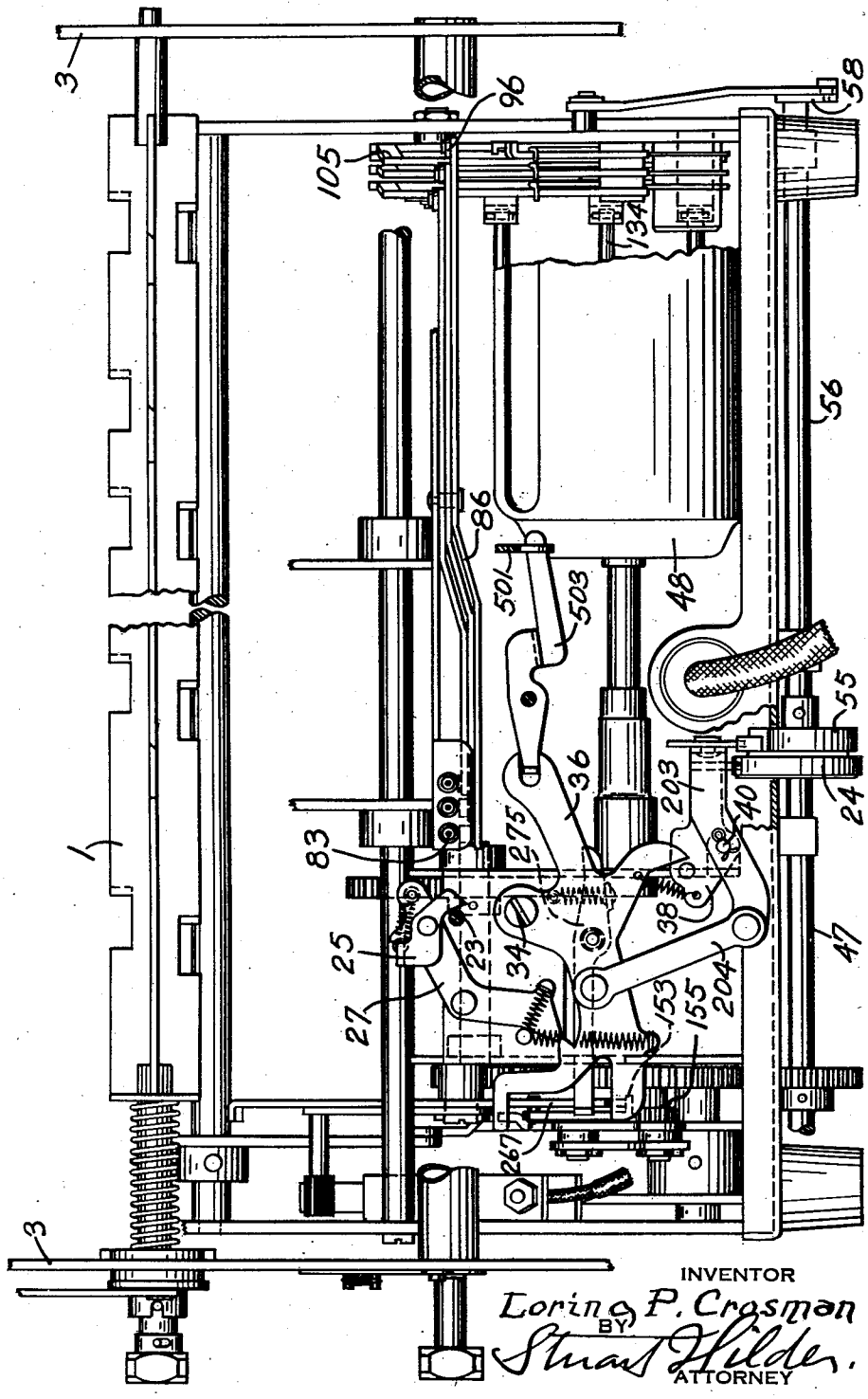
Jan. 21, 1941. L. P. CROSMAN 2,229,553

LISTING ADDING MACHINE

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FIG. 1



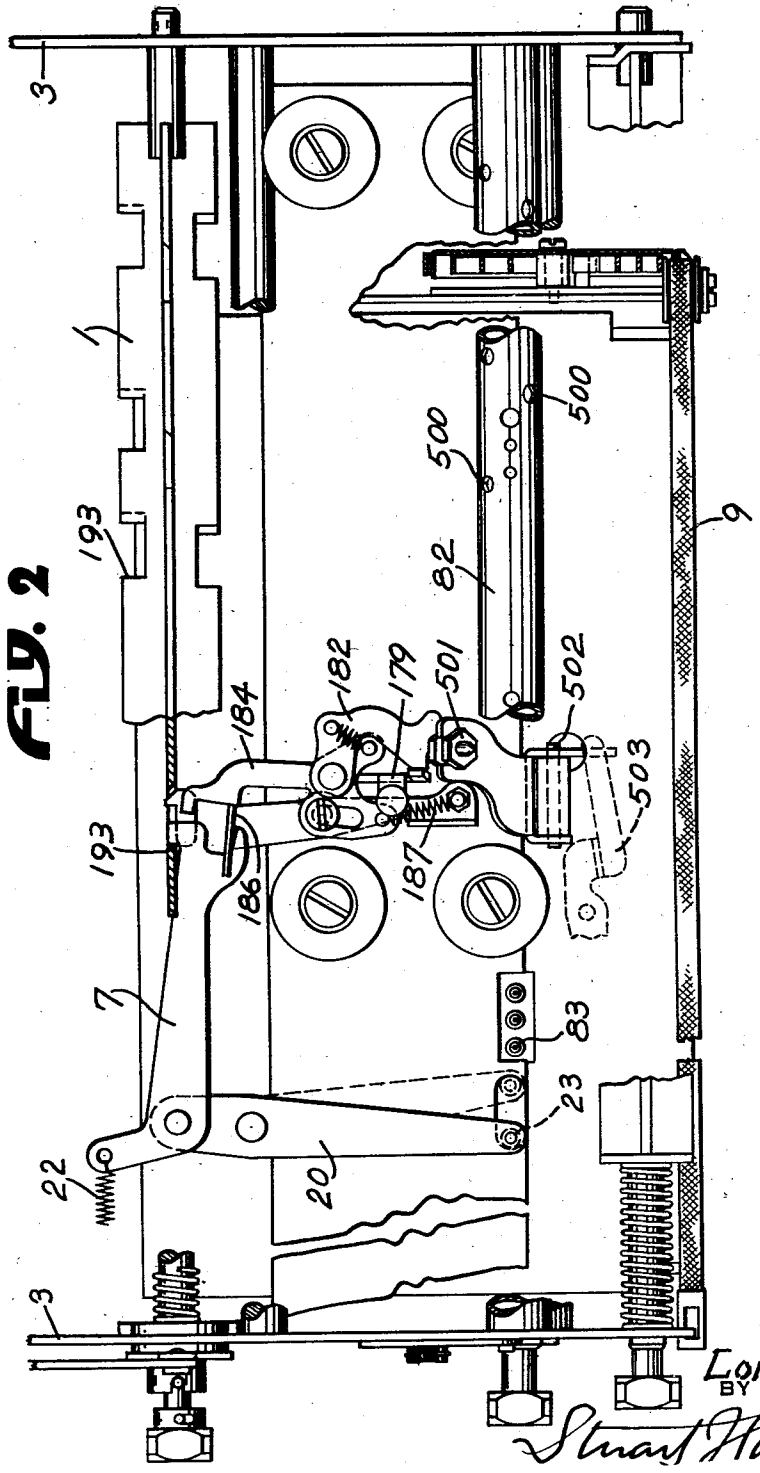
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LISTING ADDING MACHINE

Filed March 1, 1940 4 Sheets-Sheet 2

FIG. 2



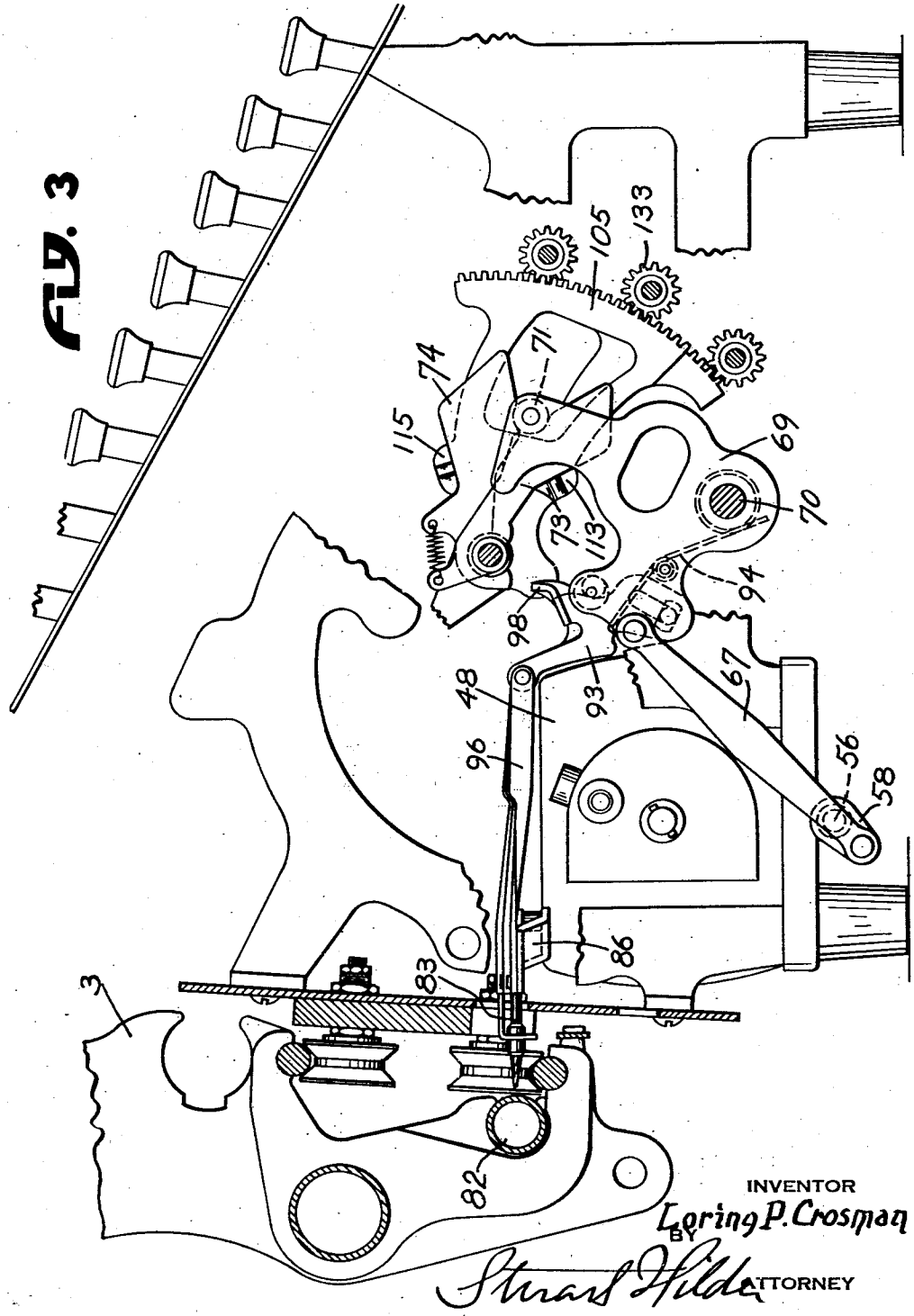
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FIG. 3



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LISTING ADDING MACHINE

Filed March 1, 1940 4 Sheets-Sheet 4

FIG. 4

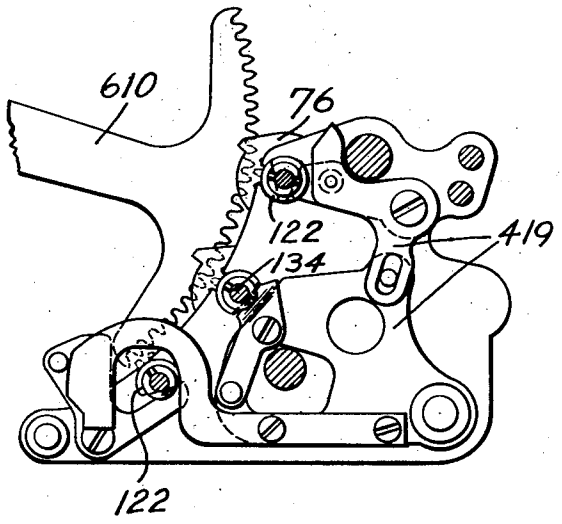
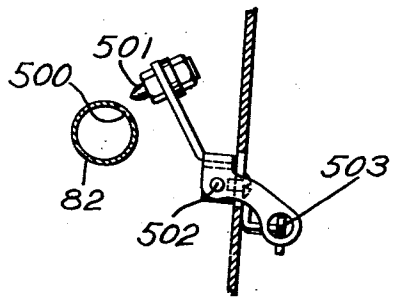


FIG. 5



Witness-
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Patented Jan. 21, 1941

2,229,553

UNITED STATES PATENT OFFICE

2,229,553

LISTING ADDING MACHINE

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

Application March 1, 1940, Serial No. 321,731

1 Claim. (Cl. 235—60)

The invention has relation to listing adding machines equipped with shiftable platens, tabulating means, and means for automatically controlling the sign character of a registration in accordance with the tabulated position of the platen.

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

In the accompanying drawings, illustrating the invention,

Fig. 1 is a rear elevation of a machine embodying the invention, with parts broken away and numerous parts removed.

Fig. 2 is a rear elevation of the tabulating means and associated parts.

Fig. 3 is a left side elevation of the sign controlling mechanism and associated parts.

Fig. 4 is a left side elevation of the accumulator adjusting mechanism and associated parts.

Fig. 5 is a detail left side elevation of the alignment feeler, with the related index element shown in cross section.

In these drawings the invention is shown as applied to a listing adding machine constructed in accordance with the disclosure of U. S. Patent No. 1,946,572, issued February 13, 1934, to Loring P. Crosman. The operation of this machine will be briefly described, reference being made to the above named patent for the detailed construction.

The amount to be registered and printed having been set up in the keyboard of the machine, and an operating key depressed, a clutch will be engaged, whereby power from an electric motor 48 (Fig. 1) will be made effective to register the amount in one or more accumulators and to print the item on a statement sheet supported in the platen carriage. The clutch, having made a single cycle, will be automatically disengaged. During this cycle of operation an arm 179 (Fig. 2) is reciprocated, first downwardly, allowing a spring latch pawl 182 to move into position above the arm, and thereafter upwardly, lifting pawl 182 and a trigger 184 pivotally connected therewith. Thus trigger 184 will be disengaged from a fixed plate 188 and allowed to rock, under the influence of a spring, so that a shoulder of said trigger is positioned above a tabulator detent 7, further rocking movement of the trigger operating to disengage the latch 182 from arm 179, whereupon the trigger will be retracted, by a spring 187, disengaging detent 7 from the shoulder 193 of a notched tabulator bar 1, mounted in the framing 3 of the platen carriage.

The platen carriage, being thus freed from the restraint of detent 7, near the end of the registering cycle of the machine, will be shifted by means of a tape 9, connected with a spring drum, until the detent is engaged by the shoulder or wall 193 of the next adjacent notch of bar 1. This engagement serves not only to arrest the platen carriage in its next tabular position, but also effects engagement of a clutch whereby the accumulator sign control mechanism is operated. This is effected as follows:

Detent 7 is pivotally mounted upon an intermediately fulcrumed lever 20 which is normally held by the platen carriage in the full line position, Fig. 2. Upon release of detent 7, the detent spring 22 will rock lever 20 into the dotted line position, moving a pin 23 of said lever idly past a click pawl 25 (Fig. 1).

Reengagement of detent 7 with the tabulator bar will cause lever 20, under the pull of the spring drum, to move back to the full line position of Fig. 2, bringing pin 23 against pawl 25 and thereby rocking a latch 27, on which said pawl is mounted, out of engagement with a spring operated lever 36, fulcrumed at 34 on the framing.

Upon operation lever 36 will engage a pin fixed in a clutch control lever 38, moving the latter about fulcrum 40, out of engagement with the pawl of a spring engaged, one cycle clutch 24, of well known design.

Clutch 24 is adapted to connect the motor 48 with a shaft 56, having fast thereon a crank arm 58 (Figs. 1 and 3), connected by link 67 with a rocker 69, mounted on shaft 70. Rocker 69 has spring connections 94 with a series of levers 93, connected each by a link 96 with one end of a whiffletree 86. The other ends of the whiffletrees are connected with feelers 83, having reduced free end portions adapted to allow the feelers three positions of adjustment toward the axis of an index tube 82, mounted in the platen carriage, in accordance with the location of a large perforation of said tube, a small perforation or no perforation, in the path of movement of the feeler.

Movement of rocker 69, transmitted from drive shaft 56, will, through springs 94 and suitable guide connections between the rocker and the levers 93, first move these levers forwardly and the feelers 83 rearwardly until the feelers are stopped in one of three positions by index tube

82. Continued movement of rocker 69 will now lift the levers 93 about their connections with the links 96 as a fulcrum, bringing a lug 98 of each lever into contact alternatively with a cam plate 73, into neutral position between the plates, or into contact with a cam plate 74, according to the positioning of the related feeler 83 by the index tube 82. Normally, the cam ends of plates 73, 74 are held in separated position by spring means, but contact of the lever 93 with either plate will swing it toward the other plate, bringing the outer cam edge of the former plate into the path of return movement of a roller 71, mounted on the rocker 69.

Cam plates 73, 74 extend between lugs 113, 115 of a gear segment 105, so that the segment will be held in its median position, or will be rocked in one or in the other direction, by the action of roller 71 on the cam plates, in accordance with the indexing of tube 82 in the given position of the platen carriage.

The segments 105 engage each with a pinion 133 mounted on a shaft having universal joint connection with the shaft 134 (Fig. 4) supporting an accumulator 76.

Each accumulator shaft 134 has fast thereon one or more cams 122 adapted each when the shaft is held by segment 105 in a displaced position to cooperate with a related cam formed upon a rocker 419, which is reciprocated once during each registering cycle of the machine. When a cam 122 lies in the path of movement of a cam portion of rocker 419, the related accumulator will be moved radially of the reciprocatory differential actuator segments 610, and held with the accumulator gears in mesh with said segments during the stroke thereof in one direction. This will effect addition or subtraction in the accumulator, as the case may be, a non-add operation being provided for by holding the cams 122 out of engaging position with the cams of rocker 419.

Near the end of the cycle of clutch 24 the tooth of a disk 55 will be brought into contact with a restoring lever 203, fulcrumed at 40 and having a link connection 204 with lever 36. The action of the toothed disk 55 will, therefore, restore lever 36 to normal position, where it will be reengaged by latch 27.

In order to prevent initiation of a registering cycle during the setting of the sign control mechanism, a spring escapement latch 275 (Fig. 1) is adapted to locate in the path of movement of the registration clutch control lever 267, when said lever is moved into position to reengage the spring pawl 153 of the clutch, and lever 36, in moving to operated position, will raise the escapement latch and will in turn lie in the path of movement of lever 267. Restoration of lever 36, upon the completion of the setting operation, will release clutch control lever 267, for response to depression of the operation key.

All of the above described mechanism is to be found in the disclosure of Patent No. 1,946,572.

Platen carriage location

It is important that the platen carriage be accurately located before the feelers 83 are moved toward the axis of the index tube 82, both to prevent distortion of the feelers by lateral stresses and to prevent incorrect setting of the sign control mechanism, by misalignment of the feelers with the index perforations of the tube.

Also, the tabulator bar 1 is made with a plurality of notched flanges and the index tube 82 with a plurality of rows of perforations, the bar and tube being mounted in the framing 3 of the platen carriage so as to be capable of rotary adjustment, to bring any one of several different stop shoulders and index perforations into active position, according to the programme of operations desired. Patent No. 1,946,572 shows a chain connection between the bar 1 and the tube 82, but as these machines have been built, the chain is omitted and the two members are separately adjustable, whereby a certain flexibility of adjustment is secured. With this latter arrangement, however, it is important that every tabulated position of the platen carriage should bring a given group of index perforations opposite the feelers, which might not be the case if bar 1 and tube 82 were so relatively adjusted as to provide for in appropriate tabulation.

It is the object of the invention to prevent such erroneous operations.

For this purpose auxiliary index perforations 500 (Figs. 2 and 5) are provided in the tube 82, and an auxiliary feeler 501 is pivoted in the framing of the machine at 502. A forward arm of this feeler has a perforation engaged by one arm of an intermediately fulcrumed lever 503, the opposite arm of which engages a slot formed in lever 36 (Fig. 1).

Therefore, whenever latch 27 is tripped by the location of the platen carriage in a new position lever 36, under the influence of its spring, will rock feeler 501 toward the axis of tube 82. Since the index perforations 500 are accurately positioned in relation to the perforations engaged by the feelers 83, it will follow that when the carriage is accurately positioned the feeler 501 will enter the perforation 500, and the operation will proceed as described above. In case of mislocation of the platen carriage, however, feeler 501 will travel only a short distance and will be arrested on the periphery of tube 82. This limited movement of feeler 50 is not sufficient to free the clutch 24. The feelers 83 will, therefore, not be moved, and the operation key of the machine will be ineffective, until the carriage is brought into correct position, either by pressure exerted against the carriage or by appropriate setting of bar 1 or tube 82.

I claim:

In a listing adding machine having accumulators and a shiftable platen carriage; the combination with tabulating means for said carriage including a releasable detent, and means settable to control the sign character of a registration to be effected in said accumulators including a device on said carriage having index configurations, feelers adapted to sense said index configurations, a clutch, power transmission connections between said clutch and said feelers, and a lever operable by the tabulator detent to engage the clutch; of means for insuring the alignment of the index configurations with the feelers including supplemental index configurations in said device, a feeler, and connections between said feeler and the clutch lever adapted to prevent engagement of the clutch when the feeler and supplemental index configurations are out of aligned position.

LORING PICKERING CROSMAN.