

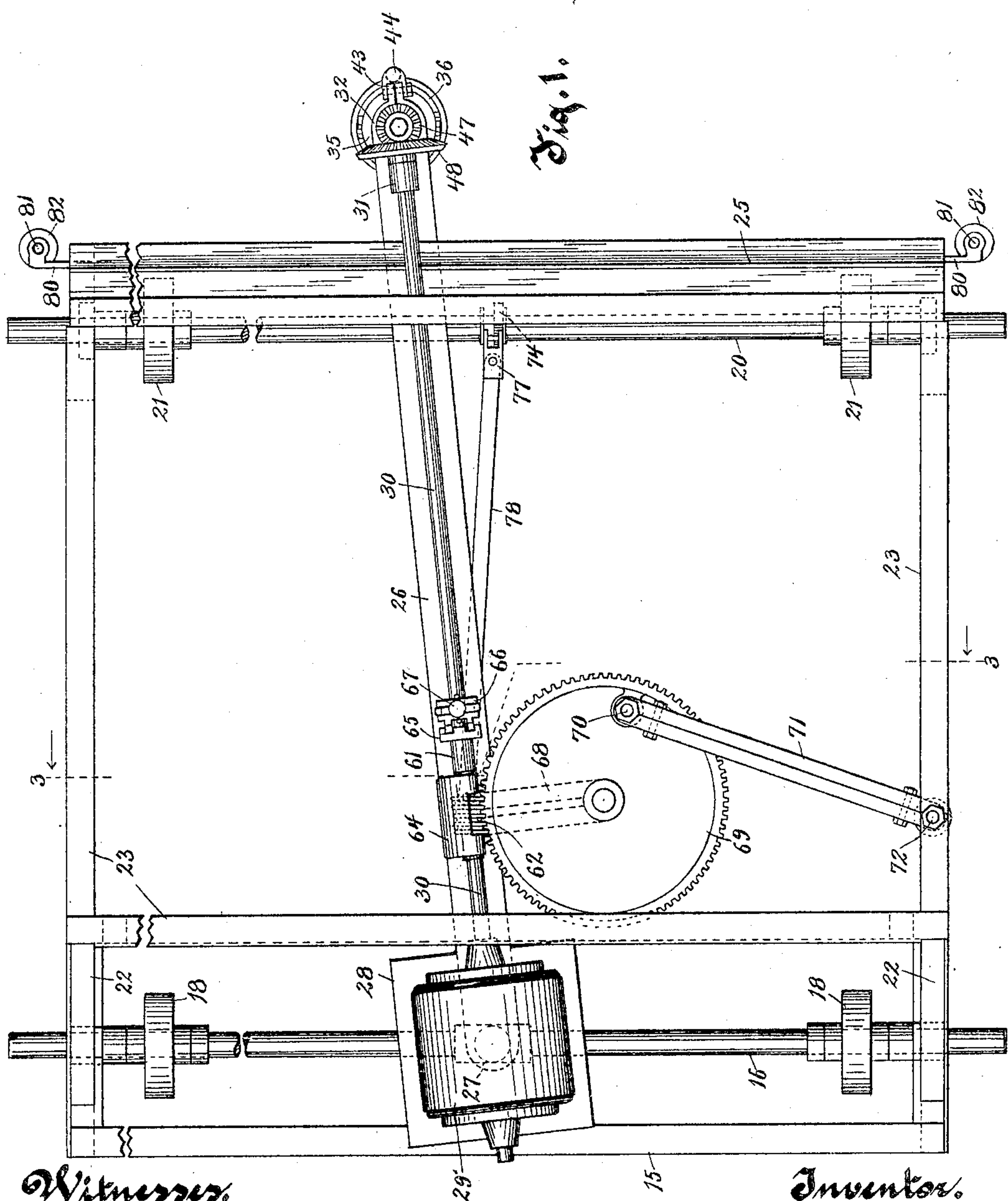
No. 807,560.

PATENTED DEC. 19, 1905.

H. KRATSCH.  
FLOOR DRESSING MACHINE.

APPLICATION FILED JULY 13, 1905.

4 SHEETS—SHEET 1.



Witnesses.

*C. H. Keeney.*  
*R. S. Caldwell.*

Inventor.

*Henry Kratsch*  
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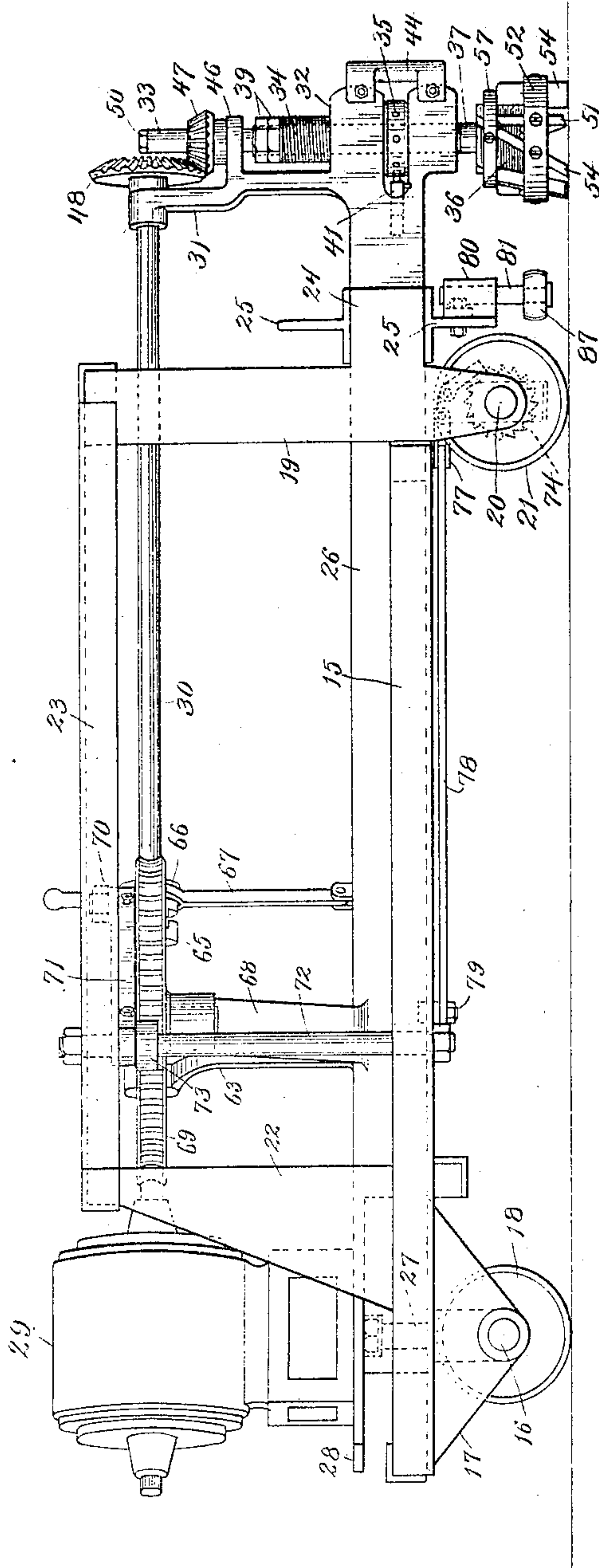
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4 SHEETS--SHEET 2.

Fig. 2.



Witnesses.

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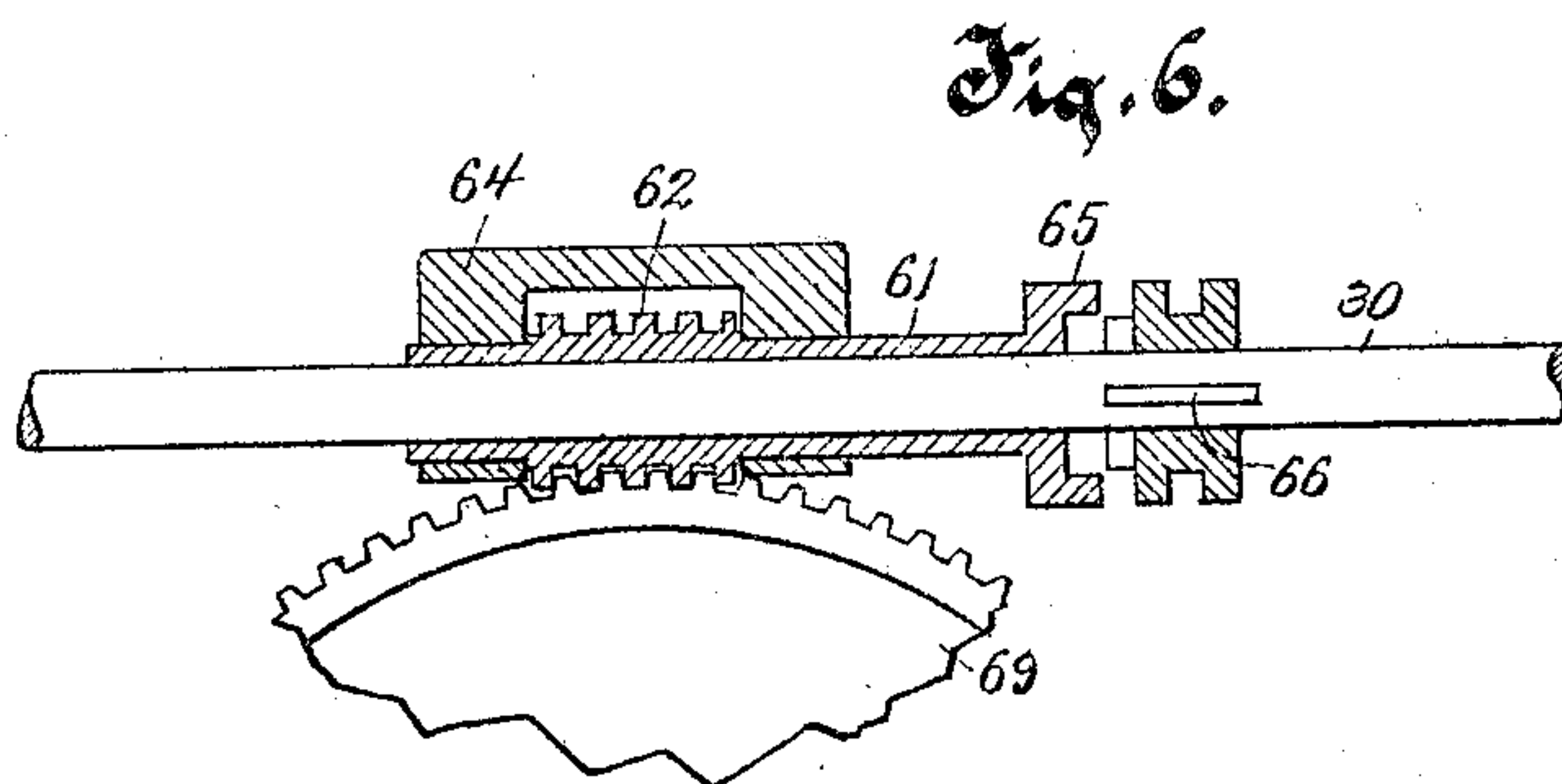
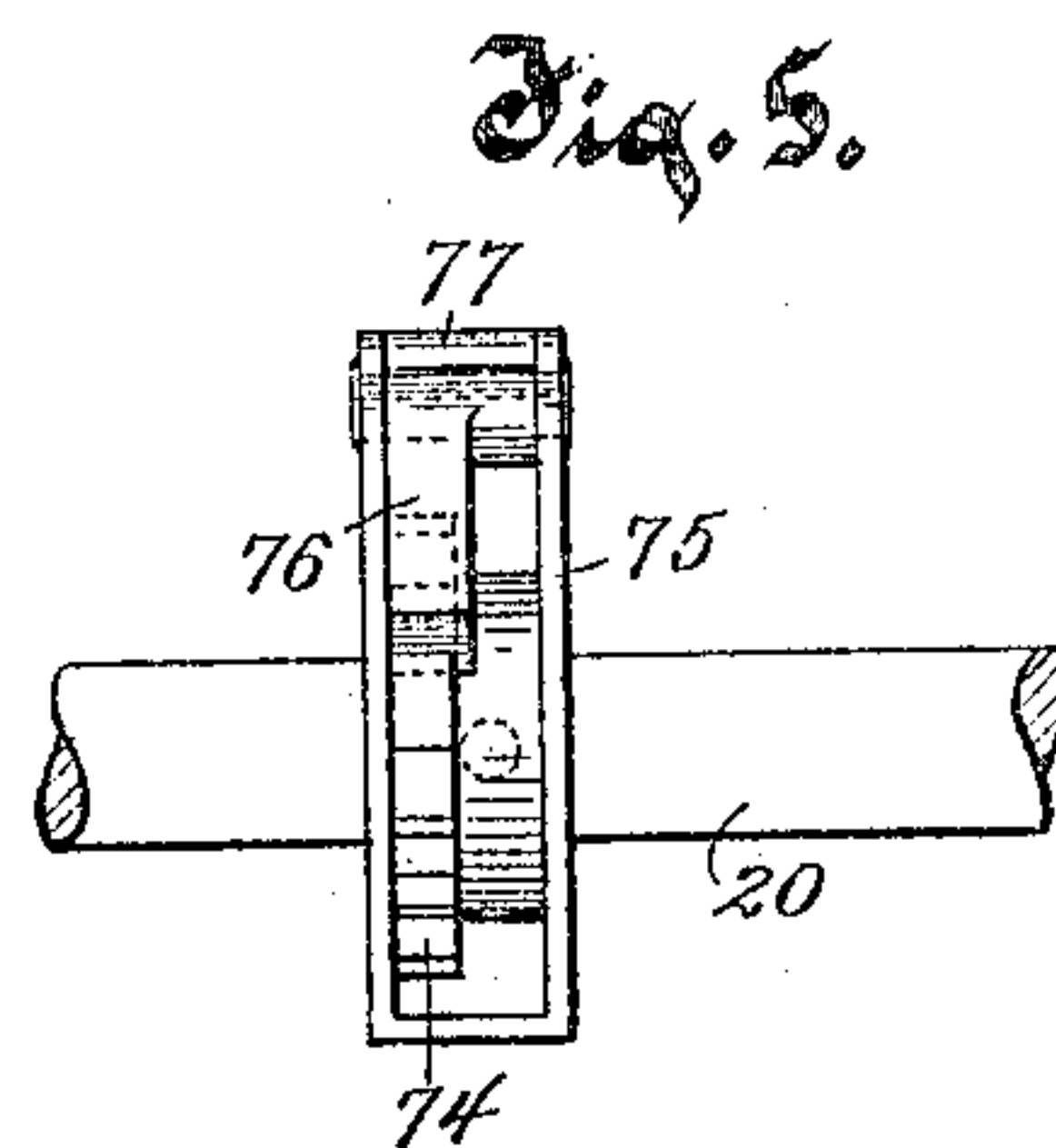
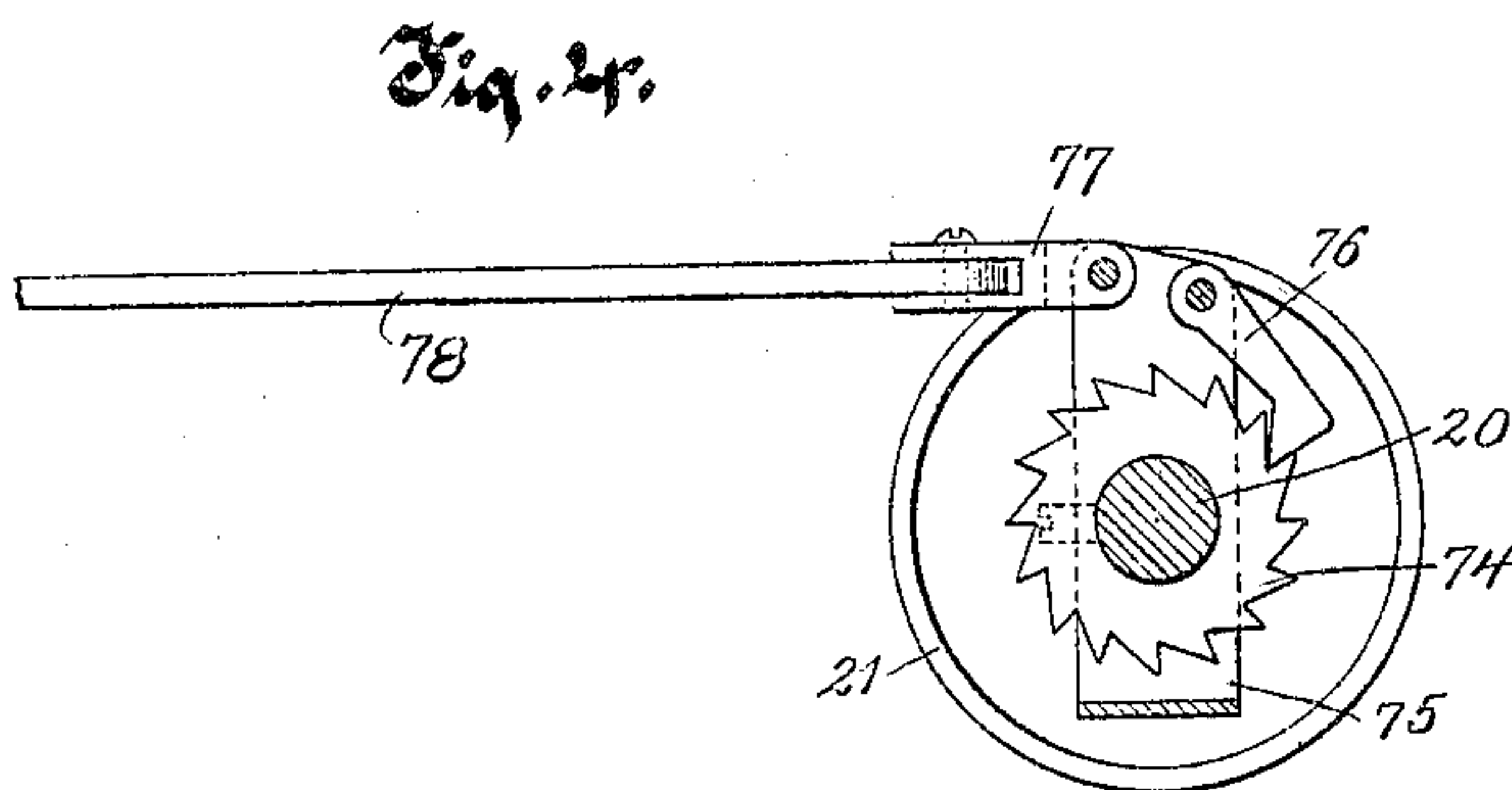
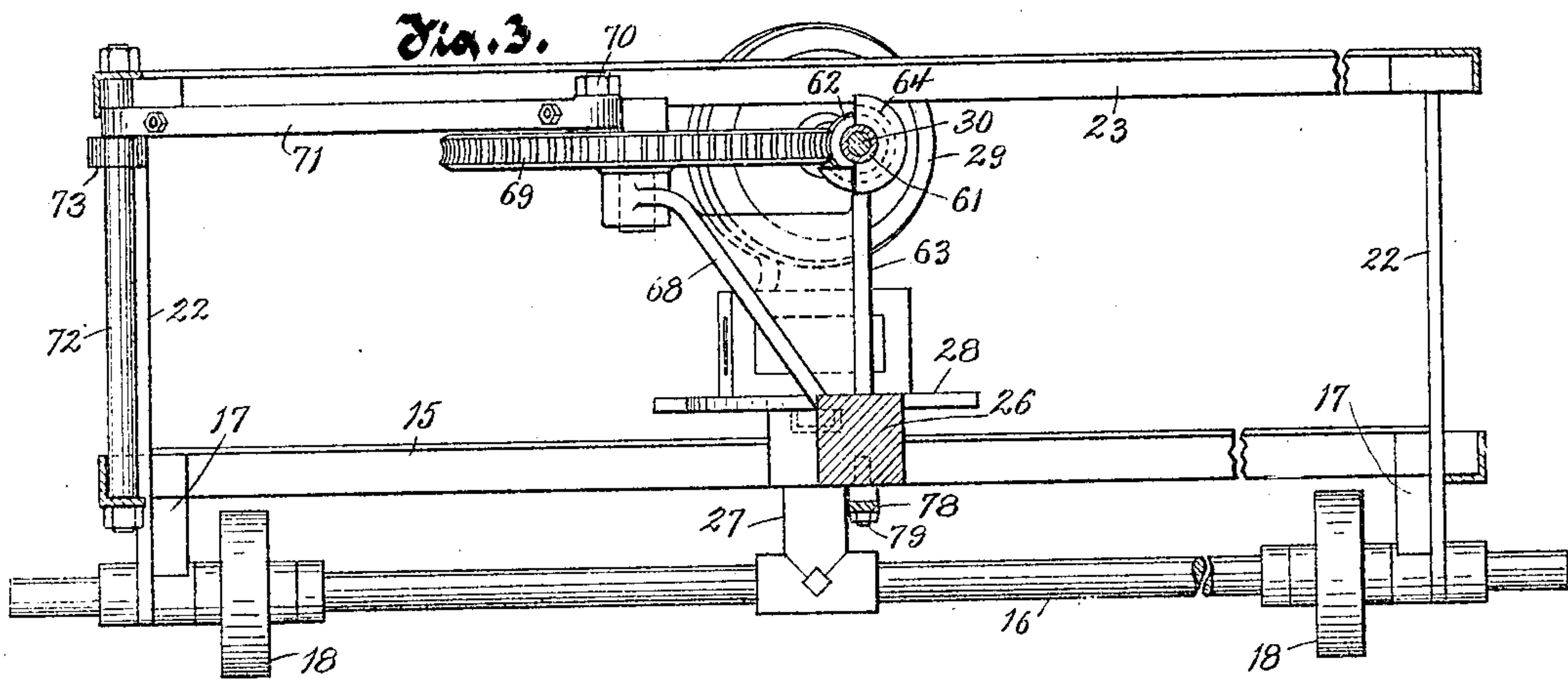
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4 SHEETS—SHEET 3.



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4 SHEETS—SHEET 4.

Fig. 7.

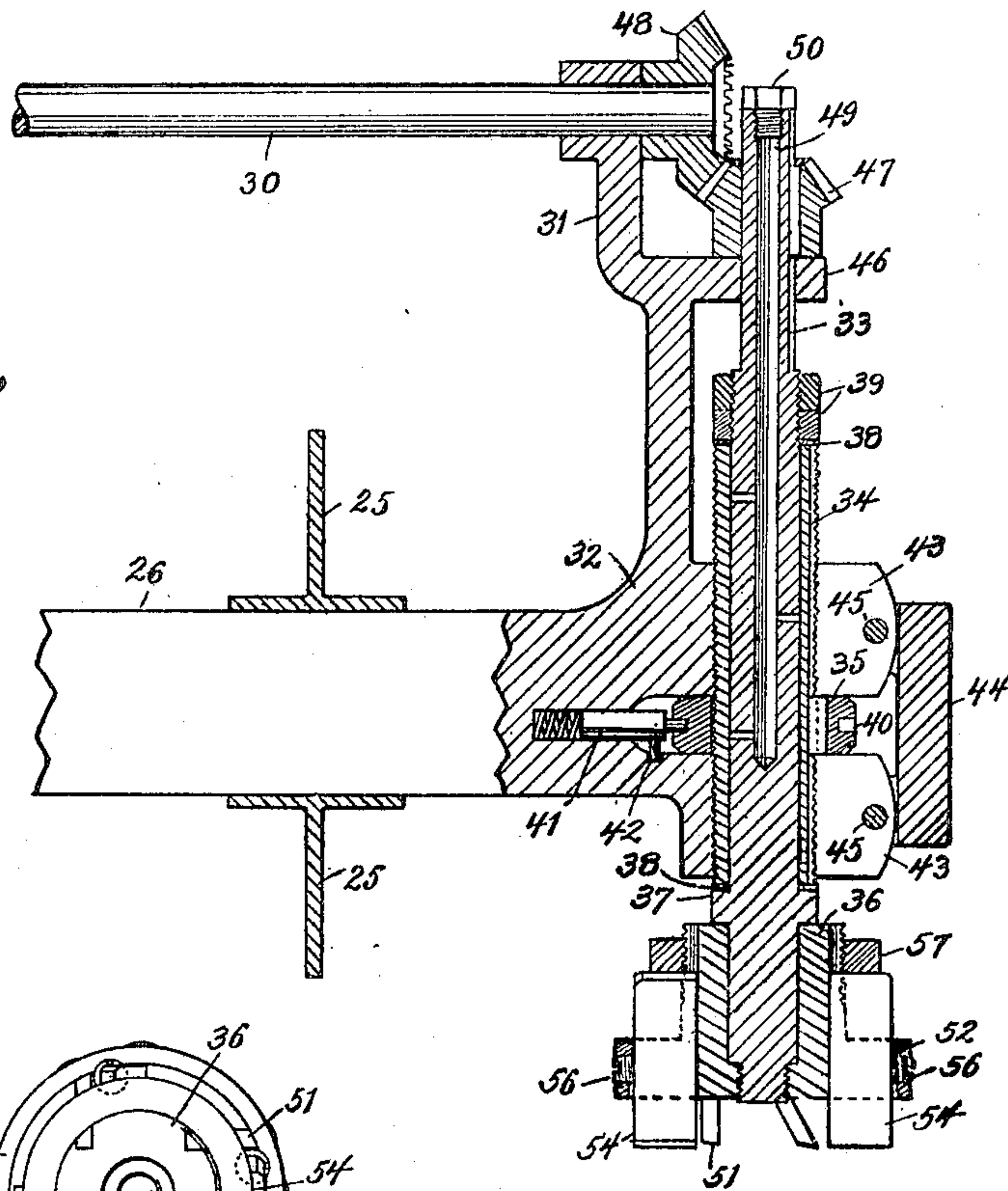


Fig. 9.

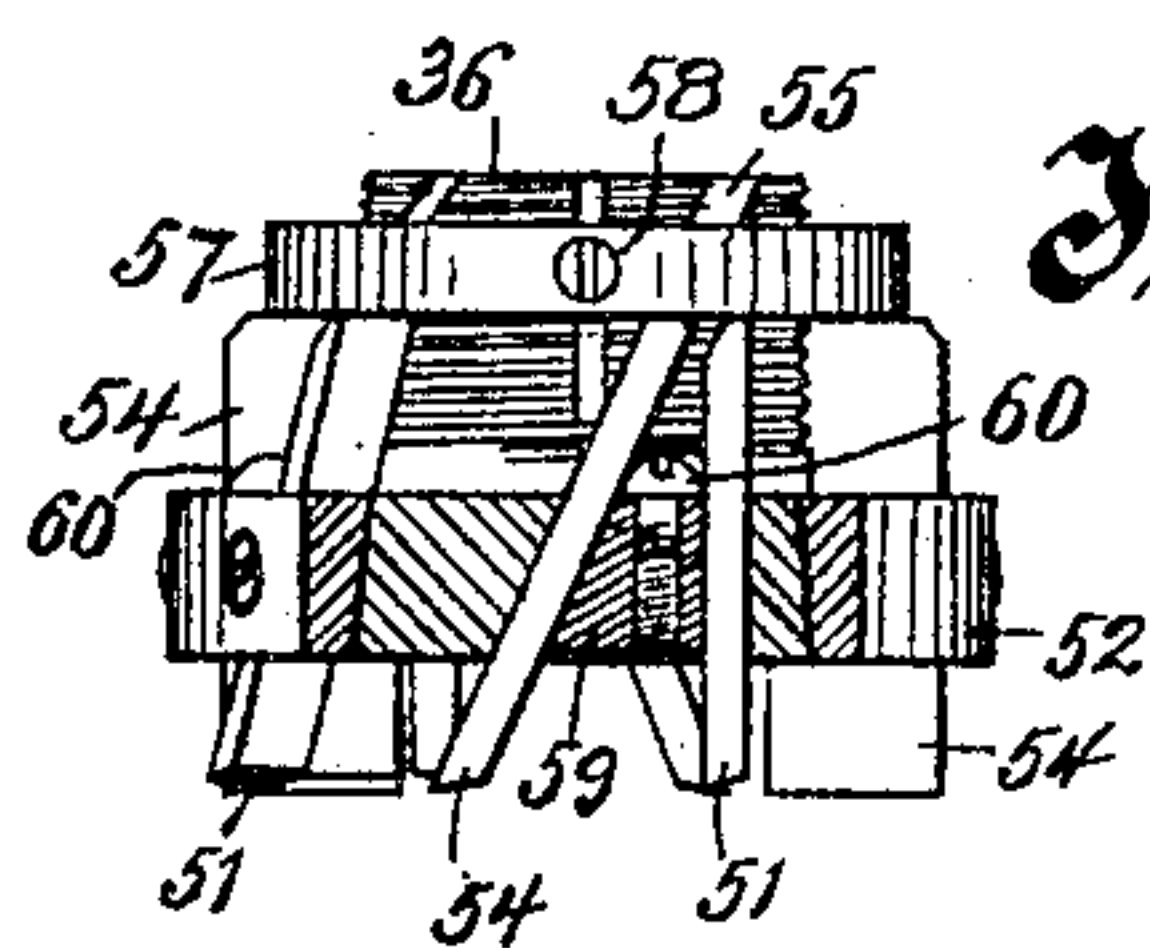
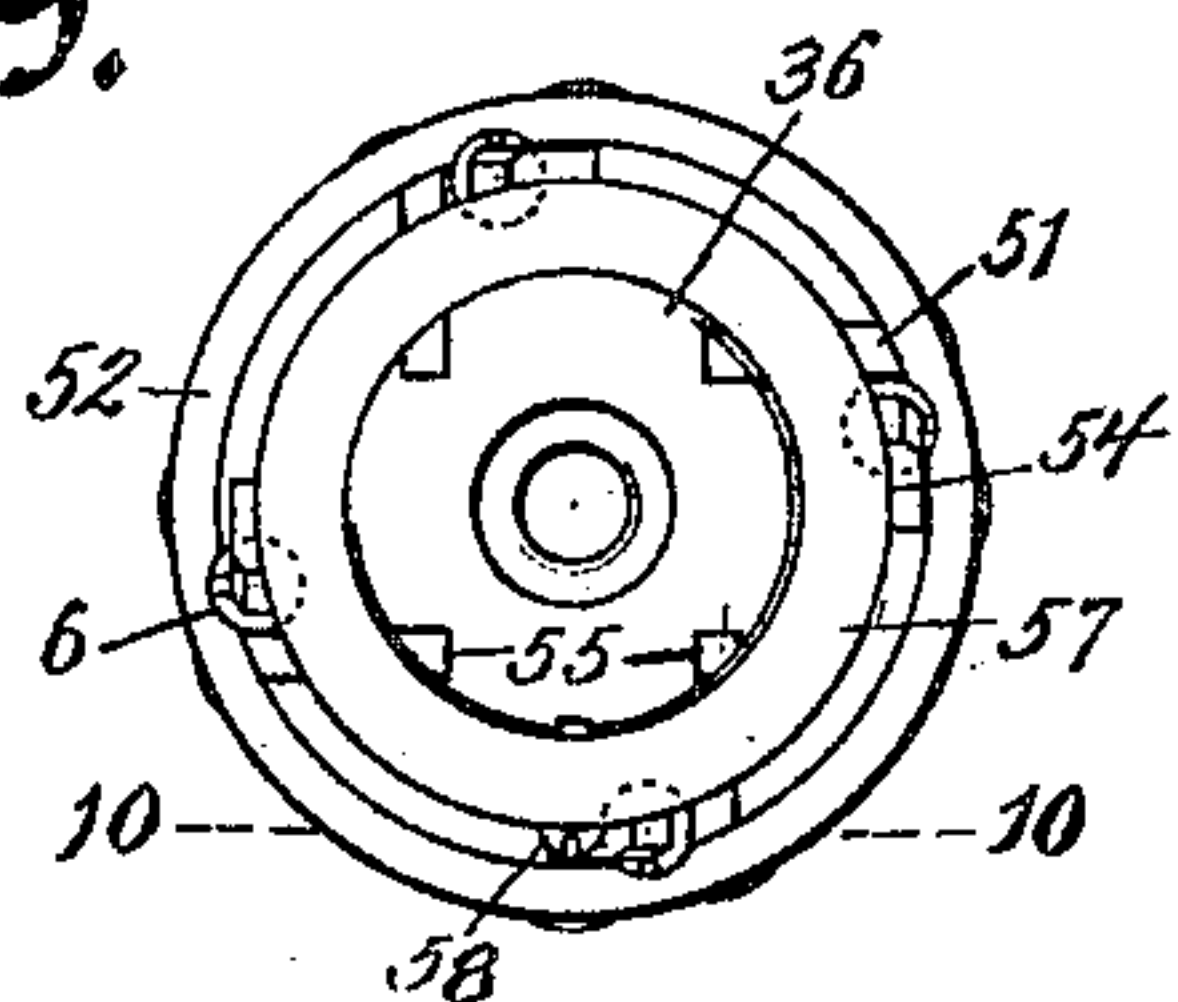
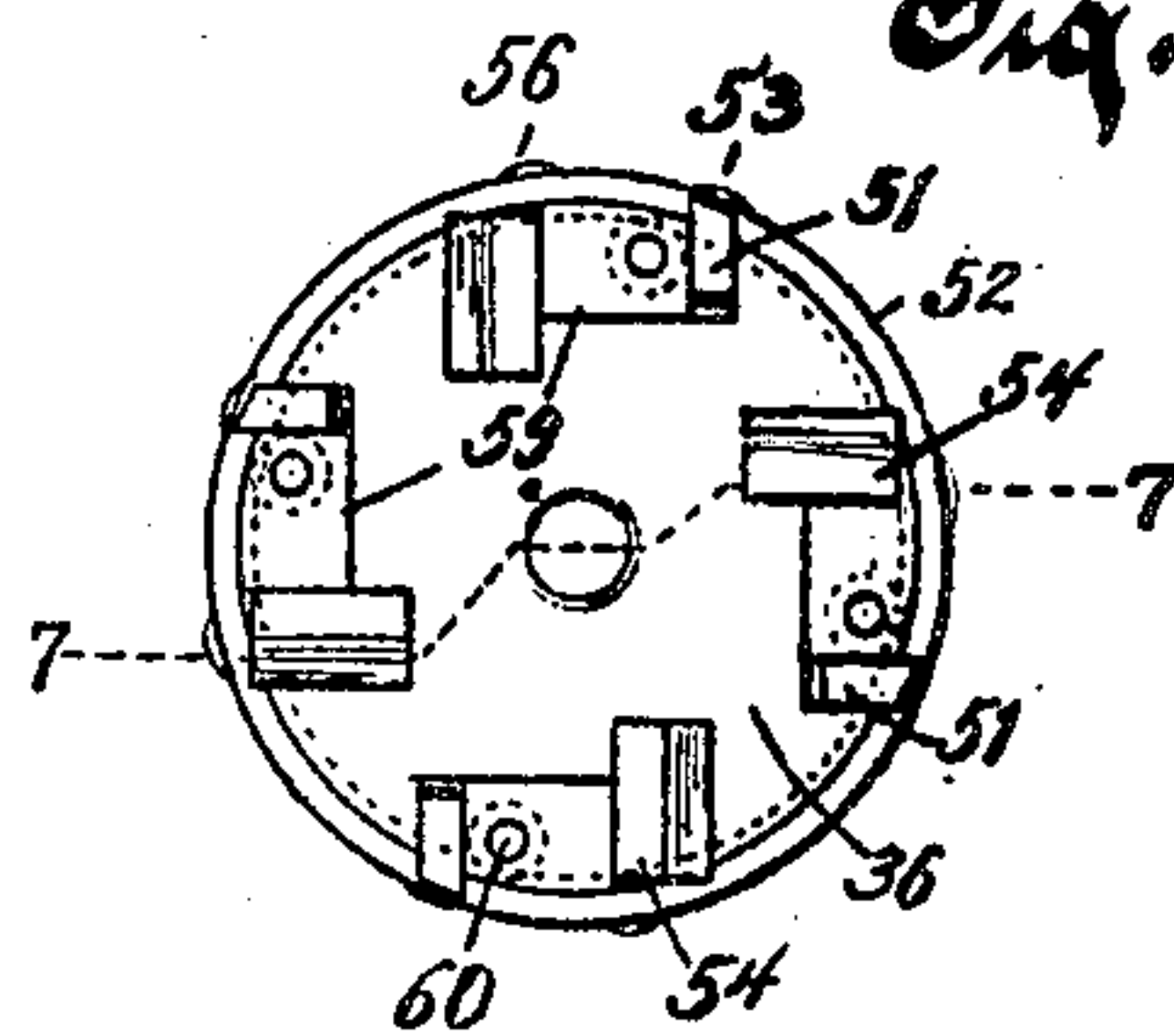


Fig. 10.

Fig. 8.



Witnesses.

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# UNITED STATES PATENT OFFICE.

HENRY KRATSCH, OF MADISON, WISCONSIN.

## FLOOR-DRESSING MACHINE.

No. 807,560.

Specification of Letters Patent.

Patented Dec. 19, 1905.

Application filed July 13, 1905. Serial No. 269,458.

*To all whom it may concern:*

Be it known that I, HENRY KRATSCH, residing in Madison, in the county of Dane and State of Wisconsin, have invented new and  
5 useful Improvements in Floor-Dressing Machines, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

This invention relates to floor-dressing machines; and it consists in a machine for cutting smooth surfaces on floors, bowling-alleys, and the like, which will automatically travel as the cutting operation progresses.

The invention further consists in a machine  
15 of this character provided with a cutting-tool of an improved construction which may be adjusted to the desired level and which is capable of producing a smooth finish to the work.

The invention further consists in a suitably  
20 mounted carriage provided with an engine or motor driving mechanism for driving a cutting-tool which is so mounted as to be swung from side to side of the carriage between suitable guides by mechanism operated from said  
25 motor or engine, the motor or engine also serving to propel the carriage over the floor or other surface being dressed.

The invention also consists in various novel details of construction and arrangement of  
30 parts, as herein set forth.

Referring to the accompanying drawings, in which like characters of reference indicate the same parts, Figure 1 is a plan view of a floor-dressing machine embodying this invention. Fig. 2 is a side elevation thereof. Fig. 3 is a sectional elevation thereof, taken on the line 3 3 of Fig. 1. Fig. 4 is an enlarged detail side elevation of the carriage-driving ratchet mechanism. Fig. 5 is a similar end view  
40 thereof. Fig. 6 is an enlarged sectional view of the worm-and-clutch connection for the tool-swinging mechanism. Fig. 7 is a sectional elevation of the cutter-head and the cutting-tool. Fig. 8 is a plan view of the cutter inverted, the line 7 7 thereon indicating the sectional plane of Fig. 7. Fig. 9 is a plan view of the cutter, and Fig. 10 is a side elevation thereof with parts sectioned on the plane of line 10 10 of Fig. 9.

In the drawings, 15 represents a rectangular carriage-frame, preferably of angle-iron construction, which has a set shaft 16, fixed in brackets 17 at its rear end, on which shaft are loosely mounted a pair of supporting-rollers  
55 18, on which the machine may travel. At the

rights or standards 19, which extend beneath the frame to form journal-brackets, in which a carriage-driving shaft 20 is loosely mounted, said shaft 20 having a pair of rollers 21 fixed  
60 thereon to also support the machine and permit of its traveling. At the rear part of the frame 15 are upright brackets 22, to which are connected the rear corners of an upper rectangular frame 23, whose front corners are  
65 mounted on the upper ends of standards 19. The standards 19 of the carriage thus formed have forwardly-projecting extensions 24, with parallel guide-rails 25 extending across the machine from side to side and producing a  
70 guideway therebetween. These guide-rails 25 are preferably made of T-rails, as shown, to be strengthened against bending by the outwardly-extending flange, though other forms of rail having the necessary strength for the  
75 purpose may be substituted. A cutter-arm 26, desirably square in cross-section, slidably fits in the guideway between the guide-rails 25, so as to have horizontal movement therein without vertical play and is pivotally mounted  
80 at its rear end upon an upstanding stud 27 on shaft 16. In this manner the cutter-arm may swing upon the stud at the middle rear part of the carriage and be guided in its movements against swinging out of a horizontal plane by  
85 means of the guide-rails 25.

At the rear of the cutter-arm 26 is a platform 28, on which is mounted a driving mechanism, such as an electric motor 29, whose shaft 30 runs above the cutter-arm and is journaled in  
90 an upstanding bracket 31 at the front end of the cutter-arm. This front end of the cutter-arm is enlarged to form a cutter-head 32 in the form of a split bearing for a vertical tool-spindle 33. The tool-spindle loosely fits within a  
95 sleeve 34, which is threaded in the split bearing of the cutter-head and is adjusted therein by means of a collar 35, splined thereon and confined within a horizontal slot through the cutter-head. A rotary cutting-tool has its body  
100 portion 36 threaded on the lower end of the tool-spindle 33 against a shoulder 37 thereof. A washer 38 is located on the spindle between the shoulder 37 and the lower end of the sleeve 34, and another washer 38 surrounds the spindle 33 and bears upon the upper end of the  
105 sleeve 34, with a pair of jam-nuts 39 threaded on the spindle above it. By the adjustment of the jam-nuts 39 on the spindle 33 the parts may be nicely fitted with relation to each other, so  
110 that the spindle may freely rotate within the sleeve without end play, and the vertical ad-



justment of the sleeve by means of the collar 35 will adjust the position of the cutting-tool. The collar 35 may be turned by hand or by means of any suitable tool, such as a spanner, engaging one of a series of notches 40, formed in its periphery. The main object of these notches 40, however, is to provide a seat for a spring - pressed bolt 41, which is slidably mounted in the cutter-arm 26 and has a lug 42, by which it may be withdrawn from the notches, or by turning said bolt so that the lug enters a groove in the cutter-arm the bolt may be locked in engagement with one of the notches, and thereby lock the collar against turning. In practice the threads of the sleeve are eight to the inch, and there are eight regularly-spaced notches 40 in the collar, so that by turning the collar from one notch to the next the cutting-tool is raised or lowered one sixty-fourth of an inch. The two side members of the cutter-head formed by splitting the spindle-bearing are provided with ears 43 above and below the horizontal slot in which collar 35 is located, and these ears are embraced by pairs of ears on a handle 44 with clamping-bolts 45 passed through them, so that when the desired vertical adjustment of the cutting-tool is accomplished these clamping-bolts 45 may be tightened to rigidly clamp the sleeve within its bearing.

The upper end of the tool-spindle 33 is reduced and is journaled in a horizontal extension 46 of bracket 41 with a beveled pinion 47 splined thereon and meshing with a corresponding beveled pinion 48 on the front end of the tool-driving shaft 30. This upper end of the spindle is also provided with a central bore or oil-recess 49 with radial passages leading therefrom at different elevations to the surface of the spindle, so as to conduct lubricant from said bore to the bearing for the spindle within the sleeve. The upper end of the bore or oil-recess 49 is closed by means of a screw-plug 50.

The body portion 36 of the cutting-tool has a flat circular lower face formed with an outwardly-extending annular flange with a beveled edge. A set of roughing-blades 51 are passed through the annular flange of the cutter-body 36 and project beneath the flat lower face thereof, all being inclined to the central vertical axis of the tool. These roughing-blades stand in vertical planes which are not radial to the circular face of the cutter, but which may be described as being tangential to a circle concentric therewith and approximately one-third of its diameter. Their outer edges are beveled to make them flush with the tapered periphery of the annular flange, so that they will fit against a ring 52, which has a correspondingly-tapered inner surface and fits around the periphery of said flange, being preferably shrunk thereon and having set-screws 53 to bear against the roughing-blades. As here shown, there are four of these

roughing-blades arranged at equal distances apart and extending to the same distance below the lower circular face of the tool-body, with their lower ends slightly beveled from their outer edge to their inner edge to have their lower ends in the same horizontal plane. It may be stated that it is intended that the tool should be rotated always in one direction, which is the direction for tightening the cutter-body 36 upon the screw-threaded end of spindle 33 and as here shown in a clockwise direction when looking down upon the cutter, and each of the roughing-blades 51 has its lower end also slightly beveled rearwardly to its direction of movement, so as to leave a sharp front cutting edge. Just behind each of the roughing-blades 51 is located a broader finishing-blade 54, which does not incline toward the vertical axis of the tool, but which does incline in the direction of rotation of the tool. These finishing-blades also pass through the annular flange of the tool-body 36 and being wider than the roughing-blades fit in oblique grooves 55 of the cylindrical upper portion of said tool-body at their inner edges, while their outer edges bear against the ring 52 and are engaged by set-screws 56, threaded through said ring, similar to set-screws 53. The finishing-blades 54 are also beveled rearwardly of their direction of movement at their lower ends to produce a front cutting edge, and this bevel is at more of an acute angle than in the roughing-blades, because of the inclined position of these blades. The cylindrical upper part of the tool-body portion above referred to has a ring or nut 57 threaded thereon and engages the upper ends of the blades 51 and 54 to form an end bearing therefor. By turning this ring on its threads it may be made to force the blades downwardly to compensate for their wear incident to repeated sharpening. A set-screw 58 is threaded through the ring or nut 57 to engage in a vertical groove through the threaded part of the tool-body and prevent the said nut from turning accidentally after its proper adjustment has been made. A block of metal of the annular flange between each pair of cutting-blades is cut away and a similarly-shaped wedge-block 59 is inserted in place thereof with a clamping-screw 60 threaded in its top and overlapping the upper edge of the ring 52, by means of which screw said wedge-block may be forcibly wedged between the finishing-blade 54 at its front and the roughing-blade 51 at its rear to tightly hold them in their proper positions. The horizontal plane which contains the cutting edges of all of the roughing-blades 51 is slightly higher than the horizontal plane which contains the cutting edges of all of the finishing-blades 54, so that the said finishing-blades will be the last to operate upon the material being cut and will so leave a smoother surface than if all of the blades terminated in the same horizontal plane. However, the



incline of the roughing-blades causes their cutting edges to extend out from the axis of rotation of the tool farther than the finishing-blades, and they are therefore first to operate upon the material.

Near the motor 29 the driving-shaft 30 is provided with a loose worm-sleeve 61 with a worm 62 thereon, said sleeve being journaled in an upstanding bracket 63 of the cutter-arm 26 with the worm contained in a housing 64 thereof, which forms a thrust-bearing for the worm-sleeve. A clutch member 65 is formed on one end of the worm-sleeve 61, and a grooved clutch member 66 is splined on the shaft 30 and is adapted to be thrown into and out of engagement with the clutch member 65 by means of a clutch-lever 67, pivoted to the cutter-arm 26. The housing 64 curves under the worm 62 to form an oil-receptacle, into which the worm turns to receive lubricant. Another bracket 68, extending upwardly from the cutter-arm 26 and connected with bracket 63 by means of a strengthening-web, supports a worm-wheel 69, which meshes with the worm 62 and carries a crank-pin 70 on its upper face. The crank-pin 70 is connected, by means of a link or connecting-rod 71, with a pivot-post 72, which connects the frames 15 and 23 at one side of the machine, said link being supported on the pivot-post by means of a shoulder 73 thereof. When the clutch members 65 and 66 are engaged, and the worm 62 is therefore driven by the shaft 30, it slowly turns the large worm-wheel 69, and by means of the connecting-rod and crank-pin connection with the side of the frame the movements of the worm-wheel cause the cutter-arm 26 to swing toward and away from the pivot-post 72, thereby swinging the cutter.

At about the middle point on the front axle 20 is fixed a ratchet-wheel 74, with a U-shaped frame 75 embracing it and loosely mounted on said shaft and carrying a gravity-pawl 76 at its upper end engaging the teeth of the ratchet-wheel. A universal coupling 77 is pivoted to the upper end of the U-shaped frame 75 and is connected, by means of a connecting-rod 78, with a stud 79 on the bottom of the cutter-arm 26. During the horizontal oscillations of the cutter-arm 26, produced by the worm-wheel mechanism above described, the stud 79 is also swung from side to side and through the connecting-rod 78 causes the frame 75 to rock upon the shaft 20 and cause the pawl 76 to successively engage the ratchet 74 and turn said shaft 20 to move the carriage forward step by step. As the cutter-arm 30 moves from either side of the machine toward the center the ratchet connection feeds the carriage forward, and during the remaining stroke of the cutter-arm the pawl swings rearwardly to take up a new hold on the ratchet-wheel. Thus the forward feed of the carriage only takes place through the first half

of each stroke of the cutter-arm, and the carriage remains stationary during the latter half thereof.

At each end of the downwardly-extending flange of the lower guide-rail 25 is adjustably mounted an extensible bracket 80, in whose outer end is vertically adjustable a stem 81, carrying a roller 82, which may be projected from the side of the machine and arranged at the desired elevation for bearing against the washboard of the room or other desirable guide, so as to permit the machine traveling close to the edge of the surface to be dressed and guide the cutting-tool close thereto, and thereby adapt the machine to perform as much of the work as possible and leave very little to be finished by hand.

In operation this machine is adapted to dress down the rough boards forming the floor of dwellings, dance-halls, bowling-alleys, ships' decks, or other wooden surfaces by swinging its cutting-tool from side to side always in the same horizontal plane, the wheels of the machine traveling in the wake of the cutting-tool, and thereby assuring the proper guidance of the cutting-tool without the constant use of leveling instruments. When the cutting-tool has been adjusted vertically by means of the collar 35 to make the desired cut in the surface and the said collar is locked in its adjustment by the spring-bolt 41, the motor 29 is started in operation to rotate the cutting-tool at a high speed. The clutch-lever 67 is thrown to start the operation of the worm-wheel feeding mechanism, so that the cutter-arm is swung from side to side upon its pivotal connection and guided between its guide-rails 25, carrying the cutting-tool from one side of the machine to the other, and meanwhile feeding the carriage forwardly during the first part of each stroke by means of the ratchet mechanism on the front shaft. The roughing-cutters by reason of their inclination from the vertical axis of the cutter extend farther from said vertical axis at their cutting edges, and consequently are the first to come into engagement with the material to be cut. They reduce the surface roughly and leave only a thickness of the material to be cut by the finishing-blades which is equal to the distance between the horizontal planes of the cutting edges of the two sets of blades. Thus the finishing-blades have only this slight thickness to remove, and their shape and position are such as to cut this away and leave a very smooth and even finish. Obviously when a high polish is desired a buffing-tool may be substituted for the cutter and the machine may be again operated over the surface, though it has been found in practice that the finish produced by the cutting-tool alone is sufficiently smooth for ordinary purposes. Should it be desired to produce the swinging of the cutting-tool by hand, it is only necessary to remove the connecting-rod 71 from



the worm-wheel 69 and manipulate the handle 44 to suit the will of the operator.

The particular details of construction of the machine as herein shown and described are not essential to the invention in its broadest aspect, but merely constitute one embodiment of the machine which has been found to be satisfactory in practice, and it is therefore to be understood that various modifications may be made without departing from the scope of the invention as defined by the claims. It is not to be understood either that the invention is confined in its application to the uses herein stated, for it is obvious that the principles involved are subject to other uses. For instance, the construction of the cutting-tool which forms one part of this invention is well adapted for use with milling-machines and the like.

What I claim as my invention is—

1. In a floor-dressing machine, a carriage adapted to travel over the surface to be dressed, a cutter-arm mounted on the carriage, parallel guides above and below the cutter-arm, and a suitably-driven rotary cutting-tool carried by the cutter-arm, said cutter-arm being adapted to be swung from side to side on its mounting and guided between the parallel guides to carry the cutting-tool across the said surface.

2. In a floor-dressing machine, a carriage adapted to travel over the surface to be dressed, a cutter-arm pivotally mounted on the carriage, parallel guides above and below the cutter-arm, a suitably-driven rotary cutting-tool carried by the cutter-arm, said cutter-arm being adapted to be swung from side to side on its pivotal mounting and guided between the parallel guides to carry the cutting-tool across the said surface, and a ratchet mechanism having connection with the cutter-arm for driving the carriage over the said surface.

3. In a floor-dressing machine, a carriage adapted to travel over the surface to be dressed, a cutter-arm pivotally mounted on the carriage, parallel guides above and below the cutter-arm, a suitably-driven rotary cutting-tool carried by the cutter-arm, means for automatically swinging the cutter-arm from side to side on its pivotal mounting and between the guides to carry the cutting-tool across said surface, and a ratchet mechanism having connection with the cutter-arm for driving the carriage over the said surface.

4. In a floor-dressing machine, a carriage adapted to be moved over the surface to be dressed, a cutter-arm pivotally mounted on the carriage, a rotary cutting-tool carried by the cutter-arm, means on the cutter-arm for driving the cutting-tool, and a crank driven by said driving means and having connection with the carriage for automatically swinging the cutter-arm from side to side.

5. In a floor-dressing machine, a carriage adapted to be moved over the surface to be dressed, a cutter-arm pivotally mounted there-

on, a rotary cutting-tool carried by the cutter-arm, means for driving the cutting-tool, a worm driven by the said driving means, a worm-wheel carried by the cutter-arm and meshing with the worm, a crank carried by the worm-wheel, and a connecting-rod connecting the crank with the carriage, whereby the cutter-arm is automatically swung from side to side.

6. In a floor-dressing machine, a carriage adapted to be moved over the surface to be dressed, a cutter-arm pivotally mounted thereon, a suitably-driven rotary cutting-tool carried by the cutter-arm, said carriage having a driving-shaft, a ratchet-wheel fixed thereon, a frame pivotally mounted on the driving-shaft provided with a pawl to engage the ratchet-wheel, and a rod having a universal connection with the frame and connected to the cutter-arm at a point which will pass the plane of the pivotal axis of the cutter-arm and the universal connection of the rod in an intermediate position of the cutter-arm, whereby each movement of the cutter-arm from side to side on its pivotal mounting will cause the frame to rock and turn the driving-shaft through the ratchet connection and drive the carriage over the said surface.

7. In a floor-dressing machine, a carriage having a driving-shaft and adapted to be moved over the surface to be dressed, a cutter-arm pivotally mounted on the carriage, a rotary cutter carried by the cutter-arm, a ratchet-wheel fixed on the driving-shaft of the carriage, a U-shaped frame embracing the ratchet-wheel and pivotally mounted on the driving-shaft, a pawl pivoted to the frame and engaging the ratchet-wheel, a connecting-rod having a universal connection with the frame and a pivotal connection with the cutter-arm, and means for automatically swinging the cutter-arm from side to side and thereby causing the frame to swing and turn the driving-shaft by means of the ratchet mechanism to drive the carriage over the said surface.

8. In a floor-dressing machine, a carriage adapted to be moved over the surface to be dressed, a cutter-arm pivotally mounted on the carriage, a rotary cutting-tool carried by the cutter-arm, driving means for the cutting-tool having an operating-shaft, a worm-sleeve loosely mounted on said shaft, a bracket carried by the cutter-arm for housing the worm and forming a thrust-bearing therefor, a clutch on the said shaft engaging the worm-sleeve, a worm-wheel mounted on said bracket and meshing with the worm through an open side of the housing, a crank carried by the worm-wheel, and a connecting-rod connecting the crank with the carriage.

9. In a floor-dressing machine, a carriage adapted to be moved over the surface to be dressed, a cutter-arm pivotally mounted on the carriage, a rotary cutting-tool carried by the cutter-arm, means for driving the cutting-



tool having a driving-shaft, a worm-sleeve on said shaft, a bracket carried by the cutter-arm forming a housing for the worm of the worm-sleeve with thrust-bearings therefor, a worm-wheel mounted on the bracket and meshing with the worm, a crank carried by the worm-wheel, and a connecting-rod connecting the crank with the carriage, said housing for the worm forming an oil-receptacle beneath the worm into which the worm turns to be lubricated.

10. In a floor-dressing machine, a carriage adapted to be moved over the surface to be dressed, a guide carried thereby a cutter-arm movably mounted on the carriage and bearing on the guide, a vertical sleeve adjustably mounted in the cutter-arm, a spindle turning in the sleeve, a rotary cutting-tool carried by the spindle, and means for driving the spindle.

11. In a floor-dressing machine, a carriage adapted to be moved over the surface to be dressed, a guide carried thereby, a cutter-arm movably mounted on the carriage and bearing against the guide, a divided cutter-head on the cutter-arm, a vertical sleeve threaded therein, a collar confined in the slot dividing the cutter-head and splined on the sleeve, means for locking the collar against accidental turning, a spindle turning in the sleeve, a cutting-tool on the spindle, and means for driving the spindle.

12. In a floor-dressing machine, a carriage adapted to be moved over the surface to be dressed, a guide carried thereby, a cutter-arm movably mounted on the carriage and bearing on the guide, a divided cutter-head on the cutter-arm, a vertical sleeve threaded through the cutter-head, a collar located in the slot dividing the cutter-head and splined on the sleeve by which the sleeve may be turned and adjusted vertically, a spring-pressed bolt slidable in the cutter-arm and engaging the collar to prevent accidental turning thereof, a spindle journaled through the sleeve, a cutting-tool carried by the spindle, and means for driving the spindle.

13. In a floor-dressing machine, a carriage adapted to be moved over the surface to be dressed, a guide carried thereby, a cutter-arm movably mounted on the carriage and bearing on the guide, a split divided cutter-head on the cutter-arm, a vertical sleeve threaded therethrough, a collar located in the slot forming the division of the cutter-head and splined on the sleeve for turning and adjusting the sleeve vertically, ears on the sides of the split of the cutter-head, bolts connecting said ears to clamp the sleeve in its adjustments, a spindle rotatably mounted in the sleeve, a cut-

ting-tool on the spindle, and means for driving the spindle.

14. In a floor-dressing machine, a carriage adapted to be moved over the surface to be dressed, a guide carried thereby, a cutter-arm movably mounted on the carriage and bearing on the guide, a split divided cutter-head on the cutter-arm, a vertical sleeve threaded therethrough, a collar located in the slot forming the division of the cutter-head and splined on the sleeve for turning and adjusting the sleeve vertically, ears on the sides of the split of the cutter-head, bolts connecting said ears to clamp the sleeve in its adjustments, a handle connected by said bolts, a shouldered spindle rotatably mounted in the sleeve, a cutting-tool carried by the sleeve, a washer on the spindle between the shoulder and the lower end of the sleeve, a pair of jam-nuts threaded on the spindle, a washer between the pair of jam-nuts and the upper end of the sleeve, a bracket on the cutter-head through which the spindle passes, a beveled pinion bearing thereon and splined on the spindle, and means for driving the beveled pinion.

15. In a floor-dressing machine, a carriage adapted to be moved over the surface to be dressed, a guide carried thereby, a cutter-arm movably mounted on the carriage and bearing on the guide, a cutter-head on the cutter-arm, a sleeve adjustable therethrough, a spindle loosely mounted in the sleeve, a cutting-tool carried by the spindle, and means for driving the spindle, said spindle having a central bore forming an oil-recess with radial passages leading therefrom to the surface of the spindle within the sleeve.

16. In a floor-dressing machine, a carriage adapted to be moved over the surface to be dressed, a cutter-arm pivotally mounted thereon, a cutting-tool carried by the cutter-arm, said carriage having a driving-shaft, a ratchet connection for the driving-shaft, and means connecting the ratchet connection with the cutter-arm at a point which will pass the plane of the pivotal axis of the cutter-arm and the ratchet connection in an intermediate position of the cutter-arm, whereby each movement of the cutter-arm from side to side will cause the ratchet connection to turn the driving-shaft during one portion of the movement of the cutter-arm only.

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

HENRY KRATSCH.

Witnesses:

ANDREW J. POWERS,  
B. S. ANDERSON.