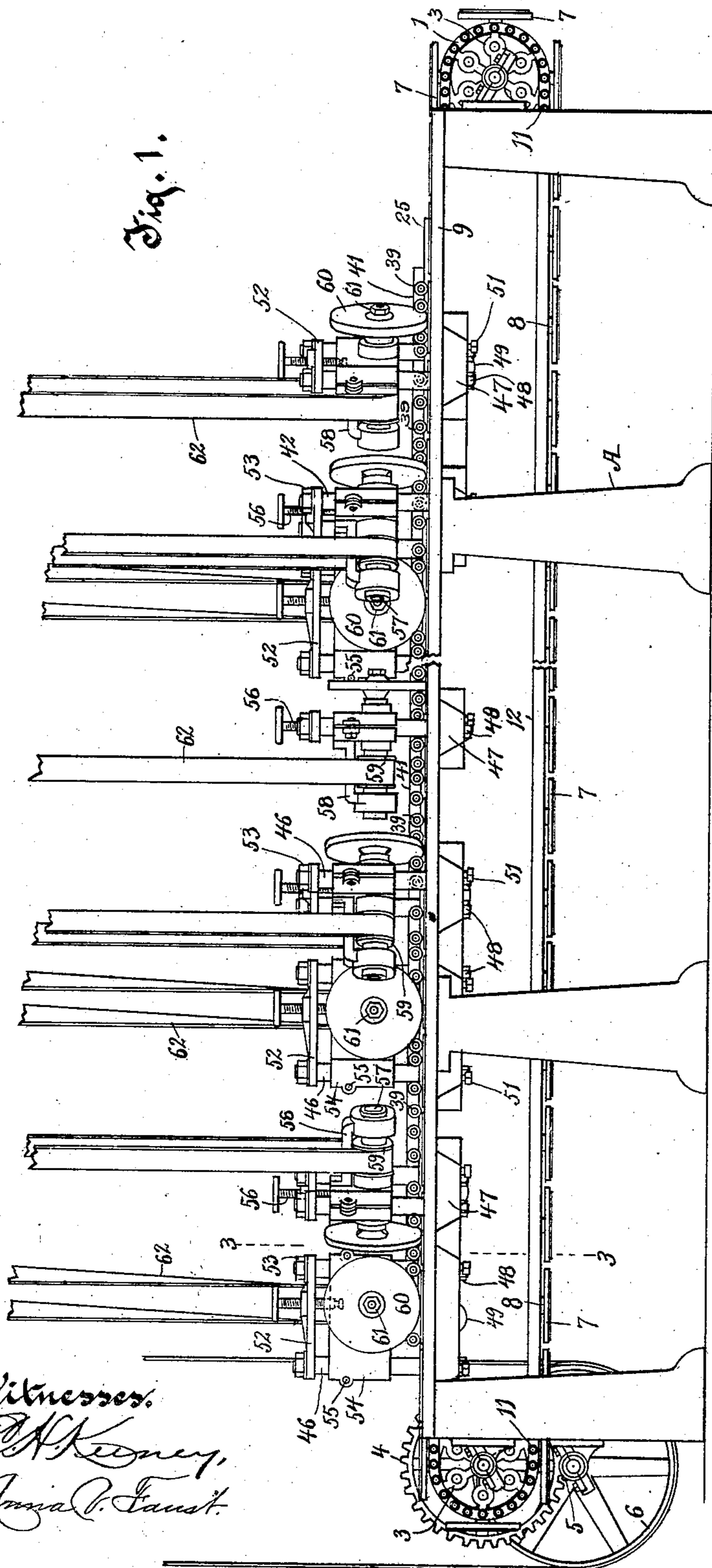
C. WERRA.

GRINDING, POLISHING, OR BUFFING MACHINE.

(Application filed Mar. 26, 1902.)

(No Model.)

3 Sheets—Sheet 1.



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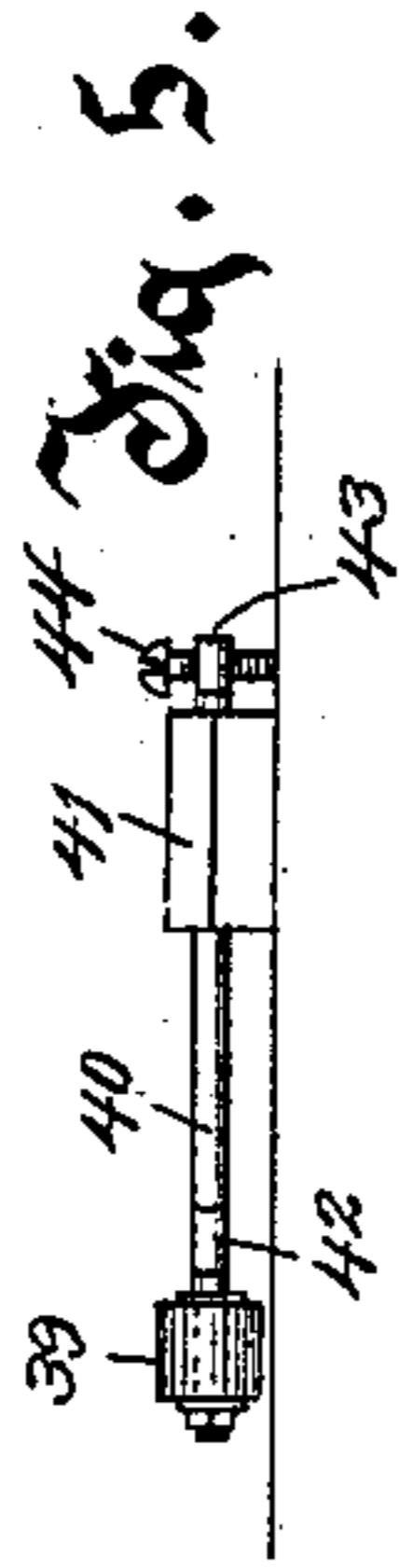


Fig. 5.

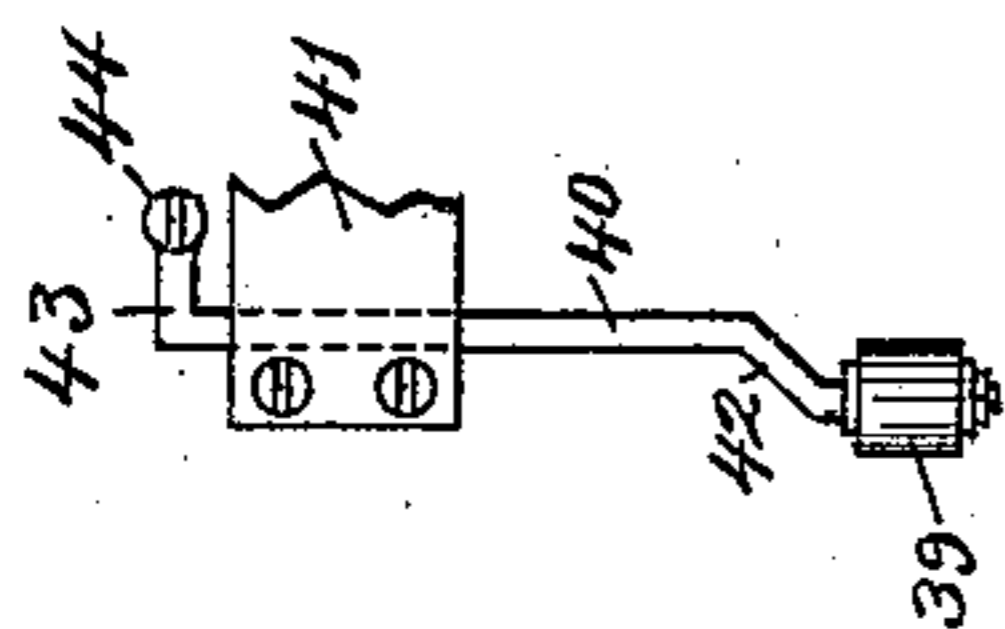
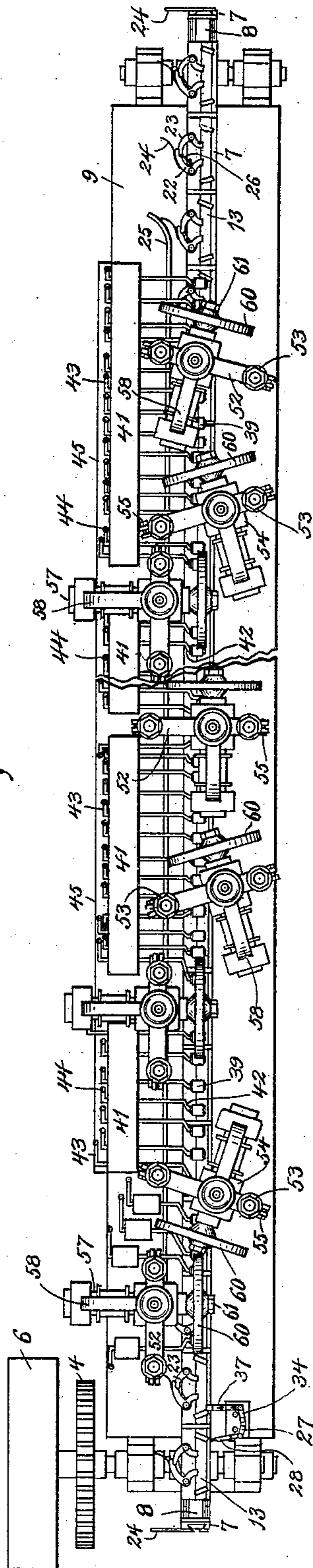


Fig. 24.

Fig. 2.



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3 Sheets—Sheet 3.

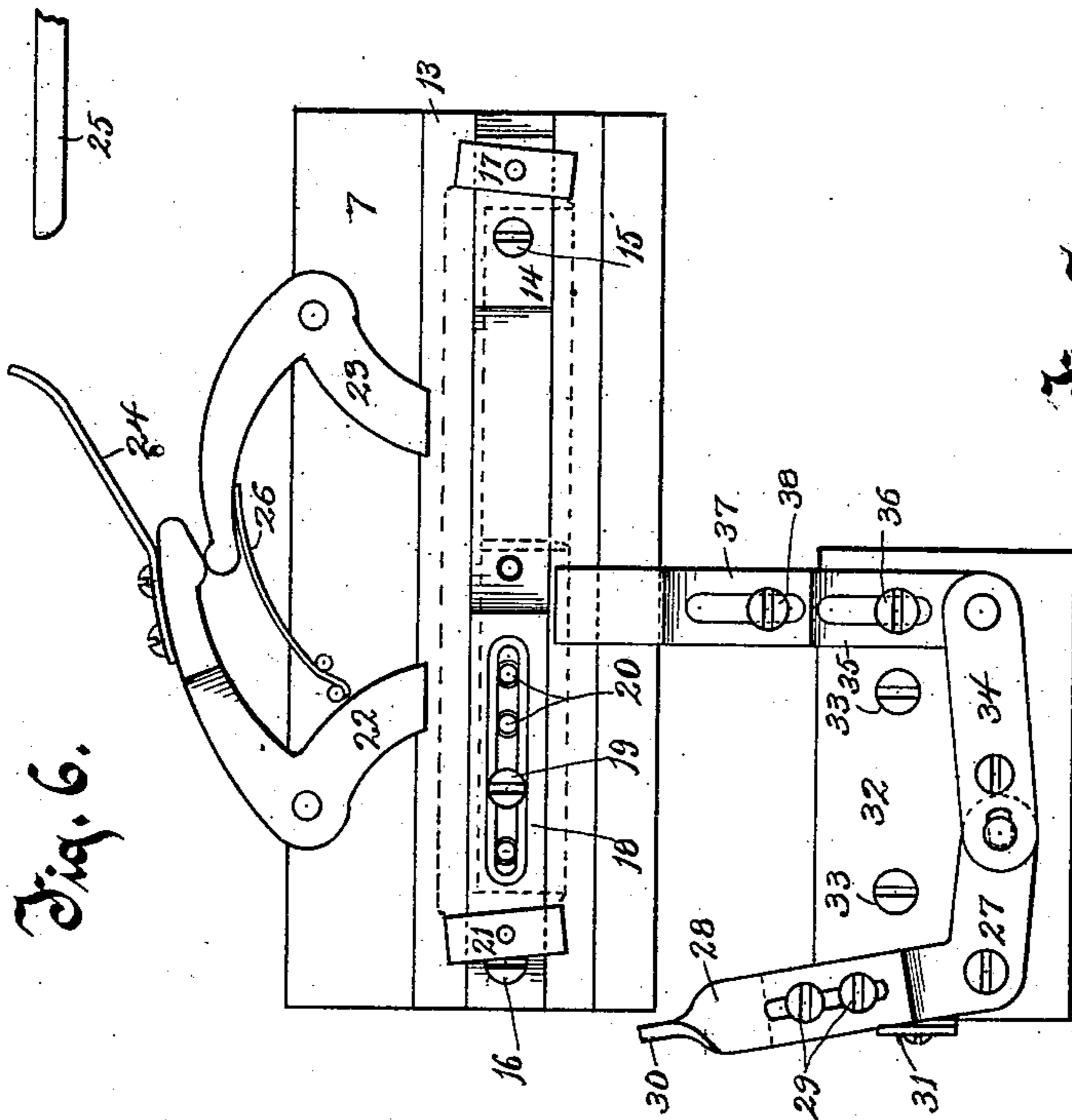


Fig. 7.

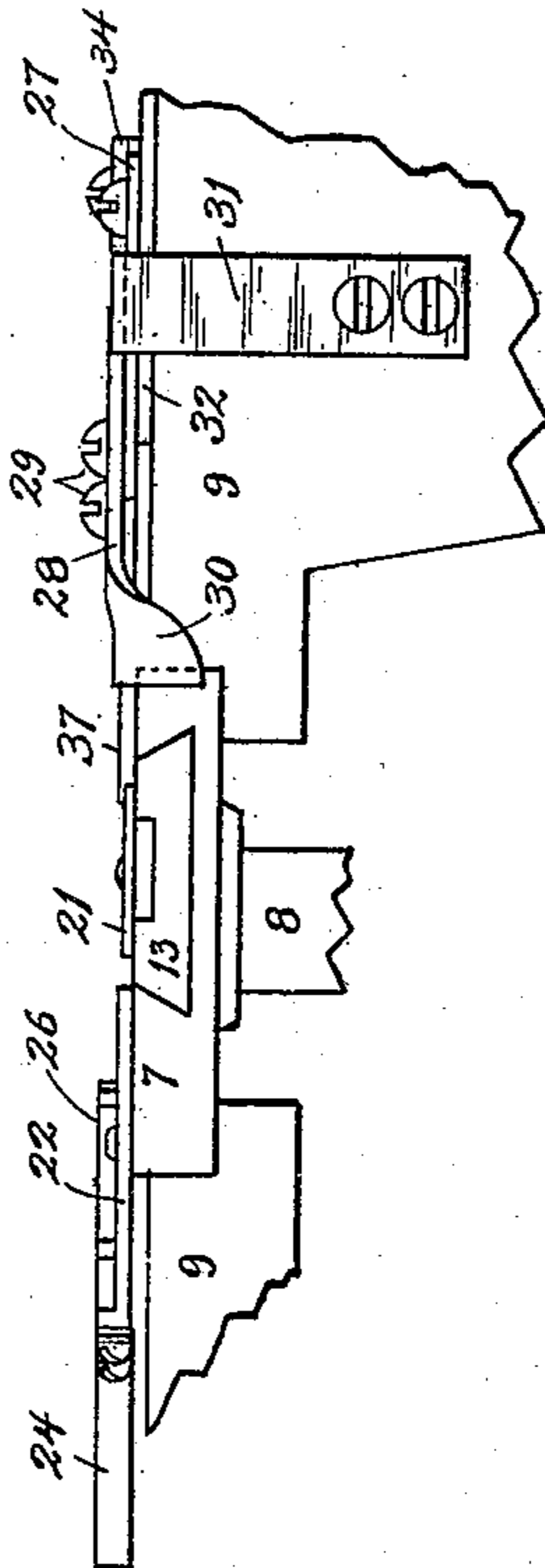
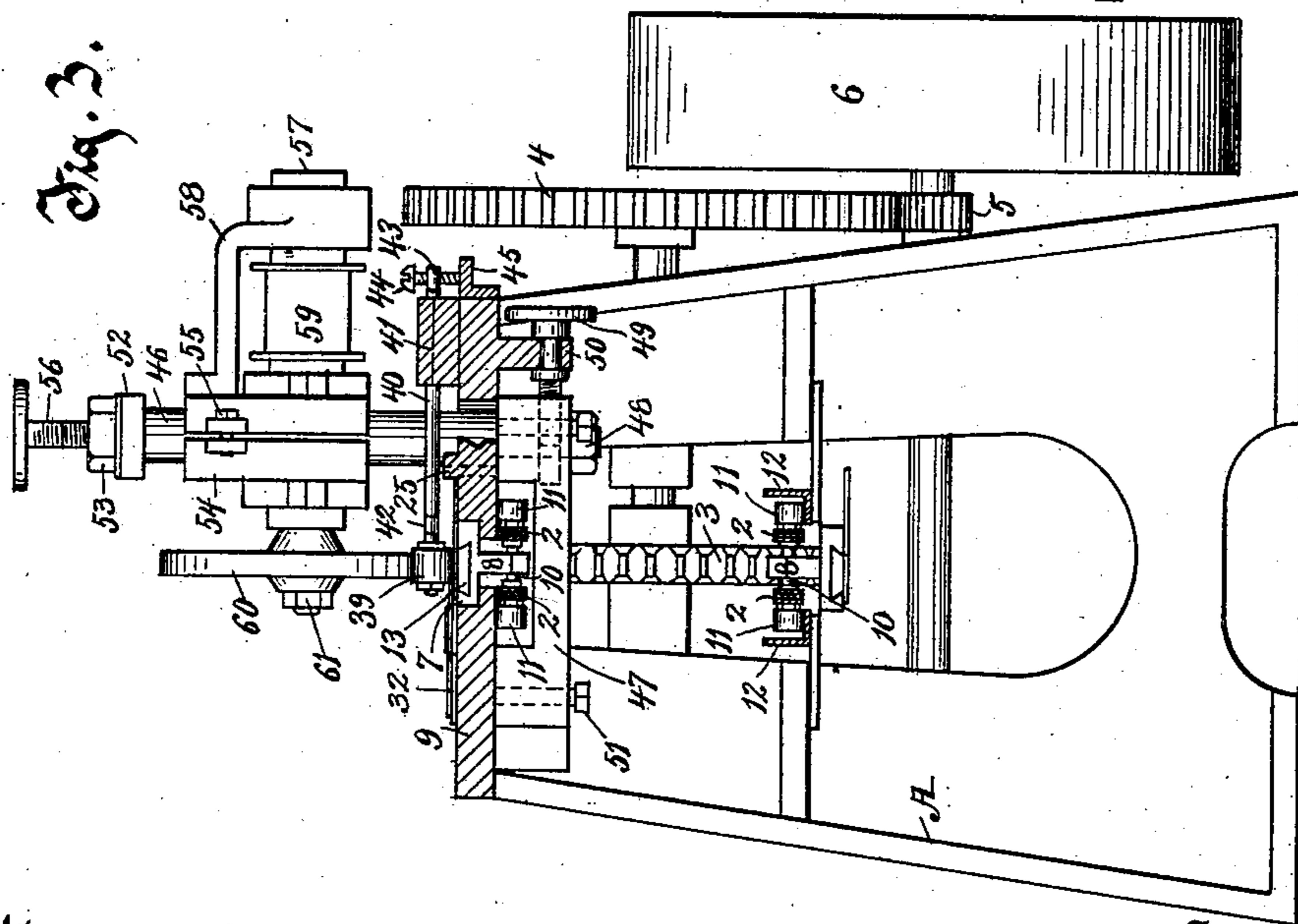


Fig. 3.



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UNITED STATES PATENT OFFICE.

CONRAD WERRA, OF MANITOWOC, WISCONSIN, ASSIGNOR TO MANITOWOC ALUMINUM NOVELTY COMPANY, OF MANITOWOC, WISCONSIN, A CORPORATION OF WISCONSIN.

GRINDING, POLISHING, OR BUFFING MACHINE.

SPECIFICATION forming part of Letters Patent No. 713,256, dated November 11, 1902.

Application filed March 26, 1902. Serial No. 100,007. (No model.)

To all whom it may concern:

Be it known that I, CONRAD WERRA, residing at Manitowoc, in the county of Manitowoc and State of Wisconsin, have invented a new and useful Improvement in Grinding, Polishing, or Buffing Machines, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

My invention relates to improvements in a grinding, polishing, or buffing machine especially adapted for finishing metal combs, particularly combs made of aluminium.

The invention consists of the machine, its parts and combinations of parts, as herein described and claimed, or the equivalents thereof.

In the drawings, Figure 1 represents a side elevation of my improved machine. Fig. 2 is a top plan of the improved machine. Fig. 3 is a transverse section of the machine on line 3 3 of Fig. 1 looking toward the left, parts of the mechanism being omitted for more clearly illustrating the parts shown. Figs. 4 and 5 are details of a presser-roll, Fig. 4 being in plan and Fig. 5 in elevation. Fig. 6 is a plan of a comb-holder, a device therewith for locking the comb in the holder, and a device for loosening the comb from the holder when it has been unlocked. Fig. 7 is a view of the left end of the comb-holder as shown in Fig. 6, with the locking device and loosening device, in connection with fragments of the frame.

In the drawings, A is a frame of suitable form and size for supporting the operative mechanism. An endless chain 1, comprising two parallel sets of links 2 2, runs on sprocket-wheels 3 3, mounted on the frame, the endless chain being disposed in a horizontal direction. For driving the chain a cog-wheel 4 is fixed on the arbor of one of the sprocket-wheels 3, which meshes with a pinion 5 on the shaft of a band-wheel 6.

The links of each set of links are pivoted together conveniently by pins, and at short intervals on the chain the two sets of links are connected together by pins or rods, which may be the link-pivoting pins at those points, on which pins are mounted comb-holding

blocks 7. These blocks or comb-holders have a substantially flat outer surface and on the under side are provided with a rib or lug 8, by which they are mounted on the chain. Along the upper line of the chain these blocks or comb-holders 7 travel in a channel in a bed 9, forming a part of the frame A. The lateral marginal portions of the blocks rest on their undersurface on the bottom of the channel in the bed. The pins or rods 10, that pass through the ribs 8 and unite the two sets of links 2 2 in the chain 1, are provided on their outer ends with antifriction-rollers 11 11, adapted to travel on the under surface of the bed 9. The bed is of course slotted from one end to the other along the medial line of the channel therein for the passage through the slot of the ribs 8 8. The channel in the bed is advisably of such depth that the comb-holders 7 when traveling therein are flush with the top of the bed. Along the path of the lower line of travel of the chain there are tracks 12 12, advisably of angle-iron, supported on the frame and so disposed that the rollers 11 11 travel on the upper surfaces of the tracks, whereby this line of the chain is suitably supported.

The endless chain, with the comb-holders mounted thereon, as above described, serves as the means for supporting and feeding the combs to be ground or polished to grinding or polishing wheels. For securing a comb in the comb-holder and for releasing the comb therefrom after it has been ground or polished the comb-holder is provided with holding and locking devices as well as a releasing device. (Shown most clearly in Figs. 6 and 7.) For adapting this comb-holder most completely for properly holding a comb during the polishing process the block or holder 7 is provided with a longitudinal channel dovetailed in cross-section, in which a steel or hardened bearing-plate 13 is fitted, and this plate is also provided with a longitudinal medially-disposed channel. Near one end of the holder a small block 14 is placed in the channel in the plate 13, and a screw 15, passing through the block 14 and through the plate 13, turns into the holder 17 and secures these members rigidly but releasably together.

Also a screw 16 through the plate 13 near its other extremity turns into the block 7. A comb-end stop 17 is swiveled medially on the holder 7 by being pivoted to the block 14. Near the other end of the holder a sliding block 18, fitted in the channel in the plate 13, is provided with an elongated slot, and a screw 19, passing through this slot, is adapted to enter any one of a series of holes 20. By this construction the sliding block 18 is made adjustable endwise in the plate 13. A comb-end stop 21 is pivoted medially on the block 18, being thereby swiveled on the block and serving with the other comb-end stop, 17, as stops adapted to receive against them and by their being swiveled to fit to the ends of a comb. The surfaces of the blocks 14 and 18 are flush with the surface of the plate 13, and these stops 17 and 21 are on the surface of these blocks, and these stops are preferably approximately the thickness of a comb. By the adjustment of the block 18 in the plate 13 the stop 21 can be placed at such distance from the stop 17 as to just receive between the stops a comb, as indicated by dotted lines on Fig. 6.

For locking a comb in place between the stops 17 and 21 and bearing against them wedgingly in the manner indicated in Fig. 6 I provide a locking device, consisting, advisably, of a pair of bell-crank levers 22 23, pivoted on the block 7 in such position that the ends of one arm of each lever may by the concurrent tilting of the levers be forced against the back edge of the comb, locking it in position on the holder. It is well known that the ends of combs are ordinarily beveled, as indicated by the dotted lines in Fig. 6. The outer arm of the lever 23 bears against the inner beveled end of the outer arm of the lever 22, and a finger 24 on the outer arm of lever 22 projects obliquely therefrom in such position as to contact with an elongated guard 25, advisably in the form of a ledge on the bed 9 and extending on the bed along past all the grinding or polishing wheels, so that the comb will be held securely in position on the holder while being ground or polished. A spring 26, mounted on the block or holder 7, bears at its free end against the outer arm of the lever 23 and is adapted to throw the levers into initial position away from the comb when the finger 24 has passed beyond and is thereby released from the guard 25.

As an aluminium comb is very light in weight and is likely to be so wedged in between the stops 17 and 21 by being held thereto by the locking device that it will not by its own weight release itself from the stops in all cases, I provide a comb-loosening device mounted on the bed 9 and so disposed as to act on the comb after it has been released by the locking device. This comb-loosening device consists of a bell-crank lever 27, pivoted on a plate 32, secured on the bed 9 by screws 33 33, one arm of which lever is advisably made

in two parts, the outer part 28 being adjustable on the main part by means of screws 29 29, passing through an elongated slot in the part 28 and turning into the arm of the lever. The member 28 is provided with an overturned and vertically-extended terminal part 30, which is located in the path of the holder 7 as it advances with the chain on which it is mounted. The disposition of the parts is such that the holder 7 will contact with the arm of the bell-crank 27 as it comes thereto and will carry it along a little distance, swinging the bell-crank and then passing it. A spring 31, fixed on the frame, bears against the arm of the bell-crank 27 and holds it yieldingly to initial position in the path of the holder 7. The other arm of the bell-crank 27 is connected to one arm of a lever 34, pivoted on the plate 32. The lever 27 is connected to the lever 34 by a pin that enters a slot in the lever 34 to provide for the proper movement of the connected levers. The other arm of the lever 34 is connected to a slide 35, movable endwise toward and from the path of the comb on the holder 7, the slide being held to proper longitudinal movement by a screw 36, passing through an elongated slot in the slide and turning into the plate 32. The slide 35 is preferably provided with an adjustable terminal member 37, secured to the slide 35 by a screw 38, passing through a slot in the member 37 and turning into the slide 35. The parts of this comb-loosening device are so disposed that when the lever-arm 28 is tilted by contact with a passing block 7, which is the situation most of the time while the machine is in operation, the end of the member 37 of the slide 35 is just in front of the ends of the teeth of the comb in place on the block 7 for finishing, and when the lever-arm 28 under the action of spring 31 is swung suddenly into the space between two passing blocks 7 7, as shown in Fig. 6, the slide member 37 is thrust forward against the ends of the teeth of the comb, pushing it away from contact with the stops 17 and 21, thereby releasing the comb, so that it will fall from the block when the block turns downwardly at the end of its line of travel. The loosening device acts directly after the comb-locking device is released. In Fig. 6 the position of the member 37 is shown as it exists in the machine at the close of its outward thrust movement, but the comb, as indicated in dotted lines, is in its position between the stops 17 and 21 and not pushed back by the slide 37, as, in fact, it would be; but the action will be clearly understood. For holding the combs on the several holders down to place thereon while being ground or polished and during their travel with the holders on the upper line of the chain I provide presser-rolls 39, so disposed as to bear on the upper surface of the combs and hold them downwardly in place. For suitably holding these rolls and making them adjustable toward and from the surface of the holders 7 I

mount each roll on the crank-pin or eccentric of a cranked rod 40. Each of these rods is mounted revolubly in a bearing block 41, fixed on the bed 9. It will be noticed that these rods are cranked at 42 near the rolls 39, so that by the rotation of the rods in their bearings the presser-rolls can be raised or lowered and thereby adjusted severally to put them in proper position for their work. For adjusting these rods revolubly each rod is provided with a radial arm 43, through which a screw 44 turns, the extremity of which bears against a ledge 45, secured to and forming a part of the bed 9. I employ such number of these rolls 39 as are found necessary to hold the combs properly in position during the process of grinding or polishing and while on their passage with the holders 7 along the upper line of travel of the chain.

For finishing the surface of the comb, either by grinding or polishing or buffing, I provide rotating wheels so disposed as to contact and finish the surface of the comb as it passes beneath the wheels during the travel of the combs on and with the holders 7. For suitably mounting these finishing-wheels I provide two standards 46 46 for each wheel, which standards pass downwardly through apertures therefor in the bed 9, the apertures being slightly elongated transversely of the bed, which standards have a contracted portion, and the two standards of each set are fixed in a block 47, slidable transversely of the bed in ways therefor secured to the bed 9. The standards are conveniently secured in the block by nuts 48 turning thereon. An adjusting-screw 49, rotatable without endwise movement in a lug 50, rigid on the under side of the bed 9, turns into the end of the block 47 and is adapted for adjusting the block laterally to the extent of the movement permitted by the standards in the apertures therefor through the bed. The blocks 47 are locked in position when adjusted by screw-bolts 51 turning through the blocks against the under surface of the bed, thereby clamping the blocks against the supporting-ways underneath. The standards 46 of each set or pair of standards are provided with a cross-head 52 on their upper extremities and secured thereon detachably by nuts 53. A bearing-block 54 is mounted adjustably on each set or pair of standards 46. The block has vertical apertures through it near each end for the standards 46 to pass loosely through it, and the ends of the block are split, forming clamps which are made to clamp on the standards releasably by screws or screw-bolts 55. An adjusting-screw 56, turning through the cross-head 52, is swiveled in the top of the block 47 and is adapted to adjust the block upwardly or downwardly. An arbor 57 is mounted revolubly in each block 46, and for supporting the arbor in its bearing against tilting or vibration I advisably provide a bearing-arm 58, fixed on the block and projecting laterally therefrom, which is also provided

with a bearing in which the distant end of the arbor fits and rotates. The arbor is provided with a belt-pulley 59. A grinding, polishing, or buffing wheel 60 is mounted on the arbor 57 and is secured thereon removably by a nut 61, turning on the end of the arbor against the hub of the wheel, the inner side of the hub bearing against a shoulder on the arbor. It will be understood that with this machine either grinding or polishing or buffing wheels may be used interchangeably, as desired. Each of these wheels is driven by a belt 62, running on the pulley 59 from a source of power.

On each machine I employ a plurality of finishing-wheels, and, as will be understood from the foregoing description, each of these wheels is so mounted and disposed that it can be shifted transversely in a horizontal plane across the direction of travel of the combs in their holders on the chain. In Fig. 1 I have shown eight finishing-wheels thus mounted and adapted for work; but the machine may contain any number of such wheels desired. The wheels being thus mounted may be so disposed that one wheel will contact with and finish a certain longitudinal portion or division of the surface of a comb passing beneath it, while another or other wheels will contact with and finish another or other portions of the comb as it passes beneath it or them, the wheels so far as their points of contact with the combs are concerned being out of alinement in the direction of the travel of the comb-holders.

What I claim as my invention is—

1. In a comb-finishing machine, means for supporting the material and carrying it forward in a right line past grinding and polishing means, and means in plurality for grinding and polishing one surface of the material, the grinding or polishing means being mounted at the same side of the material but at different angles to the line of feed of the material and so as to contact the one surface thereof being finished in varying directions.

2. In a comb-finishing machine, means for supporting the material and carrying it forward in a right line past grinding and polishing means, and means in plurality for grinding or polishing a single surface of the material, the grinding or polishing means being mounted at the same side of the material but in different longitudinal planes and at varying angles to the path of travel of the material.

3. In material supplying and feeding mechanism in a comb-finishing machine, an endless traveling chain, comb-holders mounted on the chain, and a bed in which the comb-holders travel along the upper line of the chain supporting the chain depending therefrom.

4. In material supporting and feeding mechanism in a comb-finishing machine, an endless traveling chain, comb-holders mounted on the chain, a bed in which the comb-

holders travel along the upper line of the chain supporting the chain depending therefrom, and tracks parallel with said bed on which the lower line of the chain is supported and travels supporting the comb-holders depending therefrom.

5. A comb-holder in a comb-finishing machine, comprising a block, a comb-stop swiveled on the block, and a complementary stop swiveled on the block opposite to and distant from said first stop.

6. A comb-holder in a comb-finishing machine, comprising a block, a comb-stop swiveled on the block, an adjustable block in the comb-holding block, and a complementary stop swiveled on the adjustable block opposite to and at a distance from the first stop.

7. In a comb-holder in a comb-finishing machine, a block, an elongated comb-stop pivoted medially on and so as to be disposable obliquely of the length of the block, a longitudinal channel in the block, an adjustable block in said channel, and a complementary comb-stop pivoted medially on said adjustable block and opposite to said first stop and so as to be disposable obliquely to the length of the comb-holder.

8. In combination with a comb-holder provided with means for holding a comb against movement thereon except rearwardly, means on the comb-holder adapted to bear releasably against the rear edge of the comb and lock it in position thereon.

9. In combination with a comb-holder provided with means for holding a comb against movement thereon except rearwardly, a pair of coactuated levers or cams pivoted on the holder and adapted to engage the rear edge of a comb releasably and hold it in position thereon, and means for automatically holding said levers up to their work by the travel of the comb-holder.

10. In combination with a comb-holder provided with means for holding a comb against movement thereon except rearwardly, a pair of coactuated levers or cams pivoted on the holder and adapted to engage the rear edge of a comb releasably and hold it in position thereon, a finger on one of said levers adapted to be actuated by a guard during the passing of the comb-holder, and means for automatically returning the levers to initial position when the finger is released from the guard.

11. In a comb-finishing machine, a traveling comb-holder provided with means for holding a comb wedgingly in position thereon, of a comb-loosening device disposed to be actuated by the passing of the comb-holder to strike the comb and loosen it from its place on the comb-holder.

12. In a comb-finishing machine, a traveling comb-holder provided with means for holding a comb wedgingly in position thereon, of a bell-crank lever so mounted and disposed that one arm thereof will be contacted and the lever swung by the passing of the comb-

holder, a medially-pivoted lever connected to and actuated by the bell-crank lever, a slide connected to the last-enumerated lever and adapted to strike against the comb, and a spring adapted to actuate the bell-crank lever therefor.

13. In a comb-finishing machine, a traveling comb-holder provided with means for holding a comb wedgingly in position thereon, of a bell-crank lever so mounted and disposed that one arm thereof will be contacted and the lever swung by the passing of the comb-holder, an adjustable extensible member on one arm of the bell-crank lever, a medially-pivoted lever connected to and actuated by the bell-crank lever, a slide connected to the last-enumerated lever having an adjustable and extensible member thereon the slide being adapted to strike against the comb, and a spring adapted to return the bell-crank lever to initial position.

14. In a comb-finishing machine, a plurality of compressor-rolls, each roll being axled eccentrically on a cranked rod whereby by the rotation of the rod the roll may be held up to or removed from its work.

15. In a comb-finishing machine, an endless chain having comb-holders mounted thereon, a plurality of presser-rolls axled severally eccentrically on a cranked rod revolvable in a bearing on the frame, and means for rotating and holding the rod in adjusted position whereby the rolls may be adjusted and held to their work.

16. In a comb-finishing machine, one or more presser-rolls axled eccentrically on a rod having an axial bearing rotatively, and means on the rod for rotating it limitedly and holding the rolls up to their work.

17. In a comb-finishing machine, a plurality of locally stationary grinding or polishing wheels having their arbors at angles to each other and disposed to abrade different portions of the same surface of material fed past them in a right line.

18. In a comb-finishing machine, the combination with traveling comb-holders, of a plurality of locally stationary grinding or polishing wheels at one and the same side of the traveling comb-holders and having their arbors at oblique angles to each other and so disposed as to be out of alinement with each other in the direction of the travel of the comb-holders.

19. In a comb-finishing machine, a bed, comb-holders arranged to travel in a right line lengthwise of the bed, and grinding or polishing wheels mounted and adjustable laterally on the bed.

20. In a comb-finishing machine, a bed, comb-holders arranged to travel lengthwise of the bed, blocks slidably adjustable transversely on the bed, and grinding or polishing wheels mounted on said adjustable blocks.

21. In a comb-finishing machine, a bed, comb-holders arranged to travel lengthwise of the bed, blocks slidably adjustable trans-

versely on the bed, standards fixed in the blocks, bearing-blocks on the standards, and grinding or polishing wheels mounted in the bearing-blocks.

5 22. In a comb-finishing machine, a bed on which comb-holders are arranged to travel, standards supported on the bed, a bearing-block adjustable vertically on the standards, a cross-head on the standards, a screw in the
10 cross-head swiveled in the bearing-block and adapted to adjust it vertically, means for clamping the bearing-block on the standards, and a grinding or polishing wheel mounted in the bearing-block.

15 23. Means for mounting a grinding or polishing wheel consisting of a pair of standards, a cross-head on the standards, a bearing-block movable vertically on the standards, means for securing the block in position releasably
20 on the standards, a screw for raising and lowering the block, a bearing-arm fixed on the block and extending laterally therefrom, and a wheel-arbor mounted revolubly in the bearing block and arm.

25 24. In a comb-finishing machine, a bed on

which comb-holders may travel, a wheel-carrying block slidable in ways transversely on the under side of the bed, a screw revoluble in a lug on the bed and turning into said block, and means for locking the block to the 30 bed.

25. In a comb-finishing machine, a frame having an elongated bed, an endless chain carrying comb-holders disposed to travel in a channel therefor on the bed and support- 35 ing the chain, means on the holder for receiving a comb therein wedgingly, means adapted automatically to engage the rear edge of the comb and lock it in place on the holder, blocks on and adjustable transversely of the bed, 40 and grinding or polishing wheels mounted at different angles to each other on the adjustable blocks.

In testimony whereof I affix my signature in presence of two witnesses.

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