

(No Model.)

4 Sheets—Sheet 1.

R. MIEHLE.  
PAPER CUTTING MACHINE.

No. 539,070.

Patented May 14, 1895.

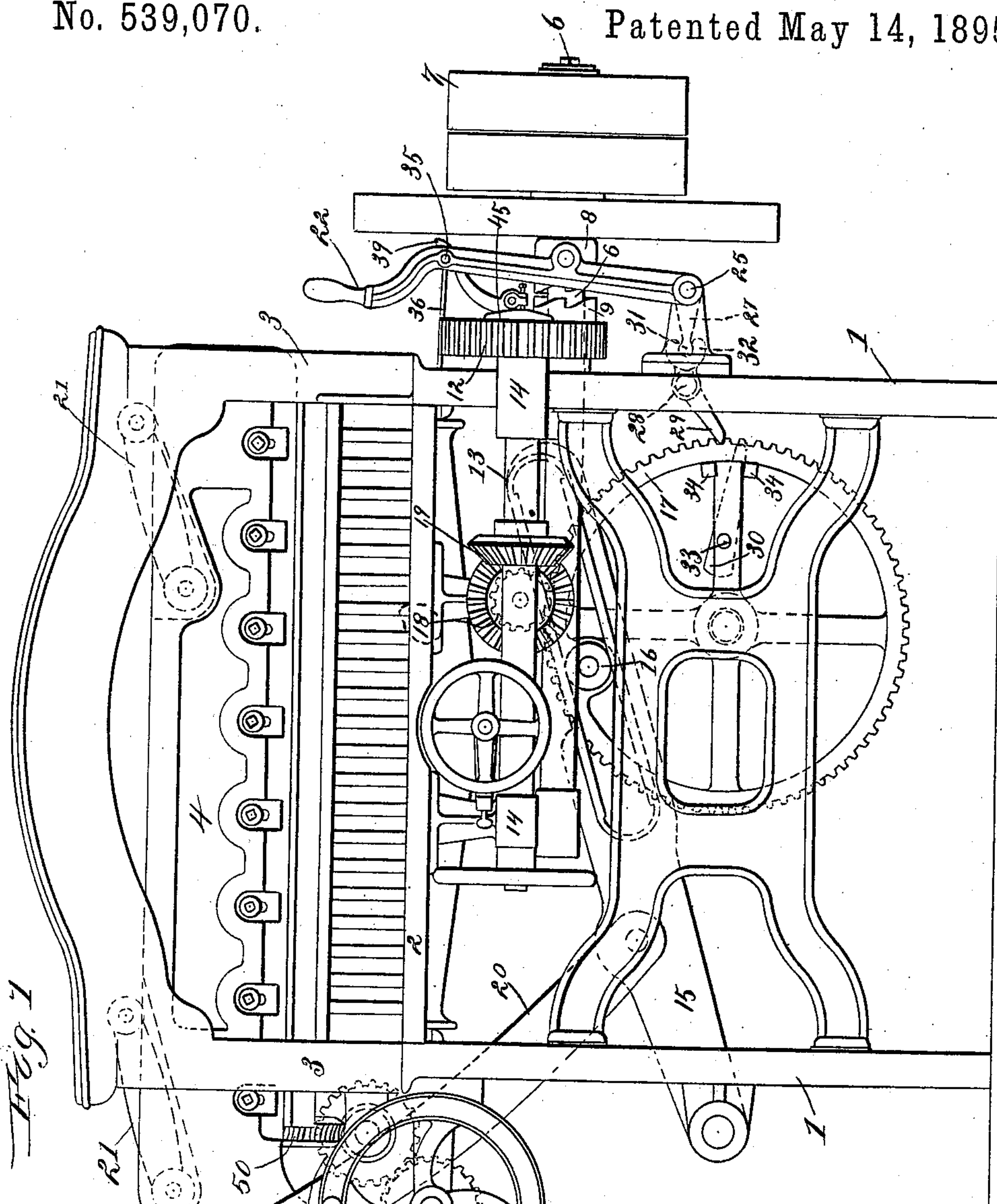


Fig. 1

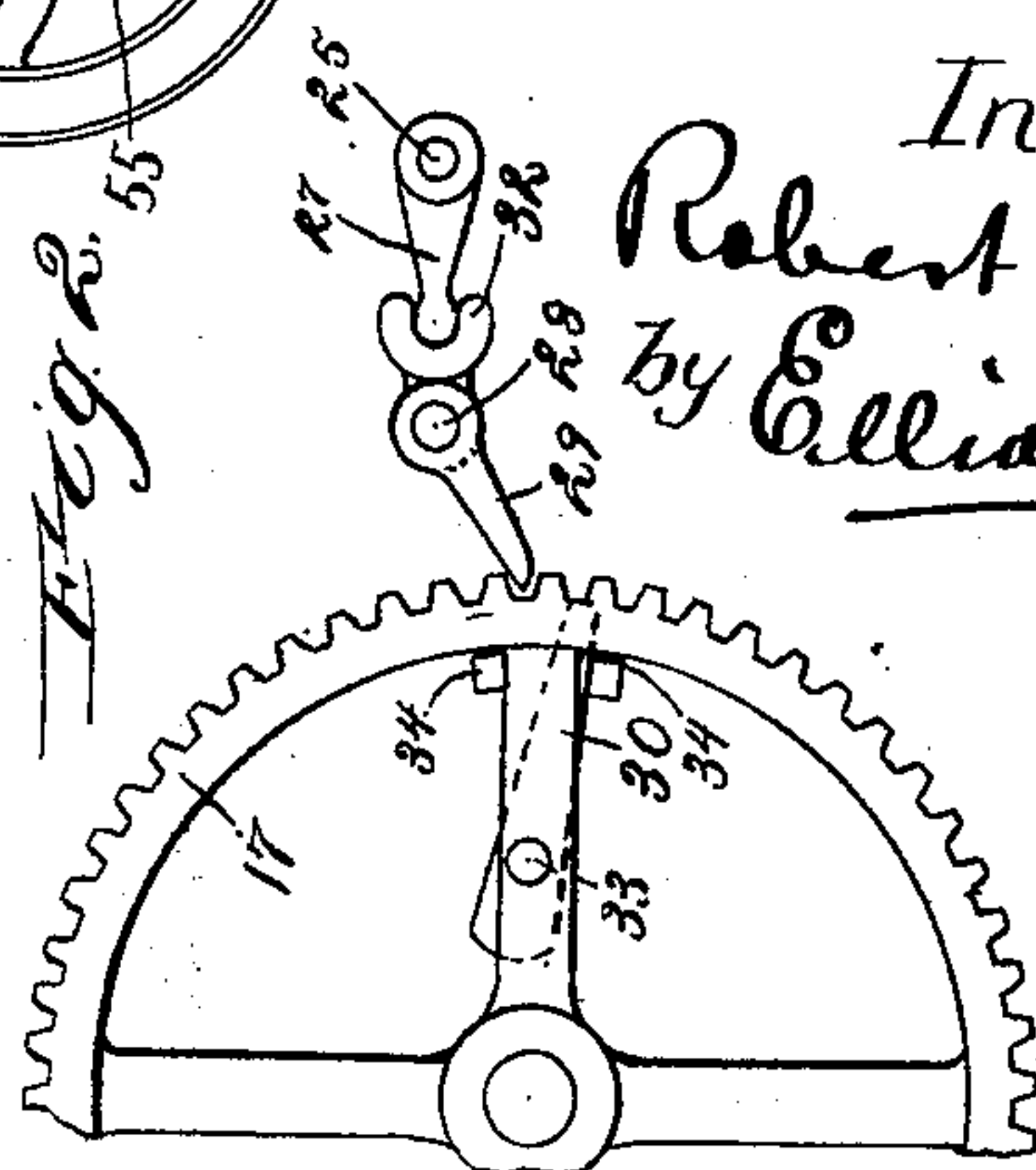


Fig. 2

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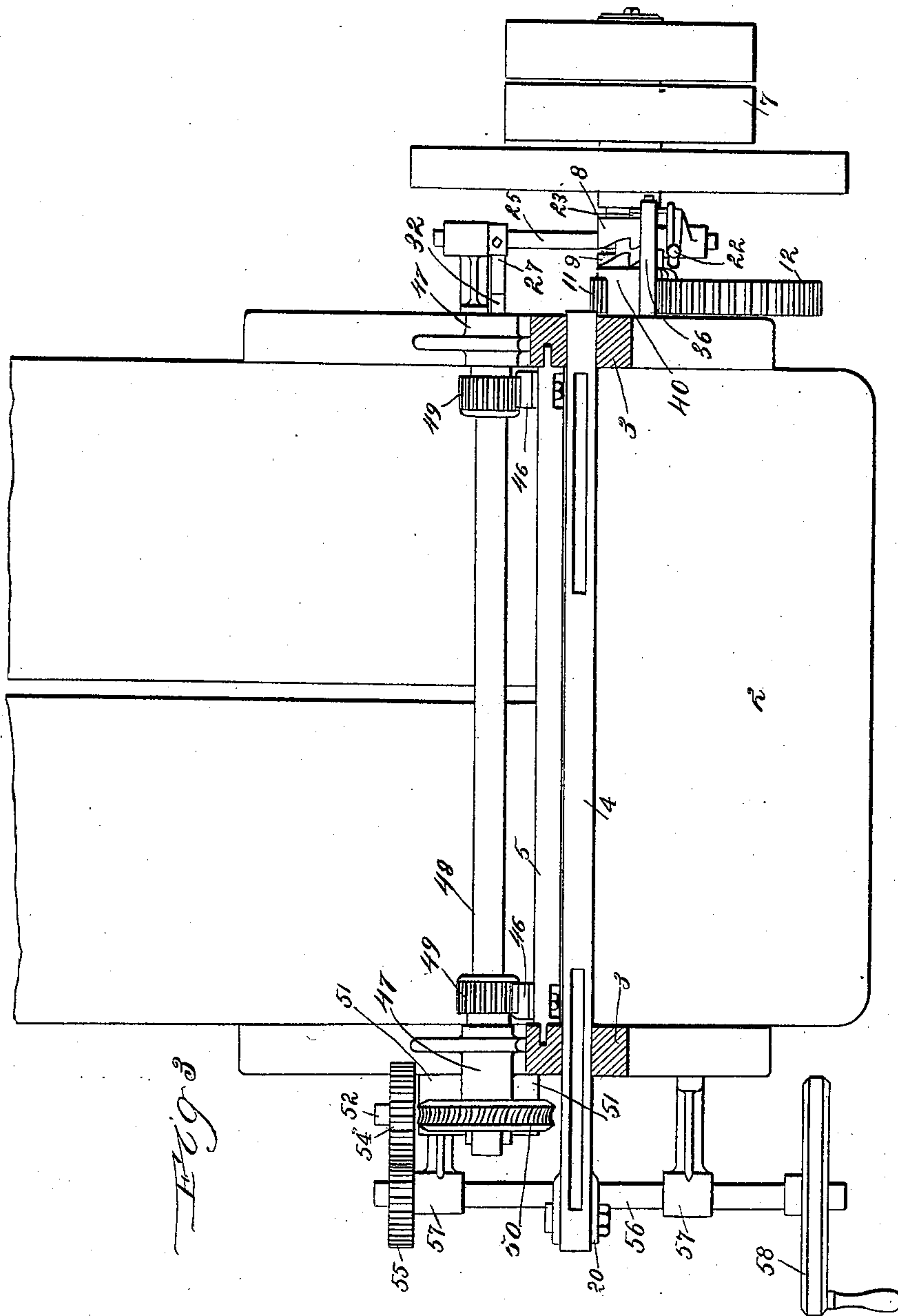
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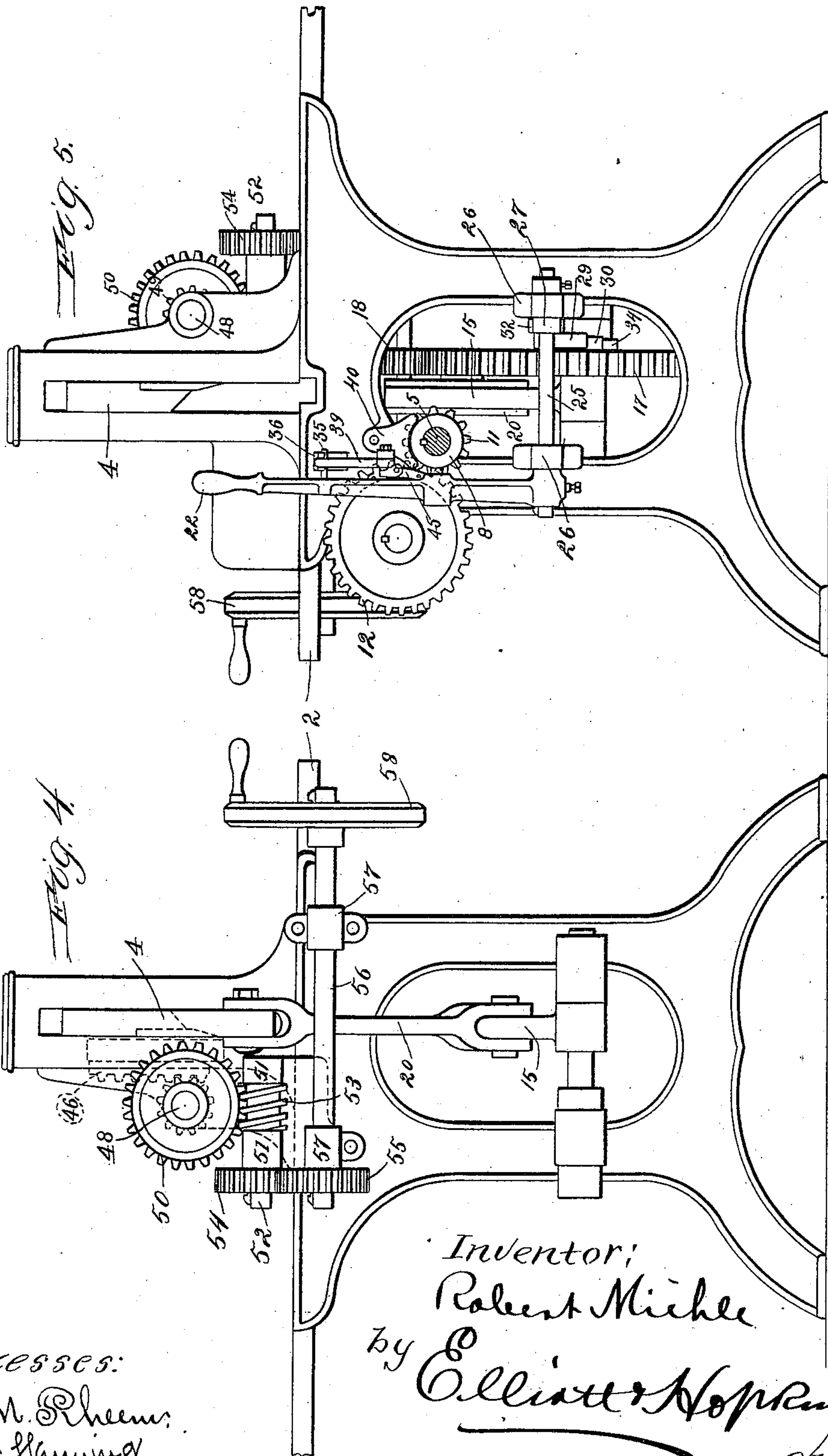
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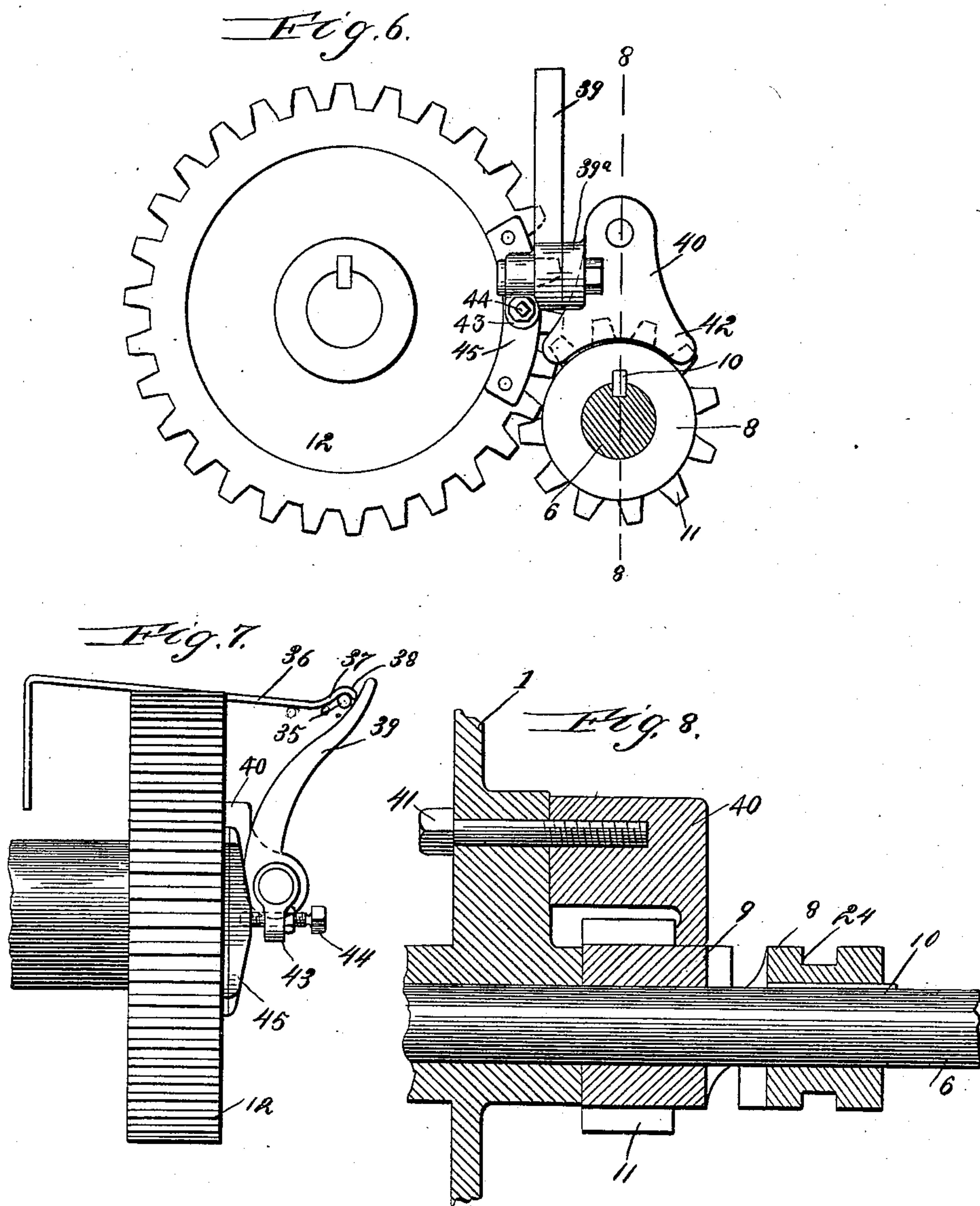
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# UNITED STATES PATENT OFFICE.

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## PAPER-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 539,070, dated May 14, 1895.

Application filed January 25, 1893. Serial No. 459,734. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT MIEHLE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Paper-Cutting Machines, of which the following is a full, clear, and exact specification.

My invention relates to that class of paper cutting machines in which the power for actuating the knife is derived from a continually rotating shaft having detachable clutch connection with the knife-operating mechanism, which clutch is adapted to be disengaged by an automatic throw-off or stop mechanism at the conclusion of each operation or return movement of the knife.

My invention also relates to that class of paper cutting machines in which the rising and falling clamp or presser-bar employed for holding the paper in position, is actuated when desired by the hand of the operator, and the knife is actuated in an oblique direction by a link connection between one end thereof and the knife-operating mechanism.

Heretofore considerable difficulty has been experienced by the moving lug of the stop mechanism or throw-off hanging on the throw-off lever or trip after the clutch-members are fully disengaged and the machine rendered inactive, thus necessitating starting the machine by hand before the clutch-members can be again brought into engagement and the machine thrown into positive operation.

Part of my improvements, therefore, relate to the stop mechanism or throw-off, and hence one of the important objects of my invention is to cause the moving lug of the stop mechanism or throw-off and the trip or throw-off lever to continue to move with relation to each other after coming into engagement, until they shall fully disengage.

More specifically speaking, the object of my invention in this respect is to cause the moving lug of the stop mechanism or throw-off to fully pass the trip or throw-off lever which it actuates, before the movable clutch-member has reached the limit of its movement away from the fixed member.

Another object of my invention is to provide improved means for causing the movable part or member of the clutch or other detachable connection between the driving shaft and knife-operating mechanism, to continue to move away from the other member after they have become fully disengaged, whereby danger of accidental re-engagement will be avoided; and yet another object of my invention is to check the running of the machine after the positive driving power is removed and to avoid the heretofore existing frictional resistance to the operation of the machine after such positive driving power is applied.

The remainder of my improvements relate to the means for actuating the clamp or presser-bar, and hence my invention has for its further object to provide improved means for applying the pressure or power to both ends of such bar simultaneously, in a machine having a knife operated substantially in the manner hereinbefore described.

With these ends in view, my invention consists in certain features of novelty in the construction, combination and arrangement of parts as hereinafter fully described with reference to the accompanying drawings and more particularly pointed out in the claims.

In the said drawings, Figure 1 is an elevation of the machine viewing the same from the position which the operator occupies. Fig. 2 is a detail view of a portion of the throw-off mechanism hereinafter described. Fig. 3 is a plan view showing a portion of the frame or guide-standards in section. Fig. 4 is an end elevation illustrating the mechanism for operating the clamp or presser-bar, the mechanism in the rear being omitted for the sake of clearness. Fig. 5 is a view similar to Fig. 4, but of the other end of the machine, the main driving shaft being shown in section. Fig. 6 is an enlarged detail face view of the brake and certain gear-wheels hereinafter described. Fig. 7 is a side elevation of the same; and Fig. 8 is a sectional view taken on the line 8 8, Fig. 6.

In the drawings, wherein like signs of reference indicate like parts throughout the several views, 1 is in the main frame, having a table 2, rising from which are the guide



standards 3, in which latter the knife 4 and presser-bar 5 are mounted and guided as usual, and 6 is the main driving shaft, which may derive its motion from any suitable belt 5 or band, not shown, running over the pulleys 7 and which is provided with a detachable connection with the knife-operating mechanism. As a convenient and efficient form of such a detachable connection I have shown 10 and prefer to employ a clutch consisting of two members 8, 9, the former of which is capable of longitudinal movement on the shaft 6, but is caused to rotate therewith by means of a spline 10 in the ordinary manner, while 15 the other member 9 is mounted loosely upon the shaft and is secured to or formed integrally with a pinion 11, which is in permanent engagement with a spur or gear-wheel 12 mounted upon a shaft 13 suitably journaled in bearings 14 on the main frame 1 or 20 other fixed portion of the machine.

The knife 4 is preferably operated by means of a pivoted lever 15 which derives its motion from a wrist-pin 16 playing in a slot formed 25 in the end of such lever and being adapted to impart an oscillatory movement thereto, as will be understood. This wrist-pin may be mounted directly upon one side of the large gear-wheel 17, which derives its motion from 30 a pinion 18 driven by miter-gear connection 19 with the shaft 13, the lever 15 being connected to one end of knife 4 by means of a link 20, as usual, and the knife being so mounted as to rise and fall in an oblique direction, the usual means of mounting the 35 knife for producing such movement being a pair of parallel arms 21 which I have shown and prefer to use.

The movable clutch-member 8 may be 40 thrown into and out of engagement with its mate 9 by means of an upright hand-lever 22 which is provided with any suitable connection with the member 8, such as a fork 23 engaging in a peripheral groove 24 formed in the 45 clutch-member, and which lever forms a part of the stop mechanism or throw-off hereinafter described. By throwing this lever inward or outward, the machine may be thrown into or out of operation, but in order that the machine may be thrown off or out of operation 50 automatically when the knife has completed its upward movement, such lever is secured to a horizontal shaft 25 mounted in suitable bearings 26 and having a short laterally projecting crank-arm 27 secured thereto and having 55 pivotal connection with a second lever 28 pivoted to the frame 1 and having an inwardly projecting end 29 which constitutes a trip with which a moving lug 30 carried by the 60 knife-operating mechanism engages for effecting the disengagement of the clutch-members.

Inasmuch as the levers 22 and 27 are secured to the same shaft, they constitute in effect a bell-crank lever and will be termed 65 such. The interposition of the lever 28 between the lug 30 and the lever 28, 29, 32, is resorted to as a convenient means of converting

the downward movement of the lug into an upward movement of the lever 27, and a consequent outward movement of the clutch 70 member 8. This is done because it is desirable to have the movable clutch-member on the outer side and the pinion 11 and spur-wheel 12 arranged on the inner side as near to the frame as possible, thus necessitating 75 the outward movement of the movable clutch-member in order to effect its disengagement with its mate; but I do not wish to confine myself to this particular arrangement or construction, as the same might be deviated from 80 by any skilled mechanic.

The connection between the lever 28 and the arm 27 may be effected by providing such arm with a rounded end or head 31 and the end of the lever 28 with a circular socket 32 85 in which said head 31 fits.

The disengaging lug 30, which forms a part of the throw-off or stop mechanism just described, is mounted upon and carried by the gear-wheel 17, and instead of being a fixed 90 lug as heretofore it is in the form of an arm or lever pivoted at 33 to a part of the wheel 17 and having its end arranged loosely between two stops 34 between which its end plays. As the wheel 17 rotates, the lug 30 will 95 be carried around and will rest upon the lower one of the stops 34 until its end reaches the end 29 of the trip 28, which, if the clutch-members are in engagement, will be engaged by the lug 30 and the lug will be forced up- 100 ward until it bears against the upper one of the stops 34, whereupon it will begin to depress the end 29 of the trip and thus effect the disengagement of the clutch members through the connections described. Inasmuch as a 105 brake, hereinafter described, is employed for arresting the further movement of the knife-operating mechanism after the clutches are disengaged, it stands to reason that the lug 30, if a fixture, will not, or at least might not, fully 110 pass the end 29 of the trip before the movement of the wheel 17 is arrested, because it is obvious that as soon as the clutch-members disengage, the rotation of the wheel 17 ceases and such members cannot be disengaged by 115 the lug 30 alone if such lug passes the trip 29 before the disengagement is fully effected; but with a pivoted lug as shown and described, the parts may be so adjusted that the end 29 of the trip, while it may be oppo- 120 site the end of the lug when the rotation of the wheel 17 ceases, will be entirely from under the lug and will permit it to fall by gravity independently of the wheel 17 until it strikes its lower stop 34, thus leaving the 125 end 29 of the trip free to move inward toward the wheel 17 when it is desired to again throw the machine into operation by forcing the hand-lever 22 inward.

While the pivoting of the lug 30 will effect- 130 ually avoid the hanging thereof on the trip lever, it does not avoid the accidental re-engagement of the clutch-members as before described, and in order that this also may be



accomplished and the disengagement of the lug with the trip at the conclusion of the operation rendered absolutely certain, I provide the hand-lever 22 with a bearing or projecting pin 35, upon which bears a flat spring 36 having near the outer end thereof an incline or cam 37 turned upwardly and terminating in a hook or rest 38 for the pin 35. The location of this incline 37 with relation to the movement of the lever 22 is such that the automatic movement of the lever 22 resulting from the engagement of the lug 30 with the trip, will bring the pin 35 to the inner edge or end of the incline 37, and as the spring 36 exerts normally a downward pressure upon the pin 35, it will be seen that as soon as the pin reaches such point, the incline 37 will act to force the pin farther outward, carrying the lever 22 away from the machine and consequently continuing the movement of the clutch-member 8 away from its mate, and also still further depressing the end 29 of the trip and allowing the pivoted lug 30 to drop to its lower stop 34 if by any possibility the lug should hang upon the trip. The spring 36 is also inclined downwardly toward the lever 22 in order that it may serve to hold the clutch-members from accidental disengagement.

39 is a brake-lever, which is pivoted to an ear 39<sup>a</sup> formed on a bracket 40 secured by bolt 41 to the frame of the machine and having a depending lip 42 which overhangs the teeth of the pinion 11 and serves to hold such pinion in engagement with the gear 12. The lower end 43 of this lever 39 is provided with a set-screw 44 which engages in a cavity formed in the outer side of a brake-shoe 45, as shown more clearly in Fig. 7, and serves to hold such shoe against the face of the gear-wheel 12, the arm 43 of such brake-lever being very short as compared with the length of the lever, whereby a slight pressure on the upper end of the lever will force the brake-shoe against the wheel 12 with great pressure and instantly arrest the movement of the knife-operating mechanism.

In order that the automatic application and withdrawal of the brake may be effected, I arrange the lever 39 in such a position that it will be struck by some member of the throw-off mechanism after such mechanism has effected the disengagement of the clutch-members. As a convenient means of accomplishing this, I arrange the lever 39 in the line of movement of the pin 35 so as to be struck by such pin or by the spring 36 just before the lever 22 has reached the limit of its outward movement, so that after the clutch-members are disengaged the further outward movement of the lever or downward movement of the spring 36 will effect the application of the brake to the wheel 12, and, on the other hand, when the lever 22 is thrown inward to cause the clutch-members to engage the pressure on the brake lever will be released before the clutch members come in contact, thus relieving the pressure on the brake before

the machine starts, and thereby avoiding the resistance to the operation of the machine when starting, heretofore experienced.

Secured to the off side or rear side of the clamp or presser-bar 5 and at each end thereof is an upright rack or toothed bar 46, and mounted in suitable bearings 47 secured to the guide standards 3 is a transverse shaft 48 upon which are secured two pinions or spur-wheels 49 so arranged as to engage respectively with the racks 46, whereby the rotation of such shaft 48 will cause the clamp or presser-bar 5 to move up and down in its guides.

One end of the shaft 48 is provided with a worm-wheel 50 arranged below which in bearings 51 is a shaft 52 having formed thereon or secured thereto between the bearings 51, a worm-screw 53 which engages with the under side of the worm-wheel 50 and serves the twofold purpose of elevating or lowering the clamp or presser-bar and at the same time locking the bar in the position to which it is adjusted. The shaft 52 is provided with a pinion 54 which meshes with a similar pinion 55 arranged below it on a cross-shaft 56. This cross-shaft 56 may be journaled in suitable brackets 57 secured to the side of the frame and provided at its end opposite to the pinion 55 with a wheel 58 which is arranged at the side of the feed-table 2 so as to be readily accessible to the hand of the operator as he stands facing the machine. The shaft 56, it will be seen, is arranged under or on the outer side of the link 20 which connects the knife with the lever 15, so as to be out of the way of such link. The advantage of this construction and arrangement of gears for operating the clamp or presser-bar, it will be seen, is that the racks being located at each end of the bar, the pressure is more uniformly distributed throughout its length, and the hand-wheel by which the bar is operated, being arranged on the side of the machine where the operator stands, the inconvenience and danger of injury to the operator resulting from passing his arm across or under the knife connections to the opposite side of the machine, are entirely avoided.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

1. In a paper cutting machine, the combination with a knife-operating mechanism, a driving shaft having a detachable connection with said knife-operating mechanism, and a trip for disengaging said detachable connection, of an independently movable lug carried by the knife-operating mechanism and adapted to engage said trip, substantially as set forth.

2. In a paper cutting machine, the combination with a knife-operating mechanism, a driving shaft having a detachable connection with said knife-operating mechanism, and a trip for disengaging said detachable connection, of an independently movable lug carried by the knife-operating mechanism and adapted to engage said trip, and means for further with-



drawing said detachable connection after the driving shaft has become disengaged with the knife-operating mechanism, substantially as set forth.

5 3. In a paper cutting machine, the combination with a knife-operating mechanism, a driving shaft having a detachable connection with said knife-operating mechanism, and a trip for  
10 disengaging said detachable connection, of an independently movable lug carried by the knife-operating mechanism and adapted to engage said trip, a spring having a cam or incline, and a projection or pin upon which said spring bears, connected with said trip, substantially as set forth.

15 4. In a paper cutting machine, the combination with a knife-operating mechanism, a driving shaft having a detachable connection with said knife-operating mechanism, and a throw-  
20 off mechanism connected to said detachable connection and operated by said knife-operating mechanism, of a spring having an incline or cam bearing against a movable part of said throw-off mechanism, and being adapted  
25 to move the same by virtue of the spring pressure, after said detachable connection has been disconnected substantially as set forth.

30 5. In a paper cutting machine, the combination with a knife-operating mechanism, a driving shaft having a detachable connection with said knife-operating mechanism, and a throw-  
35 off mechanism connected to said detachable connection and operated by said knife operating mechanism, of a spring inclined so as to bear normally against a movable part of said throw-off mechanism and hold said detach-  
40 able connection in engagement, and being provided with a supplemental incline adapted to bear against said movable part of the throw-off mechanism and force said detachable connection out of engagement, substantially as set forth.

45 6. In a paper cutting machine, the combination with a knife-operating mechanism, a driving shaft having a detachable connection with said knife-operating mechanism, a lever for disengaging said detachable connection, and means for causing the knife-operating mechanism to oscillate said lever, of a pin or pro-  
50 jection on said lever, and an inclined spring bearing upon said pin or projection and having a supplemental incline arranged to move said lever after the driving shaft has become disengaged with the knife-operating mechanism, substantially as set forth.

55 7. In a paper cutting machine, the combination with a knife operating mechanism, a driving shaft having a detachable connection

therewith, and a throw-off mechanism connected to said detachable connection and act- 60  
uated by said knife operating mechanism, of a spring having a cam or incline portion terminating in a stop, and bearing against and adapted to move a movable part of said throw-  
65 off mechanism, substantially as set forth.

8. In a paper cutting machine, the combination with a knife-operating mechanism, of a pivoted lug carried by said mechanism, and two stops between which said lug plays, a driving shaft having a detachable connection with said knife-operating mechanism, and a trip for operating said detachable connection, arranged to be engaged by said lug, substantially as set forth. 70

9. In a paper cutting machine, the combination with a knife-operating mechanism and a driving shaft having a clutch connection with said knife-operating mechanism, of a pivoted bell-crank hand-lever connected to one member of said clutch, a pin projecting from one arm of said lever, a spring having a free end 80  
inclined downwardly upon said pin and being provided with a supplemental incline terminating in a stop, a second pivoted lever pivoted to the other arm of said bell-crank, and a pivoted lug having a limited movement 85  
carried by said knife-operating mechanism and adapted to engage said second lever, substantially as set forth.

10. In a paper cutting machine, the combination with a knife-operating mechanism and a driving shaft having a detachable connection therewith, of a throw-off mechanism for actuating said detachable connection, a brake for arresting the movement of said knife-operating mechanism, having a brake lever, and a spring having an incline adapted to force a member of said throw-off mechanism against said brake-lever, substantially as set forth. 95

11. In a paper cutting machine, the combination with a knife-operating mechanism and a driving shaft having a detachable connection therewith, of a throw-off lever for actuating said detachable connection, having a projection thereon, a spring having an incline bearing against said projection, a pivoted brake-lever, having a brake-shoe for arresting the movement of the knife-operating mechanism and being arranged to be actuated by the incline of said spring, substantially as set forth. 105

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