April 19, 1938. T. O. MEHAN 2,114,604

COMPUTING AND LISTING MACHINE

Filed May 15, 1935 6 Sheets-Sheet 1

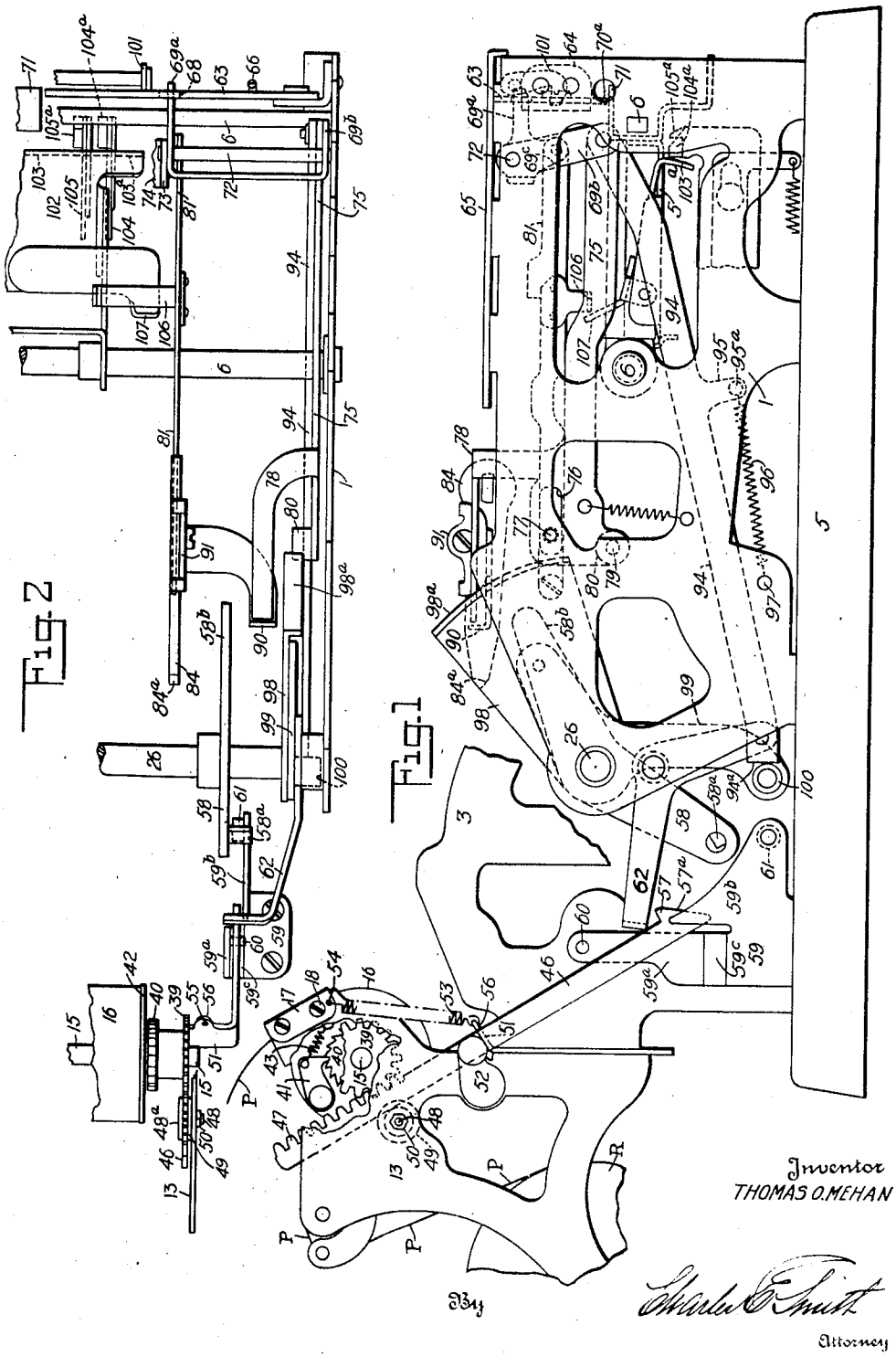


Fig. 2

Fig. 1

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COMPUTING AND LISTING MACHINE

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Fig. 3

Fig. 4

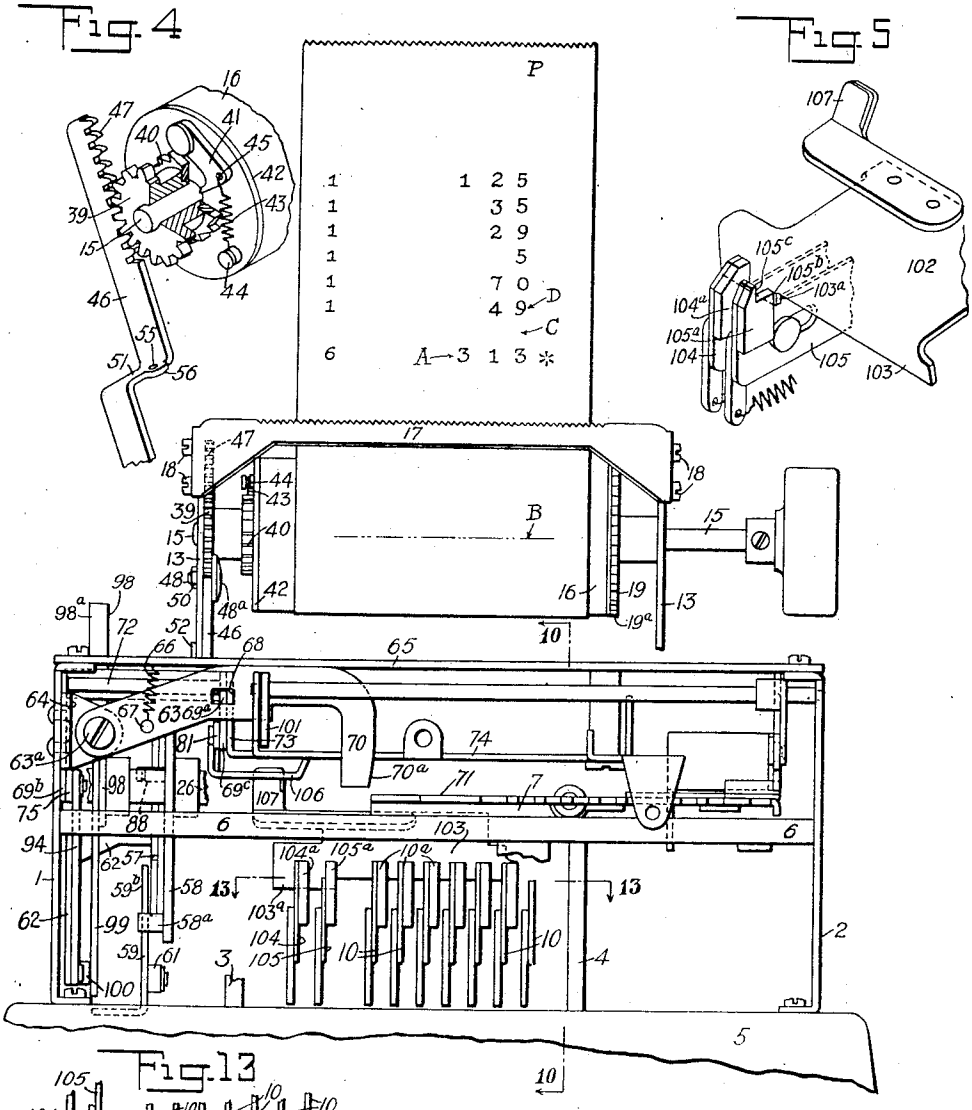
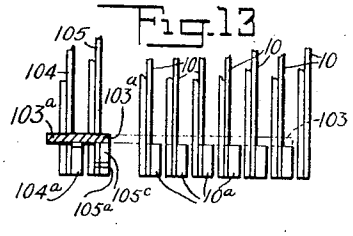


Fig. 5

Fig. 13



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COMPUTING AND LISTING MACHINE

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Fig. 6

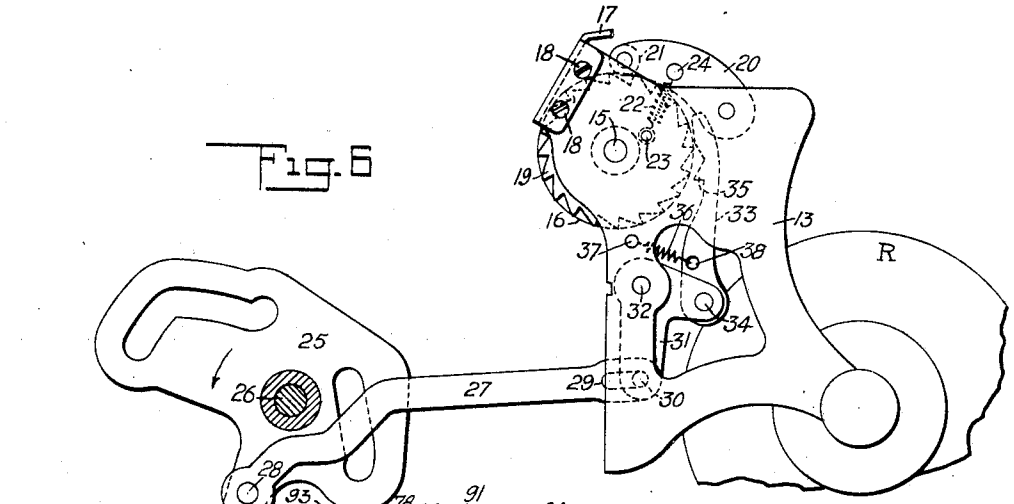
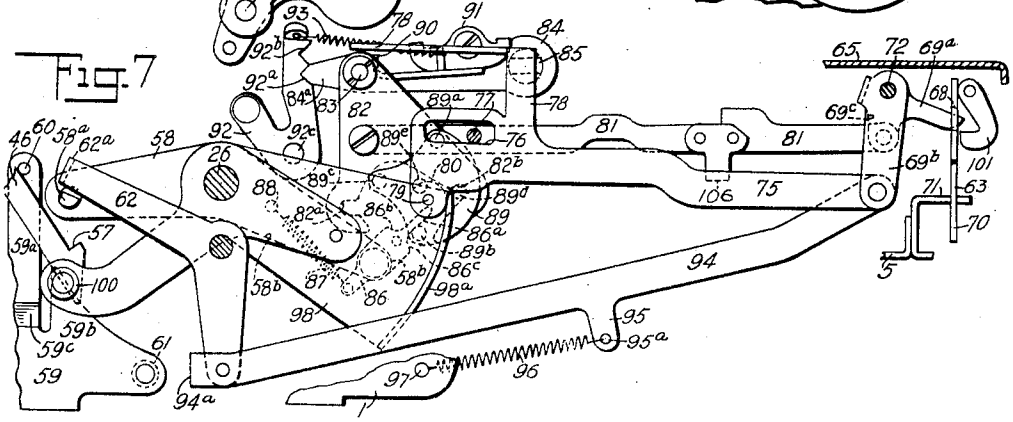


Fig. 7



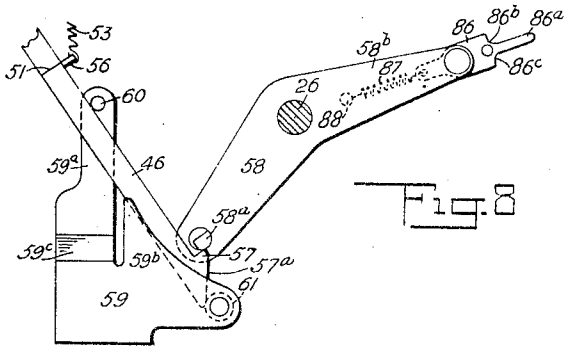


Fig. 8

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COMPUTING AND LISTING MACHINE

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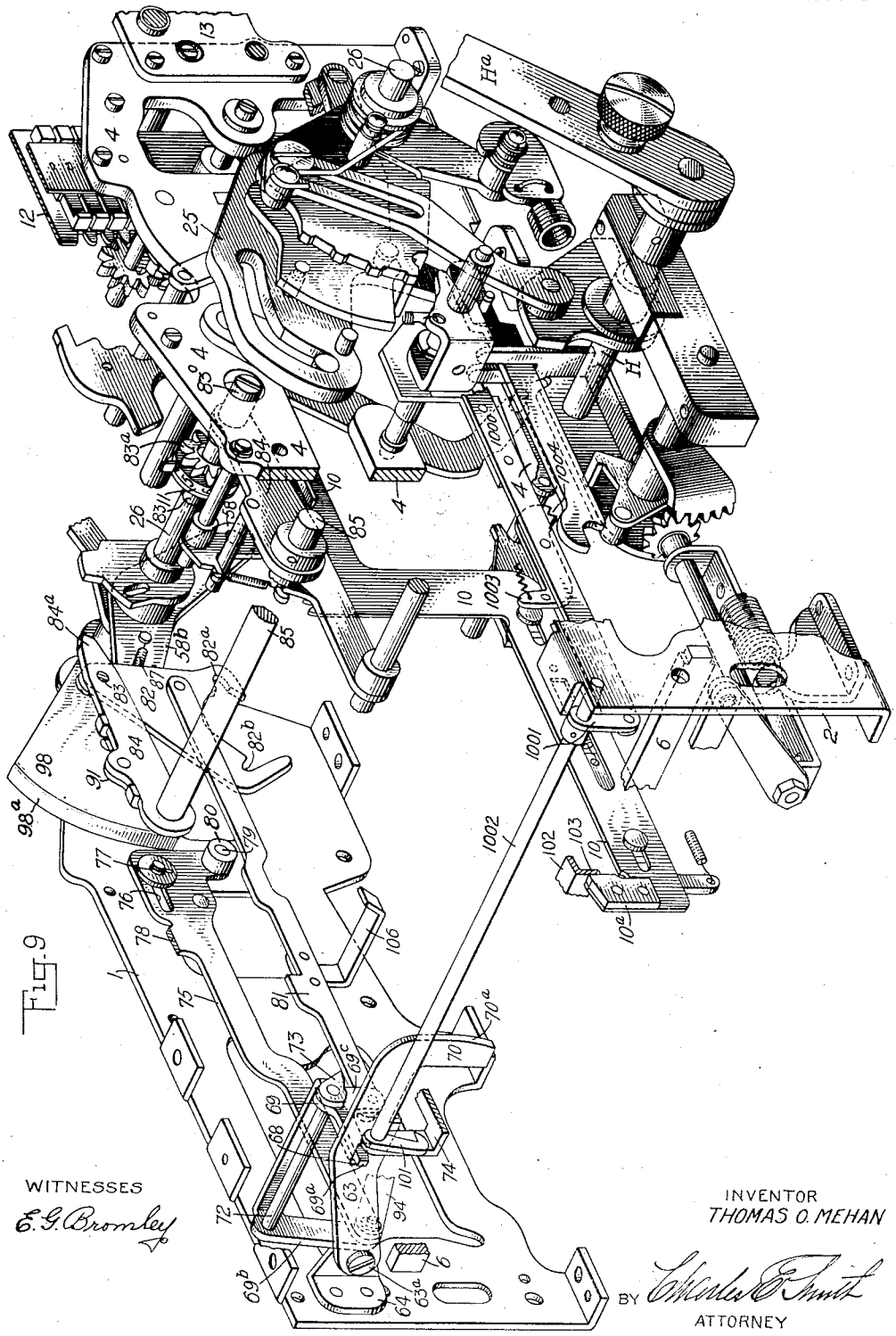


Fig. 9

WITNESSES

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COMPUTING AND LISTING MACHINE

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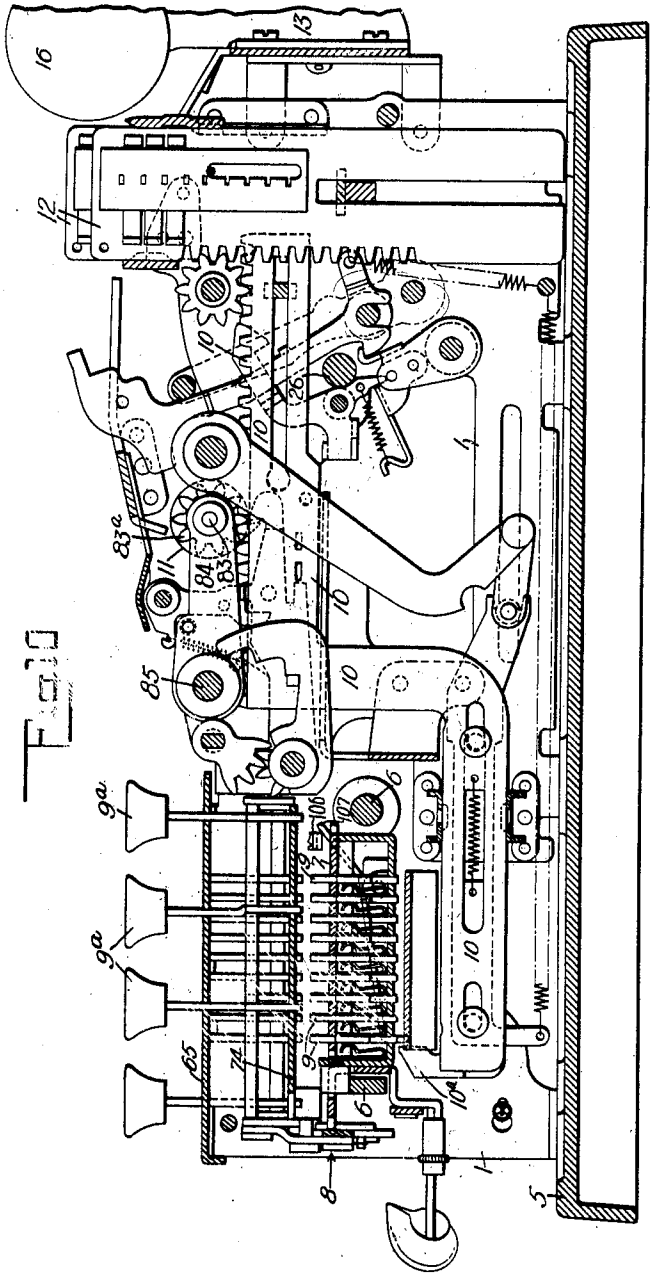


Fig. 10

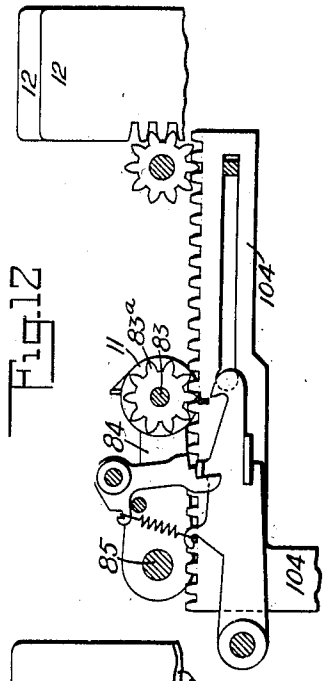


Fig. 12

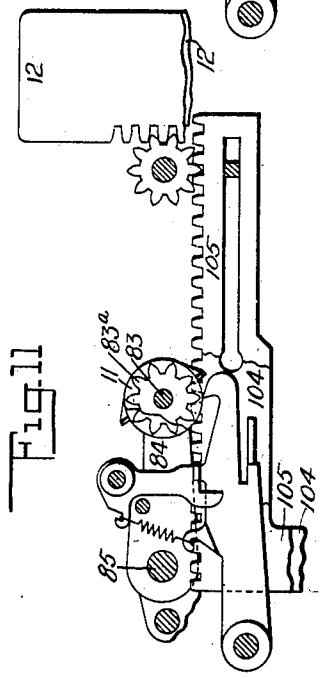


Fig. 11

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COMPUTING AND LISTING MACHINE

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FIG. 16

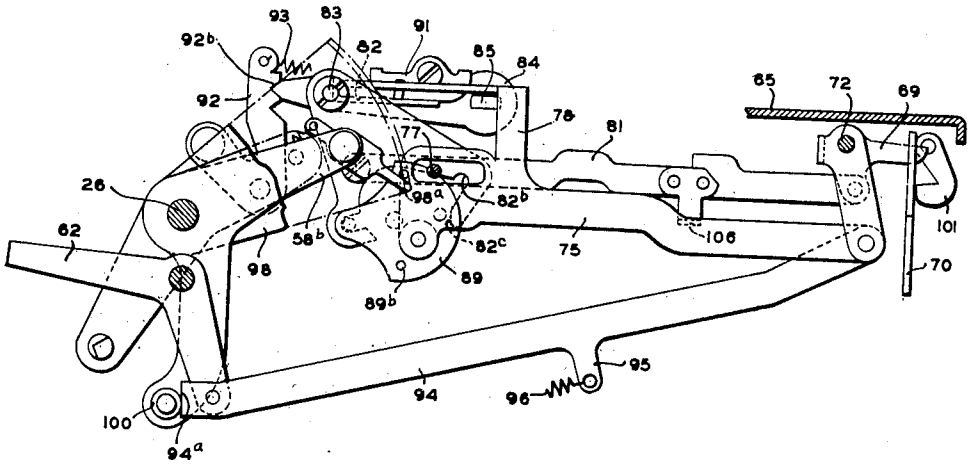


FIG. 15

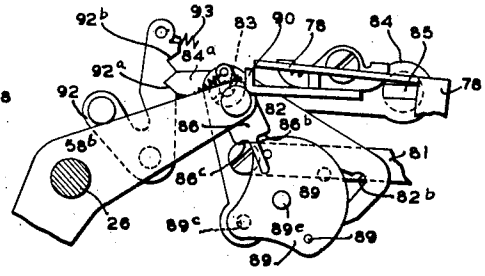
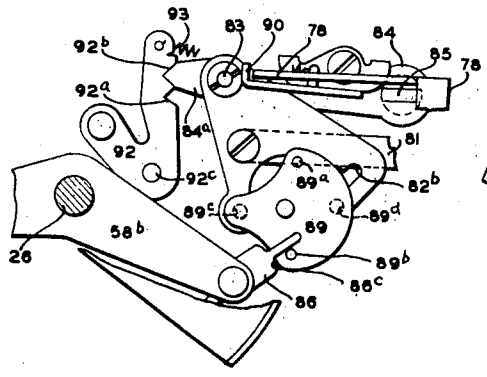


FIG. 14



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Patented Apr. 19, 1938 2,114,604

UNITED STATES PATENT OFFICE

2,114,604

COMPUTING AND LISTING MACHINE

Thomas O. Mehan, Norwood, Ohio, assignor to Remington Rand Inc., New York, N. Y., a corporation of Delaware

Application May 15, 1935, Serial No. 21,609

2 Claims. (Cl. 235—60)

One of the main objects of my invention, generally stated, is to provide a light, portable, compact and highly efficient computing and listing machine for use more particularly in stores, grocery stores for example, and whereby as each item purchased is listed, a numeral to indicate a single item will be automatically printed in line with the listed item and when the total of the amounts of said items is listed, the total of the number of items listed also will be automatically printed. It should be understood, however, that the machine is not restricted to such use, but may be employed wherever it is found available.

Among the more important features of my invention incorporated in the present machine may be enumerated the following:

(1) The provision of an improved automatic total-taking mechanism whereby a total is automatically taken after an actuation of the operating handle or main actuator while a blank stroke thereof is being effected.

(2) The provision of an improved jump paper feed mechanism whereby after each total-taking operation the paper strip is automatically fed a distance capable of bringing the total printed on the paper above the knife by which the printed portion of the strip is severed from the remainder thereof, so that the paper strip may be severed at the proper position with reference to the printed total.

(3) The provision of an improved automatically operating item counter for printing "1" in line with each item listed and registering and printing the total number of such items.

(4) The construction of the parts that enable a ready embodiment of the above mentioned features in a pin carriage machine of the type known as the "Monarch" machine without modifying or materially modifying the existing structural features of such machine.

To the above and other ends which will hereinafter appear my invention consists in the features of construction, arrangements of parts and combinations of devices set forth in the following description and particularly pointed out in the appended claims.

In the drawings wherein corresponding reference characters designate like parts in the various views—

Fig. 1 is a left-hand side elevation of a computing machine embodying my invention, some of the parts being broken away and other parts omitted entirely.

Fig. 2 is a fragmentary, top plan view of the same with certain parts omitted.

Fig. 3 is a front elevation of the machine, some of the parts being omitted and others broken away to clearly illustrate the jump feed and automatic total-taking mechanism.

Fig. 4 is an isometric view partly in section and illustrating the relation between the jump feed gear, jump feed link and the platen.

Fig. 5 is an isometric detail, showing parts of the item-counter adding-racks and their relation to the total stop.

Fig. 6 is a right-hand side elevation of the usual item feed devices for the platen and some of the associated parts.

Fig. 7 is a left-hand side elevation showing the automatic total-taking mechanism and a portion of the jump feed mechanism as it appears at the end of the forward stroke of the handle during a total-taking operation.

Fig. 8 is a detail, left-hand side elevation of a part of the mechanism illustrating the means for camming the jump feed link clear of the stud on the arm carried by the accumulator crank.

Fig. 9 is a fragmentary, isometric view showing a portion of the construction with the parts sectioned away and with parts omitted.

Fig. 10 is a vertical, fore and aft sectional view of the machine with parts omitted, the section being taken on the line 10—10 of Fig. 3 and looking in the direction of the arrows at said line.

Figs. 11 and 12 are detail, fragmentary, side views of the computing racks for the item counter mechanism together with the transfer or carrying devices therefore and some of the associated parts.

Fig. 13 is a detail, fragmentary, horizontal, sectional view showing the adding racks and some of the associated parts, the section being taken on the line 13—13 of Fig. 3 and looking in the direction of the arrows at said line.

Fig. 14 is a fragmentary section view showing the accummulator ball arm, the accumulator shifting link and their associated parts in a position where the accumulator pinions are out of mesh with their respective actuating rack bars.

Fig. 15 is a sectional fragmentary view of the same parts as shown in Fig. 14, but with all the parts in normal position and with the accumulator pinions in mesh with their associated actuating rack bars.

Fig. 16 is a left-hand, elevational detail view of the essential parts of the totaling mechanism in the positions they assume at the end of a total stroke.

My invention is shown embodied in the present instance in a "Remington-listing-adding-calcu-

lating machine" or "Monarch" machine, which is a ten key computing machine of the character disclosed in my Patents Nos. 1,835,170, 1,876,719 and 1,899,444 and more particularly in said last mentioned patent. While the features of the present invention were designed primarily for use in said machine and may be readily incorporated therein without modifying, or materially modifying, the existing structural features thereof, it should be understood that the invention from certain aspects is not restricted to embodiment in such machine but may be included in computing machines generally, wherever found available.

In the accompanying drawings I have shown only so much of said Remington or Monarch machine as is necessary to illustrate my invention in its embodiment therein. Reference may be had to my above mentioned patents for more complete disclosure of parts which are not fully described herein.

Referring to Figs. 1, 3, 9 and 10 for a preliminary general understanding of the construction, it will be understood that said views show the machine as it appears with the outer casing removed. The frame of the machine comprises outer side plates 1 and 2 and intermediate or inner supporting plates 3 and 4, said plates 1, 2, 3 and 4 being suitably united and secured to a base 5. Guide rails 6 supported at their ends by the side plates 1 and 2 support and guide a pin carriage designated as a whole by the reference numeral 7. This carriage is adapted to travel step-by-step transversely of the machine under control of the usual escapement mechanism, designated as a whole by the reference numeral 8 in Fig. 10. The carriage supports pins or stops 9 mounted for movement thereon from an elevated ineffective position to a lowered effective position by the usual digit keys 9^a. When each selected pin 9 is depressed to effective position, it is interposed in the path of an aligned stop 10^a (Fig. 9) carried by an associated adding rack member 10 by which the registering dials 11 (Fig. 10) and the type bars 12 are controlled.

While a set-up of the machine is controlled by the actuation of the digit keys as indicated above, the operation of the machine to actuate the totalizer, the printing instrumentalities and the feed of the paper, etc., is brought about by the actuation of the main driving shaft H operated by a manually controlled handle or crank arm indicated at H^a in Fig. 9, although obviously the shaft H may be power actuated.

A platen supporting frame 13 is detachably secured to and is supported by the intermediate frame plates 3 and 4 and rotatably supports a shaft 15 of a cylindrical platen 16. A paper cutter or knife 17 is secured to the frame 13 by suitable means as, for example, by screws 18.

The platen 16 has two separate and distinct feeding mechanisms hereinafter referred to as the "conventional feed" or "line space feed", and as the "jump feed."

Conventional or line space feed

The mechanism comprising the conventional or line space feed (Fig. 6) may be of any well known construction for the purpose of feeding the platen 16 as a single line space after each item printing operation, and as shown comprises a ratchet wheel 19 fixed at the right-hand end of the platen 16 for rotation therewith and with its shaft 15. One end of a detent arm 20 is pivotally mounted upon the platen supporting frame 13 and the other end thereof carries a roller detent 21 which is held in engagement with the teeth of the ratchet wheel 19 by means of a spring 22 which at one end is attached to a pin 23 upon the frame 13 and at the other end is secured to a pin 24 on an arm 20. The usual controlling cam 25 is rigidly secured to an operating shaft 26. One end of a link 27 is pivoted to this cam at 28 and the other end has a slot 29 to receive a pin 30 carried by one arm of an angular lever 31. This lever is pivoted to the supporting frame 13 at 32 and a line spacing pawl 33 is pivoted at 34 to the other arm of the lever. A tooth 35 is formed on the pawl 33 and a spring 36 which at one end is attached to a pin 37 upon the frame 13 and at the other end is fastened within a hole 38 in the pawl 33 serves to hold the pawl in engagement with the ratchet wheel at all times. From a consideration of Fig. 6 it will be readily apparent that when the controlling cam 25 is moved anti-clockwise during the actuation of the crank arm H^a, the link 27 will be moved to the right as the parts are viewed in this figure. When the pin 30 engages the forward end of the slot 29, the lever 31 will be moved anti-clockwise carrying the pawl 33 upward without engaging the teeth of the ratchet wheel 19. On the return movement of the cam 25, the movements of the link 27, lever 31 and pawl 33 will be reversed when the pin 30 engages the rearward end of the slot 29, and the tooth 35 of said pawl will engage one of the teeth 19^a of the ratchet wheel 19 and advance the platen 16 a line space after each item printing operation, in the usual well known manner.

Jump feed mechanism

In explaining the jump feed mechanism for the platen 16 two things should be remembered; first, the purpose of this mechanism; and second, the control thereof.

The purpose of the jump feed mechanism, as before mentioned, is to automatically feed the platen a distance capable of bringing the printed total above the paper knife 17 after each total taking operation of the machine. The jump feed mechanism is, therefore, controlled by and operates in timed relation with the automatic total-taking mechanism in a manner to be hereinafter explained.

Referring to the jump feed mechanism in detail, and for the present to Fig. 4, it will be seen that a gear 39 has a ratchet wheel 40 secured to the hub thereof and is freely mounted upon the platen shaft 15 at the opposite end of the platen from that which carries the ratchet wheel 19. A pawl 41 pivoted to the left-hand platen head 42 is held in constant engagement with said ratchet wheel 40 by a spring 43, one end of which is anchored to a stud 44 carried by the platen head 42, the other end of said spring being secured in a hole 45 in the pawl 41. A link or actuating member 46 has its upper end cut to form a rack 47, the teeth of which are held in permanent meshing engagement with the teeth of the gear 39. As best shown in Figs. 1, 2 and 3 this link 46 rides upon a shouldered stud 48 and between the head 48^a of said stud and a washer 49. This stud is secured to the platen supporting frame 13 by a nut 50.

The link 46 has an off-set portion 51 which coacts with a stop member 52 secured to the frame 13 to limit the upward movement of the link. Normally the link 46 is held in its upper position by a spring 53. One end of this spring is anchored in a hole 54 in the paper cutter or

knife 17 and the other end is secured within a hole 55 punched in an ear 56 formed on the offset portion 51 of the link 46. The lower end portion of the link 46 has a cam edge 57ª extending from a tooth 57 to the free end of the link. The tooth 57 is adapted to be engaged by a stud 58ª carried by an actuating arm or member 58 formed integral with an accumulator shifting crank 58ᵇ, to be presently referred to more in detail. The lower end of link 46 is guided between the arms of a bifurcated guide member 59, the arm 59ª thereof carrying a limiting stud 60 and the arm 59ᵇ thereof being provided with a laterally projecting roller 61. The stud 60 limits the forward movement of the link 46 when a release arm 62 is moved to the position shown in Fig. 7 during a total-taking operation. The roller 61 on the other hand coacts with the cam edge 57ª of the link 46 to effect a release of the tooth 57 from the stud 58ª at the last portion of the downward stroke of the arm 58 as shown in Fig. 8, thus permitting the link 46 to be restored to normal position independently of the arm 58. The effect of actuating the link 46 in the manner described is to turn the platen 16 the required distance to feed the strip P of paper from roll R a distance sufficient to move the printed total from the printing line B to a point above the knife 17, as indicated in Fig. 3.

Automatic total-taking mechanism

The automatic total-taking mechanism as embodied in the present machine comprises a pin carriage locking arm 63 pivoted at 63ª to a bracket 64 which is riveted to the side plate 1, as shown in Figs. 2, 3 and 9. This arm is normally held against the lower surface of the upper keyboard plate 65 by a spring 66, one end of which is attached to a stud 67 carried by said arm, the other end of the spring being anchored to the upper keyboard plate 65. The arm 63 is provided with a rectangular slot 68 for the reception of the end of an arm 69ª (see Fig. 9) of a bell crank lever 69. The arm 63 is further provided with a downwardly projecting tail portion 70 that has a cam edge 70ª which cooperates with the escapement rack 71 of the pin carriage, as has been fully pointed out in connection with the total key in my companion application Serial No. 688,629 filed Sept. 8th, 1933.

As shown in Fig. 9 the bell crank lever 69 turns on a pivot rod 72 which is mounted in the side plate 1 and in an upwardly struck ear 73 of the lower keyboard plate 14. A depending arm 69ᵇ is fixedly connected to turn with the bell crank lever 69 through an intermediate cross bar which connects the two. The lower end of the arm 69ᵇ is pivotally connected to the forward end of a rearwardly extending link 75. The rear end of the link 75 has a slot 76 formed therein which receives a headed stud 77 carried by a side plate 1 of the frame. The link 75 has an upwardly, inwardly and rearwardly extending member 78, as best shown in Figs. 1 and 2, and an inwardly projecting stud 79 that carries a roller 80 is also provided on said link.

As best shown in Figs. 7 and 9 the forward end of a link 81 is pivotally connected to the lower end of an arm 69ᶜ on the bell crank lever 69 and the rear end of said link is pivotally connected to the accumulator operating catch 82.

The accumulator shifting mechanism is of the same general character as that described in my above mentioned Patent No. 1,899,444, but will be briefly described herein to more clearly explain the automatic total-taking mechanism.

Referring now to Figs. 14 and 15, we shall take the parts shown therein through a complete cycle of operation and through a blank stroke and then a total cycle so that one may clearly see and know the positions of these parts as they are assumed in the machine at any and all times. Fig. 15 shows all parts in normal, unoperated position. If, now, an adding cycle were begun, on the first part of the forward adding stroke, the accumulator bail 84 would be raised so that its finger 84A would be taken out of notch 92A and would be locked in notch 92B before any of the accumulator actuating racks began to move. The manner in which this movement of the accumulator bail 84 is accomplished is as follows:

In the first part of the adding cycle, the forward stroke of the operating handle moves the main operating shaft 26 in a clockwise direction as seen in Fig. 15. Since the arm 58B is fast on shaft 26 it moves in a clockwise arc with 26. As it does so, the shoulder 86B of the wipe pawl 86 contacts pin 89A of member 89 and swings member 89 in a clockwise direction about its pivot 89E. Pins 89A and 89B project from the left hand side of member 89 as viewed from the front of the machine and pins 89C and 89D project from the right-hand side of member 89 as viewed from the front of the machine. The member 89 is pivotally mounted to the frame work of the machine at 89E and, therefore, it will be seen that, as the shoulder 86B of the wipe pawl 86 carries the entire member 89 and all its pins 89A, 89B, 89C and 89D in a clockwise direction, about pivot 89E, the pin 89C (since it is in engagement with the notch 82A shown in Figs. 7 and 15) will raise link 82 and the accumulator bail 84 to which link 82 is pivoted at 83. At this time the accumulator actuating racks 10 will move rearward in the machine and arm 58B and shoulder 86B of wipe pawl 86 will disengage themselves from the pin 89A and continue to move until the shoulder 86C contacts the pin 89B as shown in Fig. 14. The above mentioned parts are now in position to begin the return stroke of the adding cycle. In the first part of the return stroke the shoulder 86C of wipe pawl 86 moves the pin 89B, and hence the member 89, in a counter-clockwise direction about the pivot 89E. This lowers the accumulator pinion bail 84 by virtue of pin 89C contacting hook 82A of member 82 and moving this hook downward. Now, after the accumulator pinions are in mesh with their associated rack bars, the rack bars will move forward and will add in any amount which has been set up on the keyboard. On this return adding stroke, the shoulder 86C of wipe pawl 86 carries pin 89B just far enough in a counter-clockwise direction to move the accumulator bail from notch 92B to notch 92A. At this time the shoulder 86C of wipe pawl 86 leaves pin 89B, and the accumulator actuating racks begin their return adding stroke. The arm 58B and wipe pawl 86 continue their counter-clockwise movement until the end of the return stroke at which time they are again in the normal inoperative position shown in Fig. 15.

Having described an ordinary adding or operating cycle of the machine, I shall now proceed to describe a blank stroke and total stroke. Let us assume that two or three numbers have been added into the accumulator head by the method previously described. After the last addition, the movable pin carriage is returned to its nor-

mal position at the right-hand side of the machine, as seen from the front. As will be seen in Fig. 9, the reference character 1000 indicates a link which runs along the right-hand side of the machine. This link is supported at its rear end by a headed stud which is fastened to the right-hand frame plate, and which protrudes through a slot in the rear of link 1000. The front of link 1000 is supported by and pivoted to a small link 1001 which is pinned to a shaft 1002 at its right-hand end. The shaft 1002 has a hook 101 at its left-hand end which locks and unlocks the total taking mechanism previously described. On the link 1000 is a spring pressed latch 1003, (which is indicated at 90 in the patent to Mehan 2,033,045), which has in its bottom edge a notch 1004, said notch being adapted to engage the right-hand extremity of an upturned lug (not shown herein) mounted upon the right rear end of the top plate of the movable pin carriage. The latch 1003 moves forward and rearward with the link 1000 once for every operating cycle of the machine. If the pin carriage has not been moved leftward by depression of a numeral key, then the latch 1003 will catch upon the upturned lug, previously described, and will hold link 1000 in its forward position which will hold the hook 101 out of locking engagement with member 70 (well shown in Fig. 3), and will allow the taking of a total on the next stroke. Thereafter, if a numeral key is depressed, it will unlatch link 1000 and allow the hook 101 to again lock the total mechanism. The movement of link 1000 is so timed that during adding cycles the link 1000 will be drawn rearward before the pin carriage is returned to its normal right-hand position. Thus, after a series of additions have been made, the latch 1003 on the link 1000 stands in its rear or ineffective position. Now, however, a blank stroke is required and, since the pin carriage does not move leftward on a blank stroke, the latch 1003 hooks over the upturned lug on the pin carriage and holds link 1000 in its forward position. The hook 101 has now been withdrawn from the member 70 and the machine is thus free to be conditioned for a totaling operation. Referring now to Fig. 7, the pin plate 89, during a blank cycle, moves the accumulator pinions up and down just as it would in a regular adding cycle, but, since no numeral keys have been depressed, the rack bars are held at the front of the machine and do not in any way actuate the accumulator pinions. The parts as shown in Fig. 15 are positioned exactly as they are just before a blank cycle, and also as they are just after a blank cycle or just previous to a total taking cycle. Referring again to Fig. 7, it will be remembered that the hook 101 locks the total link 81, in its forward or non-totaling position, except when a blank cycle causes the hook 101 to be withdrawn from the member 70 and held withdrawn until a numeral key has been depressed. Upon the next or total cycle, the spring 96 draws the total link 81 rearward which moves member 82 clockwise about 83. The wipe pawl 86 swings pin 89A clockwise about 89E at the very same moment that the total link 81 is drawn rearward. If the total link 81 holds the pin 89 C in the notch 82A, then a clockwise rotation of member 89 will raise the accumulator pinions out of mesh and when they are in this position a counter-clockwise rotation of member 89 will lower them into mesh. If the total link 81 holds the pin 89D in the notch 82B, then a counter-clockwise rotation of member 89 will move the accumulator pinions out of mesh. Now, when a total is desired, it is necessary to keep the accumulator pinions in mesh during the first part of the total cycle, and to raise them out of mesh during the return part of the total cycle. This is accomplished in the machine on a total stroke because the total link is moved rearward at the same time that the wipe pawl 86 moves the pin member 89 in a clockwise direction. When both of these motions occur simultaneously, the result is to merely move slot 82A away from pin 89C and move slot 82B over pin 89D without raising the accumulator bail arm 84 out of notch 92A. It will be seen that, in view of the above, the accumulators will remain in mesh with their respective actuating racks during the forward stroke of any total cycle. However, on the return stroke the wipe pawl 86 will contact pin 89B and move member 89 counter-clockwise and thus raise the accumulator pinions out of mesh. The pinions will remain out of mesh during the entire return total stroke. Thus, in summation, Fig. 15 shows the parts in the position which they assume before addition, before a blank cycle and before a total cycle.

Total lock

It will be seen from Figs. 1 and 2 that a rightwardly offset spring finger 78 is formed integral with the total link 81 and that a detent member 91, fast to the arm 84, has a finger bent off to the left and then bent upwardly so as to form a lug 90 which lug is directly behind the finger 78 and which lies in the same vertical plane as the latter. The two fingers just described constitute a total locking device in that, when a total has been taken, they coact to prevent another total stroke without an intermediate blank cycle. During a total cycle, the accumulators are left in mesh with the adding racks on the forward stroke of the operating handle and are lifted out in the first part of the return stroke, as has been previously described. During the forward stroke of the total cycle, since the accumulator pinions are in mesh (see Figs. 7 and 15), the total link 81 and its finger 87 are allowed to move rearwardly so that the finger 78 overlies the lug 90 on the detent member 91. At the first part of the return stroke, the accumulator pinions are raised out of mesh, but the total link 81 still maintains the finger 78 above the lug 90. Consequently, the lug 90 comes up under the finger 78 and springs it upward and subsequently the finger 78 is drawn toward the front of the machine until it snaps down in front of lug 90. At this point the total cycle ends, and should the operator again operate the machine, the finger 78 would then abut against the front of the lug 90, and hence the total link would not be allowed to move rearward. Therefore, a blank cycle would ensue instead of a total cycle. At the end of this blank cycle, the accumulators would be in mesh due to the action of the wipe pawl 86, and consequently on a following cycle, where no numeral key had been depressed, the lug 90 would be in its lower position and would allow the finger 78 to pass rearwardly above it and cause a total to be taken. If a total is taken on any machine of this general type, and the operator then leaves the machine for some time, she will invariably take a total when she returns in order to be sure that the machine has been left in a cleared condition during her absence. Let us assume that the machine had no total lock on it and that no one had touched it during her absence.

The various parts of the totaling and accumu-

lator mechanisms will now be in the position shown in Fig. 16 and in this position (after a total cycle) the accumulators will be out of mesh. The operator now attempts to cycle the machine to test for clearance. As the main shaft 26 turns clockwise, during its forward stroke, the wipe pawl 86 moves downward and attempts to swing the pin plate 89 clockwise to throw the accumulators into mesh. Simultaneously with the movement of the wipe pawl 86, the roller 100 moves away from the link 94 and allows the link 94, (and the links 75 and 81 attached thereto), to move rearward in the machine thus swinging the accumulator catch 82 clockwise about its pivot 83. However, as the member 82 is now in its raised position (Fig. 16), a cam edge 82c thereon will strike the pin 89d and attempt to cam the pin plate 89 counter-clockwise about its pivot at about the same time that the wipe pawl 86 is attempting to move the pin plate clockwise. By the time this condition occurs, the cam plate 98, fast on the main shaft, has come to a place where its lower edge 98a is almost touching the top of the roller 80 on the link 75. Continued movement of the main shaft 26 will cause the wipe pawl 86 to force the pin plate 89 clockwise against the action of the cam face 82c on the catch 82. This, of course will force the catch 82 counter-clockwise and thus force the links 81, 75 and 94 toward the front of the machine against the tension of spring 96. Usually then, the roller 80 is forced to a position where its center is slightly in front of the edge 98a of the cam 98 and, in the remaining part of the forward stroke, the edge 98a acts on the roller 80 and forces the links 75, 81 and 94 to their forward or Fig. 16 positions. If this occurs, then, on the return stroke, the wipe pawl will hit the pin 89b and throw the accumulators into mesh. In actual usage, however, it sometimes happens that the pivotal connections of the links 81, 75 and 94 are a little bit loose, so that, due to lost motion at certain operating speeds, the edge 98a of the cam plate 98 strikes the roller 80 at its top dead center and this prevents any further motion of the cam 98 and main shaft 26. Further, the cam 98 and roller 80 are, in time, damaged. Thus, it is seen that the total lock, hereinbefore described, is a necessary and useful part of this machine.

Jump line space mechanism

Fig. 3 shows six items listed and totaled upon a regulation adding machine tape P. There is a space C between the total A and the last item D which is formed by means of the usual line space mechanism illustrated in detail in Fig. 6. It will be noted that total A is approximately seven spaces above the printing line B. These seven spaces are all accomplished on the return stroke of a total cycle and upon this stroke only. Referring again to Fig. 7, after a blank stroke the total mechanism is unlocked and during the forward total stroke, the spring 96 moves the link 94 rearward and, since the bell crank 62 is pivoted to the rear end of link 94, it is swung clockwise about its pivot, thus raising the rightwardly bent ear 62A off the hook 57. Since the main operating shaft 26 is also swung clockwise at this time, the arm 58 which carries the leftwardly protruding lug 58A is raised to the position shown in Fig. 7 and (Figs. 1 and 8) the spring 53 snaps the hook 57 and its arm 46 up to a position where they are stopped by the pin 60. This allows the rack 47 at the top end of arm 46 to ratchet the line space wheel 40 by its associated pawl 51. On the return total stroke, and after printing has been accomplished, the lug 58A catches the hook 57 and pulls it down until the fixed roller 61 cams it away. In the meantime, the roller 100 has moved link 94 forward and thus positioned the bent over ear 62A of arm 62 just above hook 57 and the hook is held here until another total cycle allows it to move up again.

Referring particularly to Fig. 1, the platen pinion 39 is fixed to the ratchet wheel 40 and both are loose upon the platen, supporting shaft 15. A spring pressed pawl 41 is pivoted to the platen roll 16 and remains in constant engagement with the ratchet wheel 40 so that, when the wheel 40 and associated pinion 39 are revolved clockwise, the platen remains unmoved, but when 39 and 40 are moved counter-clockwise, then the teeth of 40 catch pawl 41 and move it and its platen 16. Hence, when the hook 57 was pulled down by the lug 58A, it moved the rack 47 down and turned pinion 39 and thus platen 16 seven line spaces with the result shown by the spacing on the tape in Fig. 3.

Item-counter

In addition to the mechanism thus far described I provide an item counting and listing mechanism for automatically listing, registering and printing the items and the totals thereof which will now be described.

In order to accomplish this result I remove from the machine the seventh register wheel 11 together with the associated rack 10 and carrying and printing instrumentalities therefor. This leaves the first six register wheels 11 and their associated racks 10 and the carrying and printing instrumentalities therefor, in the machine for use in registering, listing and totaling the items and separates or divides them functionally from the corresponding instrumentalities of the two remaining register wheels of the higher orders and from said higher order register wheels. These two higher order register wheels, the eighth and ninth, I employ for use as an item counter and such register wheels are automatically controlled by the following means.

Referring to Figs. 3, 5 and 13 the reference numeral 102 designates the zero stop member by which the various adding racks 10 are normally held against rearward displacement. This stop member is pivotally mounted for up and down movement on the pin carriage 7 in the usual and well known manner. This zero stop 102 is raised during a totaling cycle only in order to allow all the adding racks to move rearward simultaneously. The usual downwardly projecting flange 103 of this stop member is, however, provided in the present construction with an additional depending portion or extension 103^a. The item counting racks 104 and 105 are identical with one another and with the usual racks 10 with the exception of the arresting heels thereon. The arresting heel 104^a on the rack 104 is like the heel 10^a on each of the racks 10. The heel 105^a on the rack 105, however, has a contact face 105^b that is adapted to bear against the depending portion 103^a of the total stop 102 when the pin carriage is in the normal position. Said heel 105^a also has an additional contact face 105^c arranged forward of the contact face 105^b a distance that corresponds to the movement of an ordinary rack 10 to a position where it is arrested by any "1" pin on the carriage. In other words, a movement of the rack 105 from the position where it is held by the contact face 105^b abutting the total stop

102 to the position where the contact face 105c abuts said total stop, is effective to set the rack 105 to count "1" on its associated register wheel. Bearing this fact in mind it will be understood that upon the movement of the pin carriage 7 one step to the left from its normal position, the extension 103a of the total stop flange 103 will pass to the left (Fig. 5) of the path of the contact face 105b, permitting the adding rack 105 to move rearward until the contact face 105c reaches the flange 103 thus setting up "1" on the register wheel controlled by the rack 105. This movement of the adding rack 105 takes place automatically with each item set up in the machine and is effective to bring about a printing of the numeral 1 to the left of each listed item and to add such amount in that portion of the totalizer that is used as an item counter, automatically printing the total thereof at the total printing operation, as indicated in Fig. 3.

When the number of items reaches more than nine, then the usual carrying or transfer devices shown in Figs. 11 and 12 will cause the counter rack 104 to be advanced from the normal position in the usual manner, it being understood that these carrying devices operate in the same manner as the corresponding devices for the racks 10, and as is fully disclosed in my above mentioned Patent No. 1,899,444. In this manner as many as ninety-nine items may be registered and listed and a total thereof is automatically registered and printed at the total-taking operation in the same manner and at the same time that the total of the amounts of the different items is taken.

During the forward stroke of the handle a total-taking operation takes place and a bracket 106 (Fig. 2) secured to the link 81 is moved rearward with said link and engages an up-turned lug 107 on the total stop member 102 thereby raising the flange 103 above the heels of all of the adding racks including the item counting adding racks 104, 105.

It will be understood that in view of the restriction of the machine for adding and listing of items to the first six register wheels and their associated mechanisms, suitable means are provided for limiting the travel of the pin carriage 7 for cooperation only with the feed racks of the first six register wheels.

It will be understood that various changes may be made in the construction, and that features thereof may be employed without others, without departing from my invention as it is defined in the accompanying claims.

What I claim as new and desire to secure by Letters Patent is:

1. In a calculating machine, the combination with a main actuating means of spring pressed means for conditioning predetermined elements of said machine for a total taking operation under control of said main actuating means, and a lock for preventing said spring pressed means from conditioning said elements for total taking operation at the next succeeding operation after a total taking operation.

2. In a calculating machine, the combination with a main actuating means of spring pressed means for conditioning certain elements of said machine for a total taking operation under control of said main actuating means, a platen, a gear on said platen, an actuating link which may be actuated by said main actuating means for said gear formed with a rack at one end and a tooth and cam surface at the other end, a lever controlled by said spring pressed means for moving said link into or out of effective position with relation to said main actuating means, and a pin for cooperation with said cam surface for removing said link from control of said main operating means.

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