No. 763,124. PATENTED JUNE 21, 1904.

E. J. STEWART.

CUTTER.

APPLICATION FILED SEPT. 22, 1903.

NO MODEL. 5 SHEETS—SHEET 1.

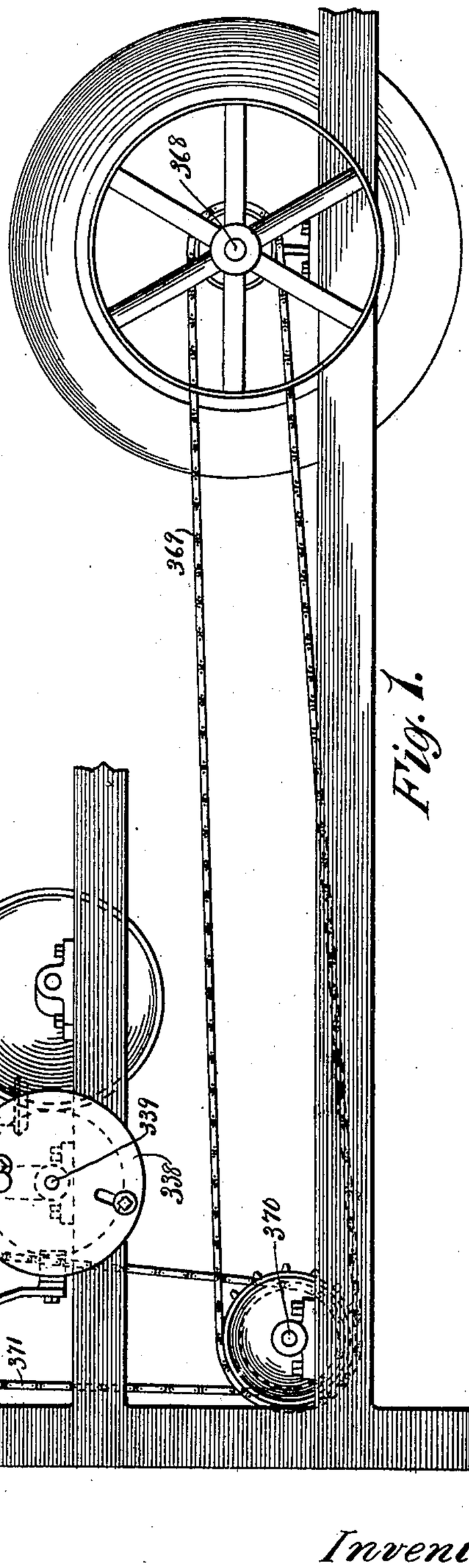

Fig. 1.

Witnesses:
W. H. Cotton
E. M. Klatcher

Inventor:
By Edgar J. Stewart.
Louis K. Gibson Atty.

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NO MODEL. 5 SHEETS—SHEET 2.

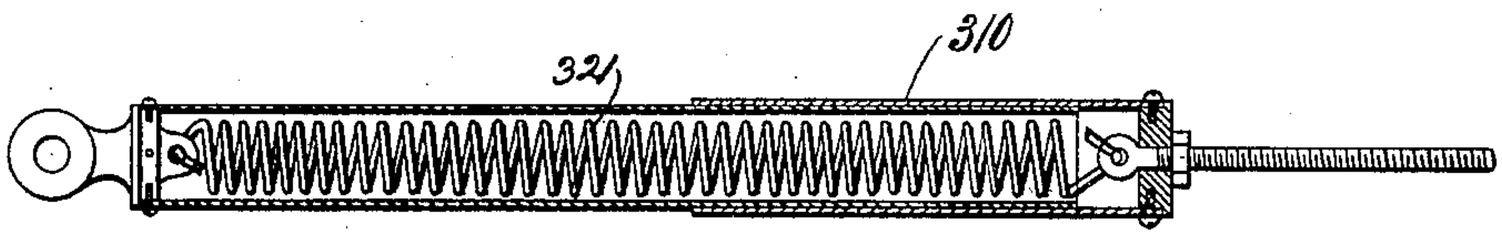

Fig. 14.

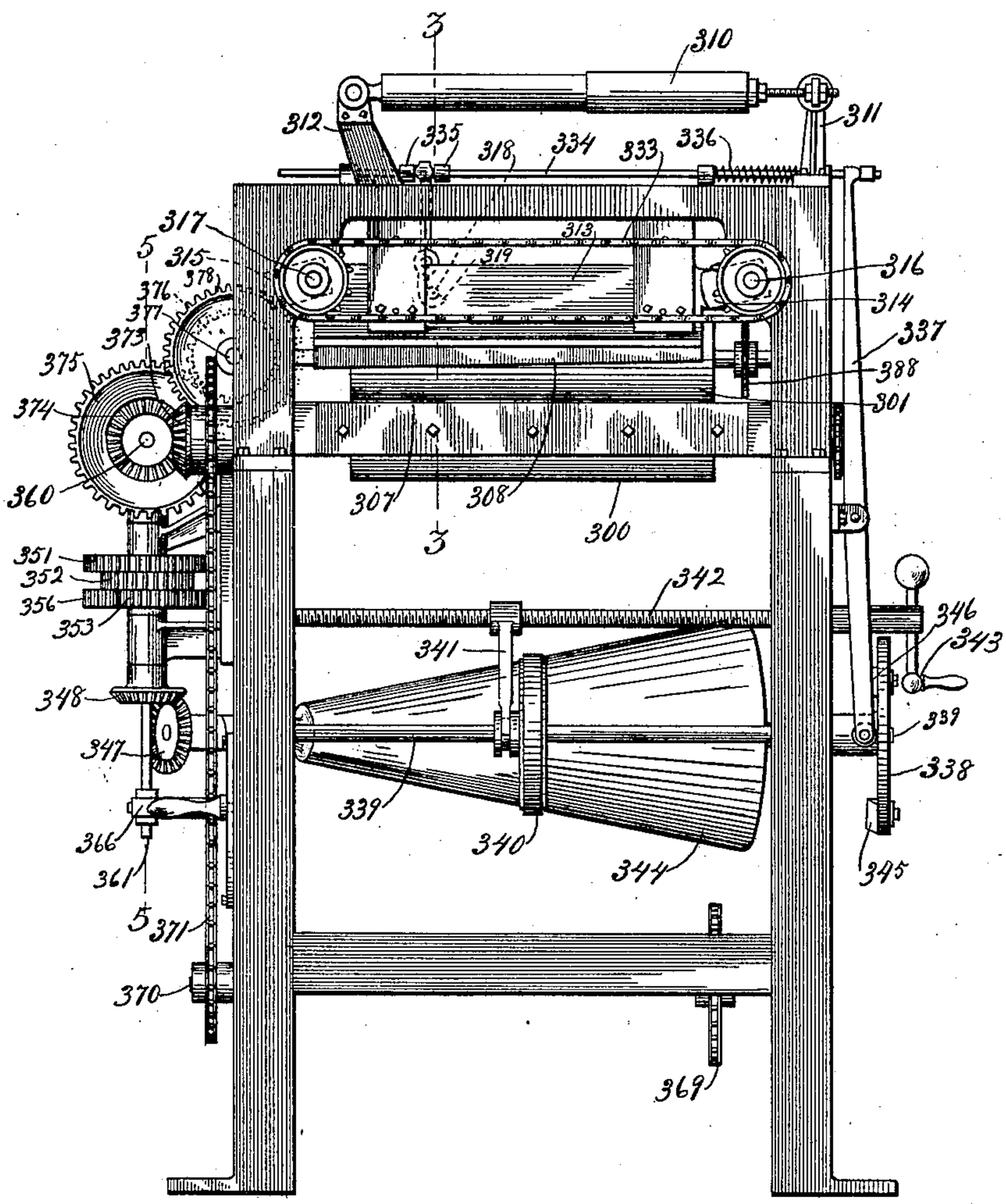

Fig. 2.

Witnesses:
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NO MODEL. 5 SHEETS—SHEET 3.

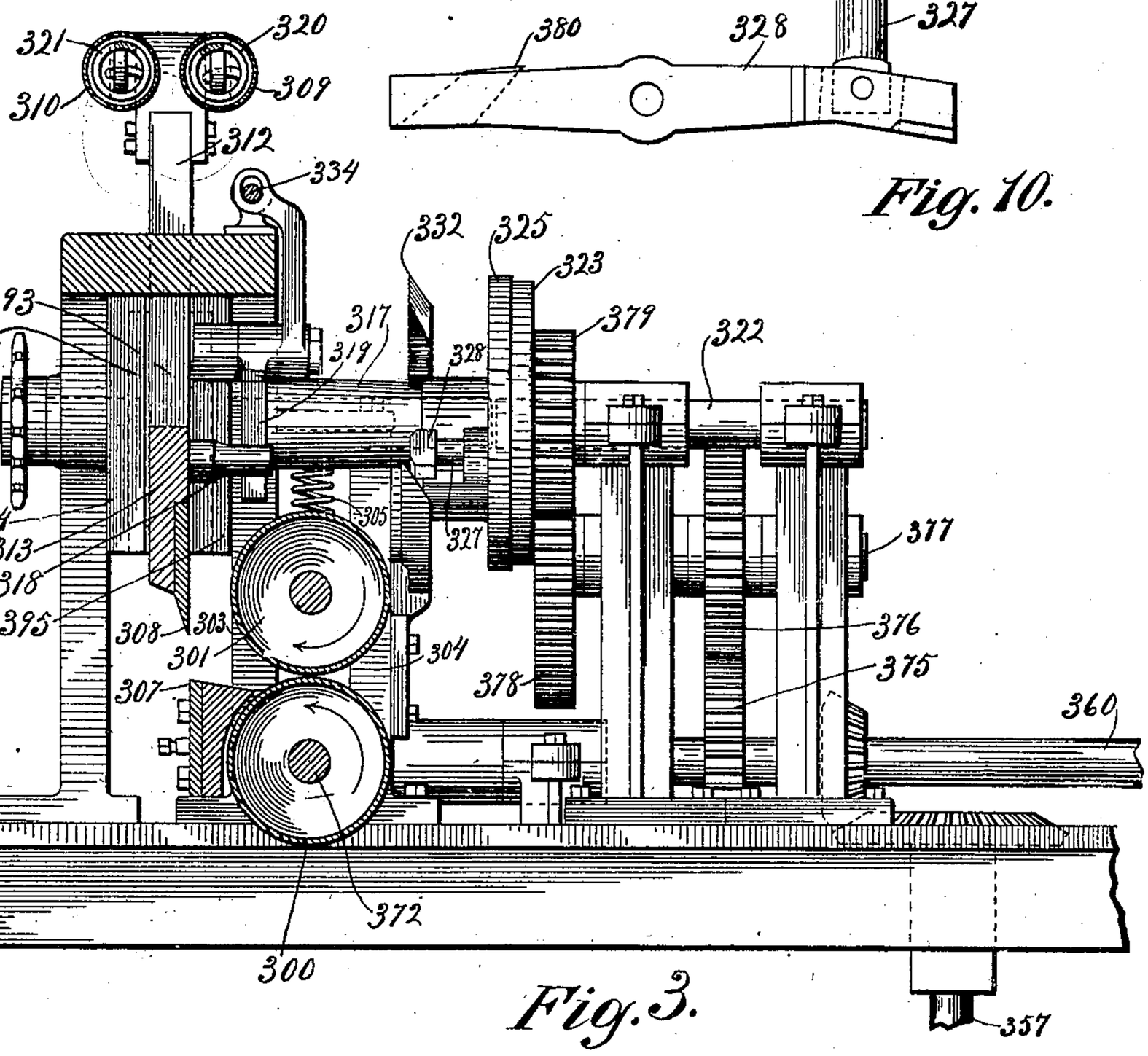

Fig. 3.

Fig. 10.

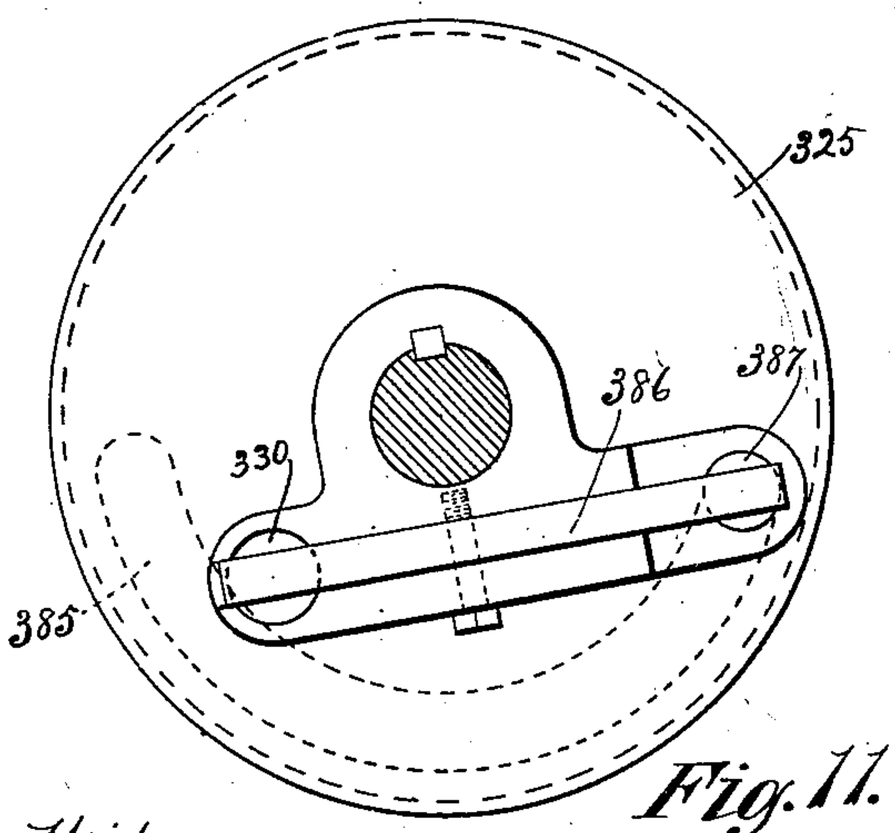

Fig. 11.

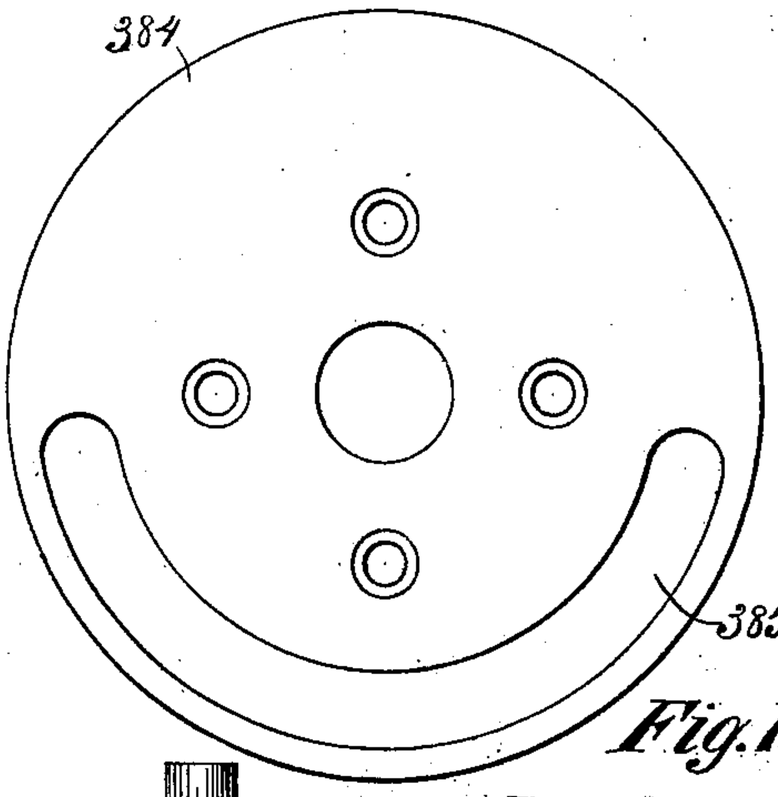

Fig. 12.

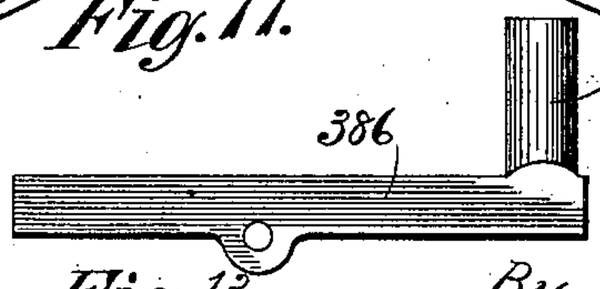

Fig. 13.

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No. 763,124. PATENTED JUNE 21, 1904.

E. J. STEWART.

CUTTER.

APPLICATION FILED SEPT. 22, 1903.

NO MODEL. 5 SHEETS—SHEET 4.

Fig. 4.

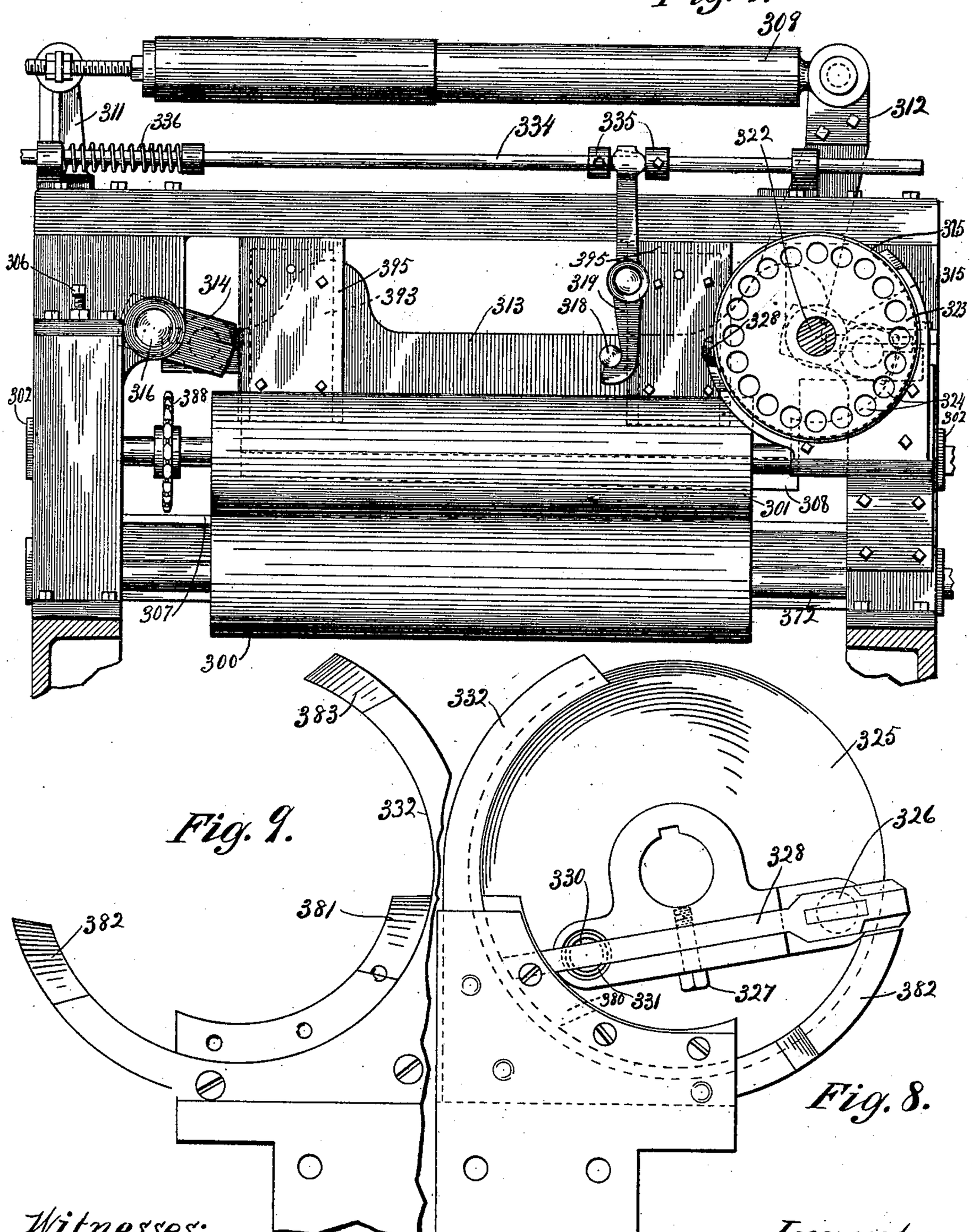

Fig. 9.

Fig. 8.

Witnesses:
W. H. Cotton
E. M. Klatcher

By

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No. 763,124. PATENTED JUNE 21, 1904.

E. J. STEWART.

CUTTER.

APPLICATION FILED SEPT. 22, 1903.

NO MODEL. 5 SHEETS—SHEET 5.

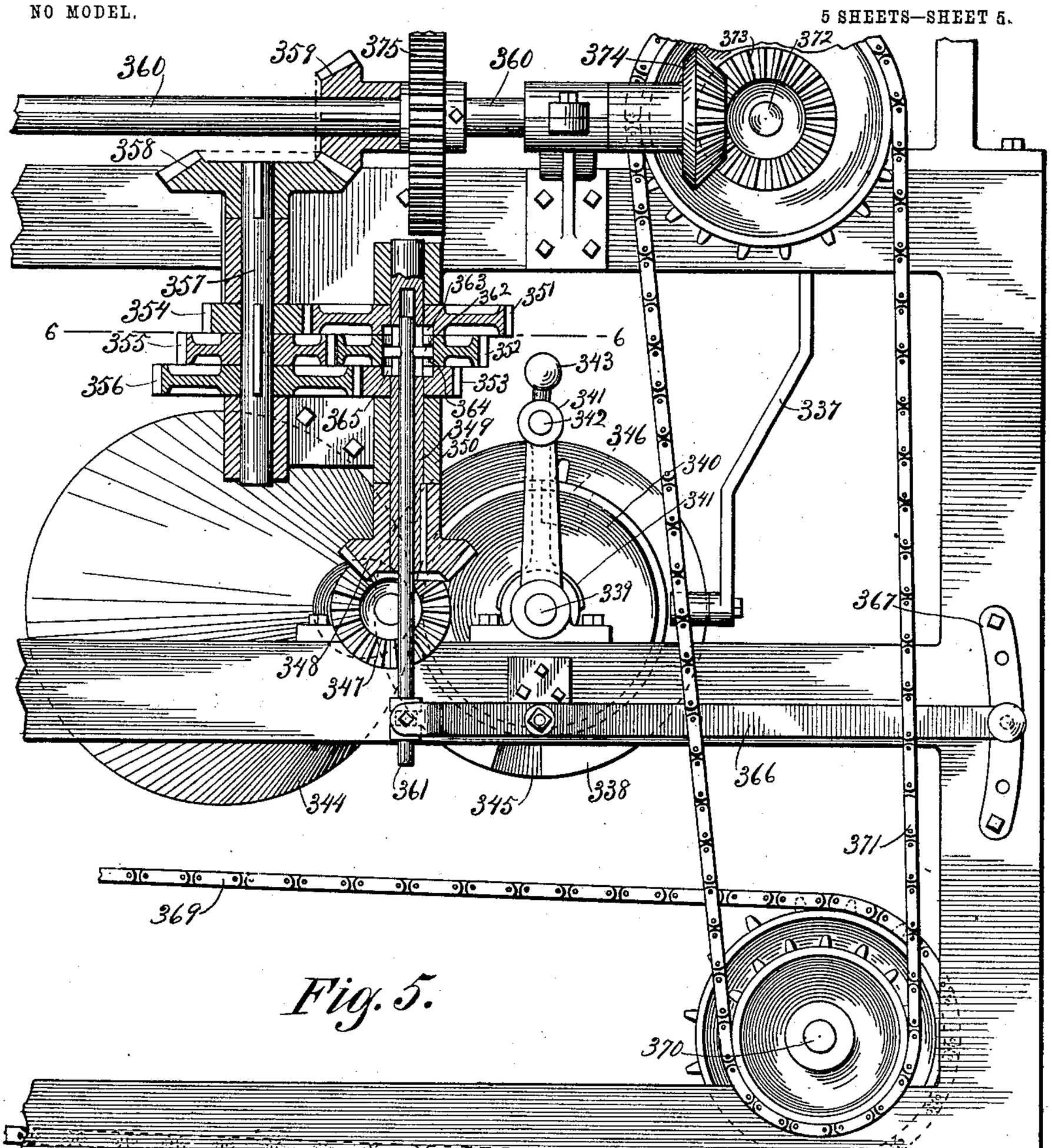

Fig. 5.

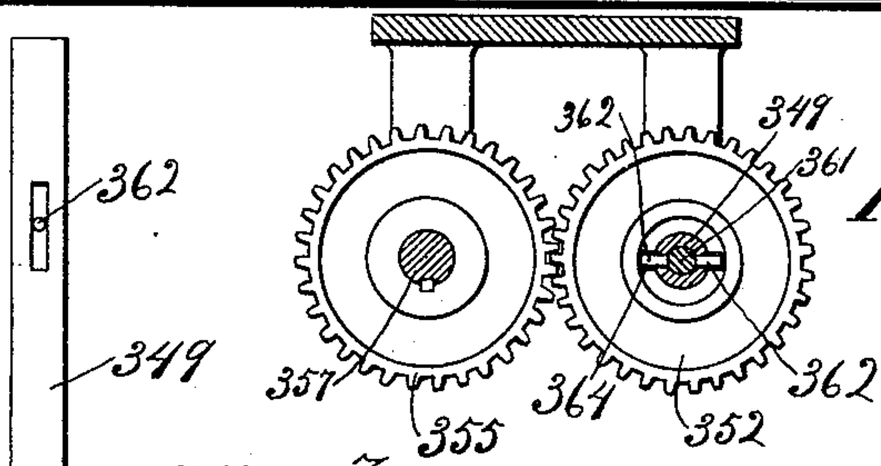

Fig. 6.

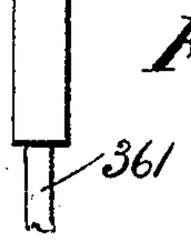

Fig. 7.

Witnesses:
W. H. Cotton.
E. M. Klatcher

Inventor:
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No. 763,124. Patented June 21, 1904.

UNITED STATES PATENT OFFICE.

EDGAR J. STEWART, OF CHICAGO, ILLINOIS.

CUTTER.

SPECIFICATION forming part of Letters Patent No. 763,124, dated June 21, 1904.

Application filed September 22, 1903. Serial No. 174,165. (No model.)

To all whom it may concern:

Be it known that I, EDGAR J. STEWART, a citizen of the United States, and a resident of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Cutters, of which the following is a specification and which are illustrated in the accompanying drawings, forming a part thereof.

The invention relates to that class of cutters which are adapted to cut off pieces from a strip of material continuously fed to it—as, for example, packing-pads, such as pads composed of excelsior as a filling and paper as a jacket.

The object of the invention is to provide a machine of this type which shall be capable of making a quick cut through a rapidly-moving piece, thereby severing it upon a straight line without interrupting its advance movement.

Further objects are to provide a wide range of variation in the speed of a machine of this kind, and particularly a very rapid action.

The invention consists, broadly, in a blade having an oblique movement to and from a stationary blade and so hung that its advance and retraction are accomplished by reason of spring-pressure applied longitudinally to the blade-carrier, means being provided for returning the blade to its final position in opposition to the spring.

The invention consists, further, in various details, as hereinafter pointed out and as illustrated in the accompanying drawings, in which—

Figure 1 is a detail side elevation of the machine. Fig. 2 is an end elevation of the same. Fig. 3 is a longitudinal vertical section on the line 3 3 of Fig. 2. Fig. 4 is a sectional detail on the line 4 4 of Fig. 1. Fig. 5 is a sectional detail on the line 5 5 of Fig. 2. Fig. 6 is a sectional detail on the line 6 6 of Fig. 5. Figs. 7, 8, 9, and 10 are details of parts of the machine. Figs. 11, 12, and 13 are details showing a modified form of construction of certain parts; and Fig. 14 is a view of the spring, showing the casing in section.

The cutter may be and ordinarily is mounted together with a machine for manufacturing the material to be operated upon by it, and as illustrated a portion only of the frame of the entire machine is shown, the entire machine in this instance being adapted for the manufacture of packing-pads, particularly such as have an excelsior filling, and is made the subject-matter of a companion application for patent filed by me of even date herewith.

There are employed in the machine a pair of feed-rollers 300 301, which turn in the direction of the arrows and are adapted to advance the material to be cut. The lower of these rollers is mounted in fixed journal-boxes. The upper one turns in movable boxes 302, which slide between vertical ways 303 304 and are forced downwardly by springs 305, reacting between the boxes and an adjusting-screw 306, thereby permitting the roller to be moved to and from the lower roller for the purpose of adapting it the better to the particular material being operated upon and also to vary the pressure thereon.

The material is advanced by the feed-rollers over the edge of a stationary knife 307, with which there coöperates a movable knife 308, which is controlled by a pair of contracting springs housed in telescopic casings 309 310, the members of which are attached to a fixed bracket 311, and an upwardly-projecting arm 312, rigidly attached to the knife-carrier 313, to which the blade 308 is secured. The knife-carrier is pivotally attached to a pair of crank-arms 314 315, one secured to each of its ends, which crank-arms form a part of the crank-shafts 316 317, pivoted in fixed parts in the frame of the machine.

The knife usually has an intermittent movement and is arrested after each stroke by means of a stud 318, projecting from the carrier 313 and engaging a hooked detent 319 in the form of a lever. These parts are so disposed that when the knife comes to rest the crank-arms 314 315 are inclined downwardly slightly, so that upon the disengagement of the detent 319 from the stud 318 a contraction of the springs 320 321 housed within the telescopic casings 309 310 will give the shafts 316 317 a half-revolution, thus carrying the blade 308 downwardly against the fixed knife 307 with a shearing movement and raising it again, the action being made with great rapidity.

The movable knife and its carrier having traveled under the influence of the springs as far as the crank-arms will permit, the further rotation of the crank-shafts is accomplished by the herein-described means, so as to return the knife to its position of rest, the springs being again brought to a tension. This returning mechanism comprises a short shaft 322 in alinement with one of the crank-shafts 317. A disk 323, mounted upon the end of the shaft 322 adjacent to the crank-shafts, is provided with an annular series of apertures 324, preferably as numerous as may be consistent with strength.

A disk 325 is fixed upon the adjacent end of the crank-shaft 316, its face being contiguous to that of the disk 323. The disk 325 is provided with a single aperture 326, located at the same radial distance from the center as are the apertures 324. Through this aperture there plays a pin 327, adapted to enter any one of the apertures 324. This pin is pivotally attached to a lever 328, which is pivoted within a suitable recess formed in the hub of the disk, the lever being a cord of the periphery of the disk and being held by the pivot-pin 327.

Within the recess 330 in the extension-hub of the disk 325 there is housed an expansion-spring 331, bearing outwardly the rearward end of the lever 328 and tending to advance the pin 327. Both ends of the lever 328 coöperate with a fixed segmental cam 332, whereby at proper times the rearward end of the lever is forced inwardly against the resistance of the spring 331, so as to retract the pin 327, and when upon the release of this rearward end of the lever as it passes beyond the cam the spring forces it outwardly, so as to bring the pin again into engagement with one of the apertures 324 of the disk 323, the forward end of the lever passes under the cam, so as to positively hold it against retraction. When the two disks are secured together by the clutch-pin 327, the shaft 317 is rotated, and the shaft 316 is cause to rotate in unison with it through the agency of a sprocket-chain 333, turning over suitable sprocket-wheels at the rearward end of the two shafts. By this means the knife-carrier is moved to the position shown in Figs. 2, 3, and 4, its stud-pin 318 engaging the hooked detent 319, and the clutch action is so timed that the pin 327 is withdrawn at the instant this engagement takes place. The crank-arms 314 315 having been carried past the center of the line of draft of the springs, the knife-carrier remains at rest until the detent is disengaged from the pin 318.

The detent-lever 319 is held in position for engagement by the stud 318 by means of a spring 336 acting upon a reciprocating rod 334, which is in engagement with the upper end of the lever through the medium of a pair of blocks 335. This rod is moved in opposition to the spring, so as to disengage the detent, by means of a lever 337, pivoted to a suitable bracket on the frame of the machine and actuated by means of a cam-wheel 338, against the disk-face of which the lever rests.

The cam-wheel is fixed to a shaft 339, with which a friction-wheel 340 is in splined engagement, and is moved longitudinally upon the shaft by means of a yoke-arm 341, fixed to a screw-rod 342, controlled by a hand-crank 343. The friction-wheel 340 is in engagement with the face of a driving-cone 344, so that by shifting it along the shaft 339 the speed of the cam-disk 338 may be varied through a considerable range. The disk 338 is provided with a fixed cam-block 345, which engages at each revolution with the lever 337. The frequency of the tripping action may be increased also by duplicating these cam-blocks, and I show as a means to this end a movable cam-block 346 secured to the disk 338 so as to slide radially thereupon, whereby it may be readily moved into or out of the path of the hand-lever 337.

The cone 344 is driven through the medium of a miter-gear 347, fixed upon its shaft, and a corresponding gear 348, keyed to a shaft 349, turning in a suitable journal-box 350. Upon this latter shaft are loosely mounted three gear-wheels 351, 452, and 353, differentiated in size and intermeshing with differentiated gears 354 355 356, keyed to a shaft 357, driven by means of a miter-gear 358, intermeshing with a similar gear 359, fixed upon a shaft 360.

The clutch mechanism for engaging any one of the loose pulleys with the shaft 349 comprises a rod 361, sliding upon the axis of the shaft 359 and provided with laterally-projecting pins 362, extending through suitable slots in the shaft and of sufficient length to enter pockets in the hubs of the gears 351 352 353, as shown at 363, 364, and 365.

The rod 361 is controlled by a shipper-lever 366 in yoked engagement with it and which plays over a quadrant 367. Power is transmitted to the counter-shaft 360 from a power-shaft 368, driving a sprocket-chain 369, which turns a counter-shaft 370, from which leads a sprocket-chain 371 to a sprocket-wheel fixed upon the shaft 372 of the roller 300, this shaft carrying a miter-gear 373, meshing with a similar gear 374, fixed upon the shaft 360.

The shaft 322 is driven by means of a train of gears comprising the gear 375, fixed upon the shaft 360 and meshing with a gear 376, mounted upon a jack-shaft 377, which carries a gear 378, meshing with a gear 379, fixed upon the shaft 322.

The lever 328 is provided with a finger 380, projecting laterally from its rearward end and being beveled or inclined, so that it makes the first contact with the cam 332 gradual. This smoothness of action is further provided for by making that portion of the cam with which this end of the lever engages inclined

at its forward end, as indicated at 381. Inasmuch as the movement of the lever 328 on its pivot is thus rendered gradual and necessary before the forward end of the lever has passed out of engagement with the cam, the rearward end of that portion of the cam 322 with which the forward end engages is inclined outwardly, as indicated at 382, allowing for the gradual movement of the lever, the complete disengagement of the pin 327 with the disk 323 not occurring until the lever has passed beyond the end of the cam. Shock upon the engagement of the forward end of the lever 328 with the cam 332 is also guarded against, the end of the cam being outwardly inclined, as indicated at 383.

The action of the machine is as follows: The knife 308 remains suspended by the action of the detent 319 until sufficient length of material has been fed past it by the feed-rollers 300 301. The cam-block 345 now engaging the lever 337 moves the rod 334 so as to disengage the detent from the stud-pin 318. The springs 320 321 cause a substantially half-revolution of the crank-shafts 316 317, throwing the knife downwardly past the stationary knife 307 with a shearing cut and raising it in the opposite direction. The shaft 317 carries with it the disk 325, and before the knife has come to rest under the action of the springs the rearward end of the lever 328 passes from under the cam 332, and by the action of the spring 331 the pin 327 is thrown forwardly into engagement with one of the apertures in the disk 323. This disk being constantly power driven and being now clutched to the disk 325 the shaft 317, and through the agency of the sprocket-chain 333, the shaft 316 are turned through a substantially half-revolution, their crank-arms being carried past the line of draft of the springs upon the carrier and the stud 318 coming again into contact with the detent 319, which has been restored to its normal position, the cam-block 245 having passed out of engagement with the lever 337. The frequency of this knife action may be doubled by moving the cam-block 346 into the path of the lever 337, so that the latter is tripped twice during each revolution of the cam-disk 338. The frequency of the knife action may also be varied by the adjustment of the friction-wheel 340 along its shaft 339 through the agency of the screw 342. A still further variation of the frequency of the knife action relatively as to the speed of the machine is accomplished by means of the shipper-lever 366 and the loose gears 351, 352, and 353. As the frequency of the knife action relatively as to the speed of the feed-rollers 300 301 will determine the lengths into which the material is cut, it will be seen that a very wide range is thus provided for. A still further modification of the action of the machine may be provided by the following-described mechanism, whereby the knife action is constant. In lieu of the disk 323 I may use a disk 384, having a segmental slot 385 at the same radial distance from its center as the series of apertures 324 in the disk 323. When this change is made, I substitute for the lever 328 a bar 386, adapted to fit into the same channel in the hub of the disk 325 and having a fixed pin 387 of sufficient length to project into the slot 385. This bar 386 is stationary within its seat, so that the pin is constantly in engagement with the slot. The detent 319 may be thrown out of action, and as the springs 320 321 are brought to a center the knife is thrown downwardly with a quick action upon the tension of the crank-arms 387, being carried from the forward end of the slot 385 to its rearward end. The knife coming to rest under the action of the springs, the disk 384 overtakes the pin 387 and carries the crank-shafts 316 317 over to a position where the springs will again exert their tension to throw the knife.

The roller 301 is driven by means of a sprocket-wheel 388, fixed upon its shaft and actuated by a sprocket-chain 389, turning over a sprocket-wheel 390, mounted upon a shaft carrying a gear-wheel intermeshing with a gear 391, fixed upon a shaft 391ª, driven by chain-and-sprocket connections 389ª and 388ª, respectively. The sprocket 388ª is rigidly attached to the shaft 372 of the roller 300. This arrangement provides for the vertical movement of the roller without interfering with its speed of rotation.

The knife-carrier is guided by friction-plates 392 393, adjustably carried by fixed blocks 394 395.

I claim as my invention—

1. In a cutter, in combination, a pair of crank-shafts, a knife-carrier hung on the cranks thereof, a spring exerting force longitudinally upon the knife-carrier, and means for moving the carrier in opposition to the spring.

2. In a cutter, in combination, a pair of crank-shafts, a knife-carrier hung on the cranks thereof, a spring exerting force longitudinally upon the knife-carrier, and a power-actuated shaft intermittently engaging one of the crank-shafts and acting in opposition to the spring.

3. In a cutter, in combination, a pair of crank-shafts, a knife-carrier hung on the cranks thereof, a spring exerting force longitudinally upon the knife-carrier, a power-actuated shaft, and a clutch intermittently engaging the latter shaft with one of the crank-shafts.

4. In a cutter, in combination, a pair of crank-shafts, a knife-carrier hung on the cranks thereof, a spring exerting force longitudinally upon the knife-carrier, a detent for arresting the carrier when the spring is under tension and the crank-arms are past the line of strain, means for releasing the detent, and

means for moving the carrier into engagement with the detent.

5. In a cutter, in combination, a knife and its carrier having a motion in a substantially circular path and in the plane of the blade, a spring acting longitudinally on the carrier, and means for moving the carrier in opposition to the spring.

6. In a cutter, in combination, a knife-carrier, a pair of crank-shafts carrying the knife-carrier, a spring acting to move the knife-carrier longitudinally, a constantly-driven shaft in line with one of the crank-arms, and automatic clutch mechanism for engaging and disengaging the alined shafts during each revolution.

7. In a cutter, in combination, a knife-carrier, a pair of crank-shafts carrying the knife-carrier, a spring acting to move the knife-carrier longitudinally, a constantly-driven shaft in line with one of the crank-arms, a disk fixed to the end of the power-driven shaft and having an annular series of apertures, a disk fixed upon the alined crank-shaft adjacent to the first-named disk, a pin carried by the crank-shaft disk and movable to engage the apertures of the power-shaft disk, and a cam for advancing and retracting the disk each revolution of the crank-shaft disk.

8. In a cutter, in combination, a knife movable through a circular path in the plane of its bed, a spring acting longitudinally on the knife, a detent for holding the knife against the action of the spring, a trip for disengaging the detent, and means for varying the action of the detent-disengaging means.

9. In a cutter, in combination, a pair of crank-shafts, and a knife carried by the cranks thereof and perpendicular to the shafts.

10. In a cutter, in combination, a pair of intergeared crank-shafts, and a knife carried by the cranks thereof and perpendicular to the shafts.

11. In a cutter, in combination, a knife movable through a circular path in the plane of its blade, a spring acting longitudinally on the knife, a detent for holding the knife against the action of the spring, a lever for disengaging the detent, a cam actuating the lever, and variable means for actuating the cam.

12. In a cutter, in combination, a pair of feed-rolls, a knife movable in a circular path in the plane of its blade, a spring acting longitudinally on the knife, a detent for holding the knife against the action of the spring, a lever for releasing the detent, a cam actuating the lever, a power-shaft for driving the feed-rolls and the cam, and variable gears for transmitting power from the power-shaft to the cam, whereby the action of the knife may be varied relatively as to the speed of the rolls.

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