July 30, 1940. L. P. CROSMAN 2,209,512

PRINTING TABULATOR

Filed Nov. 9, 1939 2 Sheets-Sheet 1

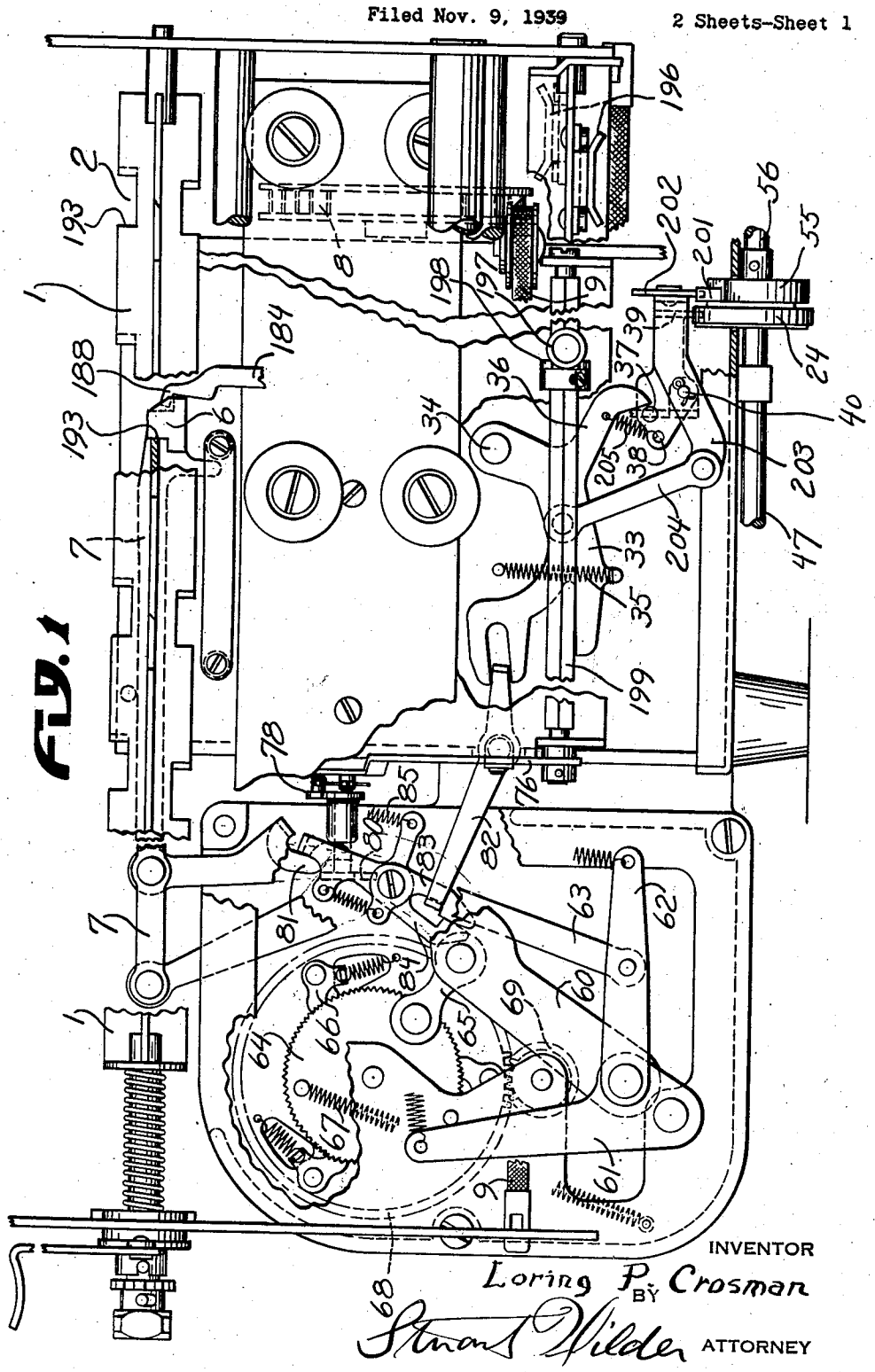


FIG. 1

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FIG. 6

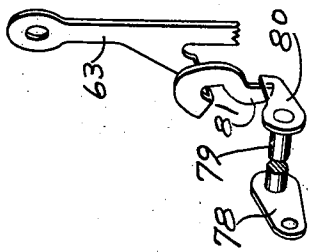


FIG. 3

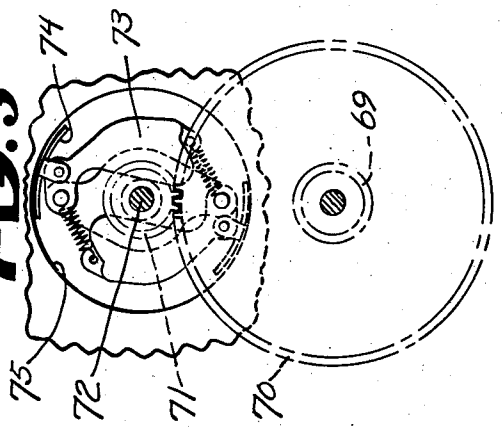


FIG. 4

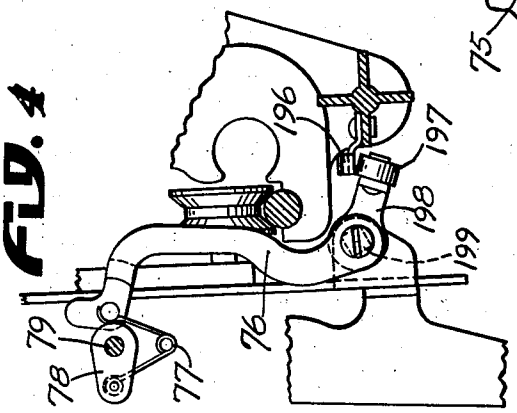


FIG. 5

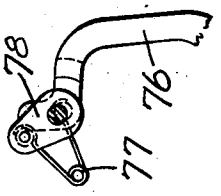
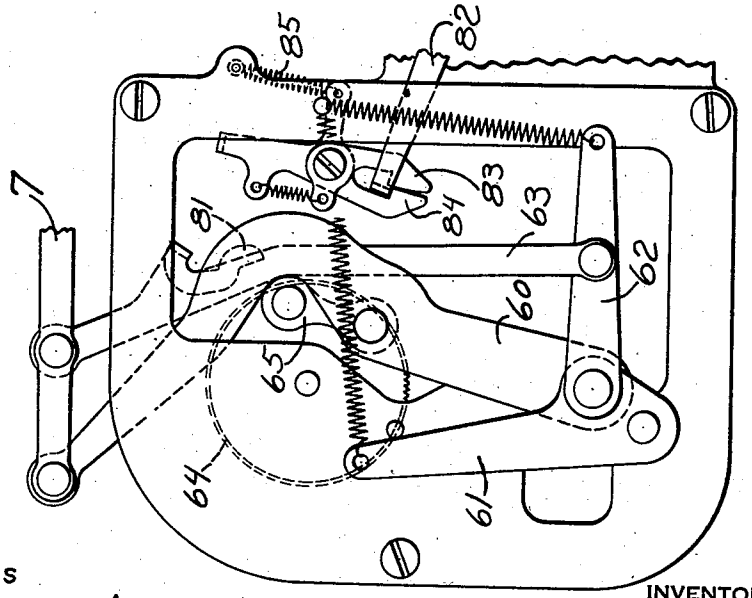


FIG. 2



WITNESS

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Patented July 30, 1940

2,209,512

UNITED STATES PATENT OFFICE

2,209,512

PRINTING TABULATOR

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

Application November 9, 1939, Serial No. 303,567

4 Claims. (Cl. 197—176)

The invention has relation to printing tabulators, being shown as applied to the tabulating mechanism of a listing calculator constructed in accordance with the disclosure of U. S. Patent No. 1,946,572, issued to the present applicant on February 13, 1934.

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

In the accompanying drawings, illustrating the invention:

Fig. 1 is a rear elevation of a listing calculating machine to which the invention is applied, the casing being removed and parts broken away.

Fig. 2 is a rear elevation of certain parts shown in Fig. 1, in position assumed during the tubiation of the platen carriage.

Fig. 3 is a detail elevation of the governor and associated parts.

Fig. 4 is a detail elevation of certain parts operated when the carriage reaches its extreme left hand position.

Fig. 5 is a detail of certain parts shown in Fig. 4, located in normal position.

Fig. 6 is a detail perspective view of the latch preventing operation of the governor.

The platen carriage of the machine is tabulated from right to left under the influence of a spring drum 8 (Fig. 1) connected to the carriage by a tape 9, the carriage being held in its various tabulated positions by means of a notched bar 1 mounted in the carriage, the walls of the notches forming spaced stops 193 engageable successively by the end 6 of a detent 7.

In the present instance detent 7 is pivotally supported on a lever 60 fulcrumed upon a spring tensioned arm 61 forming a yieldable extension of the stationary machine frame. The free end 6 of detent 7 is held upwardly, in contact with the stop face 193 by means of a spring urged arm 62, connected to the detent by link 63. The detent is disengaged from bar 1 by downward movement of a member 184, operated in known manner. Upon release of bar 1 by the end 6 of the detent the carriage will be pulled to the left by the spring drum 8, and the detent, being released by the member 184, will rise under bar 1. The carriage having moved sufficiently to bring one of the notches 2 of bar 1 into register with the end 6 of the detent, the detent will rise further, under the influence of spring arm 62, and will contact with the wall 193 of the notch to arrest the platen carriage.

The object of the invention is to cushion the carriage as it is brought to rest in tabulating position, for which purpose lever 60 and detent 7 will be moved to the right when the detent is released from bar 1, and after engagement of the detent with the wall of the next notch 2 the final movement of the carriage into tabulating position will be resisted by a braking force applied to the lever 60.

Lever 60 is therefore connected to a ratchet disk 64 by means of a link 65, said disk ratcheting idly under the pawls 66 in the movement of lever 60 to the right, this movement being effected under the influence of a spring 67, attached at one end to disk 64 and at the other end to the framing of the machine. Upon movement of lever 60 to the left, under the influence of spring drum 8, link 65 will rotate disk 64 from the position shown in Fig. 2 into that of Fig. 1, and the ratchet teeth of the disk will engage the pawls 66 to rotate a gear wheel 68, on which the pawls are mounted. Gear 68 is connected through gearing 69, 70, 71 (Figs. 1 and 3) with the shaft 72 of a centrifugal governor comprising pivoted arms 73 and brake shoes 74 attached to said arms and operating upon a stationary braking surface 75. Thus the final movement of the platen carriage into the new tabulating position will move detent 7 and lever 60 to the left, rotating the governor and bringing the brake shoes 74 into contact with the surface 75, to arrest the carriage movement gradually. In order to keep the action of the governor even the diminishing speed of the carriage is compensated by a relative speeding up of the governor, the link 65 and the lever 60 having a toggle action in moving from the position of Fig. 2 to that of Fig. 1, for this purpose. A further advantage of the toggle action of members 60 and 65 consists in the fact that the minimum resistance to movement of the carriage is exerted at the beginning of the movement, so that detent 7 will be engaged by the stop face 193 quietly and without shock.

A second toggle is formed by link 65 and disk 64, working oppositely to the first named toggle, in that the movement of lever 60 from the position illustrated in Fig. 2 to that of Fig. 1 will be increasingly resisted by the braking action of the governor, because the toggle 64, 65 will be moving from approximately right angular position into the approximately dead center position illustrated in Fig. 1. Thus the toggle 64, 65 will be loaded by the governor and the carriage will be brought to rest in an approximately harmonic movement by a substantially uniform resistance, having the advantage over a spring loaded toggle of providing resistance of a non-elastic character,

whereby the carriage will be stopped at a definite point when the toggle is open, and whereby any rebounding tendency will be eliminated.

Since the lever 60 is mounted on the yieldable arm 61, shock will be taken up in case pressure is exerted on the carriage while detent 7 is in latching position, but the spring is sufficiently stiff to prevent tabulation of the carriage beyond its stopping position.

The governor may be disabled when the carriage is returned from extreme right to extreme left hand position by the following means:

A rock shaft 199 mounted in the stationary frame of the machine is provided with an arm 198 having a roller 197 adapted to be contacted by a cam 196 on the carriage, as the carriage moves to its extreme left hand position. Rock shaft 199 is also provided with an arm 76 (Figs. 1 and 4) having toggle spring connection 77 with a crank arm 78 of stud shaft 79. Shaft 79 is also provided with an oppositely extending crank arm 80, as seen in Fig. 6, this arm normally lying out of the path of movement of a lug 81 of the link 63. Upon displacement of roller 197 by cam 196, arm 80 will be brought into the path of movement of lug 81 and movement of detent 7 and lever 60 to the left will thereby be prevented.

As the carriage reaches its extreme right hand position a cam similar to the cam 196, but oppositely disposed (as seen in Patent No. 1,946,572), will engage roller 197 and return the parts to normal position, disengaging crank arm 80 from link 63. During this reverse movement of the platen carriage a beveled face of the end 6 of detent 7 will engage the walls of the notches 2 of bar 1, and the detent will be cammed downward, out of said notches. As the carriage is released from the urge of the return mechanism, the wall 193 of the first notch 2 will be engaged by detent 7 and the carriage held in its first tabulating position.

According to the disclosure of Patent No. 1,946,572, certain operations of the machine are automatically initiated whenever the carriage is brought to rest in a new tabulating position, modified mechanism for this purpose being provided to cooperate with the parts of the present invention.

The desired operations are accomplished by the engagement of a clutch 24 (Fig. 1) whereby movement of a motor driven shaft 47 will be transmitted to a shaft 56. Clutch 24 is normally held in disengaged position by means of a detent 39, formed on a lever 38, fulcrumed at 40 and provided with a pin 37 lying in the path of movement of an arm 36 of lever 33, which is fulcrumed at 34 on the framing of the machine. Lever 33 has engagement with one arm of a lever 82, the other arm of which is provided with a lug normally engaging a latch 83. A latch release member 84 is pivoted concentrically with the pivot of the latch, the two members being urged toward contacting position by a suitable spring. In the normal position of the parts the free end of the releasing member 84 is held in contact with the lug 81 of link 63 by a spring 85. Upon movement of the parts into the position illustrated in Fig. 2 lug 81 will be withdrawn from member 84 and spring 85 will move latch 83 out of contact with the lug of lever 82, and a spring 35 will displace the levers 33 and 82 sufficiently to bring said lug below the shoulder of latch 83, resting upon a shoulder of the member 84. Upon movement of the parts back from the position illustrated in Fig. 2 to that of Fig. 1, lug 81 will contact with member 84, moving the shoulder thereof out of engagement with the lug of lever 82, whereupon spring 35 will bring the arm 36 of lever 33 against pin 37, raising detent 39 and allowing the clutch 24 to engage.

Near the end of the cycle of movement of clutch 24, a cam 201, mounted on a disk 55, fast to said clutch will contact with a roller 202 mounted upon lever 203, fulcrumed at 40, rocking said lever and thereby through link 204 moving lever 33 back to normal position, latch 83 now engaging under the lug of lever 82 to hold the parts in normal position. This will allow the clutch detent 39 to move into engaging position, under the influence of a spring 205, and release the clutch, terminating the special operation referred to.

I claim:

1. In a printing tabulator, the combination with a power urged platen carriage having spaced stops, a stationary frame, and a releasable detent supported from said frame and adapted to engage said stops; of an automatically governed brake, and connections between said detent and the brake, adapted to allow a limited movement of the detent upon engagement thereof with a stop during tabulation, including variable leverage elements adapted to effect substantially harmonic deceleration of said movement of the detent during uniform rate movement of the brake.

2. In a printing tabulator, the combination with a power urged platen carriage having spaced stops, a stationary frame, and a releasable detent supported from said frame and adapted to engage said stops; of an automatically governed brake, and connections between said detent and brake, adapted to allow a limited movement of the detent upon engagement thereof with a stop during tabulation, including toggle elements adapted to effect substantially harmonic deceleration of said movement of the detent during uniform rate movement of the brake.

3. In a printing tabulator, the combination with a power urged platen carriage having spaced stops, a stationary frame, and a releasable detent supported from said frame and adapted to engage said stops; of an automatically governed brake, connections between said detent and the brake, adapted to allow a limited movement of the detent upon engagement thereof with a stop during tabulation, including variable leverage elements adapted to effect substantially harmonic deceleration of said movement of the detent during uniform rate movement of the brake, and spring means operative to impart opposite movement to said detent upon release from a stop.

4. In a printing tabulator, the combination with a power urged platen carriage having spaced stops, a stationary frame, and a releasable detent supported from said frame and adapted to engage said stops; of an automatically governed brake, connections between said detent and the brake, adapted to allow a limited movement of the detent upon engagement thereof with a stop during tabulation, including variable leverage elements adapted to effect substantially harmonic deceleration of said movement of the detent during uniform rate movement of the brake, said connections also including pawl and ratchet elements, and spring means operative to impart opposite movement to said detent upon release from a stop.

LORING PICKERING CROSMAN.