

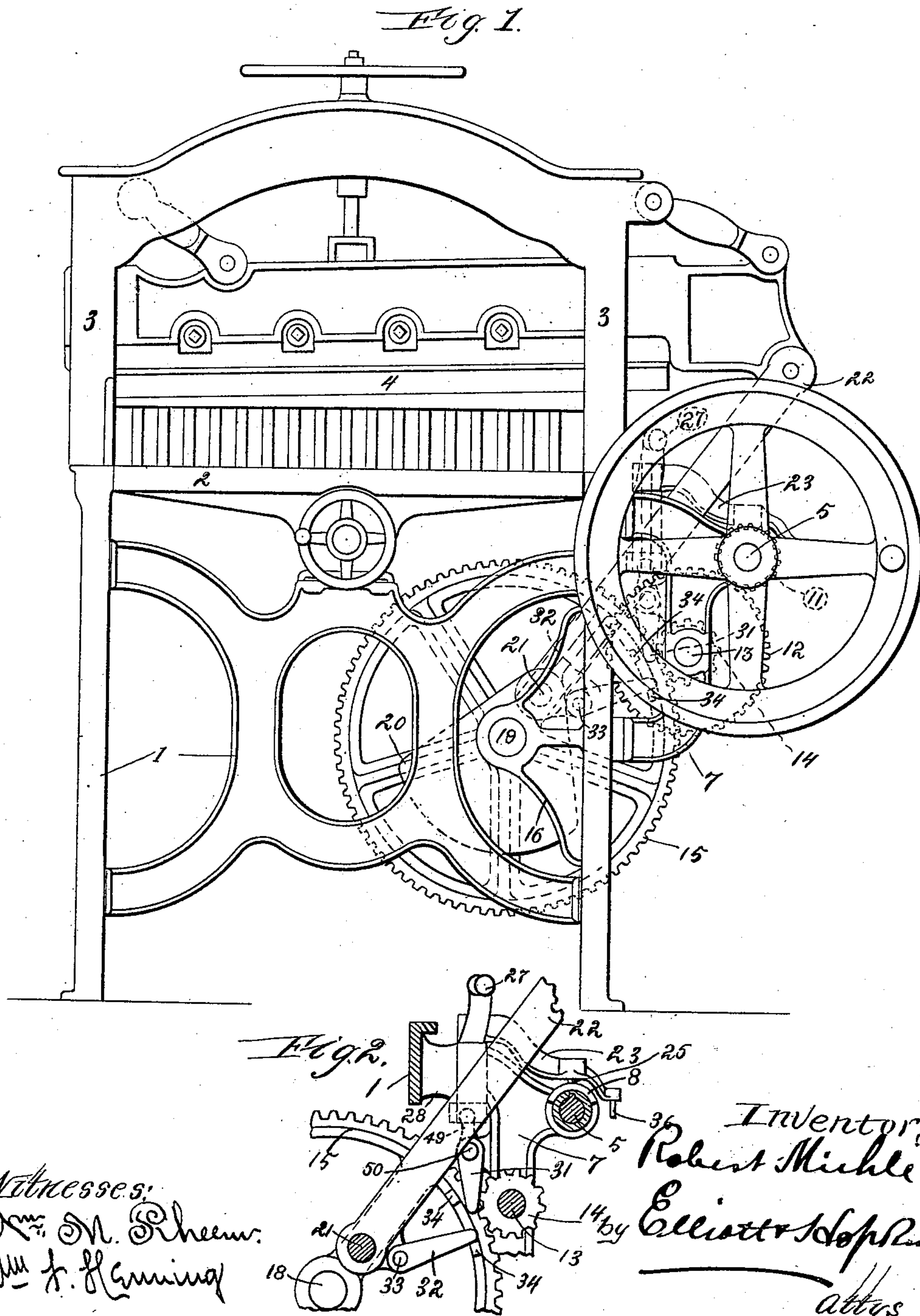
(No Model.)

2 Sheets—Sheet 1.

R. MIEHLE.
PAPER CUTTING MACHINE.

No. 539,071.

Patented May 14, 1895.



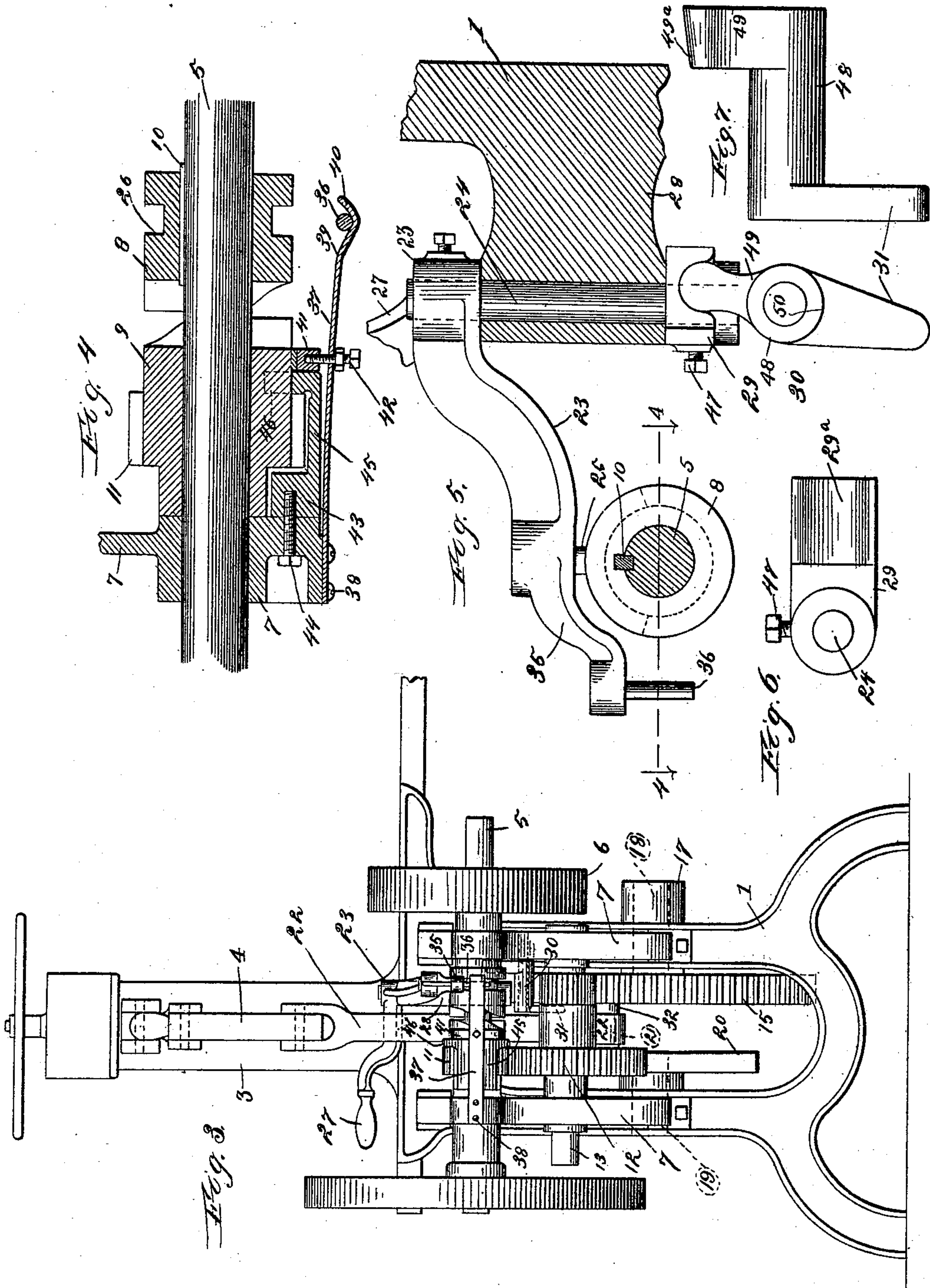
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Patented May 14, 1895.



Witnesses:

Wm. M. Pheasant
Wm. J. Fleming

Robert Miehle
by Elliott & Stephens
Attorneys

UNITED STATES PATENT OFFICE.

ROBERT MIEHLE, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE SHNIEDEWEND
& LEE COMPANY, OF SAME PLACE.

PAPER-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 539,071, dated May 14, 1895.

Application filed January 25, 1893. Serial No. 459,735. (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, and 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; and it has more especial reference to a machine in which the driving shaft is arranged transversely of the plane of action of the knife.

My invention is designed to overcome the difficulty 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.

It also has reference to means for preventing the clutch members from remaining so close together after disengagement that through slight jarring of the machine and from other causes they will again work together, which re-engagement in some instances is just sufficient to cause damage to their teeth, while at other times the members come into substantial engagement and set the machine into operation; thus not only damaging the mechanism, but endangering the operator and often spoiling the material.

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 provide improved means for causing 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 have fully disengaged.

More specifically speaking, the object of my invention in this respect is to provide improved means for causing 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 its mate or 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.

My improvements also relate to the arrangement of the various gears and shafts, and their arrangement with relation to each other and to the frame of the machine, and hence my invention has for its further object to improve the general arrangement of such gears and shafts, whereby they may be placed farther under the machine so as to be out of the way, and also render the machine more compact and convenient.

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

In the said drawings, Figure 1 is a side elevation of a paper-cutting machine embodying my improvements. Fig. 2 is a detail view of the throw-off mechanism and co-operating parts, partly in section and partly broken away. Fig. 3 is an end elevation. Fig. 4 is an enlarged detail sectional view of the clutch and brake mechanism, taken on the line 4 4, Fig. 5. Fig. 5 is an enlarged detail view, partly in section, of a portion of the throw-off mechanism hereinafter described; and Figs. 6 and 7 are detail views hereinafter described.

Like signs of reference indicate like parts throughout the several views.

1 is the main frame, having a table 2, rising from which are the guide standards 3, in which latter the knife 4 is mounted and guided as

usual, and 5 is the main driving shaft which may derive its motion from any suitable belt or band, not shown, running over the pulley 6, and which shaft is provided with a detachable connection with the knife-operating mechanism.

As shown in the drawings, the driving shaft 5 is mounted transversely of the plane of movement of the knife in brackets or castings 7 which are formed on or suitably secured to the end of the frame 1, and as a convenient and efficient form of the said detachable connection between the driving shaft and the knife-operating mechanism, I have shown and prefer to employ a clutch consisting of two members 8, 9, the former of which is capable of longitudinal movement on the shaft 5 but is caused to rotate therewith by means of a spline 10 in the ordinary manner, while 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 gear wheel 12 mounted upon a shaft 13 journaled at a lower point in the bracket 7 below and parallel with the main driving shaft 5.

On the shaft 13 with the gear-wheel 12 is mounted and secured a pinion 14 which engages with a large gear-wheel 15. This gear-wheel 15, instead of being mounted in bearings arranged at the end of the frame under the driving shaft, is mounted in a pair of inwardly projecting brackets 16, the bracket on one side of the machine only being shown in Fig. 1, but the one on the other side may be an exact duplicate thereof excepting that it is provided with an elongated bearing 17, as shown in Fig. 3, which affords a firmer and more rigid support for the journal 18, as shown in dotted lines, on that side. The journal or shaft 18, however, does not extend entirely through the wheel into the bearing of the bracket 16 on the other side. The wheel on that side is supported by a journal 19 which is secured to a counterbalance 20, and this counterbalance in turn is rigidly secured to the wheel 15 by means of a crank-pin 21, to which the usual link or connecting arm 22 for operating the knife is pivoted.

The movable clutch-member 8 may be thrown into and out of engagement with its mate 9 by means of a horizontal bell-crank lever 23 secured to an upright shaft or pin 24 and having one of its arms provided with any suitable connection with the member 8, such as a pin 25 engaging in the peripheral groove 26 formed in such member 8, the other arm of the lever 23 being provided with a suitable handle 27. This lever constitutes a part or member of the stop mechanism or throw-off before referred to and hereinafter more fully described, and by throwing such lever inward or outward, the machine may be thrown into or out of operation at the will of the operator; but in order that the machine may be thrown off or out of operation automatically when the knife has completed its

upward movement, the clutch-member 8 is connected with and adapted to be shifted by the knife-operating mechanism. I accomplish this by securing to the lower end of the pin or shaft 24, which may be mounted or journaled in a suitable bracket 28 formed on or secured to the frame 1, a horizontal crank-arm 29, which in turn is jointed to an upright pivoted lever 30 which constitutes a trip whose lower end 31 is arranged in the path of and adapted to be struck by the moving lug 32 carried by the wheel 15 of the knife-operating mechanism, thus causing the crank-arm 29 to oscillate in a horizontal plane and produce a similar oscillation of the bell crank lever 23, whose outer arm carrying the pin 25 imparts the requisite movement to the clutch-member 8 for disengaging the latter from its mate 9.

The disengaging lug 32 which forms a part of the throw-off mechanism or stop just described, instead of being a fixed lug as heretofore, is in the form of an arm pivoted at 33 to a part of the wheel 15 and has its end arranged loosely between two stops 34 between which it plays. As the wheel 15 rotates, the lug 32 will be carried around and will rest upon the lower one of the stops 34 until its end reaches the end 31 of the trip 3, which, if the clutch-members are in engagement, will be engaged by the lug 32 and the lug will be forced upward until it bears against the upper one of its stops 34, whereupon it will begin to deflect the end 31 of the trip and thus effect the disengagement of the clutch-members through the medium of the connections already described. Inasmuch as a 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 32, if a fixture as heretofore, will not, or at least might not, fully pass the end 31 of the trip before the movement of the wheel 15 ceases, because as soon as the clutch-members disengage, the rotation of the wheel 15 is arrested by the brake and such members cannot be disengaged by the lug 32 alone if such lug passes the trip before the disengagement of the clutch-members is fully effected; but with a pivoted lug, as shown and described, the parts may be so adjusted that the end 31 of the trip, while it may be opposite the end of the lug when the rotation of the wheel 15 ceases, will nevertheless be entirely from under the lug and will permit such lug to fall by gravity independently of the wheel 15, until it strikes its lower stop 34, thus leaving the end 31 of the trip free to move inward toward the wheel 15 when it is desired to again throw the machine into operation by forcing the handle 27 of the lever 23 inward.

While the pivoting of the lug 32 will effectually 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 each operation or return movement of the knife rendered absolutely certain, I provide the lower arm of the bell-crank 23 with an extension 35 having a projection or pin 36 against which bears a spring-arm 37 secured at 38 to one of the brackets 7 and having an incline or cam 39 formed thereon near its free end, such incline terminating in a hook or rest 40 for the pin 36. The location of this incline or cam 39 with relation to the movement of the lever 23 is such that the automatic movement of such lever resulting from the engagement of the lug 32 with the trip 30 will bring the pin 36 to the inner edge or end of the incline 39, and as the spring-arm 37 exerts normally an inward pressure against the pin 36, it will be seen that as soon as the pin reaches such point, the incline 39 will act to force the pin farther toward the extremity of the spring-arm, carrying the lever 23 with it and consequently continuing the movement of the clutch-member 8 away from its mate, and also still further deflecting the end 31 of the trip and allowing the lug 32 to drop to its lower stop 34 if by any possibility such lug should hang upon the trip. At the instant this additional movement of the pin 36 takes place, a brake-shoe 41 supported on the inner side of the spring-arm 37 by means of a set-screw 42 is forced against the periphery of the clutch 9 by reason of the spring-arm 37 being permitted to approach the clutch when the pin 36 slides into its rest or stop at the end of the spring, thus instantly arresting any further rotation of the clutch-member 9 and consequently of the knife-operating mechanism. On the other hand, when the handle 27 is forced inward for causing the clutch-members to again engage, the pin 36 will ride along the incline 39 and force the spring-arm 37 outward, thereby withdrawing the brake-shoe 41 from the periphery of the clutch-member 9 before such member has been re-engaged by the driving member 8.

The clutch-member 9 may be held in position on the shaft 5 and in engagement with the gear-wheel 12 by means of a bracket 43 secured by a screw 44 to the bracket 7 and having a curved plate or portion 45 projecting over the teeth of the wheel 11 and being provided with an inwardly turned lip or flange 46 engaging over the outer side of such teeth and thus preventing the endwise movement of the wheel and clutch-member toward the movable member 8.

The horizontal crank-arm 29 is adjustably secured to its stem or shaft 24 by means of a set-screw 47 or otherwise, whereby its position with relation to the lower arm of the lever 23 may be varied in order that the end 31 of the trip may be accurately adjusted with relation to the pivoted lug 32, whereby such lug may be caused to throw the trip the requisite distance for shifting the clutch-member 8.

The arms of the lever 30 are preferably formed on or secured to a horizontal sleeve or

hub 48, the upper arm 49 of such lever being formed at one end, and the lower arm 31 being formed at the other end of such hub or sleeve, whereby the upper arm will be in position to be engaged by the end of the crank-arm 29, while the lower one will be at the opposite side of the wheel 15 in position to be engaged by the lug 32. The sleeve or hub 48 is pivoted on a pin or shaft 50, as shown in dotted lines in Fig. 3, secured in a portion of the bracket 7. In order that the connecting rod 22 may pass over the end 31 of the lever 30 and the lug 32, the crank-pin 21 is so formed as to hold such connecting rod at a short distance from the face of the wheel 15, as shown in Fig. 3.

The ordinary method of connecting the arm 49 of the lever 30 with the crank-arm 29 would be by ball-and-socket joint, but a much simpler, more easily constructed and equally efficient joint, and which I prefer to employ, consists of a conical head 49^a tapering toward its inner end, as shown in Fig. 7, fitting into a semi-cylindrical cavity or socket 29^a formed in the under side of the crank-arm 29, the inner end of the head 49^a being tapered, as shown, in order to permit the arm 49 to oscillate in a vertical plane, while the arm 29 oscillates on its pivot in a horizontal plane.

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 throw-off actuated by said knife-operating mechanism and adapted to move said connection out of engagement, of a spring-arm having an incline for giving said connection a further movement in the same direction, and a brake-shoe secured to said spring-arm and adapted to arrest the movement of the knife-operating mechanism, substantially as set forth.

2. In a paper cutting machine, the combination with a knife-operating mechanism, a driving shaft having a detachable connection therewith, and a brake for arresting the movement of said knife-operating mechanism, of a spring-arm secured to said brake and having an incline, and a throw-off operated by the knife-operating mechanism for disengaging said detachable connection and having a lever provided with a bearing for said spring-arm, substantially as set forth.

3. In a paper cutting machine, the combination with a knife-operating mechanism and a driving shaft having a detachable connection therewith, of a horizontal hand-lever connected with and adapted to operate said detachable connection, a horizontal crank-arm connected to said lever, a second pivoted lever jointed to said crank-arm, and means for deflecting said second lever by the movement of the knife-operating mechanism, for shifting said detachable connection, substantially as set forth.

4. In a paper cutting machine, the combi-

nation with a knife-operating mechanism and a driving shaft having a detachable connection therewith, of a horizontal hand-lever connected with and adapted to operate said detachable connection, a horizontal crank-arm connected to said lever, a second pivoted lever jointed to said crank-arm, means for deflecting said second lever by the movement of the knife-operating mechanism, for shifting said detachable connection, and means for imparting a further shift to said detachable connection, substantially as set forth.

5. In a paper cutting machine, the combination with a knife-operating mechanism, a driving shaft and detachable clutch-members for connecting said driving shaft with said knife-operating mechanism, of a pivoted horizontal bell-crank lever connected to one member of said clutch and having a pin or projection, a spring-arm having an incline adapted to bear against said projection and move said lever, a brake-shoe actuated by said arm for arresting the movement of the knife-operating mechanism, and means for disengaging said clutch-members by the movement of the knife-operating mechanism, substantially as set forth.

6. In a paper cutting machine, the combination with a knife-operating mechanism, a driving shaft and detachable clutch-members for connecting said driving shaft with said knife-operating mechanism, of a pivoted horizontal bell-crank lever connected to one member of said clutch and having a pin or projection, a spring-arm having an incline adapted to bear against said projection and move said lever, a brake-shoe actuated by said arm for arresting the movement of the knife-operating mechanism, a horizontal crank-arm connected to said bell-crank lever, an upright pivoted lever jointed to said crank-arm, and an independently movable lug carried by the knife-operating mechanism and adapted to engage one end of said upright lever, substantially as set forth.

7. In a paper cutting machine, the combination with a knife-operating mechanism, a pivoted lever, a driving shaft, and a pair of clutch-members mounted upon said shaft and connected with said knife-operating mechanism and pivoted lever respectively, of a spring-arm, having an incline, arranged lengthwise of said driving shaft, a pin or projection on said lever against which said spring-arm bears, and a brake-shoe secured to said spring-arm and adapted to arrest the movement of the knife-operating mechanism after said pin or projection passes said incline, substantially as set forth.

8. In a paper cutting machine, the combination with a knife-operating mechanism, a pivoted lever, a driving shaft, and a pair of clutch-members mounted on said shaft and connected with said lever and knife-operating mechanism respectively, of a spring-arm arranged lengthwise of said driving shaft and having an incline, a pin or projection on said

pivoted lever against which said spring-arm bears, a brake-shoe adapted to bear against one of said clutch-members, and means for adjustably connecting said brake-shoe and spring-arm together, substantially as set forth.

9. In a paper cutting machine, the combination with a knife-operating mechanism, a pivoted hand-lever, a driving shaft, and a pair of clutch-members arranged on said shaft and being connected with said lever and knife-operating mechanism respectively, of a spring-arm arranged lengthwise of said shaft and having an incline, a pin or projection on said lever against which said incline is adapted to bear, a brake-shoe carried by said spring arm for arresting the movement of said knife-operating mechanism, an independently movable lug carried by the knife-operating mechanism, and a trip connected with the member of said clutch with which said hand-lever is connected and adapted to be impinged by said pivoted lug, substantially as set forth.

10. In a paper cutting machine, the combination with a knife-operating mechanism and a driving shaft having a pair of clutch-members thereon, with one of which said knife-operating mechanism is connected, of a horizontal bell-crank lever connected with the other one of said clutch-members and having the extension 35 provided with a pin, a spring-arm bearing upon said pin, a brake-shoe carried by said arm and arranged to arrest the movement of the knife-operating mechanism, a horizontal crank-arm secured to said lever, an upright pivoted lever jointed to said crank-arm, and an independently movable lug carried by the knife-operating mechanism and adapted to deflect said upright lever, substantially as set forth.

11. In a paper cutting machine, the combination with a knife-operating mechanism having the gear-wheel 15, a driving shaft, a pair of clutch-members on said shaft with one of which said gear-wheel is geared, and a lug carried by said gear-wheel, of the upright pin or shaft 24, a lever 23 on shaft 24 connected with the other one of said clutch-members, a horizontal crank-arm on said pin or shaft, the lever 30 having an upright arm jointed to said crank-arm, and a horizontal sleeve or hub projecting across said gear-wheel and having a downwardly projecting arm adapted to be impinged by said lug, a spring-arm having a bearing against said lever 23, and a brake-shoe operated by said spring-arm to arrest the movement of said knife-operating mechanism, substantially as set forth.

12. In a paper cutting machine, the combination of the crank-arm 29 having a semi-cylindrical cavity therein, a pivoted lever having a conical head engaging in said cavity, a driving shaft, a knife-operating mechanism, a detachable connection between said driving shaft and knife-operating mechanism connected with said arm, and means for deflecting said lever, substantially as set forth.

13. In a paper cutting machine, the combi-

5 nation with a knife-operating mechanism and
a driving shaft, of the bracket 28, an upright
pin journaled therein, a horizontal bell-crank
lever secured to said pin, a pair of clutch-
10 members mounted upon said driving shaft
and being connected respectively with said
knife-operating mechanism and horizontal lever,
a horizontal crank-arm secured to said
pin and being adjustable with relation to said
15 horizontal lever, an upright lever jointed to
said crank-arm, means for deflecting said lever
by the movement of the knife-operating
mechanism, an extension on said horizontal
bell-crank lever carrying a bearing, a spring-
20 arm arranged lengthwise of the driving shaft
and having an incline resting against said
bearing, and a brake-shoe secured to said
spring-arm and impinging one of said clutch-
members, substantially as set forth.

20 14. In a paper cutting machine, the combination with the frame having journal bear-

ings in both sides thereof, the gear-wheel 15
journaled on one side in one of said bearings,
the journal 19 journaled in the other of
said bearings, a wrist-pin secured to said 25
wheel and being connected with said journal
19, the knife, a link pivoted on said wrist-pin
and connected to said knife, the brackets 7,
the shaft 13 journaled in said brackets, a pin-
ion on said shaft engaging said gear-wheel 15, 30
the driving shaft journaled in said brackets
above said shaft 13, a clutch-member on said
driving shaft, the gear-wheel 12 on said shaft
13, and a pinion connecting said clutch-member
with said wheel 12, a second clutch-member 35
on said driving shaft, and means for
throwing said clutch-members into and out
of engagement, substantially as set forth.

ROBERT MIEHLE.

Witnesses:

F. A. HOPKINS,
EDNA B. JOHNSON.