

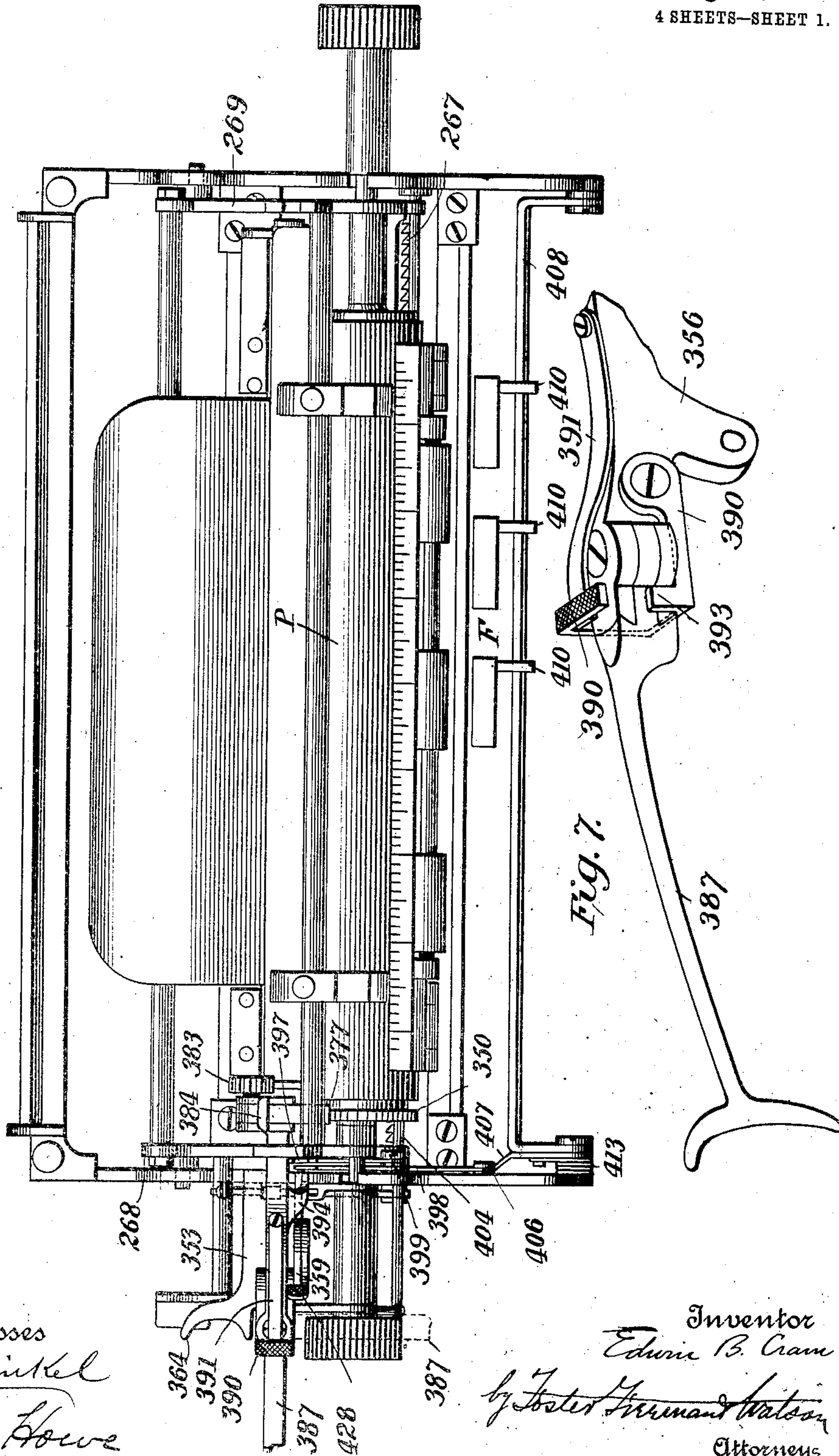
E. B. CRAM.  
 LINE SPACING MECHANISM.  
 APPLICATION FILED APR. 29, 1904.

933,021.

Patented Aug. 31, 1909.

4 SHEETS—SHEET 1.

Fig. 1.



Witnesses  
*J. P. Stirkel*  
*Thos. Howe*

Inventor  
*Edwin B. Cram*  
 by *Foster, Freeman & Watson*  
 Attorneys

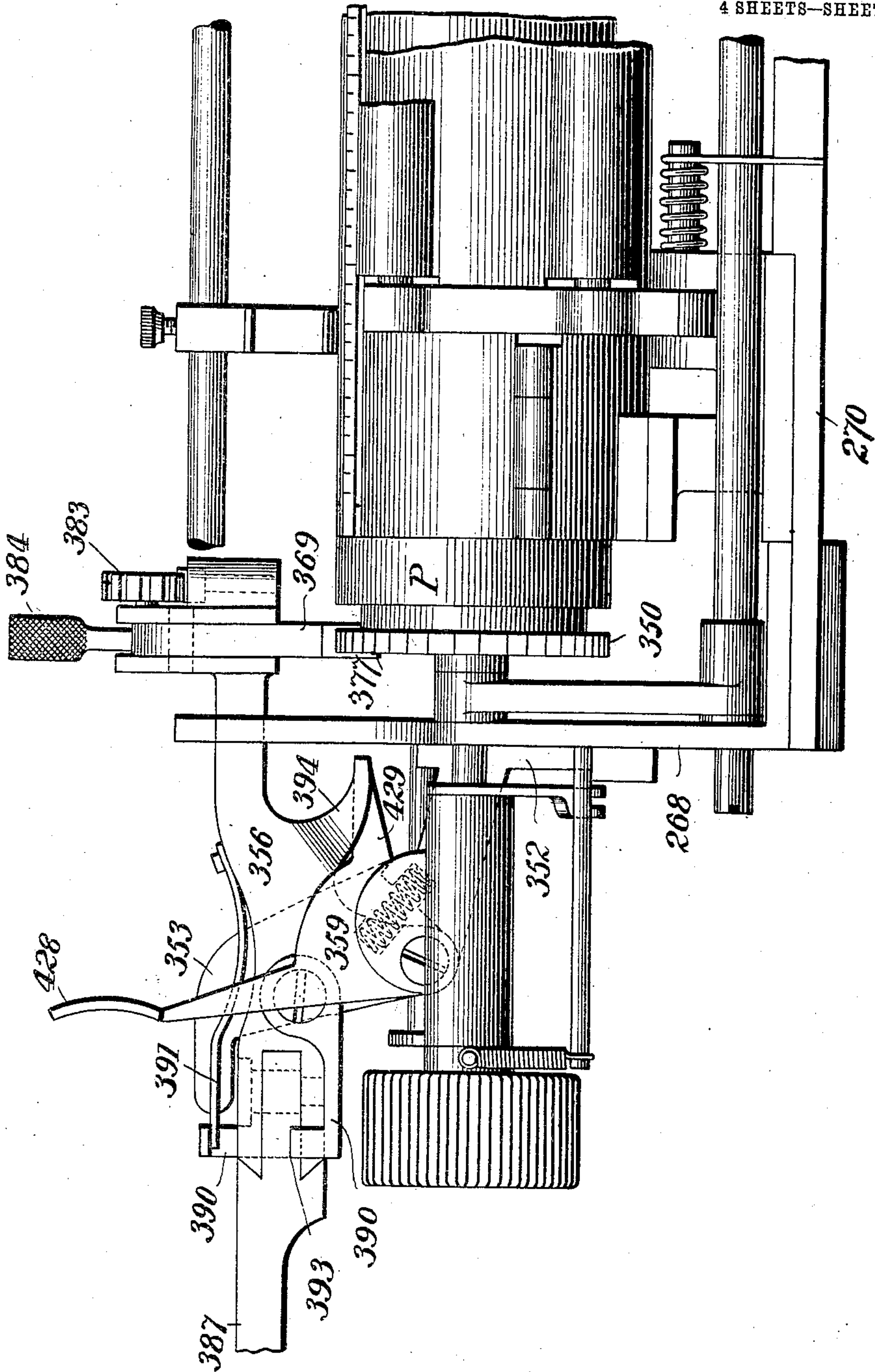
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4 SHEETS—SHEET 2.

Fig. 2.



Witnesses  
*J. G. Hinkel*  
*Thos. Howe*

Inventor  
*Edwin B. Cram*  
 by *Forster & Hume*  
 Attorneys

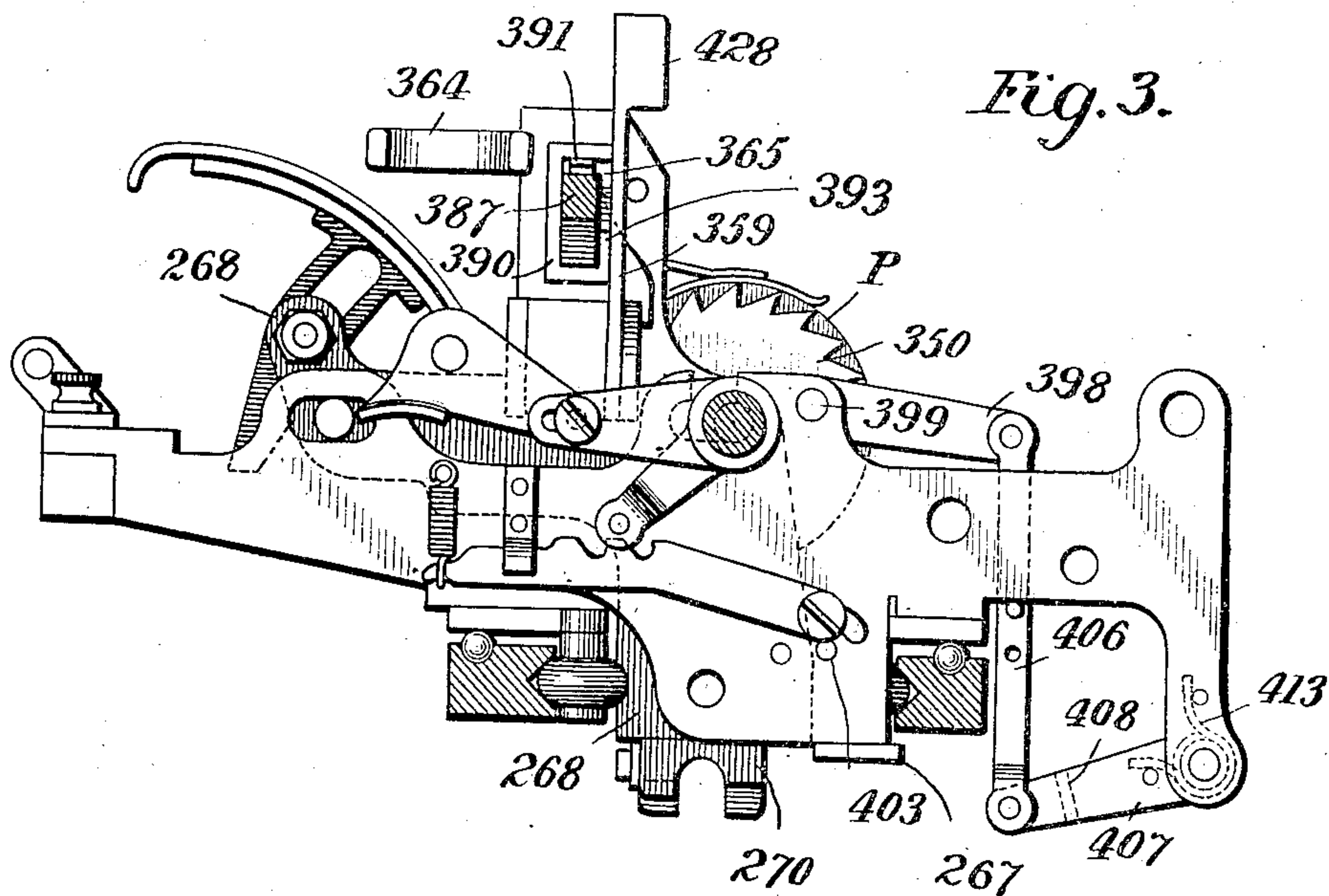


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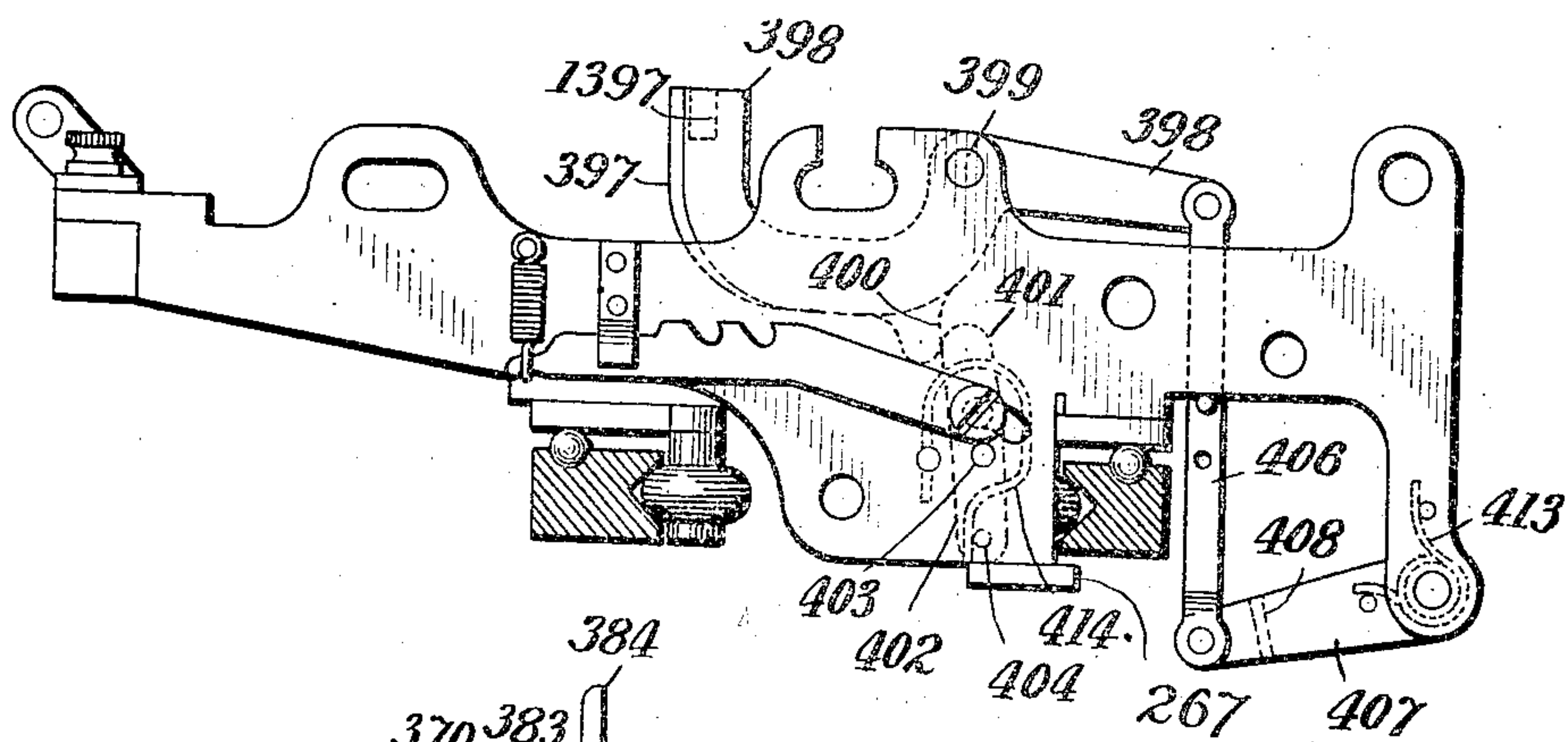
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4 SHEETS—SHEET 3

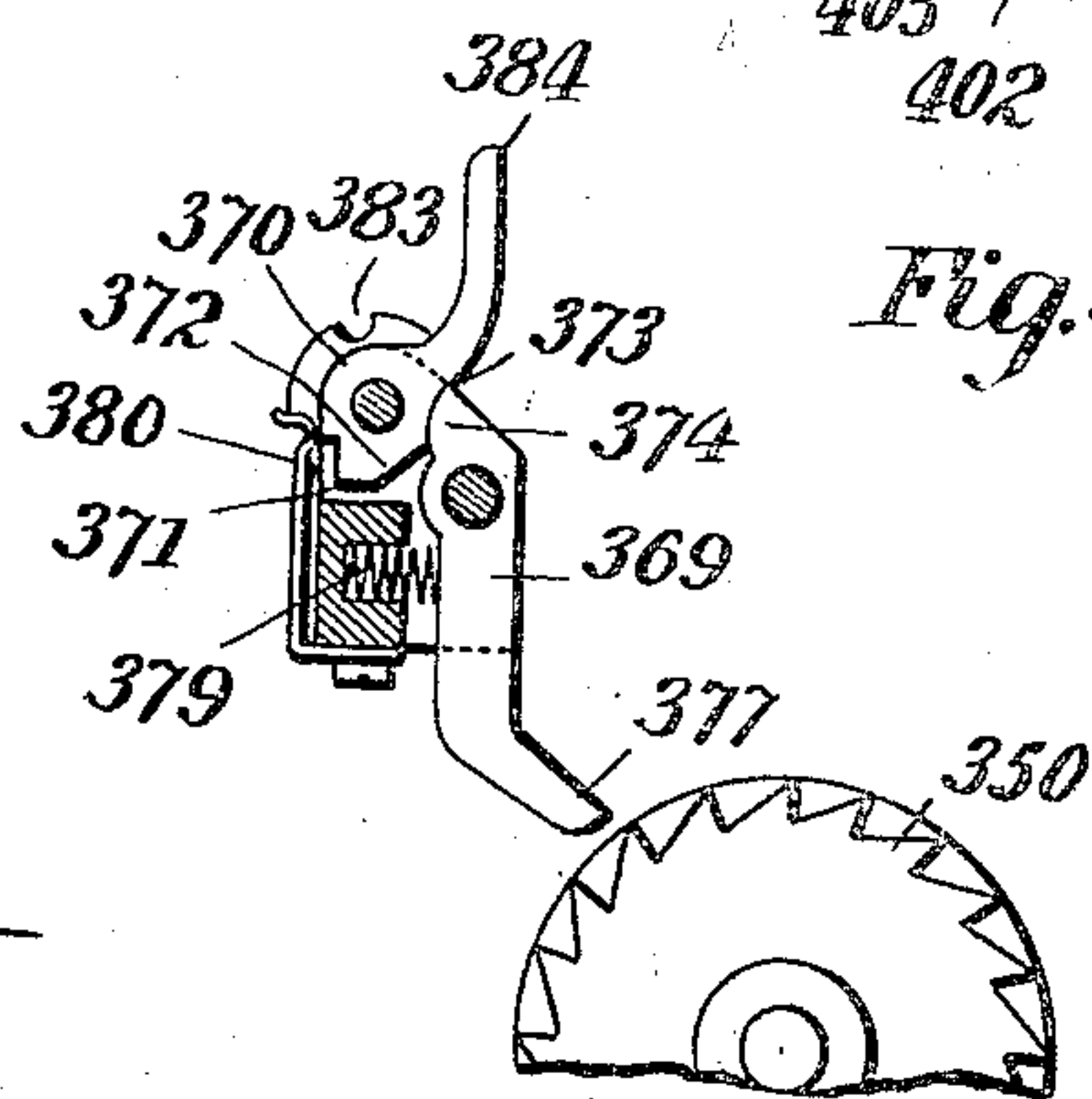


*Fig. 3.*

*Fig. 4.*



*Fig. 5.*



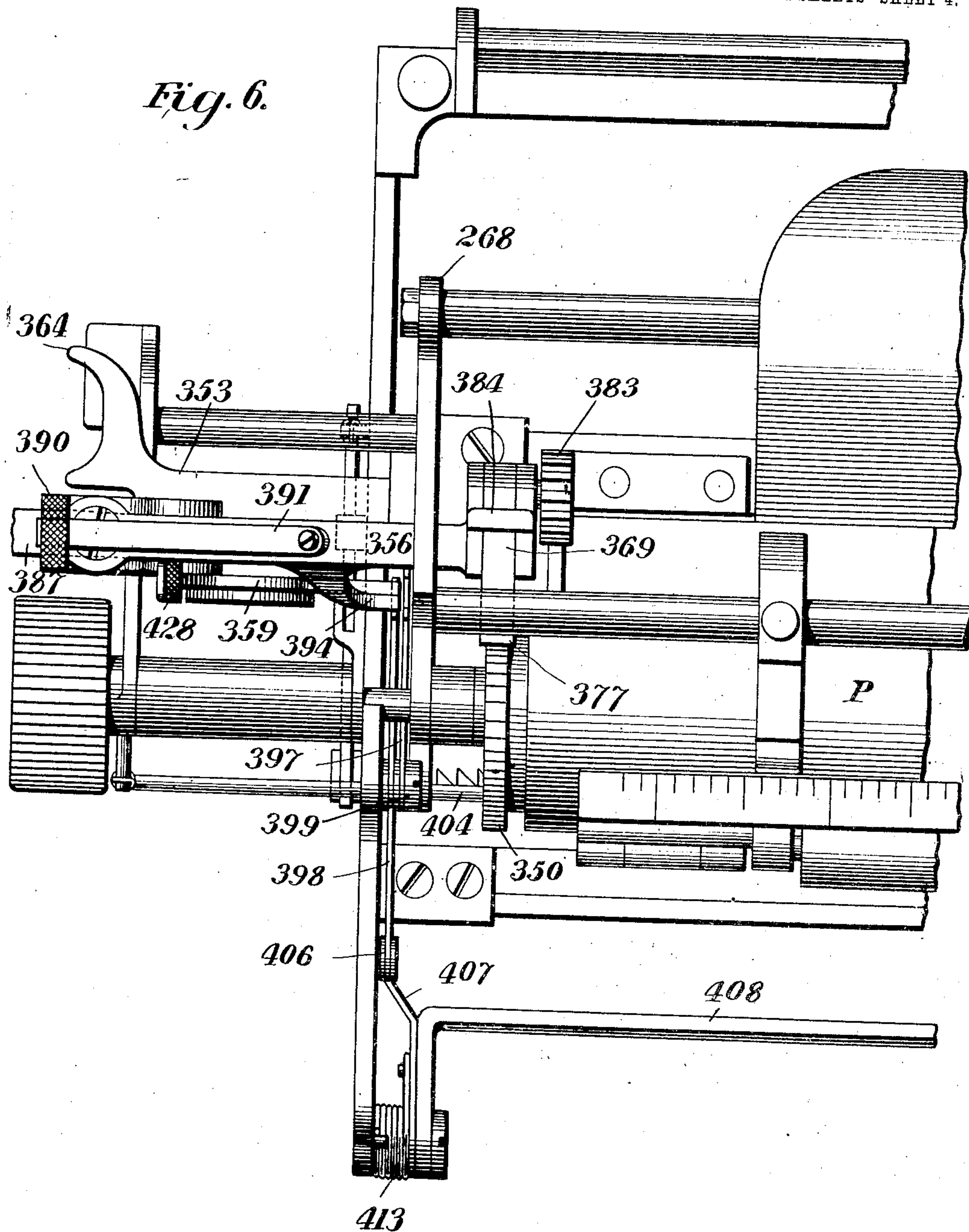
Witnesses  
*J. S. Hinkel*  
*Thos. Howe*

Inventor  
*Edwin B. Cram*  
 by *Foster Freeman & Watson*  
 Attorneys

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 4 SHEETS—SHEET 4.

*Fig. 6.*



Witnesses  
*J. J. Stinkel*  
*J. J. Mc Carthy*

Inventor  
*Edwin B. Cram*  
 by *Foster Freeman Watson* *Att*  
 Attorneys



# UNITED STATES PATENT OFFICE.

EDWIN B. CRAM, OF BROOKLYN, NEW YORK, ASSIGNOR TO NEW YORK ADDING TYPEWRITER COMPANY, OF ORANGE, NEW JERSEY, A CORPORATION OF MISSOURI.

## LINE-SPACING MECHANISM.

933,021.

Specification of Letters Patent. Patented Aug. 31, 1909.

Original application filed April 27, 1904, Serial No. 205,205. Divided and this application filed April 29, 1904. Serial No. 205,593.

*To all whom it may concern:*

Be it known that I, EDWIN B. CRAM, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Line-Spacing Mechanism, of which the following is a specification.

This invention relates to line-spacing mechanism and cooperating devices for typewriters, and has for its object the provision of improvements as will be hereinafter set forth.

In the accompanying drawings, Figure 1 is a plan view of the carriage of a typewriting machine embodying the invention; Fig. 2 is a side elevation on an enlarged scale of the line spacing mechanism; Fig. 3 is an end elevation of the entire carriage; Fig. 4 is an end elevation of part of the carriage; Fig. 5 is an end view of the platen showing the line-space ratchet wheel and its cooperating pawl and mechanism; Fig. 6 is a plan view, on an enlarged scale, of the line spacing mechanism and parts at the left end of the carriage; Fig. 7 is a detail view of the spacing lever.

The frame of the machine supports a transversely movable carriage carrying a platen P, adding mechanism F and a relatively movable sub-carriage carrying the line spacing mechanism. The sub-carriage comprises the end plates 268 and 269 and the base-piece 270 to which the end plates are secured.

Secured to the platen is the usual line-space ratchet wheel 350, forming part of the line space mechanism which with its cooperating devices will now be described. Fixed to the sub-carriage and plate is a support comprising a base portion 352 that lies between the sub-carriage end plate and the main carriage end, and an arm 353 which projects over the main carriage end. In the outer end of the arm is pivoted at 356 the line-space lever 356 and the carrying levers restoring lever 359. A finger-piece 364 is formed at the end of the arm 353 for use in moving the carriage transversely of the machine. The lever 356 works in a closed slot 365 in the sub-carriage end plate and is guided and limited in its movement thereby, a suitable spring normally pressing it

against the top end of the slot. The inner end of the lever 356 overhangs the ratchet wheel 350 and has a groove in which is pivoted a pawl 369, adapted to engage with the ratchet wheel, and a cam 370 for regulating the paper feed, having faces 371, 372 and 373 (see Fig. 5) for engagement with the tail 374 of the pawl, which faces are located at different distances from the pivotal point of the cam and therefore hold the pawl point 377 at different distances above the ratchet wheel and thereby determine different points at which the pawl engages the ratchet wheel. The tail 374 is spring pressed against the cam faces by a spring 379. The cam is held in its various positions by a spring 380 secured to the lever 356 and engaging with notches 383 in the cam corresponding to the cam faces. A finger piece 384 is fixed to the cam for use in positioning it.

The outer end of the lever 356 has a fork within which is pivoted an arm 387 for returning the carriage, having a hand part at its outer end, so that it may turn horizontally to fold against the side of the machine as shown in dotted lines, so that it will occupy less space when not in use. A clip 390 is supported on the lever 356 by a leaf spring 391 and has vertical portions extending beside the joint between said lever and the arm 387 when the latter is extended so that the joint is made rigid when the clip is in its upper position, as it is normally held by its supporting spring. By pressure upon the top of the clip, it can be moved downwardly until the vertical portion 393 is out of the path of the arm 387, when the arm can be moved forward.

On the side of the lever 356 is a projection 394 adapted to bear, in its depressed position, upon the ends of levers 397 and 398. The lever 397 is pivoted at 399 in the main carriage end and has a projection 400 for engaging with the extension 401 of an arm 402, pivoted to the main carriage end at 403, to the lower end of which one end of a rod 404 is connected. The rod 404 runs the length of the carriage and at its other end is connected to a similar arm which is pivoted to the other main carriage end. The rod 404 passes in proximity to the feed dog which is normally engaged with the rack 267 and



is disengaged therefrom, to release the carriage, by a rearward movement of the rod 404 such as would be caused by a depression of the free end of the lever 397. Normally the rod 404 is held in forward position by a spring 414.

The lever 398 is pivoted at 399 in the carriage end and pivoted to said lever is a link 406 pivoted to an arm 407 which supports one end of a transverse bail 408 and is pivoted to the main carriage end. The bail 408 extends in proximity to the "carrying levers" 410 of adding mechanism F and its other end is pivoted upon the other main carriage end. The adding mechanism may consist of the usual geared wheels bearing numbers upon their peripheries and, as is well known, the function of the "carrying levers" is to transmit movement from a wheel corresponding to one denomination after a complete rotation, to a wheel corresponding to the next denomination whereby a "carrying" is effected between one denomination and the next. The raising of the bail 408, effected by pressure upon the free end of the lever 398, restores the carrying levers, that is, moves them to their normal position, in readiness for another number to be added. The bail is normally maintained in depressed position by its own weight or by springs 413.

The restoring lever 359 has the thumb piece 428 and the tail 429 which is adapted when depressed and the platen is in the lower case position, to strike the adjacent end of the lever 398 so that said lever will be operated to restore the carrying levers, the tail 429 entering a slot 1397 in the lever 397 so that the last lever is not disturbed. In the upper case position, the tail 429 is carried beyond both the lever ends 396 and 397 and is therefore inoperative.

To explain the operation of the line spacing mechanism and its cooperating devices, let it be assumed that the arm 387 is held rigidly in extended position as shown by the full lines of the drawings. To move the carriage to the right, the hand of the operator is placed on the hand part and a pressure toward the right and upwardly is exerted. The upward pressure operates to throw the projection 394 downwardly upon the free ends of the levers 397 and 398, thus releasing the carriage and restoring the carrying levers as before described, while the pressure to the right returns the carriage to its right-hand position to begin a new line. In addition to these operations the upward movement of the arm 387 causes the pawl 369 to move downwardly into engagement with the ratchet wheel and the platen to be moved to space for a new line. The line spacing is adjusted by means of the cam 370 in a manner as before described. The pawl always moves through the same distance, which is

limited by lever 356 coming against the ends of the slot 365 in the sub-carriage and plate, and the movement of the platen is determined by fixing the point at which the pawl engages the ratchet wheel, as before described, after which the wheel will move with the pawl to the end of its travel. If it be desired to restore the adding levers without affecting the line spacing and cooperating mechanisms, it can be accomplished by pressing upon the thumb piece 428 of the restoring lever 359 when the restoring will take place as before described.

While the invention has been illustrated and described in connection with a combined typewriting and adding machine, it will be seen that the features thereof relating to line spacing are not limited to use with such a machine. It is preferred to claim such features in this application and therefore no claims are herein made to the novel features disclosed but relating to only combined typewriting and adding machines. Such features will be claimed in a divisional application.

Without limiting myself to the precise construction shown and described, what I claim is:—

1. In a computing typewriter, the combination with the carriage, of an arm secured to the carriage and extending beyond the end thereof, said arm having a joint so that its extremity may be moved to extend at an angle to the body of the arm, and means for making said joint rigid or flexible at will, substantially as described.

2. In a typewriter, the combination with the carriage, of a line spacing mechanism, an arm secured to the carriage and extending beyond the end thereof, said arm being connected with said line spacing mechanism and having a joint so that its extremity may be moved to extend at an angle to the body of the arm, and means for making said joint rigid or flexible at will, substantially as described.

3. In a typewriter the combination with the carriage, of a line spacing mechanism, an arm secured to the carriage and extending beyond the end thereof, said arm having a joint so that its extremity may be moved to extend at an angle to the body of the arm and being connected to said mechanisms, and means for making said joint rigid or flexible at will, substantially as described.

4. In a typewriter, the combination with the carriage, of an arm secured to the carriage and extending beyond one end thereof, said arm having a joint so that its extremity may be moved close to the side of the machine, and a clip pivotally mounted on said arm and adapted to normally make said joint rigid, substantially as described.

5. In a typewriter, the combination with



the carriage, of an arm secured to the carriage and extending beyond one end thereof, said arm having a joint so that its extremity may be moved close to the side of the machine, and a clip pivotally mounted on said arm and normally preventing lateral movement of said extremity in either direction, substantially as described.

6. In a typewriter, the combination with the carriage, of an arm secured to the carriage and extending beyond one end thereof, said arm having a joint so that its extremity may be moved close to the side of the machine, a clip pivotally mounted on said arm and having members situated on opposite sides of said joint, and a spring for holding said clip in position to prevent lateral movement of the extremity of the arm, substantially as described.

7. In a typewriter, the combination with the carriage, of an arm secured to the carriage and extending beyond one end thereof, said arm having a joint so that its extremity may be moved close to the side of the machine, and a leaf spring attached to said arm and supporting means for normally preventing lateral movement of the extremity of the arm, substantially as described.

8. In a typewriter, the combination with the carriage, of an arm secured to the carriage and extending beyond one end thereof, said arm having a joint so that its extremity may be moved toward the side of the machine to a position at an angle to the body of the arm, and a stop adjustable to and from a position to engage said arm and make the joint therein rigid.

9. In a typewriter, the combination with the carriage, of an arm secured to the carriage and extending beyond one end thereof, said arm having a joint so that its extremity may be moved toward the side of the machine to a position at an angle to the body

of the arm, and means mounted on said arm for making said joint rigid.

10. In a typewriter, the combination with the carriage, of an arm secured to the carriage and extending beyond one end thereof, said arm having a joint so that its extremity may be moved toward the side of the machine to a position at an angle to the body of the arm, and stops adapted to be positioned on opposite sides of said joint, to hold the same rigid.

11. In a typewriter, the combination with a platen, and a ratchet wheel thereon, of a lever movable through a fixed distance, a pawl for engaging the ratchet wheel carried by said lever, and a cam adjustably mounted on the lever and having a plurality of faces at different distances from its pivot, each adapted to engage said pawl, and a yielding arm adapted to engage either of a series of recesses formed in said cam opposite the pawl engaging faces thereon, substantially as and for the purpose described.

12. In a typewriter, the combination with a platen and a ratchet wheel thereon, of a lever movable through a fixed distance, a pawl for engagement with said ratchet wheel carried by said lever, and a cam adjustably mounted on the lever and having a plurality of faces for engagement with said pawl at different distances from its pivot, whereby the position of the pawl relative to the ratchet wheel and the duration of engagement of said pawl with said ratchet wheel may be varied, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EDWIN B. CRAM.

Witnesses:

W. F. CARTER,  
WALTER N. DAVIS.