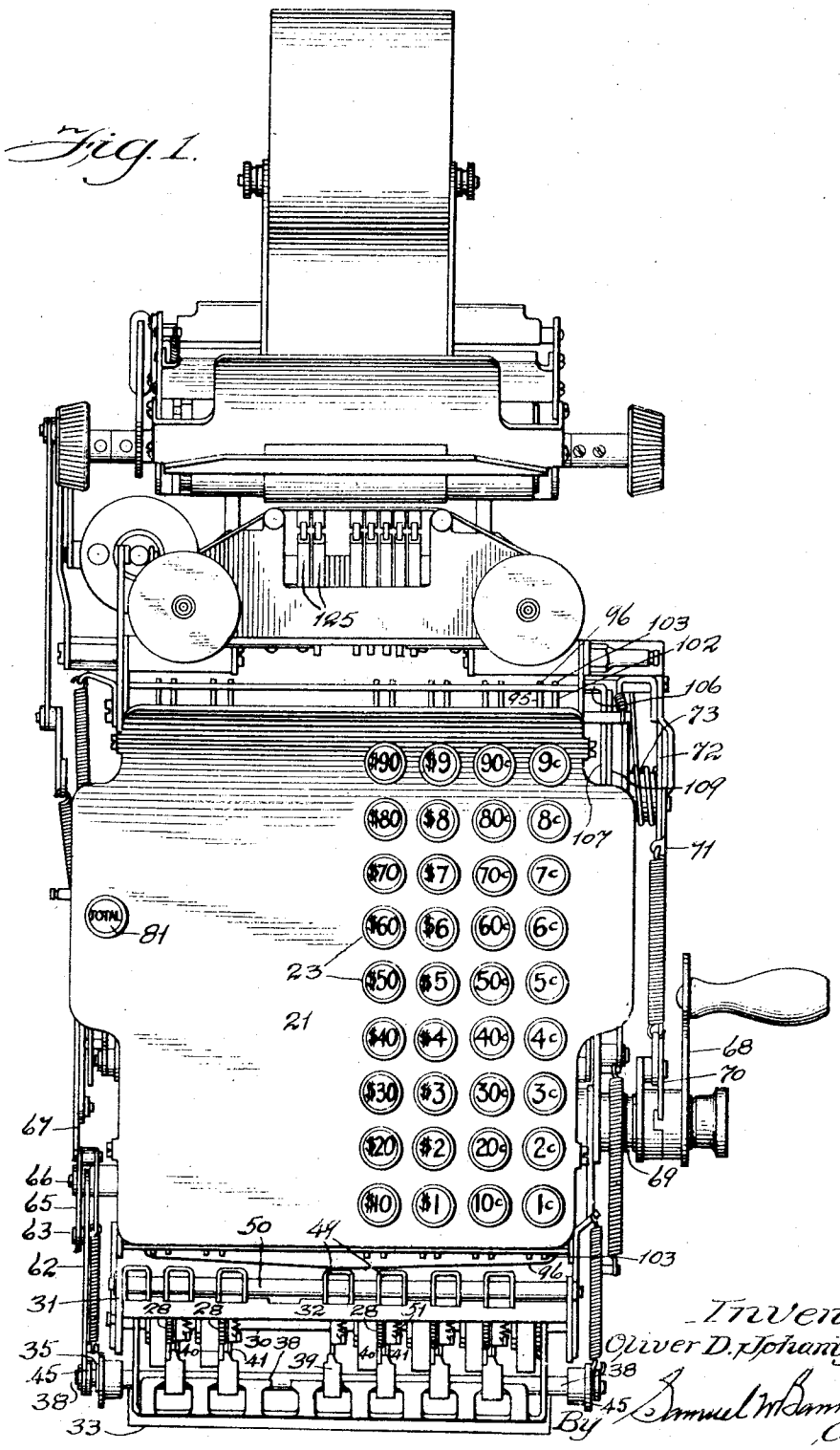
Sept. 6, 1932. O. D. JOHANTGEN 1,876,057

ITEM COUNTING MECHANISM FOR LISTING MACHINES

Filed Sept. 23, 1929 6 Sheets-Sheet 1

Fig. 1.



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ITEM COUNTING MECHANISM FOR LISTING MACHINES

Filed Sept. 23. 1929 6 Sheets-Sheet 2

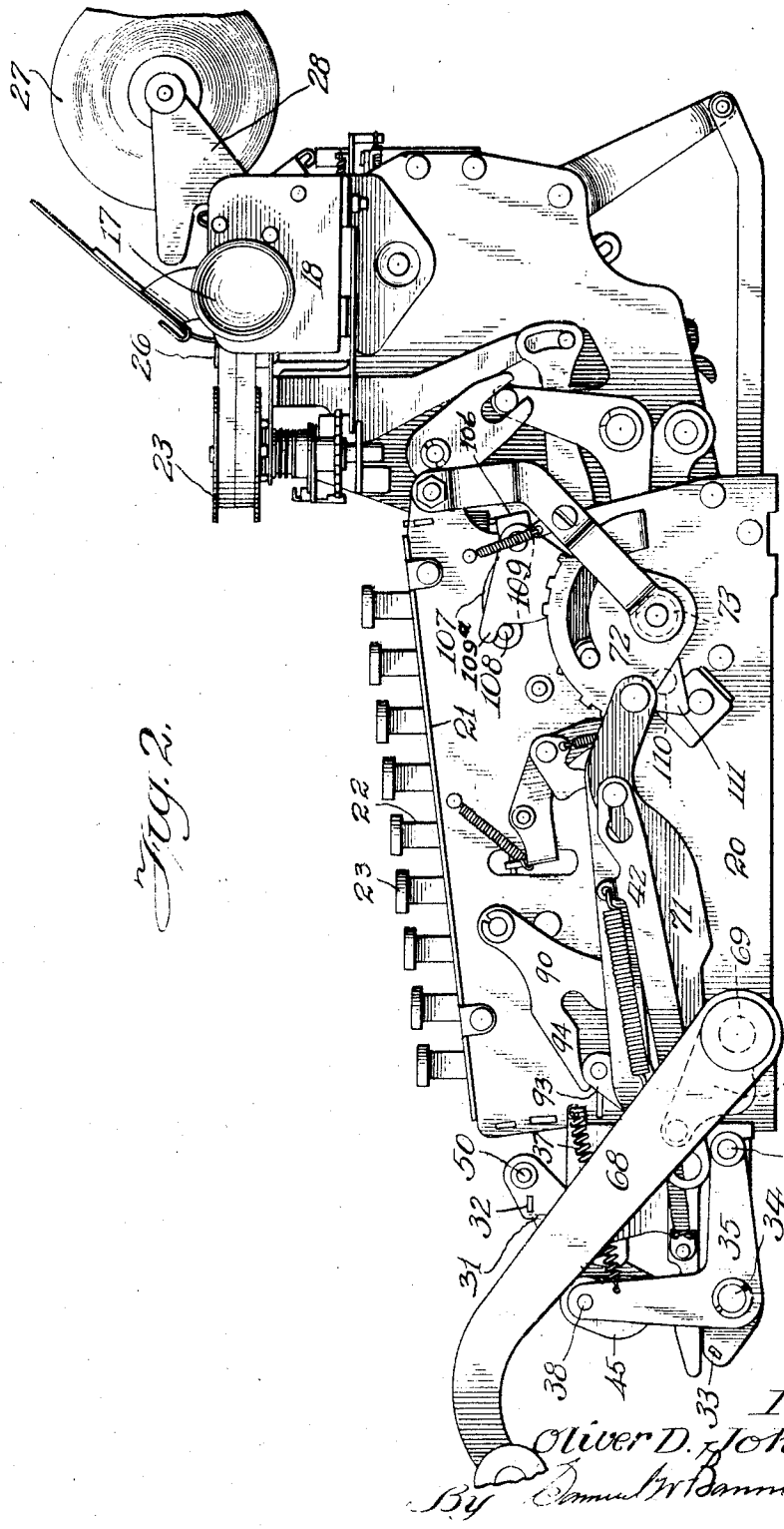


Fig. 2.

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ITEM COUNTING MECHANISM FOR LISTING MACHINES

Filed Sept. 23, 1929 6 Sheets-Sheet 3

Fig. 3.

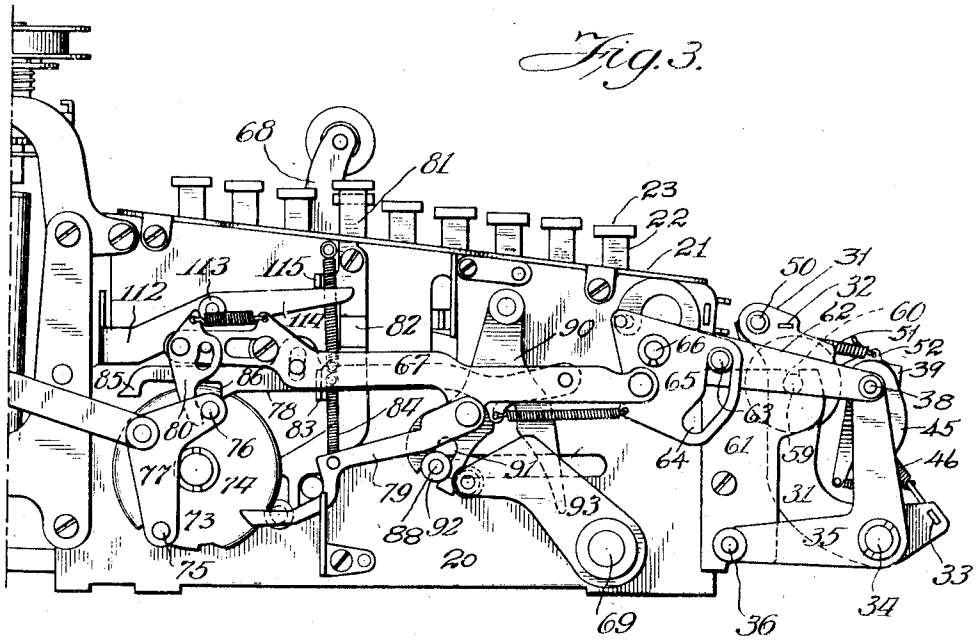
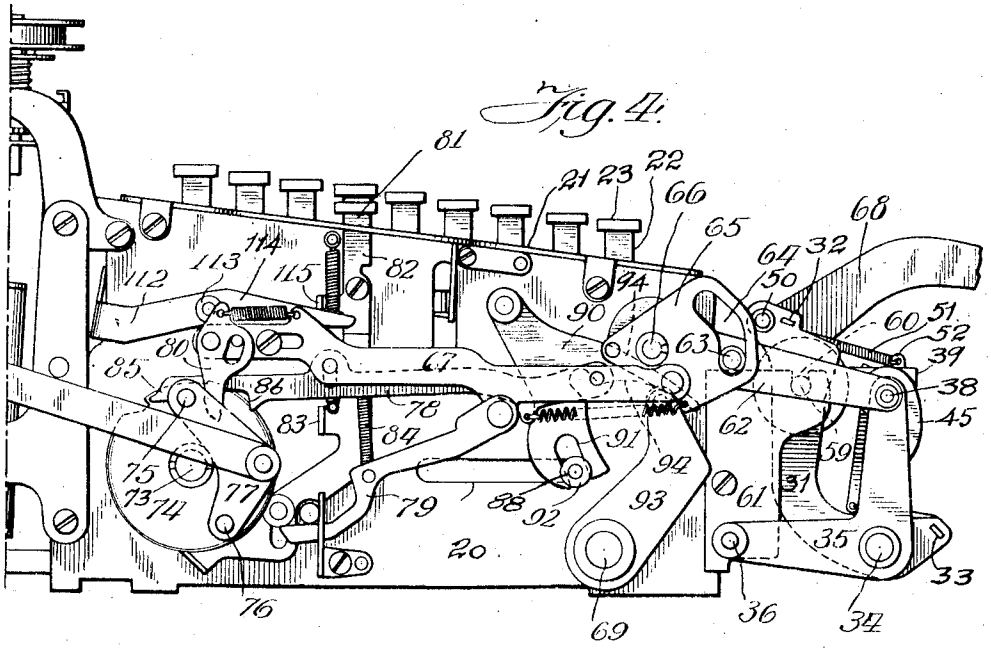


Fig. 4.



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Sept. 6, 1932. O. D. JOHANTGEN 1,876,057

ITEM COUNTING MECHANISM FOR LISTING MACHINES

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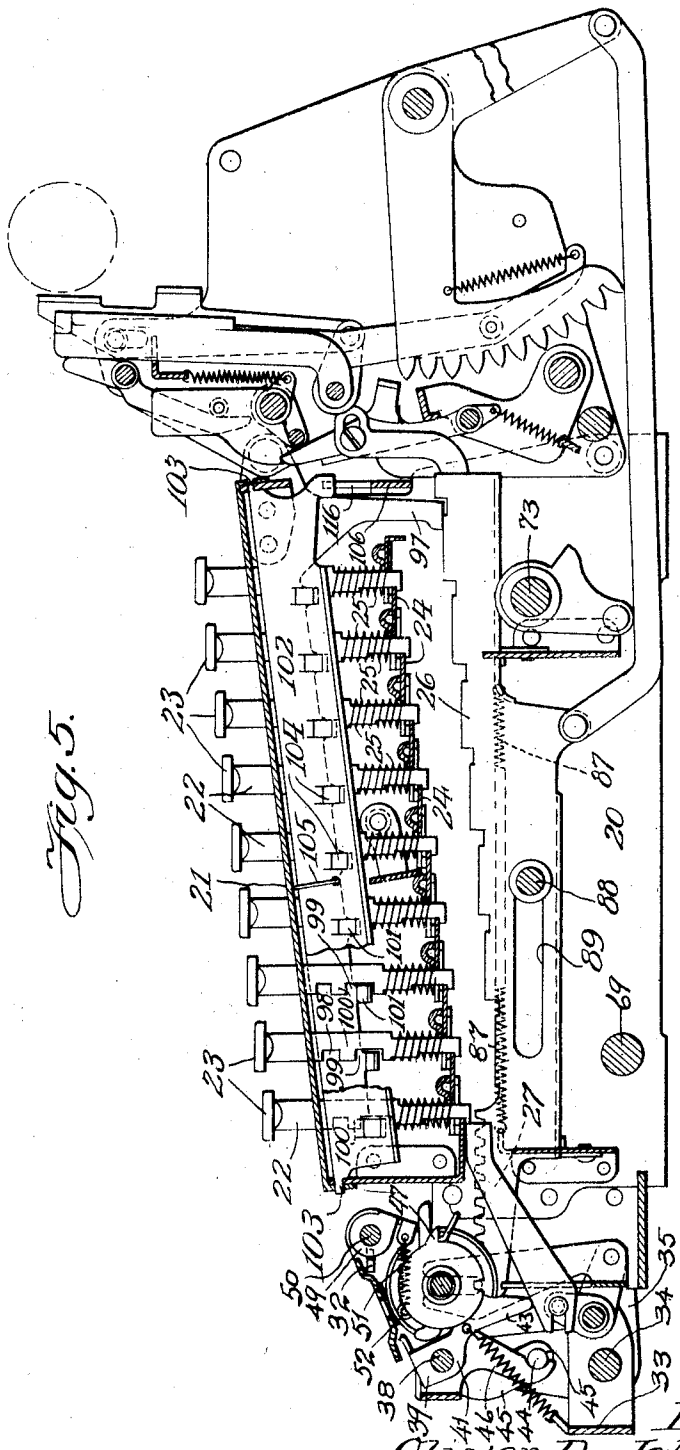


Fig. 5.

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ITEM COUNTING MECHANISM FOR LISTING MACHINES

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Fig. 6.

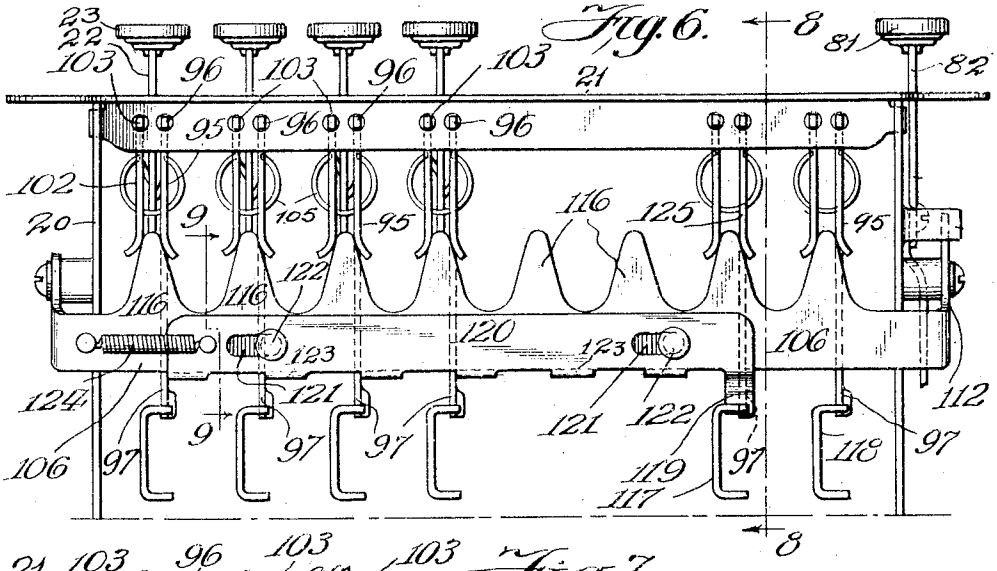


Fig. 7.

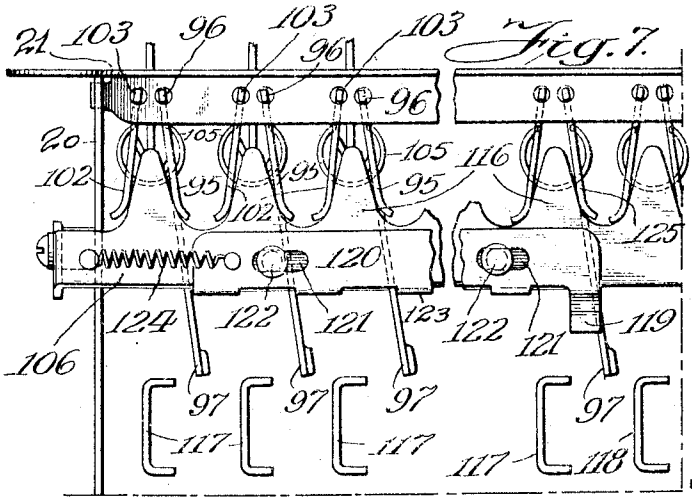


Fig. 9.

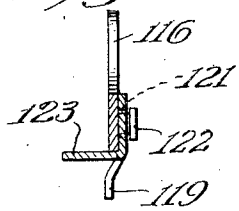


Fig. 8.

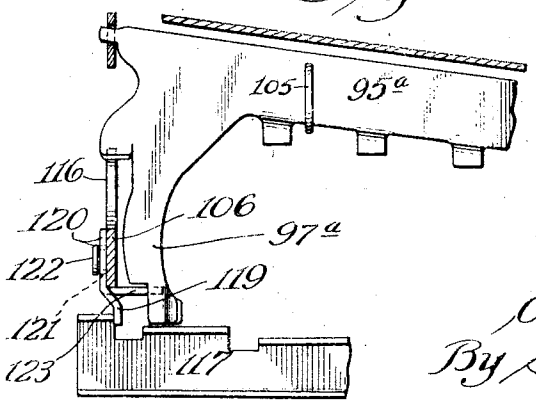
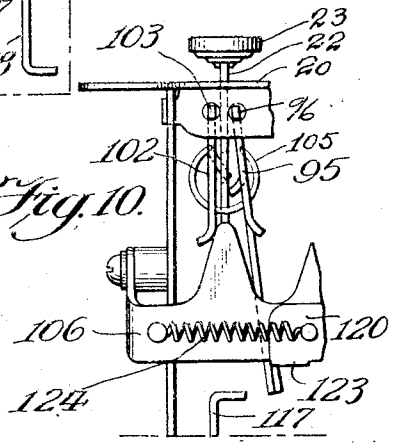


Fig. 10.



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Sept. 6, 1932. O. D. JOHANTGEN 1,876,057

ITEM COUNTING MECHANISM FOR LISTING MACHINES

Filed Sept. 23, 1929 6 Sheets-Sheet 6

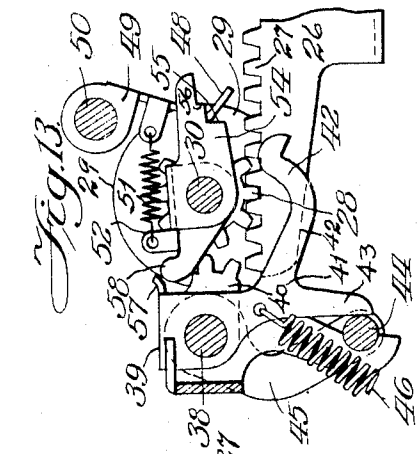


Fig. 13.

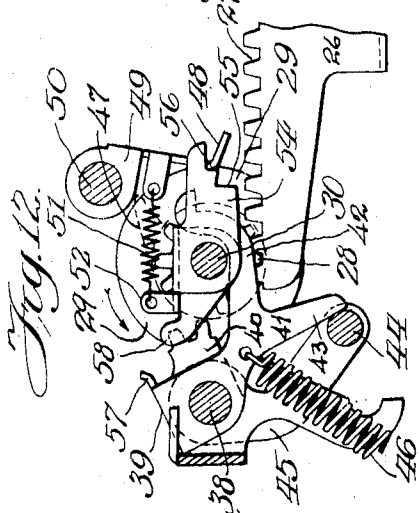


Fig. 12.

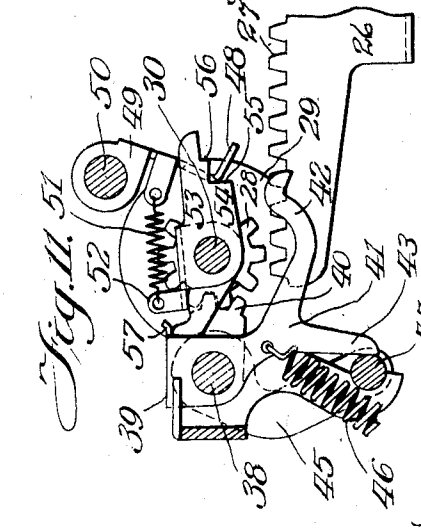


Fig. 11.

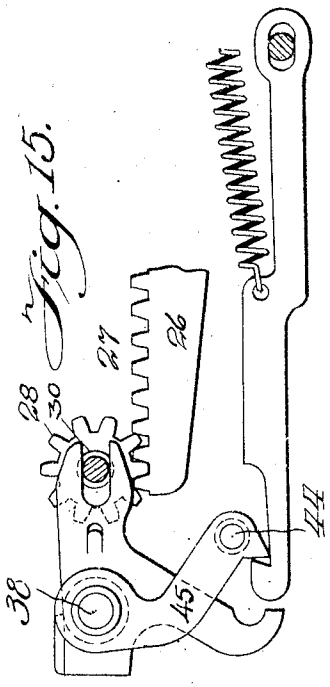


Fig. 15.

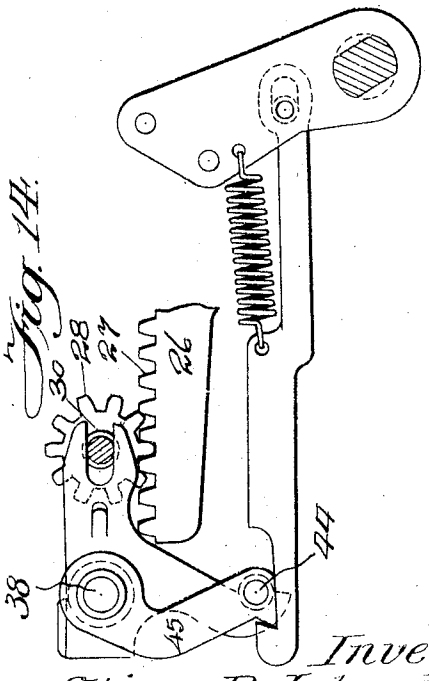


Fig. 14.

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UNITED STATES PATENT OFFICE

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ITEM COUNTING MECHANISM FOR LISTING MACHINES

Application filed September 23, 1929. Serial No. 394,492.

This invention relates to improvements in item counting mechanism for listing machines.

The item counting mechanism of the present invention is applied to a listing machine of the general type shown and described in Johantgen Patent No. 1,336,840, issued April 13, 1920, although the item counting device might be applied to listing or adding machines of other construction.

The listing machine with which the present invention is associated is one which is designed primarily for use in the listing and recording of a group of items constituting the purchases of a single customer, in such form that a record slip thereof may be torn off and delivered to the customer as a record of the transaction.

The machine lists several items in column form, and upon the depression of the total key and the operation of the handle, takes a total thereof, which results in a clearing of the machine for subsequent transactions.

The features of the present invention are designed to make a count of the number of items thus listed and record a total thereof, so that the record slip will thus display in adjoining columns not only the number of items involved but the aggregate of the amounts represented by such items.

In providing the item counting mechanism, use is made of stock parts, such as rack bars, hammer devices, accumulating, carrying and totalizing mechanisms, which parts are identical, or substantially so, with those regularly employed in the item listing section of the machine, so that machines of the type already constructed can, without substantial reorganization and with the addition mainly of stock parts, be provided with the supplemental item counting and totaling mechanism which constitutes the present invention.

Provision is also made for the unlocking and releasing of the item counting rack bar by the depression of any key in the several orders constituting the item series and provision is also made for the release of the item counting rack bar by the depression of the total key, so that, without special adjustment, the counting and totaling of items will proceed in regular order as the items are listed, accumulated and totaled in the regular operation of the machine.

Further objects and details of the invention will appear from a description thereof, in conjunction with the accompanying drawings, wherein,—

Figure 1 is a plan view of a listing machine of the general character shown in the Johantgen Patent No. 1,336,840, with the special features of the present invention added thereto;

Fig. 2 is a right side elevation of the machine, showing the operating handle advanced;

Fig. 3 is a view showing the left side of the machine, with the parts in the position occupied when the handle is in normal position with the total key elevated,

Fig. 4 is a similar side elevation with the total key depressed and the handle advanced;

Fig. 5 is a longitudinal sectional elevation through the center of the machine;

Fig. 6 is a view of the rear portion of the setting up department of the machine looking forward and with the printing mechanisms removed from the rear of the machine;

Fig. 7 is a detail showing the adjustment of the rack bar restoring mechanism when the total key is depressed;

Fig. 8 is a detail taken on line 8—8 of Fig. 6;

Fig. 9 is a detail taken on line 9—9 of Fig. 6;

Fig. 10 is a detail showing the adjustment of the rack bar release mechanism with an item key depressed; and

Figs. 11 to 15 inclusive are details of the accumulating and carrying mechanisms in various positions of adjustment.

The machine as a whole closely follows the construction and arrangement of parts shown and described in the Johantgen Patent No. 1,336,840, but since a general description is necessary in order to gain a full understanding of the mechanisms involved in the present invention, the structure of the machine will be briefly described as follows:

The machine comprises a main or body frame, which includes side plates 20 and a

top plate or keyboard 21 through which extend the key stems 22 of item keys 23. As shown, four orders of item keys are employed, although the number of orders may obviously be increased to any desired limit.

The key stems of a row of keys constituting a single order are arranged in step formation, and the lower ends of the stems are entered through and guided within a stepped cross plate 24, each of the key stems being surrounded by a coil spring 25 adapted to restore the key to elevated position after it has been released from depression.

The lower ends of the row of keys constituting a single order co-operate with a stepped rack bar 26 provided with shoulders so located that each will coact only with its own particular key, so that when a selected key within a single order is depressed it will constitute a stop for arresting the forward movement of the rack bars at the particular point constituting a representation of the numeral represented by the key.

Each order within the limits of the machine is provided for by the use of a row of keys and a rack bar coacting together in the manner indicated. Each of the rack bars terminates at its forward end in a row of upwardly projecting rack teeth 27, the several rack teeth in the different orders coacting with spur pinions 28 which constitute the accumulating wheels and which are each associated with a disk 29 provided on its periphery with visible numerals corresponding to the teeth of the associated accumulating wheel.

The accumulating section occupies the forward portion of the machine immediately in front of the keyboard, and this section of the machine is in all substantial respects like that shown in the Johantgen Patent No. 1,306,112 and the Johantgen Patent No. 1,336,840, but may be briefly described as follows:

The several accumulating wheels composing the series are freely mounted upon a fixed shaft 30, the ends of which are mounted between S-shaped plates 31, which are connected by an upper cross bar 32 and a lower cross bar 33, and constitute a frame or cradle which rocks upon a cross rod 34, the ends of which are mounted within L-shaped brackets 35 each comprising a forwardly extending leg and an upwardly extending leg, as indicated in Figs. 3, 4 and 5.

The forward legs are pivoted at their forward ends upon studs 36, so that the brackets, in conjunction, constitute a rocking frame which carries the cradle, which latter is also capable of a rocking movement upon the cross rod 34.

The brackets 35 are rocked downwardly and forwardly against the tension of a spring 37, and the upper arms of the brackets serve to journal a shaft 38 which constitutes a portion of the carrying mechanism.

The shaft 38 serves as a mounting for a plurality of detents 39, one for each numeral order, with the exception of units, and each of the detents is bent to afford on one side a toothed pawl 40 the teeth of which are adapted to mesh with the teeth of the associated accumulating wheel, so that when the parts are adjusted for carrying, the detent will be rocked to introduce a movement into the associated accumulating wheel.

Each detent also includes an arm 41 which terminates in a forwardly extending latch finger 42 and a downwardly extending stop finger 43, so disposed that all of the stop fingers will engage a universal lifting bar 44, which is carried between swinging arms 45, the upper ends of which are journaled upon the ends of the shaft 38 which carries the detents, the relation of the parts being such that when the universal lifting bar 44 is swung upwardly and rearwardly it will swing all of the detents in unison, thereby elevating all of the latch fingers 42, which lifting operation, however, occurs while the toother pawls 40 are out of mesh with the corresponding accumulating wheels, as in Fig. 12, so that this lifting action will not at this stage effect carrying.

Each of the detents 39 is drawn downwardly and forwardly by a coil spring 46 which holds the arm 43 in close engagement with the universal lifting bar 44. The toothed pawls 40, during each cycle of movement of the handle, are first thrown out of mesh with the corresponding accumulating wheels, and afterwards thrown into mesh therewith, which latter is the normal or restored position of the parts. This action is effected by a swinging or rocking movement imparted to the bracket arms 35 which rock on the studs 36, thereby swinging the upper ends of the brackets first forwardly and then rearwardly to effect the successive disengaging and engaging of the toothed dogs with the accumulating wheels.

Each of the accumulating wheels has associated therewith a cam 47 which rotates by successive steps with its associated accumulating wheel in a counter-clockwise direction, as viewed in Fig. 12.

Each cam on its tenth step of movement will encounter a latch keeper 48 which is in the form of a bent finger depending from an enlarged ring-shaped head 49, which is pivotally mounted upon a cross rod 50 which connects the upper arms of the S-shaped plates 31 which carry the accumulating wheels. These S-shaped plates 31 and the cross connecting bars 32 and 33 and the rod 50 may in conjunction be appropriately referred to as the accumulator frame.

Each latch keeper is drawn forwardly by the action of a spring 51, the forward end of each spring being connected to a tongue 52 upwardly extending from a trip dog 53 pro-

vided with a rearwardly extending arm 54 having formed at its rear end an inner shoulder 55 and an outer shoulder 56, as indicated in Figs. 11 and 12. With the parts in normal position, the latch keeper will engage the inner or forward shoulder 55, and when so held it will be in position to engage with and restrain the latch finger 42 when lifted. If, however, the keeper 48 be thrown rearwardly into the position shown in Fig. 12, it will be ineffective to restrain the latch finger when lifted, so that a return movement of the universal cross bar 44, with one or more latch fingers unrestrained by the keepers, will permit a return movement of the detents thus unrestrained at a time when the toothed dogs are thrown into meshing relation with the corresponding accumulating wheels, so that the accumulating wheels thus engaged will be moved one step in carrying.

After the trip dog 53 has functioned to restrain the latch keeper in the manner stated, it will be ultimately restored to normal or elevated position by the action of a finger 57 on the associated detent 39, which when restoring is brought into contact with the tail portion 58 of the trip dog, which contact serves to lift the arm 54 sufficiently to permit the latch keeper to restore to the position of contact with the shoulder 55, as indicated in Fig. 11.

This cycle of operations involved in carrying is thus initiated by the cam 47 which swings back the latch keeper provided to control the next higher order accumulating wheel, so that the latch keeper will fail to restrain the latch finger 42 when momentarily elevated by the action of the universal cross bar 44.

With the return of the cross bar, those latch fingers which are unlatched will swing downwardly, and at the same instant all of the toothed dogs will swing into mesh with the respective accumulating wheels, with the result that those dogs which are moved by the swinging back of the unlatched detents will throw a carry into the next higher order accumulating wheel.

During the accumulation of items, the respective accumulating wheels will be thrown into mesh with the movable rack bars during the return movement of the operating handle, while in total taking the parts will come into mesh on the forward movement of the handle. This is effected by a straight line up and down movement of the accumulating frame which rocks on the cross rod 34 and at the same time is restrained in a substantially vertical path by the action of studs 59 which move within slots 60 in bracket arms 61 forwardly extending from the main or body frame of the machine.

Movement is imparted to the L-shaped bracket arms 35 which pivot on the cross rod 36 through the action of a link 62 on the left side of the machine, which link is provided with a roller 63 traveling in an arcuate slot 64 in a segment 65, which is pivoted upon a stud 66 and is actuated by a draw bar 67 which derives its movement from connections actuated by the movements of the handle.

The handle 68, which is located on the right hand side of the machine, is mounted upon a main power shaft 69 extending transversely through the machine near the forward end thereof.

The power shaft is provided with a crank arm 70 which actuates linkage 71, which need not be described in detail and which in turn serves to actuate a segment 72 on the right hand end of a secondary shaft 73, which shaft on the left hand side of the machine carries a disk 74 provided with outstanding studs 75 and 76, which are spanned by an angular bridge plate 77.

The draw bar 67 has pivoted thereto an upper arm 78 and a lower arm 79 (see Figs. 3 and 4). With the parts in the restored or normal position shown in Fig. 3, the upper arm 78 will be elevated sufficiently to celar the stud 76 when the disk 74 is rotated in a clockwise direction by the forward pull of the handle; while during the same adjustment the rear end of the lower arm 79 will occupy a position which permits the stud 76 to engage and swing past the end of the arm 79 during the forward handle pull, until the stud occupies the lowermost position. On the return movement of the handle, the stud 76, moving in a counter-clockwise direction, will engage the rear end of the arm 79, and through it impart a forward thrust to the bar 67, thereby swinging the segment 65 on its pivotal mounting 66, which through the roller 63 imparts a forward movement to the link 62, thereby rocking the cradle afforded by the swinging arms 35 which results in a lowering movement in the bank of accumulating wheels into engagement with the respective racks, so that on the restoration of the racks a rotative movement will be thrown into each accumulating wheel commensurate with the forward movement permitted to the racks in the several orders.

As the handle is restored, the stud 76 as it returns to its uppermost position will engage a detent 80 pivoted on the forward end of the draw bar 67 and draw back the same, thereby operating the segment 65 and parts controlled thereby, with the result that the bank of accumulating wheels will be lifted above the path of movement of the rack bars in preparation for the next succeeding operation.

In total taking, a total key 81 is depressed, which key is mounted upon a stem 82 provided with a stop finger 83, which underlies the upper pivoted arm 78. As the finger 83 is lowered, the upper arm 78 will be drawn

down by the action of a coil spring 84 which connects the arms 78 and 79.

The upper arm 78 is provided with an end hook 85 and an intermediate shoulder 86, and when the arm is lowered the shoulder 86 will lie in position to be engaged by the stud 76 as the handle is drawn forwardly, with the result that in total taking the operations necessary to lower the accumulating wheels into engagement with the rack bars will occur at the beginning of the handle stroke, so that the bars will move forwardly in varying degree until the several accumulating wheels have in each instance been restored to the zero point, which in each instance constitutes the degree of movement allowed to each rack bar in the recording of a total.

With the parts in total taking position, the hook 85 will lie in position to permit the stud 75 to swing under the hook and engage with it on the forward handle pull, so that restoration of the parts will be effected by such engagement as the stud swings backwardly and downwardly on the return movement of the handle. (See Fig. 4.)

Each rack bar is under the tension of a spring 87 which tends to draw it forwardly to its extreme limit of movement, but all of the rack bars are normally held in rearmost position by the action of a universal bar 88 which operates through aligned slots 89 in the respective rack bars, so that, as the restoring bar is drawn forward, the respective rack bars, if unlocked, will move forwardly until arrested by the depression of a key in the corresponding order, in a manner well understood in the adding machine art.

The restoring bar is actuated by means of pivoted levers 90 on each side of the machine, each of which levers is slotted at its free end 91 to receive a roller 92 on the corresponding end of the universal restoring bar, so that, as the levers 90 are oscillated, the restoring bar will be moved on each handle operation to the full extent of its range of operations. The levers 90 are actuated by cranks 93, one at each end of the main power shaft 69, which are provided with rollers engaging arcuately configured arms 94 on the levers 90, so that the latter will swing or oscillate in unison as the handle is pulled and restored.

Each of the rack bars is of channel shaped formation throughout its body portion, as indicated in Figs. 6, 7 and 8, and provision is made for normally locking all of the rack bars against release, save by the depression of a key in the corresponding order or by the depression of the total key. This is effected in the manner shown in the Johantgen Patent, No. 1,336,840, by the provision, for each order group of keys, of a rack lock plate 95 in the form of a gate provided at each end with a pintle 96 which constitute pivots, permitting the rack lock plates to swing laterally through the depression of a key in the corresponding order.

Each rack lock plate, at its rear end, is provided with a depending finger 97, which normally, as in Fig. 6, occupies a substantially vertical position and engages with a notch formed in the rear end of the corresponding rack bar.

Each of the key stems 22 is provided on its edge with an upper notch 98 and a lower notch 99, with an intervening lug 100. The swinging rack lock plate is provided, along its lower edge with inturned tongues 101, one for each of the notched key stems. As a key is depressed, the lug 100 will engage and cam aside the associated tongue 101, thereby swinging the rack lock plate on its pivotal mounting and causing the finger 97 to release the corresponding rack bar, and this will occur irrespective of which of the item keys in a single order is depressed. The keys are held in depressed position by swinging key lock plates 102 similar to the rack lock plates, and similarly hinged on pintles 103.

Each key lock plate is provided with a series of inwardly extending tongues 104. With the key stems elevated, these tongues will normally lie within the lowermost notches 99, but as the key is depressed the lug 100 will cam aside the associated tongue until the key has been depressed sufficiently to permit the tongue to enter the upper notch 98 which locks the key in the depressed position. The key lock plate and the rack lock plate are held together by a bow spring 105, or other suitable device, so that they can only be spread apart by positive action.

The construction of these features is in all respects similar to that shown in the Johantgen Patent, No. 1,336,840, and further description is deemed unnecessary, nor is it deemed necessary to describe the construction and arrangement of the type bars and printing mechanism, which of course are connected and associated with the rack bars, so that in each instance each type bar will be moved in a degree commensurate with the movement of the rack bar to bring the proper type figure to the printing line.

In total taking, it is necessary to unlock all of the keys and rack bars, and to this end universal mechanism is provided which will now be described.

At the rear of the machine is located a release bar 106, which is in the form of a bail provided at its right hand end (as viewed from the front) with an arm 107 pivoted to a stud 108. The arm has pivoted thereto a cam segment 109 provided with a finger 109a which bears upon the end of the stud 108, which cam segment on the return movement of the handle is engaged by a roller 110 carried by a segment plate 111 mounted on the secondary shaft 73, the parts being so dis-

posed that on the forward movement of the handle the roller 110 will ride under the lower edge of the cam segment and lift the same, causing the finger 109ª to lift away from the end of the stud 108, but on the return movement the roller will engage the forward edge of the cam segment and cause the finger 109ª to fulcrum on the stud 108, as indicated in dotted lines in Fig. 2, thereby lifting the rear end of the cam segment and imparting an upward lifting movement to the bail shaped universal release bar.

The universal release bar at its left hand end (as viewed from the front) is provided with a forwardly extending arm 112 pivoted to a stud 113, which arm is provided with a forward extension 114 (see Figs. 3 and 4), which is so disposed as to occupy a position immediately below a finger 115 outstanding from the stem of the total key 81, so that as the total key is depressed the extension 114 will be carried down and the rear end of the arm 112 elevated, thereby lifting the universal release bar independently of the action of the handle.

The universal release bar is provided with upstanding teeth or elevations 116, which as shown in Fig. 7 normally in each instance occupy a position between the lower edges of the key lock plate and the rack lock plate of the corresponding order, but without serving to spread the plates. When the universal release bar is lifted, either by the normal operation of the handle in restoring or by the depression of the total key, the teeth or elevations 116 will be elevated, as shown in Fig. 7, thereby simultaneously separating the key lock bars and rack lock bars of all the orders, so that all of the rack bars will be unlocked and all of the item keys restored to elevated position.

In the normal handle operation, this elevation of the universal release bar occurs toward the end of the stroke and is but momentary, the bar dropping back to its lowermost position at the end of the handle stroke. In total taking, however, the depression of the total key lifts the bar and holds it elevated throughout the entire operation, which is necessary in order to unlock all the rack bars which may be involved in the clearing operation.

The foregoing description applies to the machine as a whole, and in so far as the mechanism are involved, in listing and total taking operations in the manner shown in the Johantgen Patent No. 1,336,840. Attention will now be directed to the special features of construction involved in the item counting mechanism, which especially constitutes the subject matter of the present invention.

Item counting mechanism

In addition to the rack bars and accumulating wheels involved in the listing of items, the present machine is provided with at least one and preferably two or more rack bars and corresponding accumulating mechanisms which are located at the left side of the machine, together with the necessary type bars for operating in conjunction therewith, in the enumerating of items and in the taking of a total of the number of items listed and recorded in the operation of the machine.

As shown in Figs. 6 and 7, the machine is equipped with item counting rack bars 117 and 118, the former of which is released and registers a single unit with each significant operation of the handle. The rack bar 118 and accumulating and carrying mechanism associated therewith are provided to afford a reserve in the counting of more than nine items. The rack bar 117 is normally locked against advancing to the first position (numeral 1) by a stop finger 119, which depends from the end of a slide bar 120 mounted upon the universal release bar 106.

The slide bar is provided with slots 121 which receive pins 122, so that it has a limited transverse movement along the bar and also partakes of the lifting movement of said release bar when the same is actuated. The slide bar is provided along its lower edge with inturned fingers 123, one for each order, which lie laterally adjacent to the fingers 97 which depend from the respective rack lock plates 95, and a spring 124 serves to hold the slide plate 120 in the normal or left hand position, as indicated in Fig. 6. The result of this arrangement is that whenever an item key, in whatsoever order, is depressed, the swinging movement of the corresponding finger 97 will impart a sliding movement to the slide bar 120, and thus displace the stop finger 119 toward the right, in Fig. 6, thereby unlocking the item count rack bar 117, which is thus permitted to move forwardly one step when the handle is pulled and the universal restoring bar 88 actuated.

In like manner, when the total key is depressed, it will elevate the bar 106 and with it the stop finger 119, so that in this instance also the item count rack bar 117 will be released, so that it will be free to travel to the extent required in recording a total of the number of items listed since a previous clearing of the machine.

In order to permit the rack bar 117 to advance a single step with the recording of each significent item, a lock plate 95ª is provided which is similar in all respects to the rack lock plate 95 previously described, except for the fact that a finger 97ª corresponding to the finger 97 is notched to afford free movement of one space to the rack bar 117, after which additional movement of the bar 117 is prevented. The reserve rack bar 118 will be normally locked in its rearmost position by its finger 97 as in the case of the rack

bars constituting the item accumulating group.

In view of the fact that the rack lock plates which coact with the rack bars 117 and 118 are not associated with depressible keys, it is evident that the racks 117 and 118 will be restrained against full forward movement so long as the respective lock plates maintain their normal position, and since these two rack lock plates will only be moved when the release bar is lifted, which occurs during total taking, it is evident that in the total taking operation the bars 117 and 118 will be free to travel forward to the degree permitted by the respective item accumulating wheels, so that a total will be taken out of these accumulators concurrently with the total taken from the item accumulator wheels.

The item count rack bars 117 and 118 are connected with printing devices 125 similar in all respects to the printing devices actuated by the item rack bars as shown in Johantgen Patent No. 1,336,840, so that it is not deemed necessary to describe in detail the manner in which the item count is printed. Nor is it necessary to describe the manner in which the paper strip is fed or the platen is actuated in line spacing.

Operation

A brief résumé of the operation is as follows:

An item is set up by the depression of the item keys in the various orders. The depression of the item keys by the spreading of the key lock plates and rack lock plates serves to lock the keys in the depressed position and also to unlock the adding rack bars in the various orders represented in the item. The forward travel of the unlocked adding rack bars, however, is at this stage prevented by the universal restoring bar 88.

The first item key depressed, in whatsoever order, will, through the swinging movement imparted to the associated rack lock plate, impart a sliding movement to the slide bar 120, which displaces the stop finger 119 from locking relation with the item adding rack bar 117, which, however, at this stage, is also restrained by the universal restoring bar 88. After the first item has been fully set up, the handle is drawn forward, which carries with it the restoring bar, thereby allowing the item racks to move forward until stopped in various positions by contact with the depressed item keys, and also allows the item count rack bar 117 to move forward one space, where it is stopped by the finger 97^a of the associated rack lock plate 95^a. The reserve rack bar 118, however, is permitted no movement whatever, since the rack lock bar with which it is associated is unaffected by the depression of the item keys.

After the handle has been drawn forward and the several rack bars appropriately positioned, the handle will be released, which causes all of the accumulating wheels, including the item count wheels, to be lowered into meshing relation with the associated racks, and as the return movement continues, the wheels will be rotated in each instance to a degree commensurate with the movements imparted to the respective racks, and the type bars will be lifted, in varying degrees, to the printing line, and the record imprinted upon the paper strip. During this return operation, the item count wheel associated with the rack 117 will be rotated one step and the numeral 1 imprinted in aligned relation with the item represented, and the single movement of the item count accumulator wheel will remain stored up in that wheel. As subsequent items are listed and printed, like operations will recur, the figure 1 being imprinted by the item count printing mechanism in aligned relation with each item, and the number of items involved will be progressively stored up in the item count accumulator.

When it is desired to take a total, the total key will be depressed, which in this instance actuates all of the rack lock plates, so that all of the rack bars, including the item count rack bars, will be free to partake in the total operation, and at the same time the depression of the total key sets the mechanism required in reversing the order of operations, so that, on the forward movement of the handle, the respective racks will be enmeshed with the associated accumulator wheels, and in each instance advance until the enmeshed accumulator wheel is restored to zero, which clears the machine and results in the printing of the total of the items and an alined imprint of the total of the number of items.

It will, of course, be understood that the reserve accumulating mechanism associated with the reserve item count rack bar 118 will come into play only in event that the number of items listed in the group exceeds 9, in which case the excess items will be carried over into the reserve accumulating wheel, so that in this case, in the totaling operation, the rack bar 118 will be permitted an advance movement as its associated accumulator wheel is restored to zero.

Although the rack lock plate 95^a does not coact with the depressible item keys, and although the functioning of the machine does not require that it be of full length and of a configuration similar to that of the rack lock plates 95, convenience and economy in quantity production indicate the desirability of utilizing one of the standard or stock rack lock plates, slightly modifying by notching the finger 97^a, and such practice has been observed in the construction of the machine as above described.

Although the operation of the machine requires a momentary lifting of the release bar 106 toward the end of each handle stroke,

in order to momentarily spread all of the key lock plates and rack lock plates in the restoration of the keys and the relocking of the racks, this action is timed to occur immediately after the restoring bar 88 has reached the limit of its rearward movement, so that the momentary unlocking of the racks at this stage will not permit of any uncontrolled advance movement of any of the racks, including the item count racks 117 and 118, so that such a momentary actuation of the key lock plates and rack lock plates will be ineffective to disturb the accumulation either of items or totals in the item listing group and item counting group of mechanisms.

The invention is one which may be readily applied to and introduced into machines of standard construction without re-organization of the mechanisms, and with but slight addition to the standard construction, so that the machines of standard form may be provided with the item counting features, with but slight additional expense, and when so equipped will count and total the number of items as an incident to the regular listing operation.

Although the invention has been described in detail, and although, as shown, it has been applied to a standard listing machine of the character shown and described in the Johantgen Patent, No. 1,336,840, it will be understood that it is not the intention to limit its application to machines of this precise character, since it may be otherwise applied as occasion may arise.

I claim:

1. In a machine of the class described, the combination of a plurality of rows of item keys arranged in ascending orders, a rack bar associated with each row of item keys and adapted to be stopped in appropriate position by the depression of any key in the associated order, accumulating mechanisms associated with each of the rack bars, a swinging rack lock plate for each order, positioned to be swung laterally by the depression of any key in said order and adapted when so swung to unlock the associated rack bar, a universal releasing bar extending transversely and mounted for lifting movement and provided with means adapted when actuated to restore the swinging rack lock plates to locking position and to restore the depressed item keys to elevated position, an item counting rack bar and associated accumulating mechanisms, a slide plate carried by the releasing bar and having a locking member normally in locking engagement with the item counting rack bar, and members on said slide plate adapted to engage with the respective swinging rack locks to effect a sliding unlocking movement of the slide plate by the swinging movement of any one of the rack lock plates, a swinging stop a single space in advance of the locking member for the item counting rack bar, said stop having engagement with the releasing bar and adapted to be displaced by a lifting movement thereof, a total setting member adapted when actuated to elevate the universal releasing bar to unlock the rack locks for the item accumulating mechanism and displace the stop for the item counting rack bar, and to effect displacement of the slide plate to unlock the item count rack bar through a movement imparted to the slide plate by the swinging of the rack lock plates, and power mechanisms for actuating the several mechanisms in timed relation to one another.

2. In a machine of the class described, the combination of a plurality of rows of depressible item keys arranged in ascending orders, a rack bar associated with each row of item keys and adapted to be stopped by the depression of a selected key in the associated row, accumulating mechanisms associated with the respective rack bars, a movable rack lock plate for each row of keys, adapted to be moved from normal position by the depression of any key in the associated row and adapted when moved to release the associated item rack bar, a universal releasing device for restoring all of the rack locks to locking position, an item counting rack bar and associated accumulating mechanisms, a lock for said item counting rack bar for holding the same in normal position, means carried by the universal releasing mechanism and movable therewith and adapted to be actuated by the movement of any one of the item rack locks to displace the item counting rack lock and release said item rack bar, a stop for the item counting rack bar positioned to permit a single degreee of movement to said bar, and power mechanisms and connections for actuating the several mechanisms in timed relation and adapted to operate the universal releasing mechanism to permit restoration of all of the advanced rack bars to normal position, including the item counting rack bar.

3. In a machine of the class described, the combination of a plurality of rows of depressible item keys arranged in ascending orders, a rack bar associated with each row of item keys and adapted to be stopped by the depression of a selected key in the associated row, accumulating mechanisms associated with the respective rack bars, a movable rack lock plate for each row of keys, adapted to be moved from normal position by the depression of any key in the associated row and adapted when moved to release the associated item rack bar, a universal releasing device for restoring all of the rack locks to locking position, an item counting rack bar and associated accumulating mechanisms, a lock for said item counting rack bar for holding the same in normal position, means carried

by the universal releasing mechanism and movable therewith and adapted to be actuated by the movement of any one of the item rack locks to displace the item counting rack lock and release said item rack bar, a stop for the item counting rack bar positioned to permit a single degree of movement to said bar, a total key adapted when moved to set the mechanism for total taking and to unlock all of the rack locks, including the item counting rack bar lock and to displace the item counting rack bar stop in preparation for total taking, and power mechanisms and connections for actuating the several mechanisms in timed relation and adapted to effect restoration of all of the advanced rack bars to normal position, including the item counting rack bar.

4. In a machine of the class described, the combination of a plurality of rows of item keys arranged in ascending orders, a rack bar associated with each row of item keys and adapted to be stopped in appropriate position by the depression of any key in the associated order, accumulating mechanisms associated with each of the rack bars, a movable rack lock plate for each order adapted to be moved by the depression of any key in said order and adapted when moved to unlock the associated rack bar, a universal releasing bar mounted for lifting movement and adapted when actuated to restore all of the rack lock plates to locking position and to restore the depressed item keys to elevated position, an item counting rack bar and associated accumulating mechanisms, a slide plate carried by the releasing bar and having a locking member normally in locking engagement with the item counting rack bar, and members on said slide plate adapted to engage with the respective rack locks to impart a sliding unlocking movement to the slide plate by the movement of any one of the rack lock plates, a stop for the item counting rack bars for limiting it to a single degree of movement, and power mechanisms for actuating the several mechanisms in timed relation to one another.

5. In a machine of the class described, the combination of a plurality of rows of item keys arranged in ascending orders, a rack bar associated with each row of item keys and adapted to be stopped in appropriate position by the depression of any key in the associated order, accumulating mechanisms associated with each of the rack bars, a movable rack lock plate for each order adapted to be moved by the depression of any key in said order and adapted when moved to unlock the associated rack bar, a universal releasing bar mounted for lifting movement and adapted when actuated to restore all of the movable rack lock plates to locking position and to restore the depressed item keys to elevated position, an item counting rack bar and associated accumulating mechanisms, a slide plate carried by the releasing bar and having a locking member normally in locking engagement with the item counting rack bar, and members on said slide plate adapted to engage with the respective movable rack locks to impart a sliding unlocking movement to the slide plate by the movement of any one of the rack lock plates, a stop for the item counting rack bar for limiting it to a single degree of movement, a total key adapted when depressed to actuate the universal releasing bar to unlock all of the rack locks, including the item counting rack lock and to displace the stop for the item counting rack, and power mechanisms for actuating the several mechanisms in timed relation to one another.

In witness that I claim the foregoing I have hereunto subscribed my name this 18th day of September, 1929.

OLIVER D. JOHANTGEN.