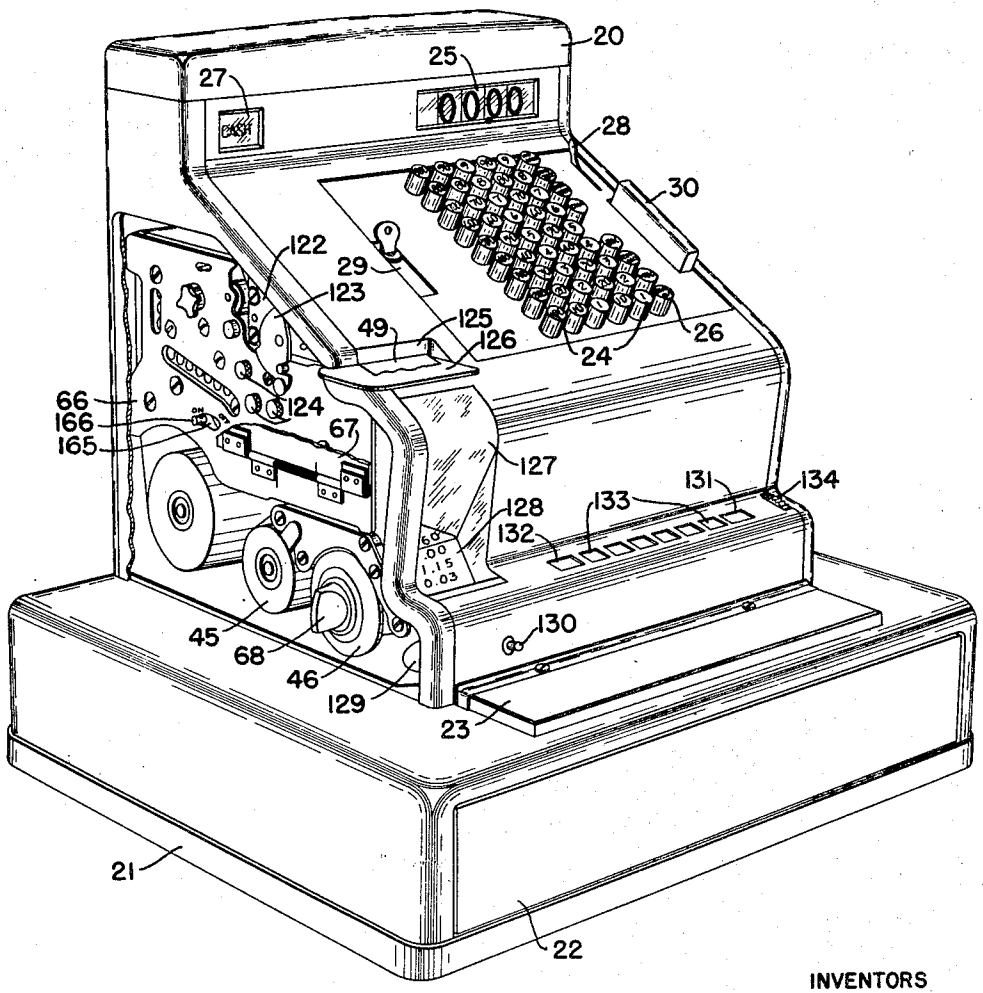
June 14, 1955 F. R. WERNER ET AL 2,710,576

PAPER HANDLING EQUIPMENT AND PRINTING MECHANISM FOR CASH REGISTERS AND ACCOUNTING MACHINES

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FIG. 1



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FIG. 2

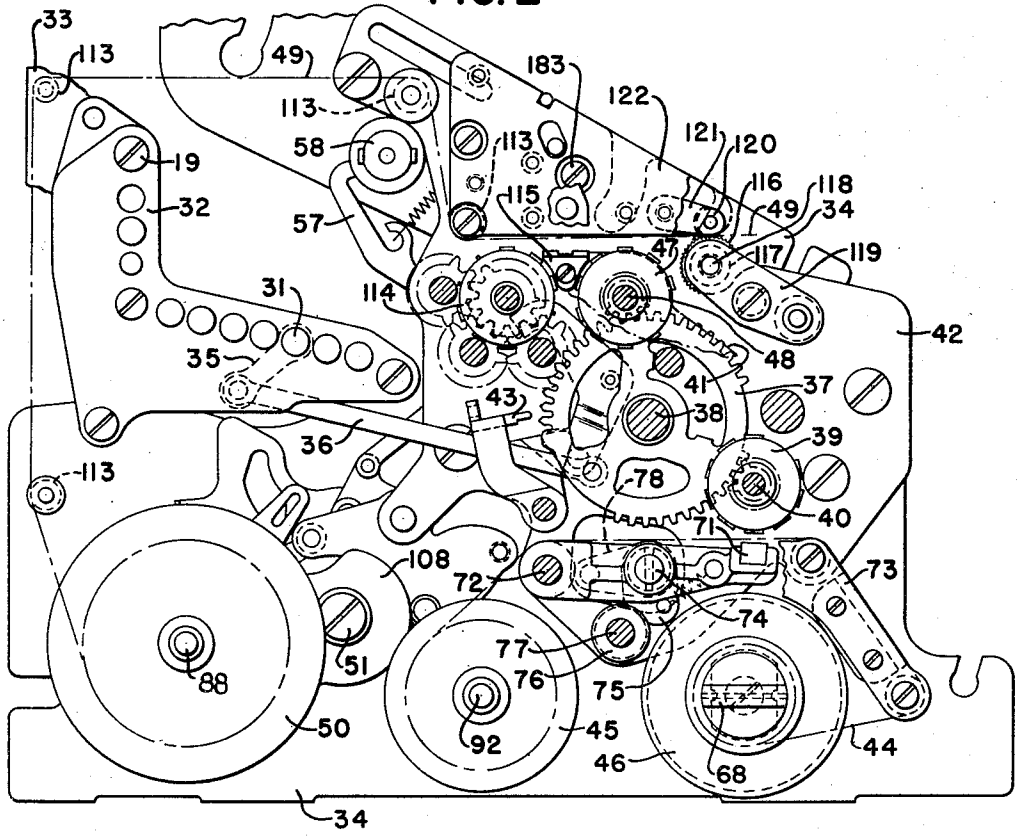
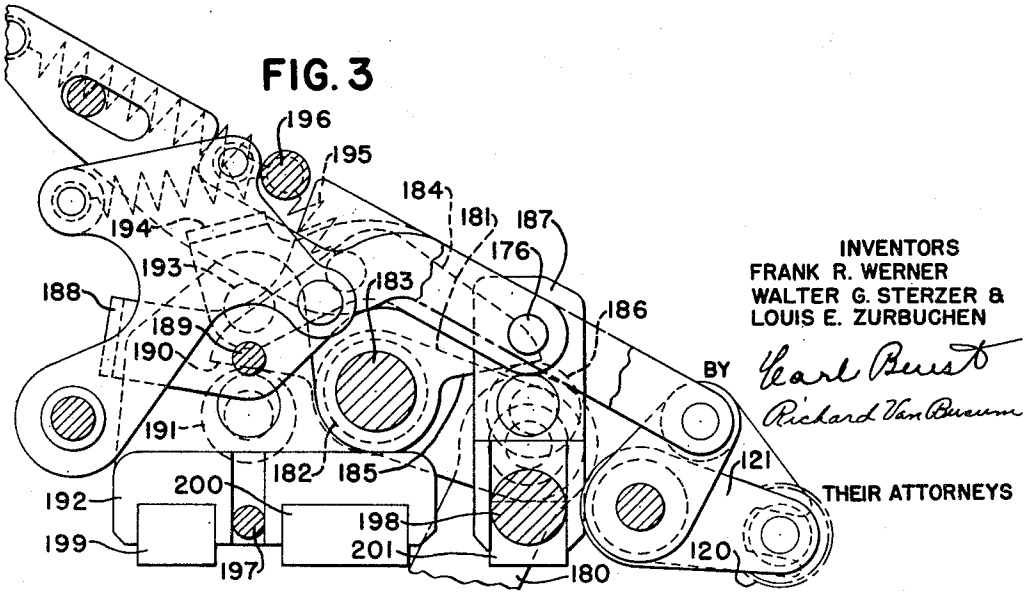


FIG. 3



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FIG. 4

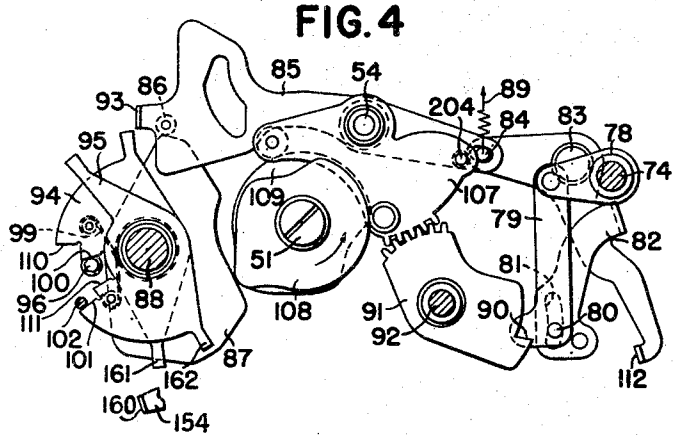


FIG. 9

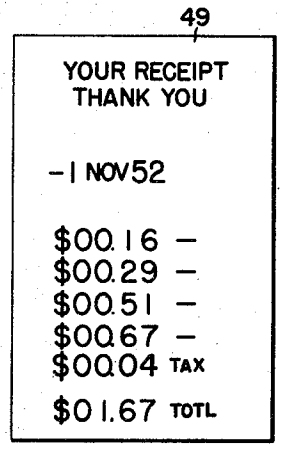


FIG. 5

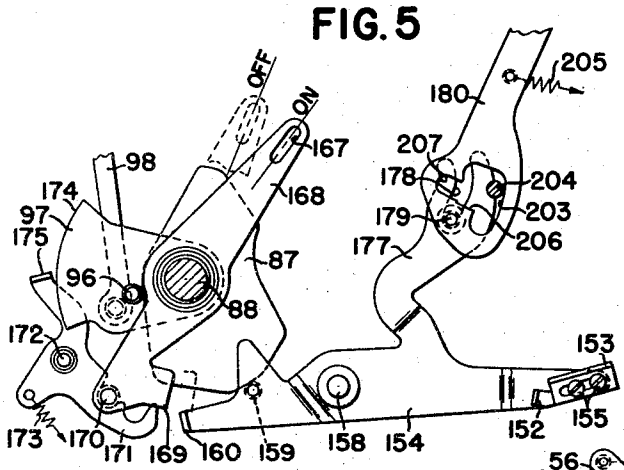


FIG. 6

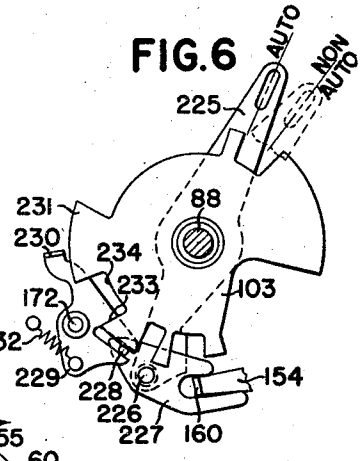


FIG. 7

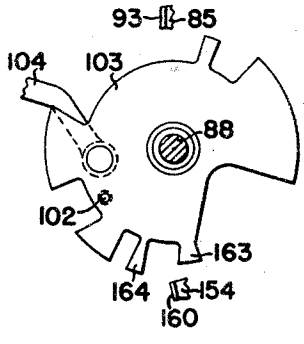
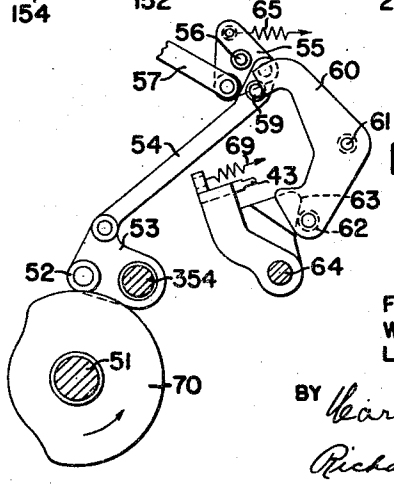


FIG. 8



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PAPER HANDLING EQUIPMENT AND PRINTING MECHANISM FOR CASH REGISTERS AND ACCOUNTING MACHINES

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FIG. 10

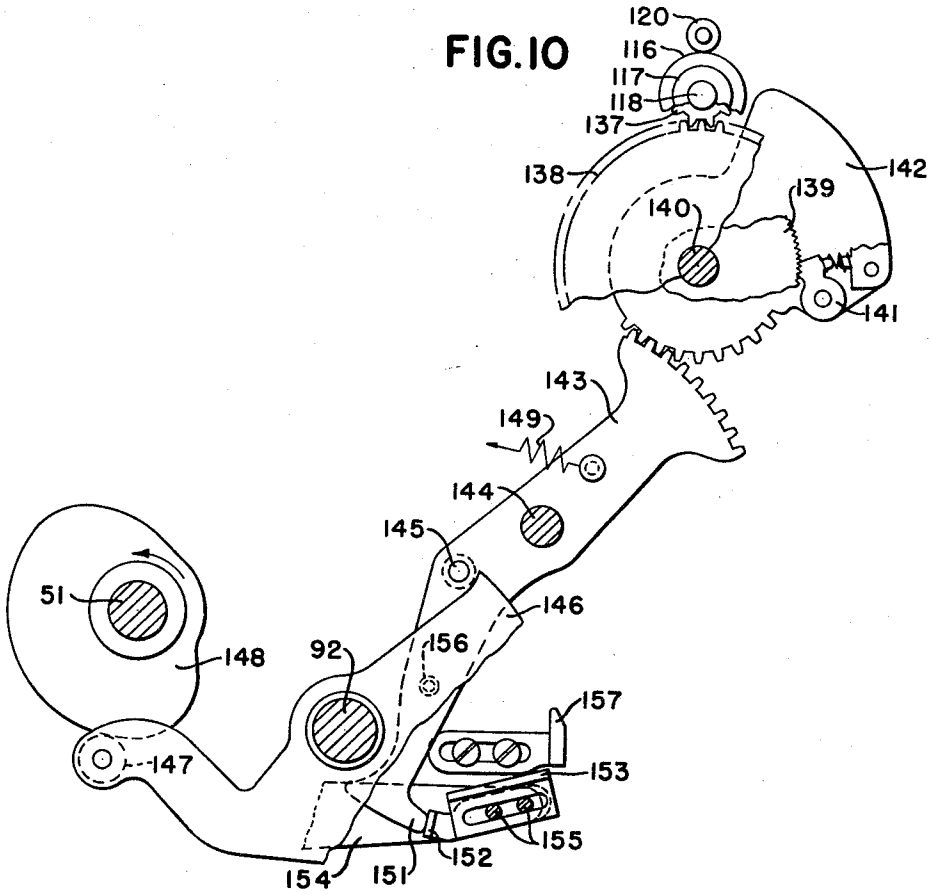
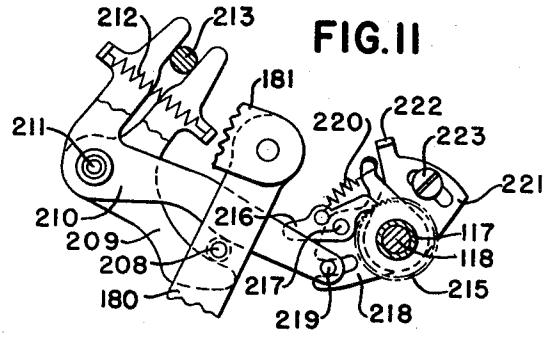


FIG. 11



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PAPER HANDLING EQUIPMENT AND PRINTING MECHANISM FOR CASH REGISTERS AND ACCOUNTING MACHINES

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FIG. 12

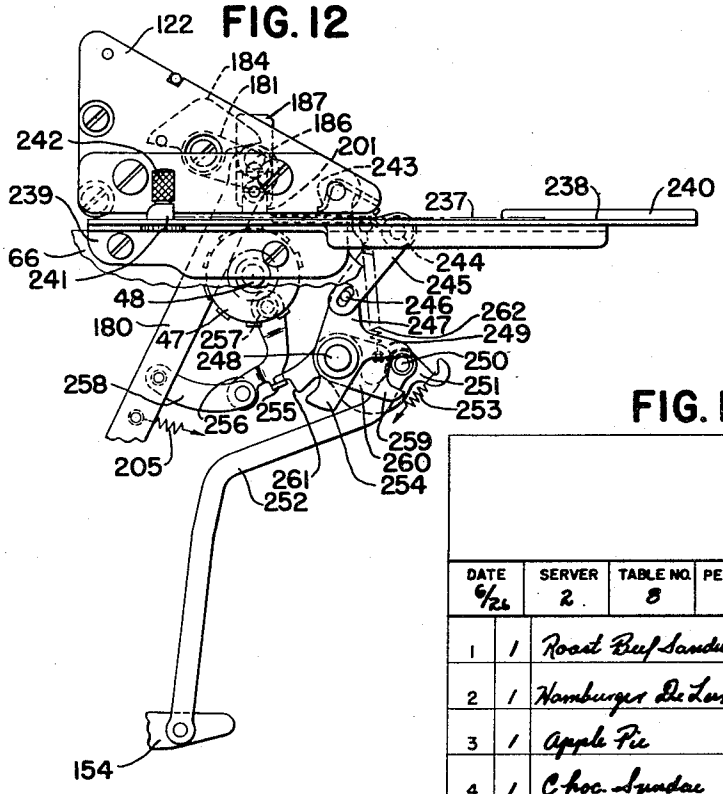


FIG. 13

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DATE		SERVER	TABLE NO.	PERSONS	CHECK NO.
6/21		2	8	2	99958
1	/	Roast Beef Sandwich			.35
2	/	Hamburger DeLuxe			.50
3	/	Apple Pie			.20
4	/	Choc. Sundae			.25
5	/	Coffee			.10
6	/	Ice Tea			.15
7					
8					
9					
10					
11					
					001.55 TOTL

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United States Patent Office 2,710,576 Patented June 14, 1955

2,710,576

PAPER HANDLING EQUIPMENT AND PRINTING MECHANISM FOR CASH REGISTERS AND ACCOUNTING MACHINES

Frank R. Werner and Walter G. Sterzer, Dayton, and Louis E. Zurbuchen, West Carrollton, Ohio, assignors to The National Cash Register Company, Dayton, Ohio, a corporation of Maryland

Application August 28, 1952, Serial No. 306,762

10 Claims. (Cl. 101—93)

The present invention relates generally to cash registers and accounting machines and is particularly directed to the printing mechanisms and paper handling equipment of such machines.

The general object of this invention is the provision of simple and efficient paper handling equipment for use in connection with cash registers and accounting machines.

Another object is the provision of an improved mechanism for printing records on record material.

Still another object of the present invention is to provide a cash register or an accounting machine with a simple and efficient mechanism for printing and issuing an itemized receipt.

A further object is to provide suitable means for controlling the operation of the impression mechanism for the receipt in receipt printing and issuing operations.

Another object is the provision of means to control the feeding of the receipt material in receipt printing and issuing operations.

A further object is to provide a simple and efficient type of slip handling mechanism to use in place of the receipt handling mechanism, said slip mechanism being arranged to utilize the receipt printing mechanism and its controlling mechanism substantially as they are as only minor alterations and adjustments are required to adapt said mechanisms for use with said slip handling mechanism.

With these and incidental objects in view the invention includes certain novel features of construction and combinations of parts, a preferred form or embodiment of which is hereinafter described with reference to the drawings which accompany and form a part of this specification.

In the drawings:

Fig. 1 is a perspective view of the complete machine with the closure on the left-hand side of the cabinet broken away to better show the paper handling equipment for the machine.

Fig. 2 is a left-side elevation of the machine showing in a general way the record material supporting, printing and feeding mechanisms, the detail strip feeding and printing mechanisms, and the mechanism for positioning the printing wheels.

Fig. 3 is an enlarged left-hand elevation showing in particular the receipt impression mechanism.

Fig. 4 is a detail view showing the operating mechanism for the detail impression mechanism and the mechanism for controlling the functioning of said operating mechanism.

Fig. 5 is a detail view showing the mechanism for controlling the operation of the receipt printing and feeding mechanisms.

Fig. 6 is a detail view of an alternate form of mechanism to that shown in Fig. 5, for controlling the operation of the receipt printing and feeding mechanisms.

Fig. 7 is a detail view of the selecting plate positioned by the control keys for controlling the operation of the detail and receipt issuing mechanisms.

Fig. 8 is a detail view of the mechanism for operating the ribbon feeding mechanism and the aliner for the printing wheels.

Fig. 9 is a facsimile of a receipt issued by the machine embodying the present invention.

Fig. 10 is a left-hand elevation of the mechanism for feeding the receipt material.

Fig. 11 is a detail view of the mechanism for imparting additional feed to the web of the receipt material in certain operations.

Fig. 12 is a left side elevation of a modified form of mechanism in which a simple type of slip printng mechanism is substituted for the receipt mechanism.

Fig. 13 is a facsimile of a slip prepared on a machine embodying the substitute mechanism shown in Fig. 12.

Description

The present invention is directed to improvements in combined cash registers and adding machines of the general type disclosed in United States Patent No. 2,443,652, issued June 22, 1948, to Edward J. Carey et al. and United States Patent No. 2,450,165, issued September 28, 1948, to Harold O. Randall et al. to which patents reference may be had for a complete disclosure of mechanism which is not pertinent to the present invention and which for that reason will not be illustrated or described herein.

Likewise, the improved mechanism disclosed in the present application is applied to a machine which is similar in every respect to the machine disclosed in the co-pending application for Letters Patent of the United States, Serial No. 255,870, filed November 10, 1951, inventors Frank R. Werner and Walter G. Sterzer.

Machine in general

The mechanism of the machine is enclosed in a suitable case or cabinet **20** (Fig. 1) secured to a machine base not shown which in turn supports the framework of the machine. The base is secured to the top surface of a drawer cabinet **21** which houses a cash drawer **22** having suitable partitions for coins and currency, said cash drawer being arranged to open automatically upon certain types of operations of the machine. Located above the cash drawer **22** upon the top surface of cabinet **21** is a coin panel **23** for use in making change.

The machine as illustrated is provided with a keyboard which comprises five rows or denominational orders of amount keys **24** (Fig. 1) which through the usual corresponding differential mechanisms (not shown) control the positioning of corresponding indicators **25** and corresponding type wheels, as will be explained presently. The keyboard also includes a row of transaction or control keys **26** which control the positioning of a corresponding indicator **27** and corresponding type wheels for indicating and printing characters for use in identifying the type of operations being performed.

A key release lever **28** is provided for releasing depressed amount or control keys and is likewise used for restoring the motor starting bar and associated mechanism from depressed position to undepressed position, in case said motor bar is inadvertently retained depressed at the end of machine operation.

The machine is provided with the usual operation control slide **29** which is shiftable to various positions to control the functioning of the machine. The control slide **29** is provided with a lock and key for controlling its movement so that only authorized persons may operate said slide for the purpose of resetting the total. In some cases the lock for the control slide **29** may be provided with two keys, one of which permits the reading of the total and the other of which permits the resetting of the total, this latter key being generally retained by the proprietor or other authorized person. The control slide **29** also controls the positioning of corresponding type

wheels for printing characters to identify the functions controlled by said slide.

The machine is provided with the usual starting bar **30** located at the right-hand side of the machine for initiating machine operations, which under normal conditions are performed electrically. However, a hand crank (not shown) is provided for operating the machine manually if necessary or desirable, due to unusual conditions.

The five rows of amount keys **24** (Figs. 1 and 2) through their differential mechanisms (not shown) position corresponding shafts **31** in accordance with the values thereof, said shafts being journaled in the machine framework, including a right frame (not shown) and a left auxiliary frame-work comprising similar plates **32** spaced apart by screw studs **19**. The plates **32** are secured to an upper left frame **33** secured to a main left frame **34**, in turn secured to the machine base. Secured on the left-hand end of each of the shafts **31** is a corresponding crank **35** connected by a link **36** to a corresponding type wheel driving segment **37** rotatively supported on a stud **38** secured in the frame **34**. The segments have on their forward edges gear teeth which mesh with pinions integral with corresponding type wheels **39** and **47**, rotatably supported respectively on studs **40** and **48** secured in the frame **34**. The outer ends of the studs **38**, **40** and **48** (Fig. 2) are supported by a plate **41** secured in spaced relationship to a companion plate **42** in turn secured by screw studs in proper spaced relationship to the left frame **34**.

The type wheels **39** are arranged for the printing of values corresponding to the depressed amount keys upon the web of a detail strip **44** (Fig. 2) which web is unwound from a supply roll **45**, mounted in the machine framework, onto a receiving roll **46**, also mounted in the machine framework, and in certain types of operations of the machine said roll **46** is advanced an increment of movement to properly space the detail strip.

The mechanism for rotating the receiving roll **46** to advance the detail strip **44** is similar in every respect to the corresponding mechanism disclosed in the co-pending application Serial No. 255,870, to which reference may be had for a complete description of this mechanism.

The receipt type wheels **47** are arranged to print values corresponding to the depressed amount keys upon the web of a receipt strip **49** (Fig. 2) which is unwound from a supply roll **50** and guided by various studs and rollers between the type wheels **47** and the receipt printing hammers to record on said receipt material the values of the depressed amount keys.

Type wheel aliner

The segments **37** (Figs. 2 and 8) are provided with a series of alining teeth which are arranged to be engaged by an alining bar **43** having parallel side arms rotatably supported on a stud **64** secured in the machine framework, said aliner being actuated so as to engage the teeth in the segments **37** after said segments have been positioned and prior to operation of the impression mechanism, to hold said segments and the type wheels **39** and **47** in position during operation of said impression mechanism. The aliner **43** is operated by a cam **70** secured on a main cam shaft **51** journaled in the machine framework, the periphery of said cam co-acting with a roller **52** mounted on an arm **53** free on a stud **354** secured in the frame **34**. A link **54** pivotally connects the arm **53** to a companion arm **55** free on a fixed stud **56**. A spring **65** urges the arm **55** clockwise, which through the link **54** urges the arm **53** counter-clockwise to maintain the roller **52** in yielding engagement with the edge of the cam **70**. The link **54** carries a roller **59** which co-acts with a left-hand extension of a lever **60** free on a stationary stud **61**, said lever carrying a roller **62** which co-acts with a cam surface **63** on an extension of the inner arm of the aliner **43**.

During each machine operation the main cam shaft **51** and the cam **70** receive one counter-clockwise revolution of movement and during this movement a low portion of the periphery of said cam **70**, in cooperation with the roller **52**, permits the spring **65** to shift the link **54** downwardly to withdraw the roller **59** from the extension of the lever **60**, to free said lever and the aliner **43**, to the action of a spring **69** which rocks said aliner clockwise to engage it with the teeth in the segments **37** prior to operation of the impression mechanism, so that said segments and the type wheels geared thereto, will be retained in set positions during operation of said impression mechanism. After the impression mechanism has operated, the cam **70**, in cooperation with the roller **52**, restores the link **54** upwardly causing the stud **59** to restore the lever **60** counter-clockwise to normal position, as shown in Fig. 8, to disengage the aliner **43** from the teeth of the segments **37** so that said segments may be positioned under control of their corresponding differential mechanisms in the succeeding machine operation.

Also, pivotally connected to the arm **55** (Figs. 2 and 8) is a ribbon feed pawl **57** which is maintained in yielding engagement with the teeth of a ribbon feed ratchet **58**, whereupon rotation of the cam **70** and consequent rocking movement of the lever **55** shifts the feed pawl **57** up and down causing the tooth thereof, in cooperation with the ratchet **58**, to advance said ratchet one increment of movement each machine operation, to feed the inking ribbon so that a freshly inked portion thereof will be presented to the type wheels each machine operation to insure a clear and distinct impression.

The entire ink ribbon assembly, with the exception of the ratchet **58** and the feed pawl **57**, is mounted on a ribbon support plate **66** (Fig. 1) which is removable from the machine as a complete unit for inspection or adjustment of the mechanism mounted thereon, and is similar in every respect to the ribbon support plate mechanism disclosed in the co-pending application, Serial No. 255,870.

Hinged on the lower edge of the ribbon support plate (Fig. 1) is a lid **67**, a fragment of which is here shown, said lid being for the purpose of enclosing the detail strip mechanism, including the supply and receiving rolls **45** and **46**. The lid **67** is provided with a lock and key for locking it in the closed position, in which position it protects the detail supply and receiving rolls **45** and **46** from being tampered with by unauthorized persons. The lid **67** is provided with an opening (not shown) through which a winding key **68** for the detail receiving roll **46** protrudes, when said lid is in closed position, so that the detail strip may be manually advanced regardless of whether said lid is open or closed.

Printing hammer for detail strip

A detail impression hammer **71** (Fig. 2) co-acts with the type wheels **39** to imprint the data thereon upon the web of the detail strip **44**, as it is fed in relation to said wheels and said hammer. The hammer **71** is pivoted on a stud **72** supported between the frame **42** and an auxiliary support plate **73** maintained in proper spaced relationship to said frame by various studs, shafts and rods extending between said plate and said frame. The hammer **71** freely supports between its side arms a shaft **74** having secured thereon a hammer operating cam **75** which co-acts with the periphery of an impression adjusting cone **76** supported by a stud **77** extending between the frame **42** and the plate **73**, said cone being adjustable along said stud **77** to bring different diameter thereof into co-acting relationship with the cam **75** to obtain the desired degree of impression. Also secured on the shaft **74** is a crank **78** (Figs. 2 and 4) having pivotally connected thereto the upper end of an operating link **79** carrying a stud **80** at its lower end which is arranged to be selectively brought into the range of an operating shoulder **90** on an operating segment **91** free on a stud **92** secured in

the frame 34, which stud 92 also supports the detail supply roll 45.

The movement of the stud 80 into the path of the operating shoulder 90 is controlled by a slot 81 which engages said stud, said slot being in an extension of a lever 82 free on a stud 83 secured in the frame 42. A rearward extension of the lever 82 carries a stud 84 which engages a slot in the forward end of a sensing lever 85 pivoted on the stud 54. A spring 89 urges the lever 85 counter-clockwise to normally maintain a stud 86 carried thereby in yielding engagement with a corresponding camming surface on a cam 87 free on a stud 88 secured in the frame 34, said stud 88 likewise supporting the receipt supply roll 50 (Fig. 2).

During machine operation the cam 87 is rocked first counter-clockwise (Fig. 4) and back to normal position to free the lever 85 to the action of the spring 89 which causes a bent over ear 93 on said lever to sense for the presence of a high or low spot on the upper portions of companion control discs 94 and 95 and a selecting plate 103 (Fig. 7) free on the stud 88. The discs 94 and 95 are flexibly connected to each other by a torsion spring 99 which urges them in opposite directions to normally maintain a shoulder 100 on said disc 94 in yielding engagement with a stud 96 (Figs. 4 and 5) in a selecting plate 97 free on the stud 88 and connected by a link 98 to the control slide 29 (Fig. 1) so that movement of said control slide positions said selecting plate 97 accordingly. The spring 99 (Fig. 4) urges the selecting disc 95 clockwise to normally maintain a shoulder 101 thereon in yielding contact with a stud 102 (Figs. 4 and 7) carried by the selecting plate 103 which is connected by a link 104 to the differential mechanism for the row of transaction or control keys 26 (Fig. 1), so that said selecting plate 103 is positioned according to the depressed control key 26. In Figs. 4 and 5, the plate 103 is shown not in zero or home position but in the position to which it is adjusted under control of the "Total Cash" key 26.

The control discs 94 and 95 and the selecting plate 103 each has a high portion or projection on the upper periphery thereof which, when positioned in the path of the ear 93, obstructs counter-clockwise movement of the sensing lever 85, under influence of the spring 89 upon operation of the cam 87, and therefore retains the stud 80 out of the path of the operating shoulder 90 on the segment 91 to render the detail hammer inoperative. When none of the projections on the control discs or selecting plate are in the path of the ear 93, the lever 85 is free to move full distance counter-clockwise, which movement rocks the lever 82 in unison therewith to move the stud 80 into the path of shoulder 90, whereupon initial movement counter-clockwise of the segment 91 causes said shoulder, in cooperation with said stud, to lift the link 79 to rock the shaft 74 clockwise. Clockwise movement of the shaft 74 (Fig. 2) and the cam 75 causes said cam, in cooperation with the periphery of the cone 76 to rock the hammer 71 counter-clockwise whereupon the platen of said hammer carries the inking ribbon and the detail strip 44 into contact with the type wheels 39 to imprint the data set up on said wheels on said detail strip. Return movement clockwise of the segment 91 restores the hammer to inoperative position, as shown in Fig. 2, and at approximately the same time return movement counter-clockwise of the cam 87 (Fig. 4) restores the lever 85 and its companion lever 82 to normal positions, as here shown, to move the stud 80 out of the path of the shoulder 90.

The upper portion of the segment 91 has gear teeth which mesh with corresponding gear teeth in the lower portion of an operating lever 107 free on the stud 54 and carrying rollers which cooperate with the peripheries of companion plate cams 108 and 109 secured to the main cam shaft 51. Rotation of the shaft 51 and the cams 108 and 109 rocks the lever 107 first counter-clockwise, for a purpose later to be described, after which said lever is restored to its neutral or normal position as here shown. Continued rotation of the cams then rocks the lever 107 in a clockwise direction which in turn rocks the segment 91 counter-clockwise causing the shoulder 90, in cooperation with the stud 80, to raise the link 79 and rock the shaft 74 and the cam 75 (Figs. 2 and 4) to cause the detail hammer 71 to make an impression stroke, in the manner explained previously, after which continued rotation of the cams 108 and 109 restores the associated parts to normal position, as here shown.

If a more detailed description of the construction and operation of the impression adjusting mechanism and the detail hammer 71 is required, reference may be had to the co-pending United States application, Serial No. 255,870, in which a complete disclosure of this mechanism may be found.

In Fig. 1 the control slide 29 is shown in its normal or "Register" position, in which the selecting plate 97 (Figs. 4 and 5) and the disc 94 are positioned as here shown so that the high portion of said disc 94 is out of the path of the ear 93 and consequently under this condition the detail impression mechanism functions. In addition to the "Register" position, which is the upper most position of the control slide 29, said slide has four other positions, namely, "Lock Register," "Read Total," "Adding," and "Reset Total," said positions being quoted in successive order as the control slide is moved downwardly from one position to the next. Moving the control slide 29 downwardly one step from "Register" position to "Lock Register" position causes the selecting plate 97 and the stud 96 to position the control disc 94 so that a high portion thereof is in the path of the ear 93 and consequently operation of the sensing lever 85 is obstructed and the detail hammer is rendered inoperative and no impression is made upon the detail strip. Performing a machine operation with the control slide 29 in "Register" position and without depressing any of the control keys 26 (Fig. 1), causes the selecting plate 103 to be located in zero position and this in turn causes the stud 102 carried by said plate to engage a shoulder 110 on the selecting disc 94 and move said disc clockwise to a position where the high portion on the upper edge thereof is in the path of the ear 93, and consequently in such operation the detail hammer will be rendered inoperative and no print will be made upon the detail strip.

As is well known, the machine may be converted to an adding machine by moving the control slide 29 to "Adding" position, and this permits adding operations to be performed without the necessity of depressing one of the control keys 26. Under these conditions the stud 96 in the control plate 97 co-acts with a shoulder 111 on the control disc 95 to position the projection on the upper portion thereof in the path of the ear 93 to obstruct counter-clockwise movement of the lever 85 and consequently the detail hammer will be disabled in such operations. Depressing the Sub-Total control key 26 (Fig. 1) to effect an item sub-total operation, causes the selecting plate 103 to be positioned so that a high portion of the periphery thereof is in the path of the ear 93 and consequently the detail hammer will be disabled in such operations.

An automatic mechanism (not shown) which is controlled by an ear 112 (Fig. 4) on a downward extension of the lever 82 prevents operation of the detail strip feeding mechanism when said ear is retained in the position here shown by the lever 85 when it is retained from counter-clockwise sensing movement by one of the high portions on the selecting discs or the selecting plate, and consequently the detail strip feeding mechanism is rendered inoperative whenever the detail hammer is rendered inoperative.

Obviously it is possible to arrange the high and low portions on the selecting discs 94 and 95 and the selecting plate 103 so as to control the operation of the detail strip

impression and feeding mechanisms by the control keys 26 and the control slide 29 in substantially any manner required for the business system to which the machine is being adapted.

Receipt printing and issuing mechanism

The web 49 (Figs. 1 and 2) of the receipt material is unwound from the supply roll 50 and guided by rollers 113 mounted on studs secured in the machine framework, thence over a series of date printing wheels 114 free on a stud secured in the frame 42, thence over an electro 115 for printing data of a descriptive or instructive nature on the receipt over the type wheels 47 and finally over serrated feeding rollers 116 integral with a sleeve 117 rotatably supported on a stud 118 secured in the frame 34 at its inner end and having its outer end supported by a bracket 119 secured in spaced relationship to the outer face of the frame 42. The web 49 of the receipt material is maintained in yielding contact with the feed rollers 116 by companion serrated pressure rollers 120 rotatably supported in a rockable frame comprising side arms 121 free on a stud extending between the frame 42 and an auxiliary plate 122 secured in proper spaced relationship to said frame 42. A manually operable cam member 123 (Fig. 1) rotatably mounted on the plate 122, is provided for lifting the pressure rollers 120 against the tension of their spring away from the feed rollers 116 to facilitate the installing of the receipt material 49 in the machine and to also free said receipt material so that it may be rewound on the supply roll 50 when it is desired to remove the ribbon support plate 66 from the machine. It will be observed by referring to Fig. 1, that the cam member 123 extends into the path of the ribbon support plate 66 when the pressure rollers 120 are effective, and it is necessary to move said cam member 123 clockwise to release the tension on said pressure rollers and to move said member out of the path of the ribbon support plate 66, before said support plate may be removed from the machine. This is a desirable safety precaution, because the web of the receipt material would interfere with the removal and installing of the ribbon support plate 66, if allowed to remain in the machine.

The date wheels 114 comprise month and day wheels which are manually adjustable by knobs 124 (Fig. 1) which protrude through corresponding openings in the ribbon support plate 66, and a year wheel which is adjustable by a slotted stud which extends through an opening in said support plate.

The electro 115 may be quickly and easily removed from the machine for replacement or adjustment by the removal of a single screw.

As previously explained, the type wheels 47, which are a substantial duplicate of the type wheels 39 comprise amount type wheels corresponding to the five rows of amount keys 24 (Fig. 1) and one overflow amount type wheel, a type wheel corresponding to the row of transaction or control keys 26 for printing identifying characters of the types of operations being performed upon the receipt material and a type wheel for the control slide 29 for printing symbols corresponding to the five positions of said total control slide 29 upon the receipt material. From the feed rollers 116 and the pressure rollers 120 the web 49 of the receipt material is fed through an opening formed between a tearing blade 125 and a table 126, both of which are secured to the cabinet 20, said table having a series of numbers engraved in its face which are for the purpose of determining the number of items printed upon the receipt material.

The cabinet 20 (Fig. 1) is provided with an opening covered by a transparent window 127 through which the last entry and several previous entries made on the web of the detail strip 44 are visible. An opening 128 in said window which is directly opposite a table over which the detail strip passes, is provided for penciling entries of any desired nature upon the web of said detail strip. The entries on the detail strip, which are visible through the window 127 and through the opening 128, are illuminated by a small electric light 129 which is controlled by a push button switch 130, which extends through an opening in the cabinet 20.

At this point it may be of advantage to explain that the cabinet 20 is provided with a series of openings located on a flat portion thereof just above the coin slab or panel 23, through which the wheels of a series of special counters are visible. These special counters include a "Customer" counter 131 (Fig. 1) which accumulates one for each transaction involving one customer, said transactions being namely, "One Item Cash," "Cash Total" and "Charge." The special counters also include a "Reset" counter 132 which accumulates one each time an operation is performed with the control slide 29 in "Reset Total" position. There are also six special counters 133 corresponding to six of the control keys 26, which are; beginning with the left-hand counter and progressing toward the right, "Paid Out," "Charge," "Received On Account," "Tax," "Cash" and "No Sale," said counters constructed to accumulate one each time an operation of the machine is performed with the corresponding control key 26 depressed to control said operation. A conveniently located reset knob 134 (Fig. 1) which protrudes through an opening in the cabinet 20, is provided for resetting all of the special counters simultaneously, with the exception of the "Reset" counter 132 which is never reset.

The serrated tearing blade 125 is provided for separating the completed receipts from the web 49 of the receipt material.

Receipt feeding mechanism

Mechanism for driving the feed rollers 116 (Fig. 2) for advancing the receipt material comprises a pinion 137 (Fig. 10) integral with the sleeve 117 and meshing with a gear 138 integral with a ratchet 139 free on a stud 140 secured in the frame 34. The teeth of the ratchet 139 are yieldingly engaged by three spring pushed feed pawls 141 (only one here shown) mounted on an extension of a segment 142 free on the stud 140 and having gear teeth which mesh with corresponding gear teeth in the upper end of a lever 143 free on a stud 144 in the frame 34 (Fig. 2). A comparatively strong spring 149 urges the lever 143 counter-clockwise to normally maintain a stud 145 carried thereby in yielding contact with a shoulder formed on an operating lever 146 free on the stud 92. The lever 146 carries a roller 147 which co-acts with the periphery of a plate cam 148 secured on the main cam shaft 51 and performing one counter-clockwise revolution each machine operation.

In addition to the feed pawls 141, the teeth of the ratchet 139 co-act with three retaining pawls (not shown) which are similar in every respect to the corresponding retaining pawls shown in the co-pending application, Serial No. 255,870, which pawls hold said ratchet and the gear 138 against retrograde movement during take-up movement of the feed pawls 141, as will now be explained.

Revolution of cam 148 permits the spring 149 to rock the lever 143 counter-clockwise which movement in turn rocks the segment 142 clockwise to move the feed pawls 141 in a take up direction, during which time they ratchet over the teeth of the ratchet 139 which is held stationary by the retaining pawls. The cam 148 co-acting further with lever 146 then restores the lever 143 clockwise, against the action of the spring 149 to return the segment 142 counter-clockwise to cause the feed pawls 141 to advance the ratchet 139 and the gear 138 in a counter-clockwise direction whereupon said gear 138 revolves the pinion 137, the sleeve 117 and the feed rollers 116 in a clockwise direction to advance the receipt material 49.

The present machine is arranged for itemizing transactions which comprise several item entering operations and a final item total operation during which latter

operation the item total, the date and the data on the electro are printed upon the receipt material. A comparatively short feed of the receipt material is required in item entering operations and a comparatively long feed of the receipt material is required after the item total operation to feed the finished receipt beyond the edge of the taring blade 125 (Fig. 1). Likewise, in certain operations it is desirable that the receipt material not feed at all, as in such operations no entry is made thereon. The length of the receipt feed is controlled by the counter-clockwise or take-up movement of the lever 143 (Fig. 10), said movement of said lever being governed by a sensing mechanism which prevents take-up movement of said lever when no receipt feed is required, permits a short take-up movement of said lever when a short feed is required and permits full movement of said lever when a full or long feed of the receipt material is required. The mechanism for controlling take-up movement of the lever 143 comprises a toe 151 on a foot-shaped downward extension of said lever 143, which toe coacts with a bent over ear 152 on a plate, and with a bent over edge 153 on another plate, both of said plates being adjustably secured on the forward end of a sensing lever 154 by means of screws 155, threaded in said lever, coacting with slots in said plates. The downward extension of the lever 143 carries a stud 156 which co-acts with an ear 157 bent outwardly from a plate adjustably secured to the frame 34 by means of a slot therein in cooperation with screws threaded in said frame 34. The lever 154 (Fig. 5) is pivoted on a stud 158 secured in the frame 34 and said lever has an ear 160 bent outwardly therefrom, which coacts with medium portions 161 and 162 extending downwardly from the control discs 94 and 95 (Fig. 4) and with medium portion 163 and high portion 164 (Fig. 7) extending downwardly from the selecting plate 103. The lever 154 is spring urged clockwise to normally retain a stud 159 therein in yielding engagement with a corresponding camming surface on the cam 87.

In item Sub-Total transactions, which are controlled by depression of the "Sub-Total" key 26 (Fig. 1) the selecting plate 103 is positioned so that the projection 164 is opposite the ear 160 of the lever 154 and obstructs clockwise movement of said lever when the cam 87 (Fig. 5) functions in the manner explained previously to permit said lever 154 to move first clockwise under influence of its spring to sense the projections on the selecting discs and plate, and near the end of machine operation said cam restores said lever counter-clockwise to normal position against the action of its spring. Obstructing clockwise movement of the lever 154 (Fig. 10) retains the ear 152 in the path of the toe 151 and consequently pickup movement counter-clockwise of the lever 143 is prevented and as a result no feeding movement is imparted to the receipt material 49.

In Tax operations, which are controlled by the "Tax" key 26, the selecting plate 103 is positioned so that the projection 163 is opposite the ear 160 and as said projection 163 is shorter than the projection 164 slight clockwise sensing movement of the lever 154 is permitted upon initial movement of the cam 87 and this movement of said lever 154 (Figs. 5 and 10) is sufficient to move the ear 152 out of the path of the toe 151 and to move the bent over edge 153 opposite said toe whereupon operation of the lever 146 permits a slight take-up movement counter-clockwise of the lever 143 under influence of the spring 149 and return movement of said lever 146 restores said lever 143 from its take-up position to its normal position, as here shown, to impart a short feed to the receipt material 49.

Itemizing or multiple-item transactions are performed with the control slide 29 in "Register" position, and, during ordinary item-entering operations of itemizing transactions, it is not necessary to depress a control key. Consequently the selecting plate 103 (Figs. 4 and 7) is free to move to zero position, and in so doing the stud 102 engages the shoulder 110 and moves the control disk 94 to a position where the medium portion 161 is in the path of the ear 160 to permit a slight take-up movement of the lever 143 (Fig. 10) to cause a short feed to be imparted to the receipt material, as explained above. This positioning of the control disk 94 also moves the projection on the upper portion thereof into the path of the ear 93 to render the detail printing mechanism inoperative, as explained before.

After all of the items have been entered in an itemizing transaction, the "Total Cash" key 26 is depressed to condition the machine for a total cash operation, during which the item totalizer is cleared and a total of the items is printed upon the receipt 49 (Fig. 9). Operation of the "Total Cash" key also causes the selecting plate 103 to be positioned so that a low portion of its periphery is opposite the ear 160, as shown in Fig. 7, and, as a result, full feeding movement is imparted to the lever 143, to effect a long feed of the receipt material, as will be explained more in detail presently.

All other operations controlled by the control keys 26 cause the selecting discs 94 and 95 and the selecting plate 103 to be positioned so that no projection is opposite the ear 160 and consequently the lever 154 is free to move full distance clockwise upon initial movement of the cam 87, which movement moves the ear 152 and the edge 153 beneath the toe 151 so as not to interfere with full take-up movement counter-clockwise of the lever 143. Initial movement of the lever 146 permits the spring 149 to move the lever 143 full distance in a take-up counter-clockwise direction, which distance is determined by the stud 156 contacting the ear 157 and return movement of said lever 146 imparts full feeding movement to said lever 143 to cause a long feed of the receipt material. The control keys 26 which cause a long feed of the receipt material are as follows: "No Sale," "One Item Cash," "Total Cash," "Received On Account," "Charge," and "Paid Out."

The operations referred to above are performed under control of the keys 26 with the control slide 29 (Fig. 1) in its uppermost or "Register" position. Moving the control slide 29 to "Lock Register" position locks all the control keys 26 and the starting bar 30 against operation and consequently the machine cannot be operated. Moving the control slide 29 to "Read" position locks the control keys 26 against depression and causes the selecting discs and plate to be positioned so that low portions thereof are opposite the ear 160 and consequently the lever 154 is free to move full distance in a clockwise or sensing direction and as a result a long feed is imparted to the receipt material 49.

Moving the control slide 29 to "Adding" position locks all of the control keys against depression, with the exception of the "Sub-Total," "Total Cash," and "Charge" keys. Performing an adding or listing operation with the control slide in "Adding" position and with none of the control keys 26 depressed, causes the control disc 95 (Fig. 4) to be positioned under influence of the stud 96 in the control plate 94 and the stud 102 in the selecting plate 103 which plate is positioned in zero position, when no key 26 is depressed, to locate the projection 162 in the path of the ear 160. The projection 162 like the projection 163 permits a short movement of the sensing lever 154 and consequently said lever controls the movement of the lever 143 to cause a short feed of the receipt material 49 in such operations. Depressing the "Charge" key 26 with the control slide in "Adding" position causes the selecting plate 103 to be positioned accordingly upon operation of the machine, and during this positioning the stud 102 (Figs. 4 and 7) in cooperation with the shoulder 101, moves the projection 162 out of the path of the ear 160 so as to permit full sensing movement of the lever 154 so that in such operations a long feed of the receipt material will be effected. An operation performed with

the control slide 29 in "Adding" position and with the "Sub-Total" key 26 depressed causes the selecting plate 103 to be positioned so that the projection 164 is opposite the ear 160, which as previously explained obstructs movement of the lever 154 and consequently in such operations no feed will be imparted to the receipt material 49. Operating the machine with the control slide 29 in "Adding" position and with the "Total Cash" key 26 depressed causes the selecting plate 103 to be positioned accordingly and during such positioning the stud 102 in cooperation with the shoulder 101 moves the projection 162 out of the path of the ear 160 so that full sensing movement of the lever 154 is effected and consequently a long feed of the receipt material 49 takes place. Performing an operation of the machine with the total control slide 29 in "Reset" position has exactly the same effect on the receipt control mechanism as a Read operation and consequently in such operations a long feed of the receipt material 49 takes place.

"On" and "Off" mechanism for the receipt

An "On" and "Off" mechanism is provided for controlling the printing and issuing of receipts, said mechanism comprising an on and off knob 166 (Fig. 1) which is mounted on the ribbon support plate and protrudes through a clearance slot in said plate. The knob 166 is connected to the outer arm of a yoke 165 which is rockably mounted on the ribbon spool support plate 66 and the inner arm of said yoke has a stud (not shown) which engages a slot 167 (Fig. 5) in the upper end of a lever 168 free on the stud 38, when the plate 66 is attached to the machine. The lever 168 has a forward projection 169 which co-acts with the ear 160. When the on and off knob is in "On" position, as here shown, the projection 169 is maintained out of the path of the ear 160. Moving the on and off lever from "On" position to "Off" position rocks the lever 168 from the position shown in Fig. 5 counter-clockwise to the position shown in dash lines to move the projection 169 over the ear 160 to obstruct clockwise sensing movement of the lever 154 and thus prevent feeding of the receipt material 49. The lower end of the lever 168 carries a stud 170 which cooperates with two notches in a forward extension of a control arm 171, said notches corresponding to the two positions of said lever 168. The arm 171 is free on a stud 172 in the frame 34 and a spring 173 urges said arm counter-clockwise to maintain the notches in yielding engagement with the stud 170, to yieldingly retain said lever 168 in either of its two positions.

In the present arrangement it is possible to operate the on and off knob 166 only when the control slide 29 is in "Reset" position and this is controlled by an arcuate surface 174 on the control slide selecting plate 97 co-acting with a bent over ear 175 on an upward extension of the notched retaining arm 171 which obstructs clockwise movement of said arm except when the control slide 29 is in "Reset" position, at which time the surface is above and out of the path of the ear 175. Obstructing clockwise movement of the arm 171 causes the notches therein in cooperation with the stud 170, to secure the lever 168 and its operating knob 166 (Figs. 1 and 5) in either of its two positions and the said parts remain thus secured until the control slide 29 is again moved to "Reset" position, at which time it is possible to change the setting of the on and off knob 166 and associated parts.

Receipt printing hammer mechanism

A selectively operable dual hammer mechanism is provided for printing data on the receipt material 49. One of the hammers prints the date and electro data and the other prints the amounts, including items and item totals on said receipt material.

Directing attention to Fig. 5, the lever 154 has an upward extension 177 with an arcuate slot 178 which cooperates with a stud 179 fast in the lower end of a pitman 180, the upper end of which is pivotally connected to a crank 181 (Fig. 3) secured to the inner end of a sleeve 182 free on a stud 183 extending between the frame 42 and the auxiliary plate 122 (Fig. 2). Secured on the outer end of the sleeve 182 (Figs. 2 and 3) is a hammer operating arm 184 having a surface 185 which co-acts with a roller 186 mounted on an eccentric adjusting stud supported in a hammer block 187 having axially alined trunnions 176 which are freely engaged by holes in parallel forwardly extending arms of a yoke 188 pivoted on axially alined trunnions 189, one of which is in the plate 122 (Fig. 2) and the other in the frame 42. The hammer operating arm 184 has a surface 190 which co-acts with a roller 191 mounted on an eccentric adjusting stud in a hammer block 192, which like the block 187 has axially alined trunnion studs 193 which freely engage holes in the parallel arms of a yoke 194, the forward ends of said arms being pivotally supported by the trunnions 176 in the block 187.

The block 192 has a vertical slot in its outer edge which freely engages a guide stud 197 secured in the plate 122, and the block 187 has a similar vertical slot which engages a guide stud 198, also secured in the plate 122, said slots and said studs being for the purpose of maintaining the hammers 187 and 192 in proper vertical alinement with the type carriers that they co-act with. The hammer block 192 carries a platen 199 which co-acts with the date wheels 114 (Figs. 2 and 3) and said block also carries a wider platen 200 which co-acts with the electro type 115. The hammer block 187 carries a platen 201 which co-acts with the type wheels 47 for printing the data set up thereon on the receipt material 49. Two springs 195 (only one here shown) tensioned between the yoke 194 and a rod 196 supported by the plate 122 and frame 42, normally maintain the hammer blocks 187 and 192 in their upward positions where the platens carried thereby are clear of the web of the receipt material 49. The upper position of the blocks 187 and 192 is determined by lugs on the side arms of the yoke 188 engaging the rod 196.

The pitman 180 (Figs. 3 and 5) is selectively operable either upwardly or downwardly or both to selectively operate either or both of the receipt hammers during a machine operation. In the present arrangement during item entering or itemizing operations, the hammer 187 only functions to print the data on the type wheels 47 on the receipt material. However, in one item cash operations and in total cash operations both of the hammers function to print the total amount of the items, the date and the electro material upon the receipt.

The enlarged bottom end of the pitman 180 (Fig. 5) has an irregular control slot 203 which cooperates with a stud 204 in the hammer operating arm 107 (Fig. 4) and a spring 205 urges said pitman in a counter-clockwise direction which in turn urges the sensing lever 154 in a sensing or clockwise direction to position the control slot 203 in relation to the stud 204. As previously explained, initial rocking movement of the cam 87 causes the lever 154 to sense for high and low portions on the control discs 94 and 95 and the selecting plate 103 and return movement of said cam 87 restores said lever to its normal position as here shown, near the end of the machine operation.

If either the on and off lever 168 or the subtotal projection 164 is positioned opposite the ear 160 of the lever 154, sensing movement clockwise of said lever will be obstructed and in this case the slot 203 in the pitman 180 (Fig. 5) will be maintained in the position here shown so that the stud 204 is free to oscillate back and forth in a clearance portion of the slot 203, upon operation of the lever 197, without imparting any up or down movement to said pitman and consequently no printing move-

ment will be imparted to the hammers 187 and 192 (Fig. 3). It should also be remembered that no feeding movement will be imparted to the receipt material 49 when the receipt hammers are disabled as explained above. When one of the intermediate projections 161, 162 or 163 (Figs. 4 and 7) is positioned opposite the ear 160, the sensing lever 154 will receive sufficient clockwise movement to rock the lower end of the pitman 180 sufficiently in a forward or counter-clockwise direction to move an intermediate lower surface 206 in the slot 203 beneath the stud 204 so that clockwise movement of the hammer operating lever 107 to operate the detail printing hammer as explained previously, will cause the stud 204 to engage the surface 206 and shift the pitman 180 downwardly. Downward movement of the pitman 180 (Fig. 3) rocks the crank 181, sleeve 182 and arm 184 clockwise, causing the surface 185 in cooperation with the roller 186, to shift the hammer block 187 downwardly to cause the platen 201 to carry the receipt material and the inking ribbon into yielding contact with the type wheels 47 to print the data thereon upon said receipt material.

The intermediate projections 161, 162 and 163 which cause the hammer 187 only to print are effective respectively in multiple item operations in which no control key 26 is depressed, in operations during which the adding machine feature is being utilized which are controlled by moving the control slide 29 to "Adding" position and in tax operations which are controlled by depression of the "Tax" key 26. It will be recalled that the intermediate projections 161, 162 and 163 also control the receipt feeding mechanism to cause a short feeding of the receipt material when the hammer 187 only operates, as explained above.

In operations of the machine during which low portions of the selecting discs and selecting plate are presented to the ear 160, the sensing lever 154 is free to move full distance in a clockwise direction to shift the lower end of the pitman 180 full distance forwardly or counter-clockwise to move a rearward branch 207 of the slot 203 into engagement with the stud 204. When the pitman 180 is thus positioned initial movement of the hammer operating lever 107 (Fig. 4) causes the stud 204 in cooperation with the branch 207 to shift the pitman 180 upwardly which movement rocks the crank 181 (Fig. 3) sleeve 182 and arm 184 in a counter-clockwise direction. Counter-clockwise movement of the arm 184 causes the surface 190 in cooperation with the roller 191 to shift the hammer 192 downwardly to cause the platens 199 and 200 to carry the receipt material 49 and the inking ribbon into yielding engagement respectively with the date type wheels 114 (Fig. 2) and the electro 115 to print the data thereon on the receipt material.

Subsequent clockwise movement of the lever 107 (Figs. 4 and 5) causes the stud 204 in cooperation with the branch 207 of the slot 203, to shift the pitman 180 downwardly to cause printing movement to be imparted to the hammer 187 to print the data on the type wheels 47 upon the receipt material. It will be recalled that full sensing movement clockwise of the lever 154 (Fig. 5) when low sensing spots are presented to the ear 160, causes a long feed of the receipt material which is necessary when both of the hammers operate to print the date, the electro data and the total cash upon the receipt, as shown in Fig. 9.

It is believed advisable to explain that the date and the electro data are printed on the receipt material 49 in advance of the operation in which the amounts are printed thereon and the completed receipt is issued. In other words, the date and the electro data are printed on the receipt material 49 at the end of the previous operation and become a part of the receipt for the next succeeding operation in which the various items are first listed and a total cash operation performed to print the total of the items and the date and electro data upon the receipt material, the receipt material being so fed in the total cash operation that the tearing blade 125 (Fig. 1) is located between the presently printed electro data and the total cash item or the last item.

It is necessary that the pitman 180 (Fig. 5) be yieldingly maintained in a neutral position to locate the slot 203 in the lower end thereof in proper relationship with the stud 204 so that said pitman may be rocked back and forth without interference between the shoulders in said slot 203 and said stud 204.

The upper end of the pitman 180 (Fig. 11) carries a stud 208 which co-acts with forwardly extending arms of companion equalizing levers 209 and 210 free on a stud 211 in the frame 42. A spring 212, tensioned between upward extensions of the levers 209 and 210 urges said levers in opposite directions to cause said upper ends to yieldingly engage a fixed stud 213 in the frame 42, and to cause the forward extensions of the levers to yieldingly engage the stud 208 and yieldingly maintain the pitman 180 in neutral position, as shown in Fig. 5, in which the stud 204 will not interfere with the shoulders in the slot 203 as said pitman is shifted back and forth under influence of the sensing lever 154 to select the receipt hammers for operation.

Auxiliary receipt feeding mechanism

Mechanism is provided for imparting an auxiliary or additional feed to the receipt material 49 in total cash operations so that the total cash entry will be separated sufficiently from the last item entry so as to be readily identifiable.

Secured to the sleeve 117 (Figs. 2 and 11) which also has secured thereto the feed rollers 116 is a ratchet 215 having teeth which are yieldingly engaged by the teeth in a feed pawl 216 free on a stud 217 in an operating plate 218 free on the stud 118 which also rotatably supports the sleeve 117. A spring 220, tensioned between an upward extension of the plate 218 and the pawl 216, urges said pawl clockwise to normally maintain the teeth thereof in yielding engagement with the teeth of the auxiliary feed ratchet 215.

Upward movement of the pitman 180, which always occurs in total cash operations, as previously explained, to print the date and the electro data on the receipt material 49, causes the stud 208 to rock the lever 210 counter-clockwise against the action of the spring 212. Counter-clockwise movement of the lever 210 causes a stud 219 in the forward extension thereof in cooperation with a slot in the plate 218 to rock said plate and the auxiliary feed pawl 216 in a clockwise direction to cause said pawl in cooperation with the teeth in the ratchet 215, to advance said ratchet the sleeve 117 and the feed rollers 116 clockwise to impart an additional or auxiliary feed to the receipt material 49 to space the total cash entry a noticeable distance from the last item entry on the receipt so that said total cash entry will be readily identifiable.

Mechanism is provided for adjusting the length of the auxiliary feed, and this mechanism comprises a plate 221 free on the stud 118 and having an ear 222 bent outwardly from an upward extension thereof which is arranged to co-act with a tail on the feed pawl 216. The plate 221 is provided with a slot, through which extends a clamp screw 223 threaded into the frame 34, said slot and said screw providing means for adjusting the ear 222 in relation to the tail of the pawl 216. The ear 222 is adjusted in relation to the tail of the pawl 216 so that after said pawl has imparted the proper amount of auxiliary feed to the receipt material, said tail will contact said ear and disengage the teeth of the feed pawl 216 from the ratchet 215 to terminate auxiliary feeding of the receipt material. Return movement downwardly of the pitman 180 and coincident clockwise movement of the lever 210, under influence of the spring 212, causes

the pawl **216** to be returned counter-clockwise or in a take-up direction, subsequent to the auxiliary feeding of the receipt material **49**.

Automatic receipt control mechanism

Fig. 6 illustrates an automatic receipt control mechanism which may be used as a substitute for the manual "On" and "Off" mechanism shown in Fig. 5 and explained earlier herein, if required by the business system to which the machine is being applied.

The automatic receipt mechanism comprises a control lever **225**, which is similar in every respect to the on and off control lever **168** (Fig. 5), with the exception that the shoulder **169** which co-acts with the ear **160** of the lever **154**, is omitted so that movement of the lever **225** never obstructs sensing movement of said sensing lever **154**. The lever **225** has a slot in the upper end thereof, similar to the slot **167** which is engageable by a stud carried by the yoke which is operated by the knob **166** (Fig. 1) for the convenient manual operation of said control lever **225**. Instead of the on and off positions of the mechanism shown in Fig. 5, the automatic receipt mechanism substitutes in their places "Non-Automatic" and "Automatic" positions respectively. The lower end of the lever **225** carries a stud **226** upon which is pivotally mounted an arm **227** having a slot in its forward end which engages the ear **160**, as here shown, when the lever **225** is in automatic position. The arm **227** carries a stud **228** which engages a slot in a lever **229** pivoted on the stud **172** adjacent the arm **171** (Fig. 5). The lever **229** has an ear **230** bent outwardly from the upper end thereof which coacts with an arcuate projection **231** formed on the selecting plate **103**. A spring **232** urges the lever **229** in a clockwise direction to cause the ear **230** to sense for the projection **231**.

When the lever **225** is in "Automatic" position, as shown in Fig. 6, which is equivalent to the "Off" position of the lever **168** (Fig. 5) the slot in the arm **227** is engaged with the ear **160**, as here shown, and consequently the sensing movement of the lever **154** is controlled by the lever **229** and the projection **231** on the selecting plate **103**. As presently constructed, the projection **231** is so formed on the plate **103** that it obstructs clockwise movement of the lever **229** when operations of the machine are performed under control of the following control keys **26** (Fig. 1): "No Sale," "Sub-Total," "One Item Cash," "Total Cash" and "Tax."

In operations in which no control key **26** is depressed, which under ordinary circumstances would be multiple item entering operations, the selecting plate **103** is located in zero position, in which a projection **233** (Fig. 6) thereon is positioned opposite the ear **230**, and consequently in such operations clockwise movement of the lever **229** is obstructed and no receipt will be issued. In operations performed under control of the "Charge," "Received On Account," and "Paid Out" keys **26**, the selecting plate **103** is positioned so that an undercut or notched portion **234** thereof is opposite the ear **230** and in such operations the lever **229** is free to move in a clockwise direction to cause the receipt printing and feeding mechanism to function automatically to prepare and issue a receipt.

Operating the knob **166** (Fig. 1) to move the lever **225** from "Automatic" to "Non-Automatic" position, as shown in dot and dash lines in Fig. 6, shifts the arm **227** in a counter-clockwise direction to disengage the slot therein from the ear **160** and as a result the sensing lever **154** is no longer under control of the lever **229** but functions normally in the manner explained in connection with Fig. 5, to control the receipt printing and feeding mechanisms according to the arrangement of the control discs **94** and **95** and the selecting plate **103**.

Slip printing mechanism

A simple type of slip printing device has been devised for use on the machine described in the preceding pages to replace the receipt mechanism used thereon. When the slip printing device is substituted for the receipt printing mechanism it is necessary to omit the receipt supply roll, the receipt feeding mechanism and the control mechanisms which cooperate therewith. It is likewise necessary to omit the date printing wheels, the electro and the selectively controlled hammer mechanism for coacting therewith. In the slip printing mechanism, the type wheels **47**, which are controlled by the amount keys, the control keys, and the control slide, and the hammer **187** which co-acts with said type wheels, are retained for printing totals on a slip **237** (Fig. 13). The slip **237** is inserted in a chute provided at the front of the machine in substantially the same location as the chute out of which the receipt is fed.

If desirable it is possible to arrange the slip printing mechanism so that in addition to the data on the type wheels **47**, the date may also be printed on the slip **237**, however, in the present adaptation only the data on the wheels **47** is arranged to be printed on said slip, as shown in Fig. 13.

The slip **237** is supported on and directed into printing relationship with the type wheels **47** (Fig. 12) by a slip table **238** secured to a bracket **239** in turn secured to the ribbon support plate **66** (Figs. 1 and 12) by suitable screws. The inner edge of the table **238** is bent upwardly to form a guide flange **240** for side spacing the slip **237** in relation to the printing wheels **47**. Likewise an adjustable slip stop bar **241** is provided for locating the slip **237** lengthwise in relation to the printing wheels **47**, and said stop bar is provided with a clamp screw **242** which co-acts with a slot in the table **238** to provide means for adjusting the slip **237** in relation to the type wheels **47**, so that data on said wheels will be printed in the proper location on said slip.

The hammer **187** for coacting with the printing wheels **47** is exactly the same as that explained above in connection with the receipt mechanism, and said hammer is operated by the arm **184** and the pitman **180** in exactly the same manner as explained in connection with the receipt mechanism. However, the slip printing device has been provided with mechanism for further controlling the printing movement of the pitman **180** so that the hammer **187** will operate properly for printing records on the slip **237**.

Co-acting with the slip **237** (Fig. 12) is a slip feeler **243** pivoted on a stud **244** secured in the frame **34**, said slip feeler having a downwardly extending arm **245** with a slot which engages a stud **246** in an upward extension of an arm **247** free on a stud **248** secured in the frame **34**. The arm **247** has an extension **249** which overlies and co-acts with a stud **250** in an arm **251** free on the stud **248**, said stud **250** also having pivotally connected thereto the upper end of a link **252**, the lower end of which is pivotally connected to the sensing lever **154** (see also Fig. 5) which as previously explained co-acts with the control discs **94** and **95** and the selecting plate **103** to control operation of the pitman **180** and the hammer **187**. A spring **253** urges the arm **251** and the sensing lever **154** clockwise in a sensing direction. The arm **247** has a control extension **254** which co-acts with an ear **255** formed outwardly from an arm **256** free on a stud **257** in frame **34**. A link **258** pivotally connects the arm **256** to the pitman **180** for the purpose of controlling the movement of said pitman to and from effective position. The stud **250** (Fig. 12) also co-acts with an extension **259** on an arm **260** free on the stud **248** and having a control surface **261** which co-acts with the ear **255**. A spring **262** tensioned between the feeler **243** and the arm **260** urges said arm in a counter-clockwise direction to normally maintain a finger extending inwardly from the control surface **261** in yielding contact with the upper surface of the ear **255**, and said

spring urges said feeler **243** also in a counter-clockwise or feeling direction to normally maintain the extension **249** of the arm **247** in yielding contact with the stud **250**, as here shown.

When low control surfaces on the discs **94** and **95** (Figs. 4 and 5) and the selecting plate **103**, permit full clockwise sensing movement of the lever **154**, the link **252** (Fig. 12) withdraws the stud **250** from the extension **249** to permit counter-clockwise sensing movement of the feeler **243**, under influence of the spring **262**. If a slip **237** is in proper position on the table **238**, the feeler **243** contacts said slip and further movement of said feeler and the arm **247** are prevented, and consequently the control extension **254** remains below and out of the path of the ear **255** and does not interfere with the movement of the pitman **180** forwardly or counter-clockwise into co-acting relationship with the operating stud **204**. Full clockwise sensing movement of the lever **154** likewise, through the link **252**, causes the stud **250** to engage the extension **259** to rock the arm **260** clockwise, against the action of the spring **262**, to move the control surface **261** out of the path of the ear **255** so that counter-clockwise movement of the pitman **180** will not be obstructed and therefore said pitman is free to move under control of the lever **154** (Fig. 5) into co-acting relationship with the stud **204**, which in cooperation with the control surface **206** urges said pitman downwardly to rock the arm **184** (Fig. 3) clockwise to cause said arm in cooperation with the roller **186** to move the hammer **187** downwardly to cause the platen **201** to carry the slip **237** and the inking ribbon into contact with the printing wheels **47** to print the data set up on said wheels on the slip **237**, as shown in Fig. 13.

In case there is no slip **237** on the table **238** to obstruct movement of the feeler **243**, said feeler is free to move through an opening in said table **238**, during downward movement of the stud **250**, and consequently the arm **247** moves in unison therewith to move the extension **254** into the path of the ear **255** to retain the pitman **180** in ineffective position, as shown in Fig. 5, in which the stud **204** operates idly in the enlarged portion of the slot **203**, and therefore does not impart any printing movement to the hammer **187**. In operations of the machine in which either of the control discs **94** or **95** (Fig. 4) or the selecting plate **103** (Fig. 7) is positioned so that a high portion of the periphery thereof (such as the projection **164** on the plate **103**) is opposite the ear **160** and thus obstructs clockwise sensing movement of the lever **154**, the link **252** and the stud **250** remain stationary, and as a result the arm **260** remains in effective position, as here shown, in which the control surface **261** obstructs counter-clockwise movement of the pitman **180** and consequently said pitman is retained in the position shown in Fig. 5, in which the enlarged portion of the slot **203** is in co-acting relationship with the stud **204**, and under such conditions no printing movement is imparted to the hammer **187**.

The manner in which the slip printing mechanism functions may be varied to suit the requirements of the business system to which the machine is being applied, by properly arranging the high and low surfaces on the control discs **94** and **95** and the selecting plate **103**. An example of one such system is illustrated by the slip **237** (Fig. 13) which is intended for use by waiters or waitresses in a restaurant when taking orders for food to be served patrons. As the order for the food is taken, the various items and the prices thereof are entered in pencil or pen on the slip by the waiter and the slip left with the patron. The patron later presents the slip to the cashier whose duty it is to collect payment for the food.

In the system being described the control disks **94** and **95** and the selecting plate **103** should be arranged to disable the slip printing mechanism in all operations except "Total Cash" operations. With this arrangement the cashier may use a series of itemizing or multiple-item entering operations to accumulate a total of the food items listed on the slip **237**, and a final "Total Cash" operation may be used to print a total ($1.55) near the lower edge of the slip, as shown in Fig. 13, to certify the slip and obtain an accurate total of the food items entered on said slip by hand.

In another business system, the control discs and control plate may be arranged so that the slip printing mechanism will be disabled in every operation except a "Sub-Total" operation, under control of the "Sub-Total" key **26** (Fig. 1). In still another system the control discs **94** and **95** and the control plate **103** may be arranged to control the slip printing mechanism so that in all totalizing or re-setting operations of the machine the slip printing mechanism will function, but in all other operations of the machine, said mechanism will be rendered inoperative.

Inasmuch as the operation of the machine has been fully covered in the preceding specification, it is considered unnecessary to incorporate a separate description of such operation at this juncture as it would be a substantial duplicate of what has been described previously.

In connection with the slip printing mechanism, the control lever **154** (Figs. 5 and 12) used in connection therewith, has been altered in outline to omit the portion forming the left-hand wall of the slot **178** to eliminate possible interference and mal-operation when counter-clockwise movement of the pitman is obstructed by the extension **254** or the surface **261**. This change in no way changes the operation of the pitman, as the spring **205** is strong enough to insure that said pitman is properly positioned in relation to the stud **204** by said lever **154**.

While the forms of mechanism herein shown and described are admirably adapted to fulfill the objects primarily stated, it is to be understood that it is not intended to confine the invention to the forms or embodiments herein disclosed, for it is susceptible of embodiment in various other forms all coming within the scope of the invention.

What is claimed is:

1. In a machine of the class described, constructed and arranged to perform various types of operations and to print records of said operations and other data on record material, said machine having a plurality of manually operable control elements to control the various types of operations, and printing means including type carriers for each type of data and two printing hammers co-acting therewith to print said data on the record material, the combination of a plurality of control members positioned by the control elements; means including an arm movable in one direction to actuate one hammer and movable in another direction to actuate the other hammer; means to move the arm in either direction to operate the hammers; a pitman to connect the arm to the moving means, said pitman operatively connected to said arm and having operating surfaces normally out of co-acting relationship with the moving means but movable into co-acting relationship therewith; and means operatively connected to the pitman and coacting with the control members to selectively move the operating surfaces into and out of co-acting relationship with the moving means to selectively control the operation of each hammer to print the corresponding data on the record material in accordance with the type of machine operation being performed.

2. In a machine of the class described, constructed and arranged to perform various types of operations and to print records of said operations and other data on record material, said machine having a plurality of operable control elements to control the various types of operations, a plurality of control members positioned by the control elements, and printing means including type carriers for each type of data and two printing hammers co-acting therewith to print said data on the record ma-

terial, the combination of means including an arm movable in one direction to actuate one hammer and movable in another direction to actuate the other hammer; means to move the arm in either direction to operate the hammers; a pitman to connect the arm to the moving means, said pitman operatively connected to said arm and having operating surfaces thereon normally out of co-acting relationship with the moving means but movable into co-acting relationship therewith; a sensing lever operatively connected to the pitman and co-acting with the control members to selectively move the operating surfaces into and out of co-acting relationship with the moving means to selectively control the operation of each hammer in accordance with the type of machine operation being formed; means including a rockable lever to feed the record material in relation to the type carriers and printing hammers; means comprising a constant displacement device to operate the rockable lever; and means controlled by the sensing lever to determine the extent of movement imparted to the rockable lever by the constant displacement device to in turn control the amount of feeding movement imparted to the record material in accordance with the operation of the hammers.

3. In a machine of the class described, constructed and arranged to perform various types of operations and to print records of said operations and other data on record material, said machine having a plurality of manually operable control elements to control the various types of operations and a plurality of control members positioned under control of said control elements, said machine also having one set of type carriers and a printing hammer co-acting therewith to print the records of the operations on the record material and another set of type carriers and a printing hammer co-acting therewith to print the other data on said record material, the combination of a common actuating member for both hammers, said member movable in one direction to actuate one hammer and movable in the opposite direction to actuate the other hammer; a pitman operatively connected to the actuating member; means operable in two directions to move the pitman and actuating members in either of their two directions to actuate the hammers, said pitman normally disconnected from said moving means but connectable thereto; a lever connected to the pitman and co-acting with the control members to selectively control the connection of said pitman with the moving means to control the operation of each hammer to print the corresponding data on the record material in accordance with the type of machine operation being performed; means to feed the record material in relation to the type carriers and the hammers; means including a part yieldably operable in a take-up direction and positively operable in a feeding direction to actuate the feeding means; a constant displacement device to operate the part; means on the lever co-acting with the part to selectively control the take-up movement thereof to in turn control the feeding of the record material in accordance with the operation of the hammers; and auxiliary means operable by the pitman when said pitman is moved in a certain one of its two directions and co-acting with the record material feeding means to impart an additional feeding movement to the record material in certain types of machine operations.

4. In a machine of the class described, constructed and arranged to perform various types of operations and having one set of type carriers to print records of the various types of operations on record material and having other type carriers to print other data on the record material, said machine also having a plurality of control elements to control the various types of operations and control members positioned under control of the control elements, the combination of a first printing hammer co-acting with the one set of type carriers; a second printing hammer co-acting with the other type carriers; means including a pitman movable in one direction to operate the first hammer and movable in the opposite direction to operate the second hammer; means to move the pitman in either or both of its two directions to operate the hammers, said pitman normally disconnected from said moving means but connectable therewith; and a lever connected to the pitman and co-acting with the control members to selectively connect and disconnect said pitman and the moving means to in turn selectively control the operation of each hammer according to the type of machine operation being performed to print the corresponding data on the record material.

5. In a machine of the class described, constructed and arranged to perform various types of operations and having one set of type carriers to print records of the various types of operations on the record material and having other types of carriers to print other data on the record material, said machine also having a plurality of control elements to control the various types of operations, and control members positionable under control of the control elements, the combination of a first printing hammer co-acting with the one set of type carriers; a second printing hammer co-acting with the other type carriers; means including a pitman movable in one direction to operate the first hammer and movable in the opposite direction to operate the second hammer; means to move the pitman in either or both of its two directions to operate the hammers, said pitman being normally disconnected from said moving means but connectable therewith; a lever connected to the pitman and co-acting with the control members to selectively connect and disconnect said pitman and the moving means to selectively control the operation of each hammer according to the type of machine operation being performed to in turn print the corresponding data on the record material; means to feed the record material in relation to the type carriers and the printing hammers; means including a part yieldably operable in a take-up direction and positively operable in a feeding direction to actuate the feeding means; a constant displacement device to operate the part; and means on the lever co-acting with the part to selectively control the take-up movement of said part to regulate the length of feed of the record material in accordance with the operation of the hammers.

6. In a machine of the class described, constructed and arranged to perform various types of operations and having one set of type carriers to print records of the various types of operations on the record material and having other type carriers to print other data on the record material, said machine also having a plurality of control elements to control the various types of machine operations and control members positionable under control of the control elements, the combination of a first printing hammer co-acting with the one set of type carriers; a second printing hammer co-acting with the other type carriers; means including a pitman movable in one direction to operate the first hammer and movable in the opposite direction to operate the second hammer; means to move the pitman in either or both of its two directions to operate the hammers, said pitman normally disconnected from said moving means but connectable therewith; means comprising a lever operatively connected to the pitman and co-acting with the control members to selectively connect and disconnect said pitman and the moving means to in turn selectively control the operation of each of the hammers according to the type of machine operation being performed to print the corresponding data on the record material; means to feed the record material in relation to the type carriers and the printing hammers; means including a part yieldably operable in a take-up direction and positively operable in a feeding direction to actuate the feeding means; a constant displacement device to operate the part; means on the lever co-acting with the part to selectively control the take-up movement of said part to regulate the length of feed imparted to the record material in accordance with the operation

of the hammers; and auxiliary means co-acting with the feeding means and operable by the pitman when it is moved in said opposite direction to operate the second hammer to impart an additional feeding movement to the record material when said second hammer is operated.

7. In a machine of the class described, constructed and arranged to perform calculating operations, and having printing means, including type carriers and a hammer co-acting therewith to print records of certain of said calculating operations on record material, said machine also having a plurality of control elements to control the calculating operations and a plurality of control members positionable under control of said control elements, the combination of means including an arm to actuate the hammer; a pitman connected to the arm; regularly excursioned operating means for the hammer; a projection on the operating means; an operating surface on the pitman, constructed and arranged to coact with the projection, but normally retained out of coacting relationship therewith; and means connected to the pitman and normally effective to retain the operating surface out of coacting relationship with the projection, said means yieldably operable each machine operation and coacting with the control members upon operation to selectively control the movement of the operating surface into coacting relationship with the projection to in turn control the operation of the hammer in accordance with the calculating operation being performed.

8. In a machine of the character described, having printing means, including type carriers and a hammer coacting therewith to print records on record material, said machine constructed and arranged to perform printing and non-printing operations, and having a plurality of control elements to control said operations, the combination of a plurality of control members positionable under control of the control elements; regularly excursioned operating means for the hammer; a pitman connected to the hammer and connectable to the operating means but normally disconnected therefrom; a lever connected to the pitman; means effective each machine operation to urge the lever to move the pitman into connection with its operating means; and coacting control parts on the lever and the control members to selectively control the movement of said lever and the pitman by the urging means to render the hammer operative in printing operations, and to render said hammer inoperative in non-printing operations.

9. In a machine of the class described, having a plurality of manually operable control elements to control operation thereof, control members positionable under control of said control elements, and printing means comprising type carriers and a printing hammer coacting therewith to print records on record material, the combination of regularly excursioned operating means for the hammer; means including a pitman operatively connected to the hammer and constructed and arranged to coact with the operating means to operate said hammer, said pitman normally retained out of coacting relationship with said operating means; means including a lever operatively connected to the pitman and coacting with the control members to selectively move said pitman into coacting relationship with the hammer operating means to render the hammer operative; means normally effective to obstruct movement of the pitman into coacting relationship with the hammer operating means; means actuated by the lever to sense for the presence of record material in printing position, and to move the obstructing means to ineffective position; and means controlled by the record material sensing means to obstruct the movement of the pitman into coacting relationship with the hammer operating means to prevent operation of the hammer when the record material is not in printing position.

10. In a machine of the class described, having means including type carriers and a hammer to print records on record material, said machine constructed and arranged to perform printing and non-printing operations, and having a plurality of operable control elements to control said operations, the combination of a regularly excursioned operating means for the hammer; a pitman connected to the hammer and connectable to the operating means but normally disconnected from said operating means; a lever connected to the pitman and yieldably movable each machine operation to connect said pitman to the operating means; and control members positionable under control of the control elements, said members having control surfaces engageable by the lever upon movement thereof, to control the connecting of the pitman with the operating means to render said hammer operative in printing operations and inoperative in non-printing operations.

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