

May 25, 1937.

L. P. CROSMAN

2,081,423

LISTING ADDING MACHINE

Filed June 19, 1936

6 Sheets-Sheet 1

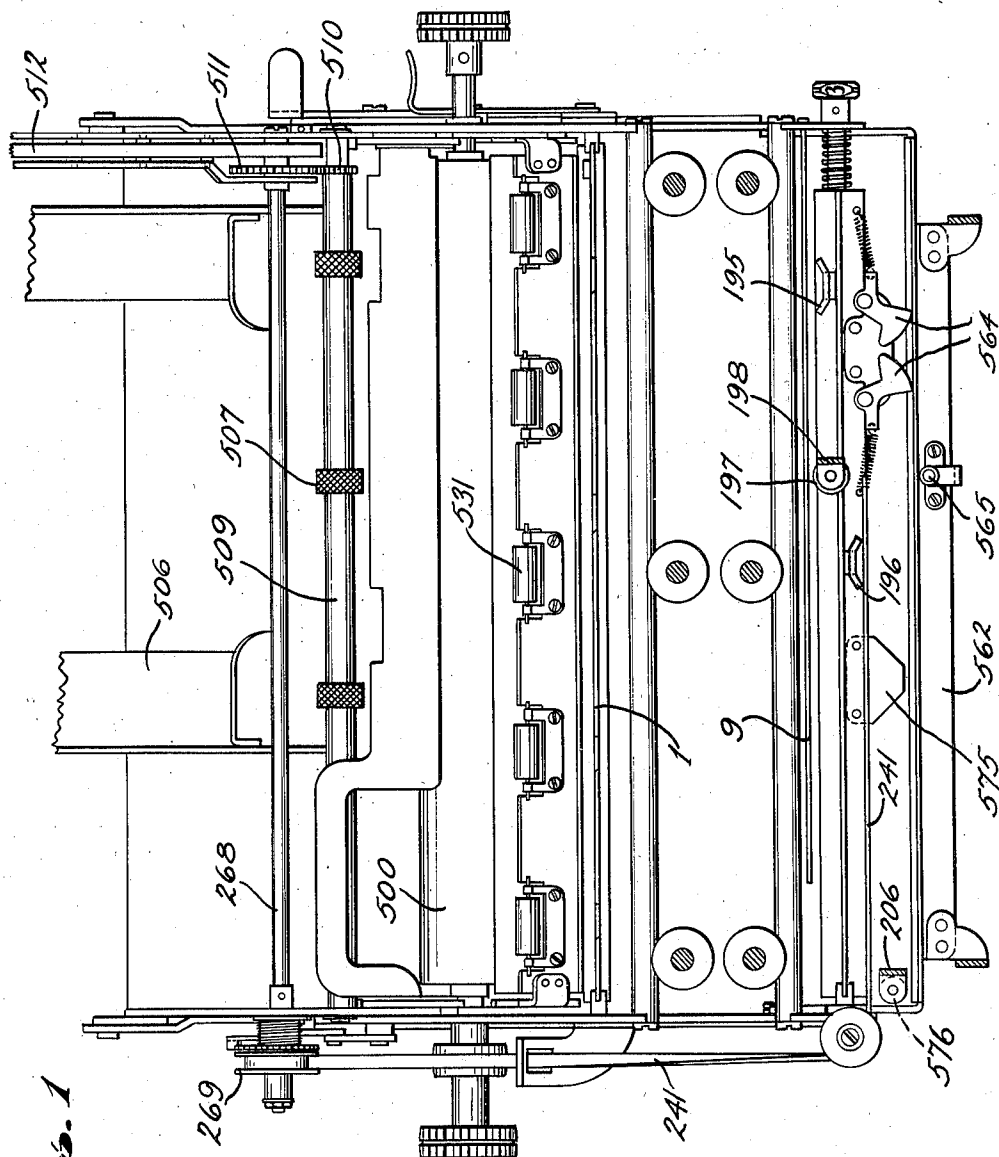


Fig. 1

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May 25, 1937.

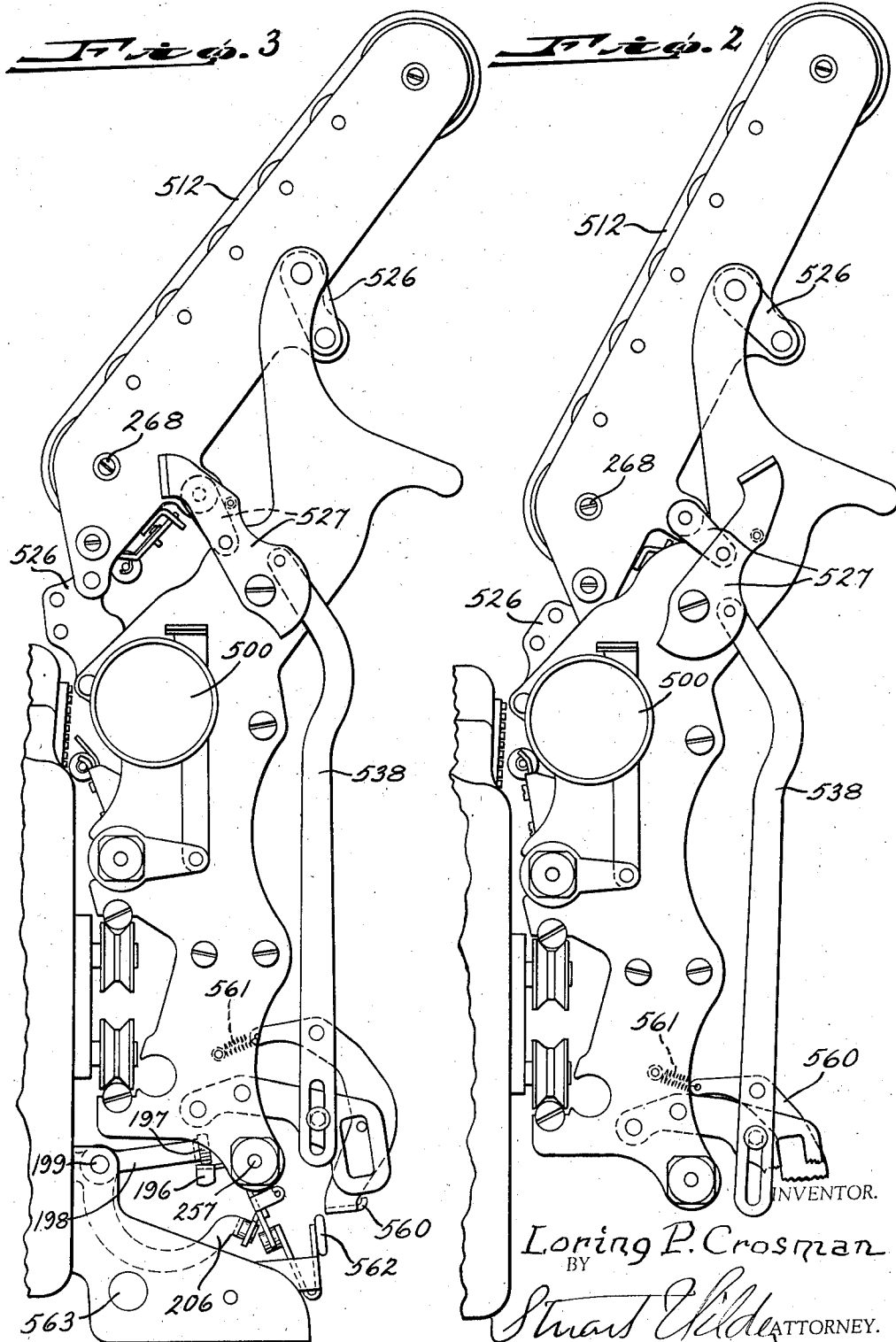
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LISTING ADDING MACHINE

Filed June 19, 1936

6 Sheets-Sheet 2



May 25, 1937.

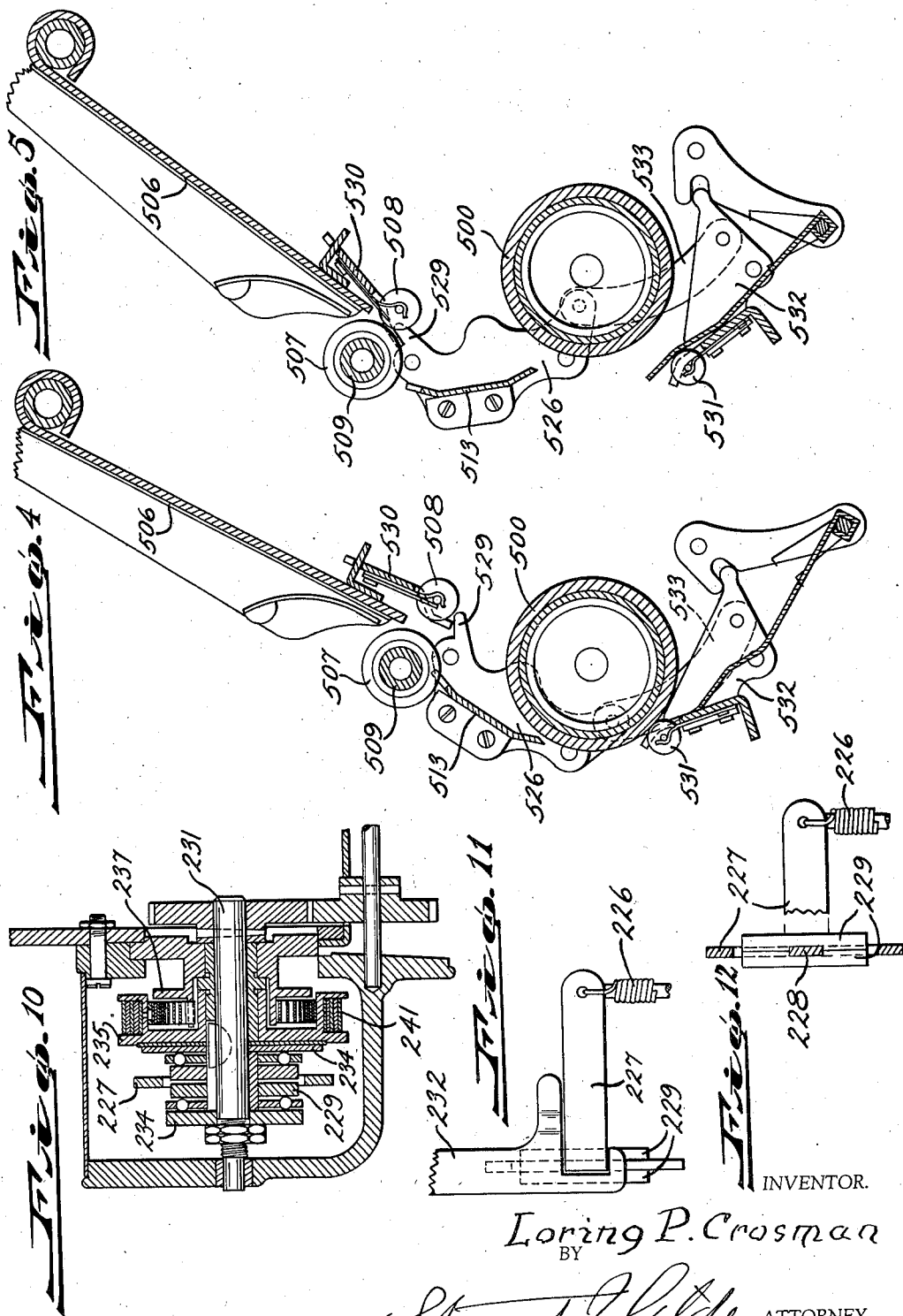
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LISTING ADDING MACHINE

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6 Sheets-Sheet 3



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2,081,423

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6 Sheets-Sheet 4

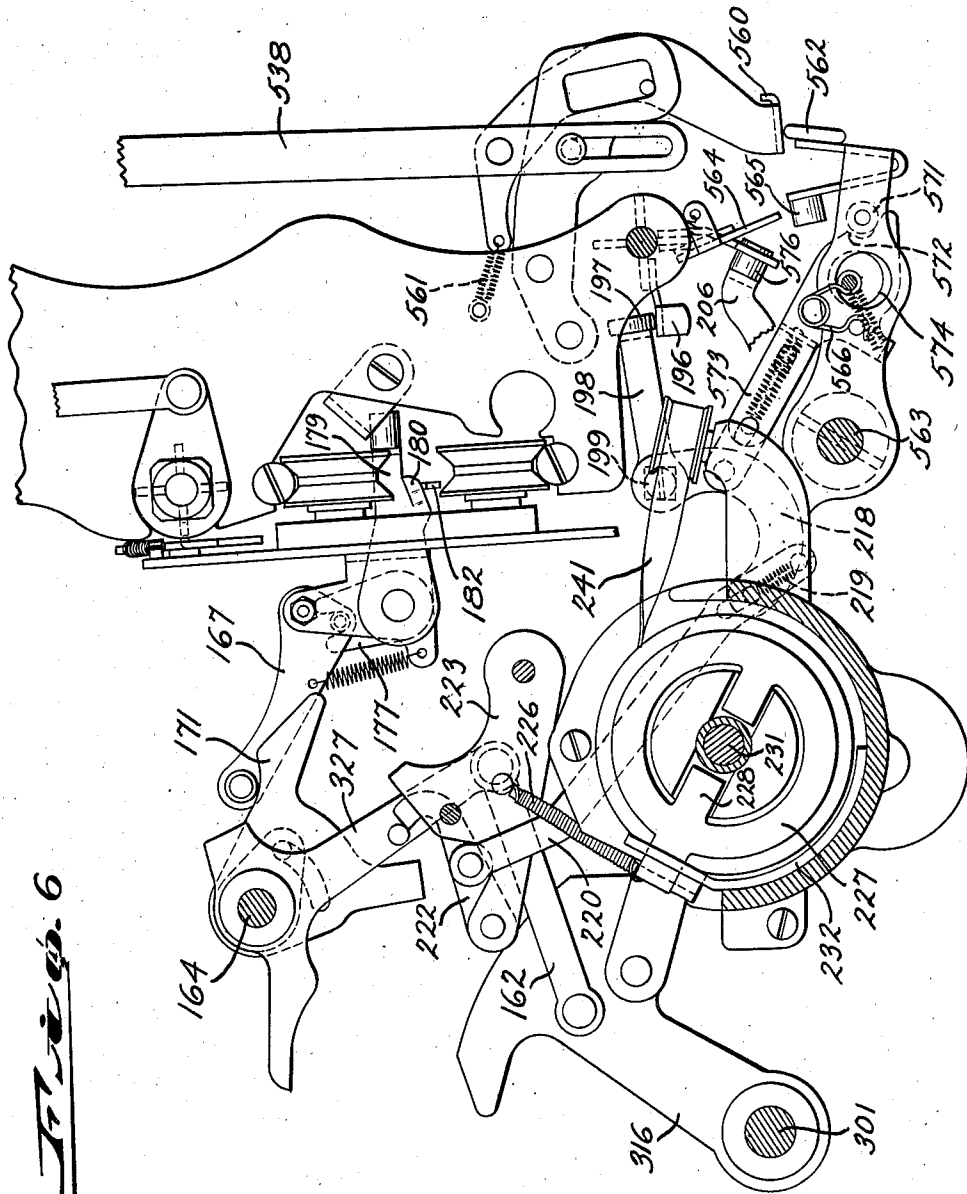


Fig. 6

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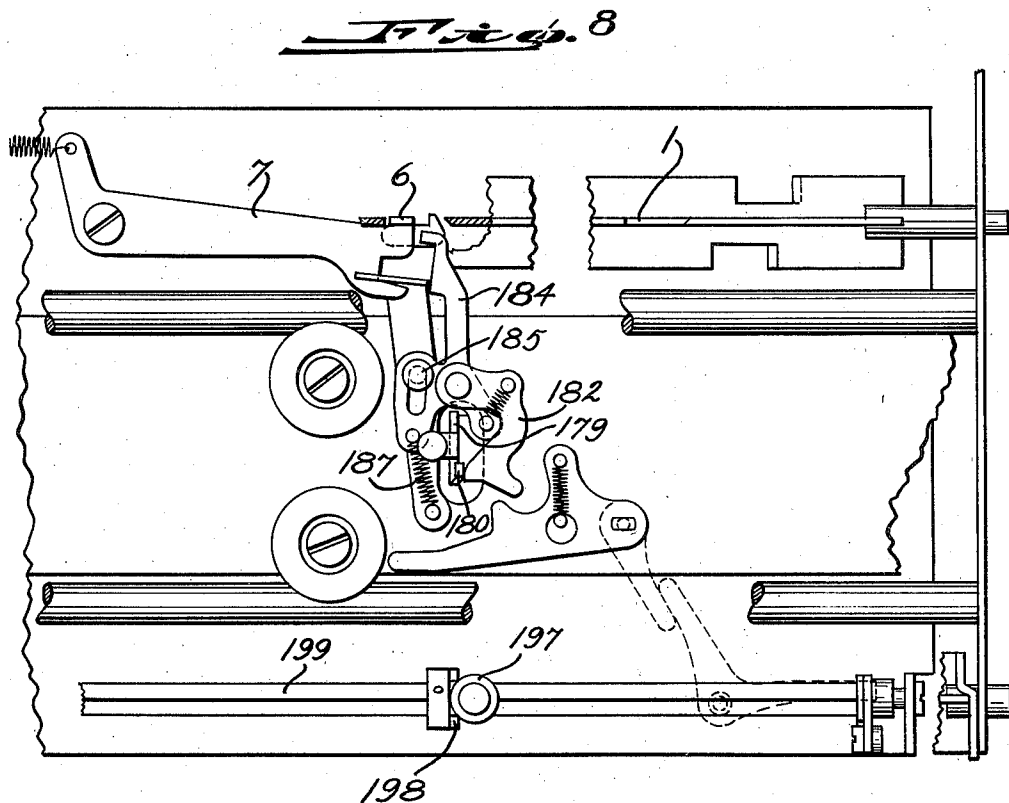
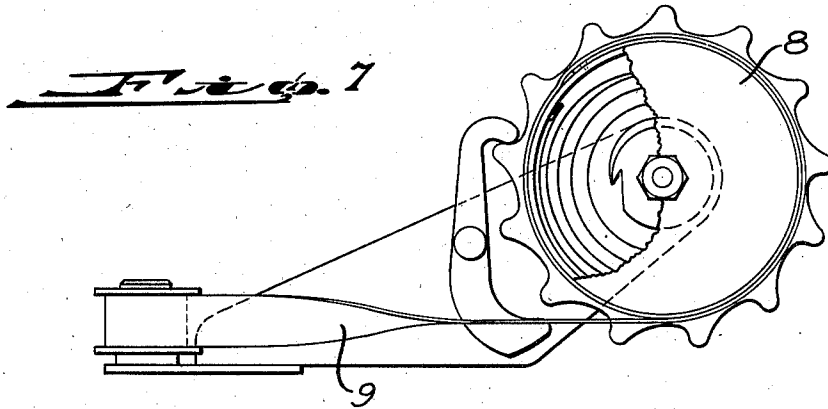
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LISTING ADDING MACHINE

Filed June 19, 1936

6 Sheets-Sheet 5



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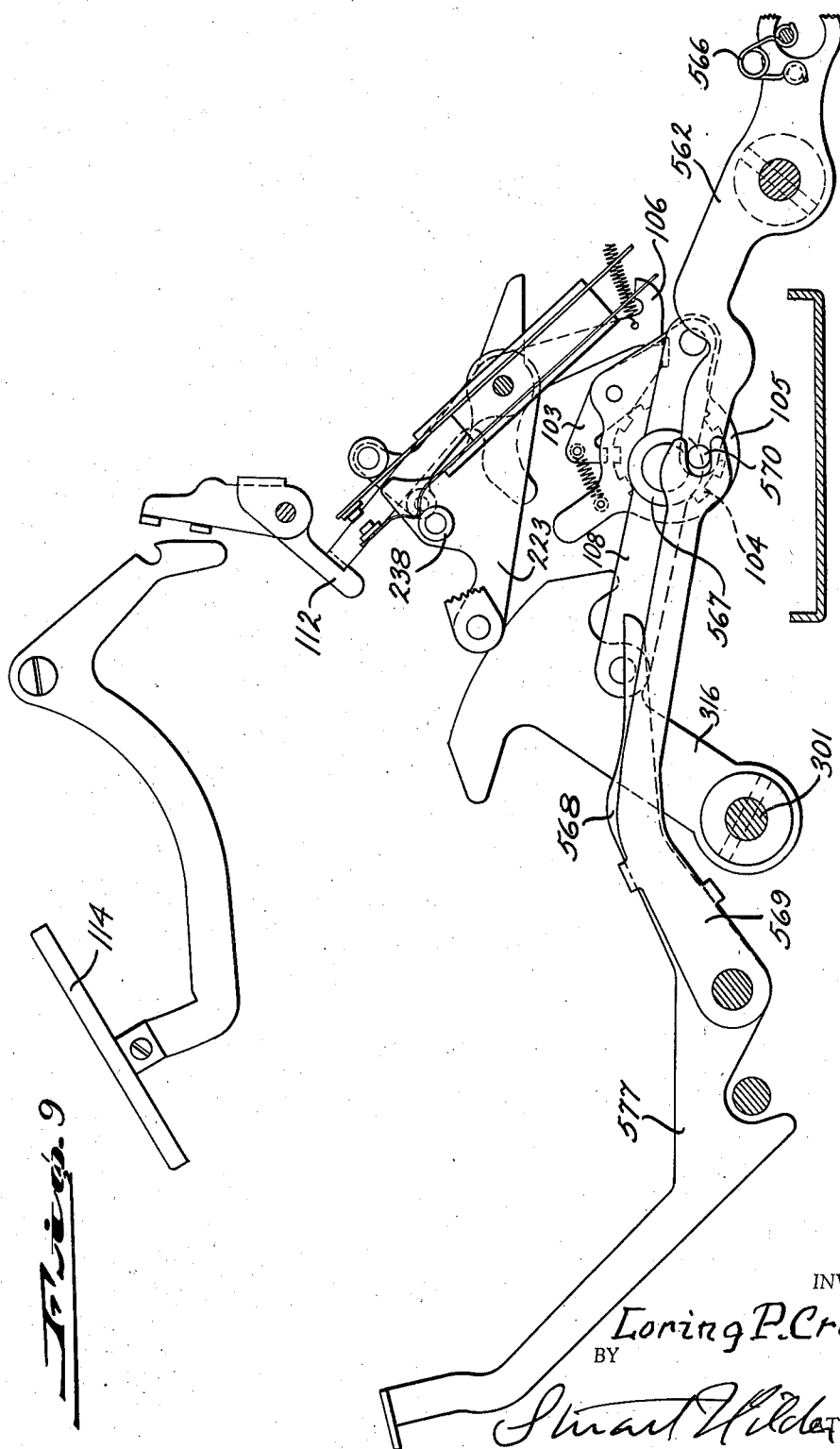
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Filed June 19, 1936

6 Sheets-Sheet 6



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UNITED STATES PATENT OFFICE

2,081,423

LISTING ADDING MACHINE

Loring Pickering Crosman, Maplewood, N. J., assignor to Gardner Company, Orange, N. J., a corporation of Delaware

Application June 19, 1936, Serial No. 86,072

3 Claims. (Cl. 197—127)

The invention has relation to listing adding machines, and more particularly to means for automatically ejecting a statement sheet from such a machine as part of a special program of operation.

The invention consists in the novel construction and combination of parts as set forth in the appended claims.

The present disclosure shows the invention applied to a Gardner calculating machine provided with a platen carriage, as disclosed in U. S. Patent No. 1,945,026, issued on January 30, 1934 to the present inventor and with tabulating mechanism disclosed in U. S. Patent No. 1,946,572, issued February 13, 1934, also to the present inventor.

In the accompanying drawings, illustrating the invention:

Fig. 1 is a front elevation of the platen carriage, with certain connections with the mechanism in the base of the machine shown in section.

Fig. 2 is a right side elevation of the same, with the carriage shown in closed or operating position.

Fig. 3 is a similar view with the carriage shown in open or ejecting position.

Fig. 4 is a vertical section through the platen and feed roll mechanism, the carriage being shown in closed position.

Fig. 5 is a similar view showing the parts in position taken when the carriage is open.

Fig. 6 is a right side elevation of the carriage control means in the base of the machine, with parts in section.

Fig. 7 is a detail side elevation of the carriage tabulating drum, with parts broken away.

Fig. 8 is a rear elevation of the tabulating escapement means, with parts broken away.

Fig. 9 is a right side elevation of the add and paper ejection keys and associated parts, with parts shown in section.

Fig. 10 is a detail sectional view of the carriage return and paper ejection clutch.

Figs. 11 and 12 are detail views of the clutch operating mechanism.

In these drawings the numeral 500 (Figs. 1-5) designates the cylindrical platen, mounted in a transversely shiftable carriage which is provided also with means for holding a statement sheet in position opposite the printing devices in the base of the machine.

During the printing operation, the statement sheet is held against the platen by idler rolls 531, mounted upon plates 532 which are movable to bring the rolls 531 out of contact with the platen 500 when the statement sheet is to be ejected out

of the machine and a new sheet inserted. In this movement of plate 532 to open position a pair of feed rolls 507, 508, normally held apart from each other (Fig. 4), are brought into contact (Fig. 5), whereupon rotation of roll 507 will feed the statement sheet, between said roll and roll 508, out of or into the machine.

The paper rests upon guides 506 carried in a frame which is adjustable relatively to the platen carriage proper, the two frames being connected by links 526, best seen in Fig. 3. Means are provided whereby movement of the paper guide frame upon the links 526 will adjust the rolls 507, 508 and 531 in the manner above mentioned, this means comprising a toggle link 527 between the two frames, which toggle will be in the bowed position shown in Fig. 2 when the carriage is closed (that is to say when the rolls 531 are against platen 500 and the rolls 507, 508 are separated). Straightening of toggle 527 into the position shown in Fig. 3 will move the plate 532 into open position by means of a link 533 connecting said plate with the forward link 526. This forward link 526 is also provided with a projection 529 which in the movement of the parts to open position will engage a spring retracted plate 530 upon which the rolls 508 are mounted, and will thereby force the rolls 508 into contact with the rolls 507, the latter being mounted upon a shaft 509 journaled in the paper guide frame.

The carriage is opened automatically, in connection with means for automatically ejecting the statement sheet, and may be closed by the operator through manipulation of a thumb lug formed in one of the elements of the toggle 527.

The carriage is automatically opened by operation of rods 538, pivotally connected to the toggles 527 at opposite sides of the machine, a bail 560 being pivotally connected to the lower ends of the rods 538 and normally held, by a spring 561 in position against the rear face of or above a bail 562, pivotally mounted in the base of the machine at 563, as seen more clearly in Fig. 6. Spring 561 has a toggle effect upon bail 560, so that, as the carriage comes to closed position bail 560 will swing from a rearward position toward bail 562.

When the machine is operated in accordance with the controls illustrated herein, the platen carriage is moved back and forth between two adjacent tabulating positions, and movement of the carriage from one tabulated position to the other bringing one or the other of two opposed cams 564 (Fig. 1) into contact with a roller

565, fixed upon the bail 562, forcing the bail into its lower position, bail 560 being thereupon moved by spring 561 to position above bail 562. Bail 562 is held in either of its two positions of adjustment by means of a toggle spring 566, one arm of said spring being fixed to the frame of the machine.

The platen carriage is moved into its left-hand position (depressing the bail 562) by means of a tape 9, attached at one end to the carriage and at the other end to a spring drum 8 (Fig. 7). This movement of the carriage will occur upon the movement of a stop lever 7 (Fig. 8) to active position, this stop lever being mounted in the frame of the machine and having a lug 6 adapted to engage in notches of a tabulator bar 1 mounted in the carriage. Stop lever 7 is released near the end of a printing cycle of the machine by means of a pawl 184 having pin and slot connection 185 with the frame of the machine and being adapted to be lifted from the position illustrated in Fig. 8, to a position overlying lug 6 of stop lever 7, by means of a lever 179 having a lug 180 engageable beneath the shoulder of a dog 182 pivoted upon pawl 184, lever 179 being operated by lever 177 (Fig. 6), 167, 171, shaft 164, lever 327, link 162 and arm 316, from the oscillating driving shaft 301 of the machine. In engaging over lug 6, pawl 184 moves dog 182 away from lug 180, whereupon a spring 187 will pull pawl 184 and stop arm 7 downwardly, releasing the carriage for movement to the left under the influence of spring drum 8.

The printing operation of the machine will also act to raise the bail 562, and thereby the bail 560 and rods 538, to open the carriage, this movement of bail 562 being effected by means of a roller 567 (Fig. 9) fixed upon the driving link 108 between arm 316 and the driven member 105 of the main clutch, roller 567 for this purpose contacting the end of a lever 568, having a rearward extension 569 engaging a pin 570 fixed in a forwardly extending arm of bail 562.

The printing operation being completed and the carriage opened, the paper will be ejected and the carriage returned to the right as follows:

A tape 241 (Fig. 1) is fastened at one end to a drum 269, fast upon the shaft 268 which has gearing connection 510, 511 with the shaft 509 upon which the feed rolls 507 are mounted. The other end of this tape is attached to a drum 235 (Fig. 10) having spring connection with a hub 237, this hub having in turn friction clutch connection 229, 234 with a motor driven shaft 231.

Feeding of a statement sheet into the machine will wind tape 241 about the drum 269, and upon engagement of the friction clutch, tape 241 will first rotate the drum 269 reversely, ejecting the paper by means of the feed rolls 507, 508, and after the tape is completely unwound from drum 269, continued operation through the clutch will return the carriage to the right, until the clutch is disengaged, whereupon spring drum 8 will engage the notch of tabulator bar 1 with the stop lug 6, to locate the carriage in its right-hand printing position.

The friction clutch is controlled as follows:

An arm 198 (Fig. 6), fixed upon the shaft 199 in the base of the machine, is provided with a roller 197 lying in the path of movement of a cam shoe 195 mounted in the platen carriage. Upon movement of the carriage into the left-hand position shoe 195 will contact roller 197 and rock arm 198 and shaft 199. Fixed upon

shaft 199 is a forward arm 218, having yieldable connection 219 with a link 220, the other end of link 220 is pivoted to a latch 222, carried upon a plate 223. Upon rocking of shaft 199 latch 222 will be pressed against a pin in the motor driven lever 327, movement of said lever in the operation of the machine causing latch 222 to drop behind the pin and to be operated thereby in the return movement of the parts. This will effect rocking of the plate 223, which plate has a yieldable link connection 226 with an angularly bent arm of plate 227 (Figs. 6, 10, 11 and 12). Plate 227 is provided with lugs 228 lying between two plates 229 of the clutch. Movement of plate 223, by its connection with the right angle arm of plate 227 will rock the latter plate on an axis running through the lugs 228, whereby said lugs will act to force the plates 229 oppositely toward plates 235 of the driven element of the clutch. Suitable anti-friction devices are interposed between the plates 229 and 235.

Upon movement of the platen carriage into its right-hand position, roller 197 will encounter a cam shoe 196, mounted in the carriage, and projecting oppositely to the cam shoe 195, whereby arm 198 and shaft 199 will be rocked in the opposite direction, retracting latch 222 from the pin in arm 327 and thereby releasing the clutch.

Means are provided for opening the carriage and ejecting the statement sheet with the carriage located in its right hand position, this means comprising a roller 571 (Fig. 6) fixed upon an arm of the bail 562, and adapted to contact with a shoulder 572 of an arm 573, pivotally connected to the arm 218. Upon lifting of bail 562 from the position illustrated in Fig. 6 roller 571, by engagement of shoulder 572 will push arm 573 forwardly, rocking arm 218, to engage the clutch as hereinbefore described. In this movement of bail 562 an edge 574 of arm 573 will engage a pin fixed in the framing of the machine, preventing further movement of arm 573 with bail 562, so that roller 571 will ride over the angle of shoulder 572 and engage the upper surface of arm 573. Roller 571 will be brought again into position opposite shoulder 572 when bail 562 and arm 198 are moved into the positions therein illustrated, as set forth in the appended description of operation.

The printing operation of the machine may be effected by operation of the add key 114, acting to release a spring operated lever 106 from latch 112, thereby effecting the release of clutch pawl 103, pivoted upon the driven clutch member 105 from engagement with lever 106, and allowing the pawl to drop into engagement with the teeth 104 of the driving clutch member. Alternatively, lever 106 may be released to effect the clutch by operation of the well known total or sub-total key means, and automatic operation of the total mechanism may be effected by pulling down the total key, as described in U. S. Patent No. 1,994,211, issued March 12, 1935 to the present inventor. In the present case the arm 206 (Figs. 1, 3 and 6) which effect the depression of the total key is operated by means of a cam 575, mounted upon the carriage, contacting with a roller 576, fixed on the arm 206, this contact being effected as the carriage is moved into its left hand position.

The lever 568 which effects the setting of the parts for the opening of the carriage and the ejection of the statement sheet upon the succeeding operation of the machine, may be provided with

a forward key extension 577, whereby the machine may be set to perform these operations whenever desired by the operator. This is principally useful when other programs of operation, not specifically herein described, are being used. The setting of parts, whereby the cams 195, 196, etc. are moved into inoperative position and replaced by other control devices is fully described in the Patent 1,946,572, hereinbefore referred to.

Operation

While the invention may be useful in any one of a number of different applications, it is illustrated herein in connection with a program operation which is used in bank statement and other work, in preparing the statements for transmission to the depositors and in preparing new statement sheets upon which future entries are to be made. These statement sheets are customarily made in two detachable parts; a left-hand part which is sent to the depositor and a right-hand part which is retained by the bank. The two tabular positions of the carriage hereinbefore referred to are designed to provide for printing upon the depositor's portion and the bank portion of the statement respectively. On the depositor's portion the new balance is to be printed, this balance being copied from the final balance appearing upon the bank's portion of the statement. Thereafter, this new balance is to be printed as an old balance upon both portions of a new statement sheet.

With the platen carriage of the machine located in its right-hand position; with the carriage open and with the control mechanism in the position illustrated in Fig. 6, the operator inserts the old statement sheet into the machine and closes the carriage. The new balance is then set up on the keyboard of the machine and printed upon depression of the adding key 114, this serving also to register the amount of this new balance in an accumulator of the machine, in well known manner.

During this printing operation roller 567 of link 108 will contact with lever 568 and will thereby raise bail 562 to open the carriage. This raising of bail 562 will also bring roller 571 against the shoulder of arm 573, to rock arm 218 and engage the friction clutch 229, 234. Engagement of the friction clutch will act to wind tape 241 on drum 235, to eject the statement sheet and to move the carriage slightly to the right, bringing roller 197 onto cam shoe 196 and thereby reversely rocking arm 218 to disengage the clutch. In this operation bail 562 remains in raised position, and roller 571 engages the upper surface of arm 573.

The operator now inserts a new statement

sheet into the machine, closes the carriage and depresses the well known sub-total key, whereby the balance which has been registered in the accumulator is printed and the registration retained in the accumulator. During this printing operation the lever 179 is reciprocated to release the platen carriage, which is thereupon stepped to the left by the action of the spring drum 8. Movement of the carriage into the left-hand position brings roller 576 against cam 575, whereby the total key is depressed and the printing of the total and clearing of the register is effected in well known manner.

This movement of the carriage to the left also brings roller 197 against cam shoe 195 and roller 565 against cam 564, whereby the controls are set into position for opening the carriage, ejecting the new statement sheet and returning the carriage to the right, these operations following the printing of the total.

In moving back to the right, roller 565 will encounter cam 564 setting the controls in the position illustrated in Fig. 6, ready for the next series of operations.

I claim:

1. In a listing adding machine having a transversely shiftable platen carriage; the combination with printing operation means including a cyclically positioned member of normally inactive paper ejection means including elements settable into position for timed actuation by said cyclically positioned printing member, and a key manipulable to set said elements into active position in any shifted position of the platen carriage.

2. In a listing adding machine having a transversely shiftable platen carriage and printing operation means; normally inactive paper ejection means including elements settable into position for actuation by said printing operation means, and means operable as the carriage shifts into and also as it shifts out of its extreme left-hand position to set said elements into active position.

3. In a listing adding machine having a platen, a transversely shiftable platen carriage and printing operation means; paper feed means including a pair of ejector rolls, and a line spacer roll cooperating with the platen, normally inactive settable adjustment means including elements adapted to move the ejector rolls into engagement and to move the line spacer roll away from the platen, and means operable as the carriage shifts into and also as it shifts out of its extreme left-hand position to set the adjustment means into active position.

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