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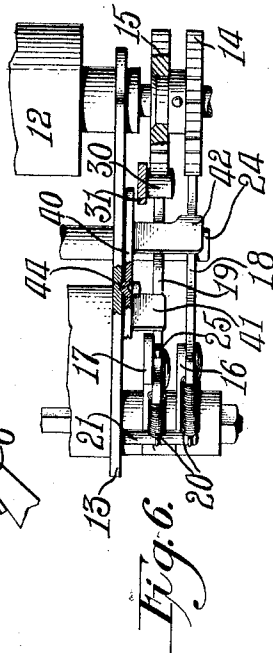
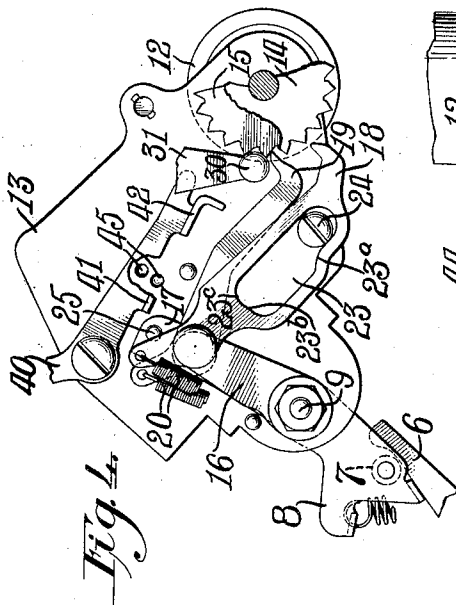
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R. L. MULLER

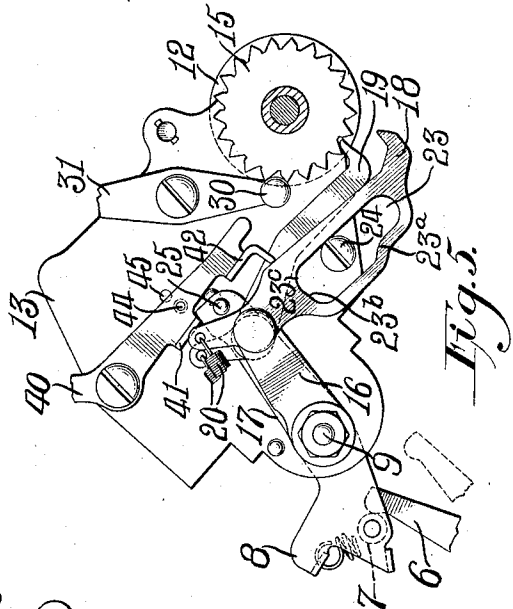
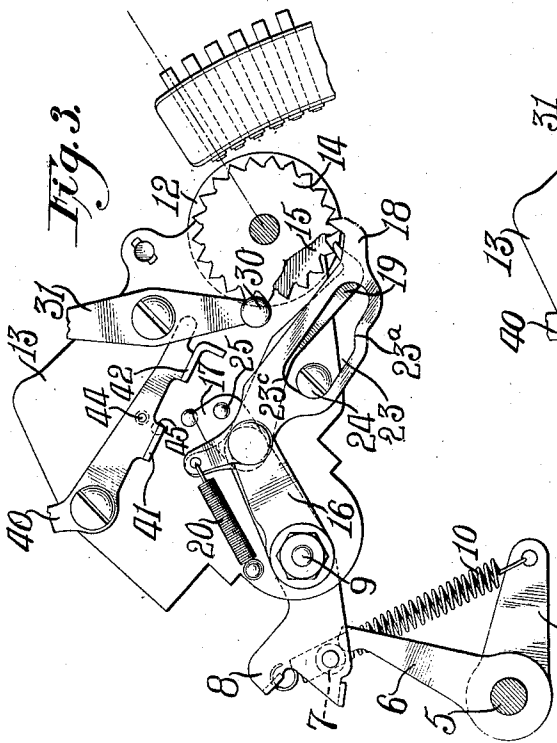
RECORDING MACHINE

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RECORDING MACHINE.

Application filed June 21, 1920. Serial No. 390,360.

To all whom it may concern:

Be it known that I, ROBERT L. MULLER, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Recording Machines, of which the following is a specification.

The invention relates more especially to recording mechanisms of adding machine, though not necessarily limited to this particular field, and pertains to the matter of so-called "visibility", the object being to so control the paper on which printing is done by the machine that there may be presented to the view of the operator matter already carried upon a form, such for example as the name of an employee, with the paper advanced beyond a position in which printing would be done upon it in association with such form-matter, the paper being then carried backward so as to bring it to the proper position for such printing and then when the printing has been done again advanced to such extent as to carry said form-matter and the printed item associated therewith beyond the position wherein it was first presented to the view of the operator and other form-matter, such as the name of another employee, brought to view. Mention has been made of names of employees because the invention finds one of its uses in facilitating the making up of a payroll upon a form bearing a list of the names of employees, such work being facilitated by reason of the fact that the name of each employee is brought to the view of the operator in advance, enabling him to look up the wage item and proceed to set it up upon the keyboard of the machine and thereupon operate the machine to print the wage item opposite the name of the employee, the paper being automatically fed backward for the purpose and then, in the same operation of the machine, being advanced to bring to the view of the operator the name of the next employee on the list.

In the drawings which accompany and form part of this specification Fig. 1 represents a foreshortened broken perspective of a sufficient portion of the recording department of an adding machine of a well known type to serve for illustration of an adaptation thereto of this invention, the

condition of the parts being that which obtains just as an operation of the machine starts; Fig. 2 is a left-side elevation of the same part of the machine on a somewhat larger scale and showing the parts at normal with a dotted line illustration of certain of them in positions which they would occupy at the middle of a cycle of operation of the machine; Fig. 3 is a generally similar view illustrating the condition as an operation of the machine starts; Fig. 4 is a like view illustrating the condition at the middle of a cycle of operation; Fig. 5 is a view of the same character illustrating a condition in which a certain pawl is disabled and the effective stroke of another pawl is curtailed so as to provide for ordinary single line spacing when the work in hand does not call for the automatic back-and-forth control of the paper; Fig. 6 is a plan view of parts shown in the preceding figures, with some of them broken away; and Fig. 7 represents an example of payroll work to which the invention lends itself.

Referring first to Fig. 1 the numeral 2 designates the base and 3 portions of frame side pieces of a "Burroughs Visible" adding machine, a drive shaft of which is designated by the numeral 4, and a countershaft by the numeral 5. The latter is oscillated through familiar operating connections with said drive shaft and carries the familiar arm 6 which normally engages a roller stud 7 on an arm 8 secured to a paper fed rock shaft 9. A spring 10 connects a branch of said arm 8 with another arm 11 on the shaft 5. Forward swinging of the operating arm 6 in the first part of an operation of the machine disengages it from the roller stud 7 and results in the pulling down of the arm 8. During the last part of an operation of the machine, said arm 6 swings rearward and restores the arm 8. This is the familiar action in these machines for effecting paper feed, the shaft 9 being arranged to reciprocate a pawl which coacts with a ratchet wheel on the roller platen 12. The latter is as usual journaled between side plates 13 of a suitable holder or carriage and has combined with it appropriate pressure rollers for paper feed purposes. In Fig. 1 the reference letter P designates a strip of paper which may be drawn from a roll and is introduced back of the platen and passes

under the same and around its front side and is then led rearward through suitable guides.

In the carrying out of the present invention the roller platen is provided with two ratchet wheels instead of one, the same being designated respectively by the numerals 14 and 15. They are reversely related as to tooth formation, inasmuch as the outer ratchet 14 is to be used for turning the roller platen backward whereas the inner ratchet 15 is to be used for turning said platen forwardly. On the aforesaid rock shaft 9 there are mounted and secured for oscillation therewith a pair of crank arms 16 and 17, the former of which operates a pawl 18 coacting with the ratchet wheel 14, and the other of which crank arms operates a pawl 19 coacting with the ratchet wheel 15. Each of these pawls is pivoted to its crank arm and has its tail connected by a spring 20 with a stud 21 projecting from the side plate of the carriage. The nose of the pawl 18 is square on its rear side to adapt it for engaging the teeth of the ratchet 14 for turning the platen backwardly, whereas the nose of the pawl 19 is reversely fashioned for turning the platen forwardly, functioning after the manner of the usual pawl. The crank arms 16 and 17 being normally at the end of their forward and downward throw, the two pawls occupy corresponding positions, their noses being about directly below the axis of the roller platen (Fig. 2). Both are normally disengaged from their ratchets. In the case of the pawl 18 this is caused by camming engagement between the rear end of a slot 23 in the pawl plate and a screw stud 24 secured in the side plate of the carriage. In the case of the pawl 19 the condition is brought about by the engagement of a stud 25 on the crank arm 17 with the upper edge of the pawl plate, all as illustrated in Fig. 2. The reason for establishing this normal condition is the usual one, viz: the desirability of leaving the roller platen free to be turned by hand. The usual dolly roll 30 on the spring-held lever 31 engages the inner ratchet wheel 15 so as to properly regulate the roller platen. Now the first thing that happens in an operation of the machine when the arm 6 moves from under the roller stud 7, is for the two pawls to be swung into engagement with their respective ratchet wheels, (Figs. 1 and 3) and then as the operation proceeds and these pawls are carried upward and rearward, the pawl 18 acts upon a tooth of the ratchet wheel 14 to turn the roller platen rearward, while the pawl 19 is simply slipping over the teeth of the ratchet wheel 15. In the particular form of embodiment of the invention here illustrated the effective stroke of the pawl 18 is two tooth spaces of the ratchet wheel or two line spaces upon

the paper. The aforesaid slot 23 is of the proper dimensions to provide for this, its under side having a cam formation 23^a to cooperate with the aforesaid screw stud for disengaging the nose of the pawl from the ratchet wheel after the above defined extent of backward movement of the platen has taken place. Fig. 2 shows the normal condition in which an oblique part 23^b of the upper or rear side of the slot 23 has been forced upon the screw stud with the effect of swinging the pawl plate slightly on its pivotal connection with the crank arm 16, the said screw stud then seating in a small notch 23^c in the upper part of said rear side of the slot. Figs. 1 and 3 illustrate the condition at the outset of the operation when the crank arm 16 has been slightly elevated and the pawl spring 20 has swung the pawl until the lower rear corner of its slot is engaged with the screw stud. Fig. 4 illustrates the condition at the middle of the operation when the said crank arm 16 is at the end of its initial swing and the pawl 18 has turned the platen two line spaces and has then been disengaged from the ratchet wheel 14 by reason of coaction between the cam 23^a and the screw stud, the latter then occupying the narrow forward end of the slot in the cam plate.

Now the parts are so proportioned and related that in this first half cycle of operation the other pawl 19 will have been carried back over four teeth of the ratchet wheel 15 so that it stands ready to advance the roller platen to the extent of four line spaces and will do so as the operation proceeds and the crank arms 16 and 17 are swung back to their normal positions. Of course the pawl 18 re-engages the ratchet wheel 14 but in its return movement this pawl slips idly over the teeth of the ratchet wheel 14.

As a concrete example of the practical uses of the invention let it be assumed that the adding machine is being employed for the purpose of making up a payroll and that a strip of paper is introduced upon which there is printed a list of names of employees and that said paper is first adjusted to bring the first name on the list two line spaces beyond the printing point. The operator observing this name looks up the amount of wage due this employee, sets it up upon the keyboard of the adding machine, and operates the machine to print that amount. As will be clear from what has already been explained as to the mechanism, the first thing that happens is a back-spacing of the roller platen two steps, which would of course result in bringing the first name on the list to the printing line. The printing then takes place, as is usual, at the middle of a cycle of operation of the adding machine. Then as the operation of the machine con-

tinues the roller platen will be advanced four line spaces which will cause the first name on the list, with the printed amount opposite it, to pass through the position it first occupied and two spaces beyond and will bring to view the next name on the list. Observing this name, the operator looks up the amount of wage due this employee and proceeds as before. It will be obvious that the automatic mechanism provided by the present invention will greatly facilitate the carrying on of work of this character, doing away entirely with the necessity, as heretofore, for working the platen back and forth by hand. Fig. 7 illustrates a partly completed payroll as it would appear when operating the machine in the manner above described. A similar illustration appears in Fig. 1 with the work carried somewhat farther.

It is of course desirable that a machine equipped with this automatic back-and-forth line spacing mechanism shall nevertheless be available for ordinary uses, and therefore provision is made for putting the back spacing pawl 18 out of commission and at the same time shortening the effective stroke of the other pawl 19 so that it will simply do single line-spacing as in ordinary work. To this end there is mounted upon the carriage side plate a lever 40 having a handle by which to manipulate it and being formed with flange lugs 41 and 42, the former operating to limit the preparatory throw of the pawl 19, and the other flange lug serving to hold the pawl 18 out of effective position. Fig. 5 illustrates this device in use. It will be noted that the flange lug 41 is there shown obstructing the crank arm 17 so as to limit the preparatory or upward and backward movement of the pawl 19 and thereby restrict it to movement taking its nose over a single tooth of the ratchet wheel 15 so that in its return movement it will only advance the platen a single line space. The other flange lug 42 has a down-turned portion which engages the forward edge of the pawl plate 18 to prevent the nose of this pawl from engaging the ratchet wheel 14 at all. The two positions of the lever 40 are made certain by the simple expedient of punching a detent formation in the lever at 44 and providing spaced depressions 45 in the carriage side plate, the resiliency of the metal out of which the lever is made being effective to cause the proper coaction between this detent and the depressions.

It will be understood that the invention is alike usable upon a machine in which the paper carriage is of the familiar laterally-shiftable character. In such case a rock shaft of square cross-section is employed (such as shown, e. g., in Gardner Patent 1,223,379 issued April 24, 1917) having the same function as the rock shaft here desig-

nated 9, such rock shaft sliding through the hub of the arm 8 while the latter is confined against lateral movement.

I claim:

1. In a recording machine, the combination of a roller platen having reversely related ratchet wheels; a rock shaft with crank arms; pawls pivoted on said arms respectively; springs applied to the pawls; and means for rocking the shaft, one of said pawls adapted to turn the platen backward during the initial stroke of the rock shaft, and the other pawl adapted to turn said platen forward and twice as far during the return stroke of the rock shaft; with provisions for disengaging the pawls from the ratchets at the ends of their respective platen-turning excursions and also for disengaging one of said pawls from its ratchet at the end of the idle excursion of said pawl.

2. In a recording machine, the combination of a roller platen having reversely related ratchet wheels; a rock shaft with crank arms; pawls pivoted on said arms respectively; springs applied to the pawls; means for rocking the shaft, one of said pawls adapted to turn the platen backward during the initial stroke of the rock shaft, and the other pawl adapted to turn said platen forward and twice as far during the return stroke of the rock shaft; and a settable lever having a part to engage and hold out of action the first pawl and a part to limit the stroke of the other pawl.

3. In a recording machine, the combination of a roller platen having reversely related ratchet wheels; a rock shaft with crank means; pawls pivoted on said crank means; springs applied to the pawls; a stationary pin; and means for rocking the shaft, one of the pawls adapted to turn the platen backward during the initial stroke of the rock shaft and having a cam portion cooperating with said pin for disengaging such pawl from its ratchet wheel during the latter part of its platen-turning excursion, and the other pawl adapted to turn said platen forward and twice as far during the return stroke of the rock shaft; with provision for disengaging the last mentioned pawl from its ratchet at the end of its platen-turning excursion.

4. In a recording machine, the combination of a roller platen having reversely related ratchet wheels; a rock shaft with crank means; pawls pivoted on said crank means; springs applied to the pawls; a stationary pin; and means for rocking the shaft, one of the pawls adapted to turn the platen backward during the initial stroke of the rock shaft and having cam portions cooperating with said pin for disengaging such pawl from its ratchet wheel during the latter part of its platen-turning excursion and at the end of its idle excursion, and the

other pawl adapted to turn said platen forward and twice as far during the return stroke of the rock shaft; with provision for disengaging the last mentioned pawl from its ratchet at the end of its platen turning excursion.

5 5. In a recording machine, the combination of a roller platen having reversely related ratchet wheels; a rock shaft with crank means; pawls pivoted on said crank means; springs applied to the pawls; a stationary pin; and means for rocking the shaft, one of the pawls adapted to turn the platen backward during the initial
10 stroke of the rock shaft and having a cam

portion cooperating with said pin for disengaging such pawl from its ratchet wheel during the latter part of its platen-turning excursion, and the other pawl adapted to turn said platen forward and twice as far
15 during the return stroke of the rock shaft; with provision for disengaging the last mentioned pawl from its ratchet at the end of its platen-turning excursion; and a
20 settable lever having a part to limit the stroke of the last mentioned pawl and a part to engage and hold out of action the other pawl.

ROBERT L. MULLER.