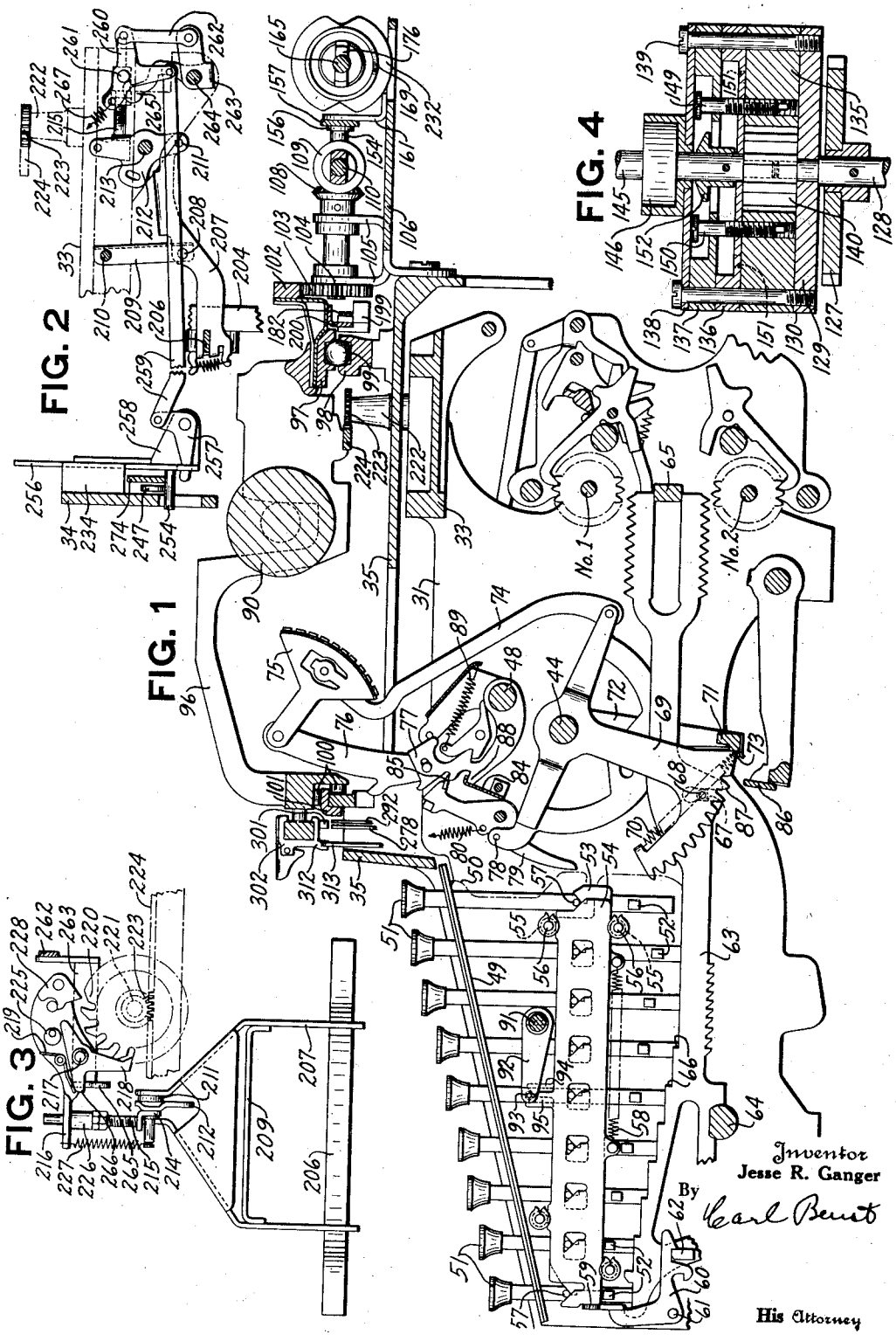
Oct. 8, 1940. J. R. GANGER 2,217,221

CARRIAGE FOR ACCOUNTING MACHINES

Filed Oct. 13, 1937 4 Sheets-Sheet 1



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CARRIAGE FOR ACCOUNTING MACHINES

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FIG. 5

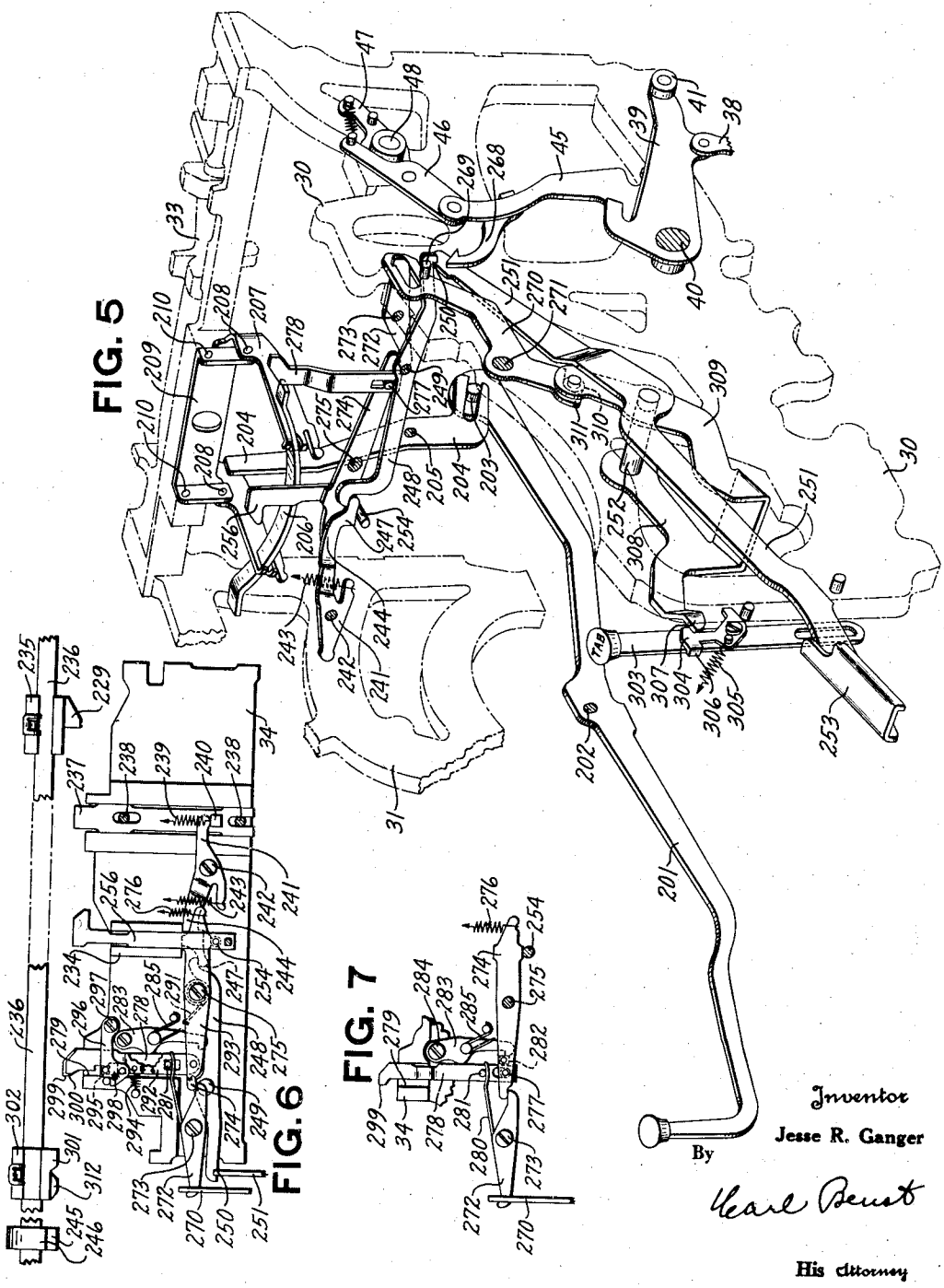


FIG. 6

FIG. 7

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CARRIAGE FOR ACCOUNTING MACHINES

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FIG. 8

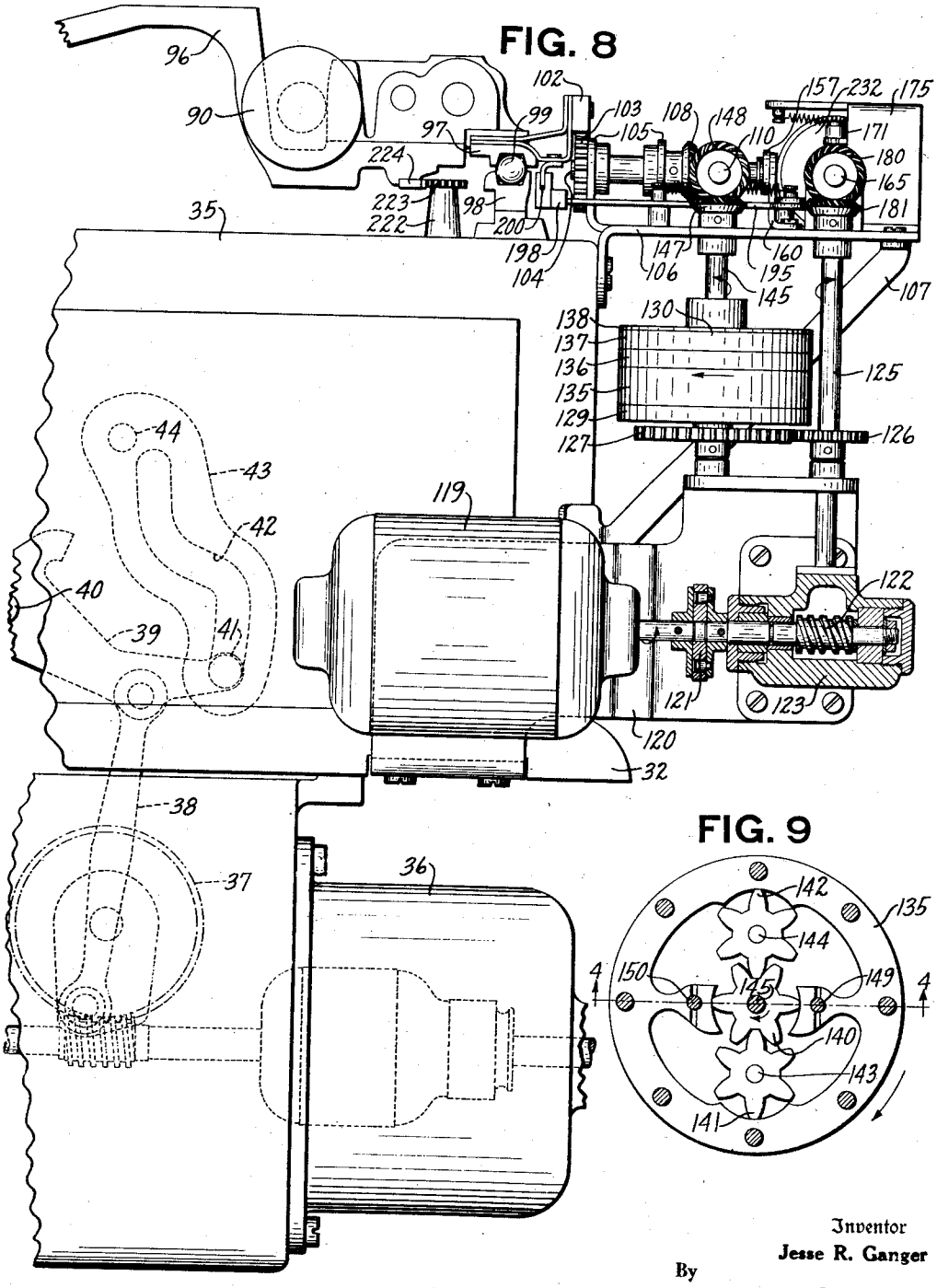


FIG. 9

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CARRIAGE FOR ACCOUNTING MACHINES

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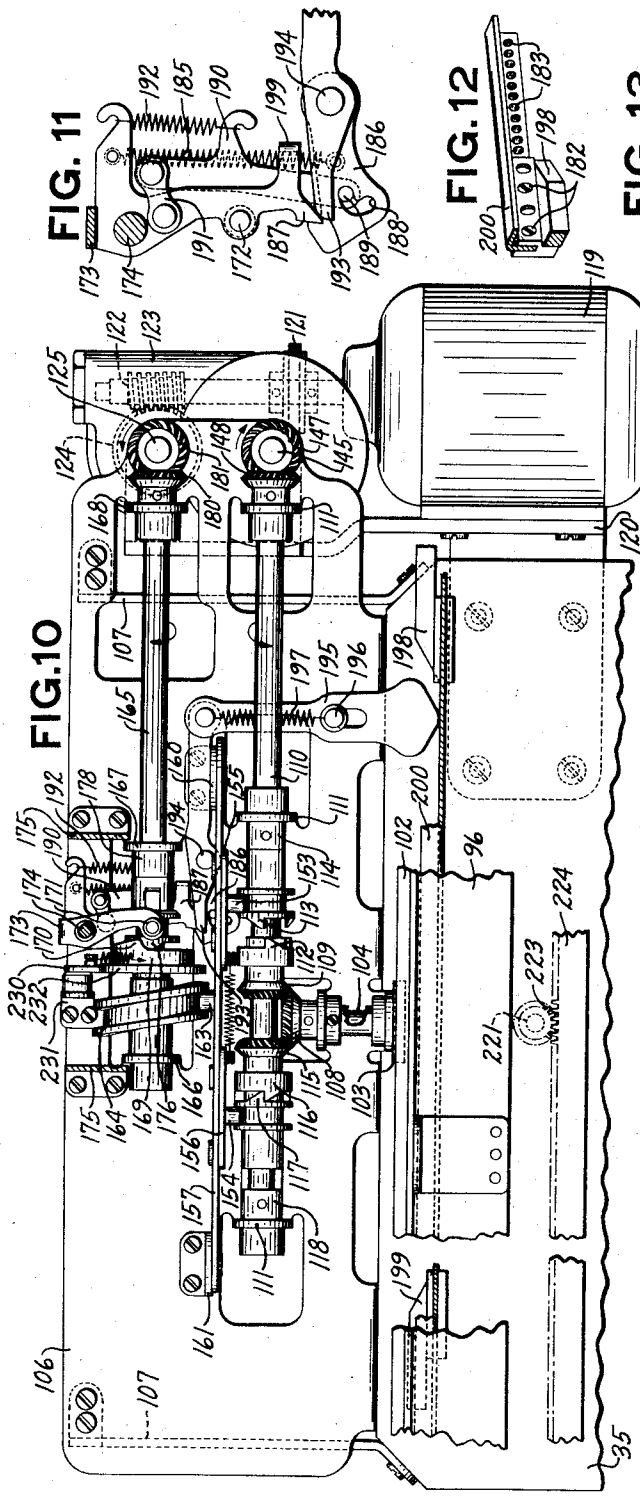


FIG. 10

FIG. 11

FIG. 12

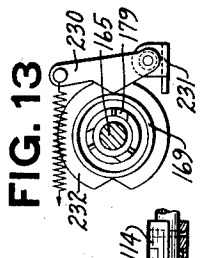


FIG. 13

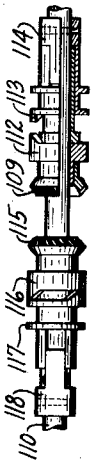


FIG. 15

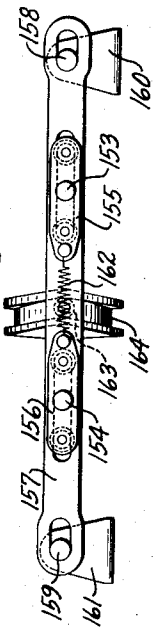


FIG. 16

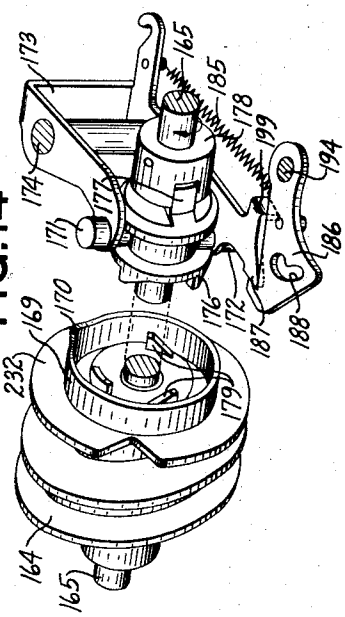


FIG. 14

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UNITED STATES PATENT OFFICE

2,217,221

CARRIAGE FOR ACCOUNTING MACHINES

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Application October 13, 1937, Serial No. 168,716

36 Claims. (Cl. 197—66)

This invention relates to combined typewriting and accounting machines having a laterally shiftable traveling carriage, and is particularly directed to a power mechanism for driving said traveling carriage in its working direction for letter-spacing and tabulating, and for returning said traveling carriage from tabulated position to starting position.

The majority of accounting machines used in the business world at the present time are equipped with a laterally shiftable traveling carriage similar to that used on typewriters, and certain of these machines also have, in addition to the usual accounting machine keyboard and mechanism, a typewriter keyboard and mechanism for typing various data, of a descriptive nature, upon the record material, which is supported by a platen roll mounted in the traveling carriage.

The traveling carriages of such machines are frequently large and heavy, as they must not only be long so as to be capable of handling wide ledger sheets, having a plurality of vertical columns for the recording of various data pertaining to particular business systems, but said carriages also carry control means for controlling the functioning of the accounting machine in accordance with the columnar position of said traveling carriage. A typical example of record material used in such machines is the statement sheet used by banks in the balancing of individual checking accounts.

The traveling carriages for accounting machines are generally movable from a starting position in a working or tabulating direction, and when such movement is completed the carriage is returnable to starting position. The usual practice is to use a spring motor consisting of a spring-actuated drum and its associated drawband for moving the traveling carriage in its working direction. When the tabulating or working movement of the traveling carriage is completed, mechanical means driven by the operating motor becomes automatically effective to return the traveling carriage to starting position.

The weight of the traveling carriage frequently makes it necessary to apply excessive tension to the spring motor in order to have said carriage move at the desired speed. This results in excessive rebounding of the carriage when it is stopped after being tabulated through several intervening columnar positions to a particular column. When the traveling carriage is moved only a short distance for letter-spacing, under control of the typewriter keys and the escapement mechanism, or when tabulated from one column on the ledger sheet to the next, the spring motor drive works very satisfactorily. However, in some bookkeeping systems it is necessary to tabulate the carriage from the first column on the ledger sheet to the last column thereon or to some other intervening column, and this is when the deficiencies of the spring motor become more manifest.

One of the inherent characteristics of the spring-driven traveling carriage is that it gets under way slowly, when released for tabulation, and accelerates rapidly; therefore, when a long tabulation of the traveling carriage is terminated abruptly by the stop mechanism, the momentum of said carriage causes excessive rebound. Inasmuch as the columnar position of the traveling carriage controls certain functions of the accounting machine, if the machine is released for operation during the interval that the traveling carriage is rebounding it is quite possible that the wrong control will be exercised by said carriage over the accounting mechanism due to the incorrect position of the traveling carriage at that moment.

In the present machine the spring motor for for moving the traveling carriage in its working direction has been replaced by a fluid-operated power device, or connection, and this power device is driven by a separate motor and is therefore in no way dependent upon the accounting machine operating mechanism, this latter being a desirable feature when the accounting machine operating motor is of the start-stop type. In addition to moving the carriage in its working direction the fluid-operated power device is also arranged to return the traveling carriage to starting or initial position.

Therefore, it is broadly an object of this invention to provide a fluid-operated power device, or connection, for moving the traveling carriage of an accounting machine or typewriter in its working direction and for returning said traveling carriage to starting position.

Another object of this invention is the provision of a fluid-operated power device, nonpositive in action, for moving the traveling carriage of an accounting machine or tyepwriter from starting position in letter-spacing or working direction, and an automatic reversing mechanism for returning the carriage to starting position.

Still another object of this invention is to supply a continuously running hydraulic power device, non-positive in action, and operating independently of the accounting machine operating mechanism, for moving the traveling carriage of an accounting machine or typewriter from initial or starting position in a tabulating or letter-spacing direction, said device being provided with a transmission mechanism for reversing the action thereof to return the traveling carriage from tabulated position to starting position.

With these and incidental objects in view, the invention includes certain novel features of construction and combinations of parts, the essential elements of which are set forth in appended claims and a preferred form or embodiment of which is hereinafter described with reference to the drawings which accompanying and form a part of this specification.

In the drawings:

Fig. 1 is a longitudinal sectional view of a machine to which the invention is shown applied, showing the traveling carriage and its operating mechanism and showing one of the amount banks and its associated actuator mechanism for actuating the totalizers and the printing mechanism.

Fig. 2 is a side elevation, showing in detail a portion of the escapement mechanism for controlling letter-spacing of the traveling carriage.

Fig. 3 is a plan view of a part of the mechanism shown in Fig. 2.

Fig. 4 is a sectional view taken along line 4—4 Fig. 9, showing the fluid-operated power device, or connection, for driving the traveling carriage in its working and return directions.

Fig. 5 is a perspective view, showing a typewriter key and the mechanism associated therewith for operating the escapement mechanism, said figure also showing the mechanism for controlling tabulating movement of the traveling carriage.

Fig. 6 is a detail view of the tabulating frame and the tabulating mechanism assembled thereon.

Fig. 7 is a detail view of the stop plunger that terminates tabulating movement of the traveling carriage.

Fig. 8 is a right side elevation of the machine, illustrating the mechanism for moving the traveling carriage in its working and return directions, and illustrating the machine operating mechanism.

Fig. 9 is a plan view of the hydraulic connection with cover removed, said connection forming a non-positive connection between the traveling carriage and its driving motor, for moving said carriage in its working and return directions.

Fig. 10 is a plan view of the mechanism for moving the traveling carriage in its working and return directions.

Fig. 11 is a detail view of the latch mechanism that controls the reversing of the traveling carriage driving mechanism.

Fig. 12 is a detail view of one of the cam blocks mounted on the traveling carriage, for releasing the latch shown in Fig. 11.

Fig. 13 is a detail view of the retaining disc and its associated pawl for the reversing mechanism.

Fig. 14 is a perspective view of the clutch mechanism that controls the reversing of the carriage driving mechanism.

Fig. 15 is a detail view, partly sectioned, of the transmission and clutch mechanism for driving the traveling carriage in its working and return directions.

Fig. 16 is a detail view of the cam and associated link mechanism for shifting the clutches shown in Fig. 15.

General Description

The present invention is shown embodied in the well known accounting machine, fully illustrated and described in Letters Patent of the United States, No. 1,203,863, issued November 7, 1916, to Halcolm Ellis, Patent No. 1,819,084 issued August 18, 1931, to Emil John Ens, and Patent No. 2,082,098 issued to Raymond A. Christian, June 1, 1937. Only the mechanism of the machine, pertinent to the present invention, will be described in detail in this specificaton, as reference may be had to the above patents for a full disclosure of the complete machine.

The accounting machine is provided with a laterally shiftable traveling carriage supporting a platen roll, adapted to present record material wound therearound to the printing mechanism. The carriage is adapted to be tabulated from column to column, to present different columnar divisions of the record material to the printing mechanism. If desired, the machine may be equipped with a typewriter keyboard and typewriter mechanism for typing various data upon the record material, and when so equipped, the machine is provided with an escapement mechanism, operated by the typewriter keys, for letter-spacing the traveling carriage. The escapement mechanism also holds the carriage against tabulating movement.

Releasing the carriage for tabulating movement renders the escapement mechanism ineffective and moves a stop plunger into the path of a series of stops, adjustably mounted on the carriage to correspond to the different columns of the record material. Tabulation of the carriage is terminated by one of the stops contacting the stop plunger, which is unlatched by the impact and immediately moves out of the path of said stop. The stop then contacts an escapement control plunger, which is likewise unlatched by the impact and immediately causes the escapement mechanism to again become effective to hold the carriage against further tabulation.

The traveling carriage is driven in either tabulating or return direction by a continuously running motor, which drives a control shaft, which is in turn geared to one member of a hydraulic connecting device, the other member of which is geared to a carriage drive shaft. The carriage drive shaft has slidably mounted thereon and rotatable therewith, two similar clutch members adapted to alternately engage corresponding clutch members, integral with bevel reversing gears free on said drive shaft. The bevel gears in turn mesh with a similar bevel gear mounted on a short shaft, which also carries a spur gear which meshes with the teeth of a horizontal rack secured to the traveling carriage. The two slidable clutch members mounted on the carriage drive shaft are connected for unitary shifting movement by a shifting bar, controlled by the carriage control shaft, which results in one of the clutch members being engaged with its corresponding bevel gear, and the other clutch member being disengaged, at all times.

When the traveling carriage is in its extreme righthand, or starting, position the clutch member that drives said carriage in its letter-spacing or working direction is engaged. Consequently

the hydraulic connecting device constantly but non-positively urges the traveling carriage in its letter-spacing or working direction, but said carriage is normally restrained against such movement by the escapement mechanism. Operating one of the typewriter keys or depressing one of the tabulating keys releases the escapement mechanism, thereby permitting the hydraulic device to move the traveling carriage in letter-spacing direction until the escapement mechanism again becomes effective to terminate such movement of the carriage. When the traveling carriage nears the end of its letter-spacing movement, a cam block, mounted thereon, renders the mechanism effective that shifts the clutches for the bevel gears, whereupon the letter-spacing clutch is disengaged and the return clutch is simultaneously engaged to reverse the direction of movement of the carriage. This causes the hydraulic device to return the traveling carriage toward starting position, near the termination of which movement the cam block on the lefthand end of the traveling carriage again causes the clutches for the bevel gears to be shifted, whereupon the return clutch is disengaged, and the letter-spacing clutch is simultaneously engaged.

It is evident that the fluid connection between the members of the hydraulic device forms a yielding or cushioned drive against which the traveling carriage may be held stationary. When the traveling carriage is held against tabulating movement, maximum pressure is built up in the hydraulic device; therefore when the traveling carriage is released for tabulating movement, this excess pressure causes said carriage to immediately get under way at full speed, and when the excess pressure is dissipated, the traveling carriage travels along at a uniform rate, the hydraulic connection acting as a governor. The tabulating movement of the traveling carriage is abruptly terminated by the stop mechanism, whereupon the hydraulic connection immediately builds up pressure and maintains a steady pull upon the traveling carriage, which practically eliminates rebounding thereof, irrespective of whether said carriage is tabulated a long or a short distance.

As previously stated, the traveling carriage, when in columnar poistion, exercises certain control over the operation of the machine, such as selecting totalizers for addition and subtraction, and it is very essential that said carriage be accurately located in columnar position when the machine is released for operation so that the proper controls will be effective. The elimination of excessive rebounding of the traveling carriage, by means of the hydraulic drive, causes said carriage to be accurately located in columnar position so that the proper control will be effective upon operation of the machine, thereby permitting experienced operators who have become exceedingly fast in the handling of particular business systems to operate the machine as fast as desired.

Mechanism pertinent to the present invention will now be described in detail.

Detailed Description

Framework

The mechanism of the machine is supported by and between a right frame **30** and a left frame **31** (Fig. 5), secured on a machine base **32** (Fig. 8) and maintained in relation to each other by means of cross frames **33** and **34** (Fig. 6) and various other cross frames, bars and rods. The mechanism of the machine is enclosed in a suitable case or cabinet **35** (Figs. 1 and 8) which is secured to the machine base **32**.

Operating mechanism

The accounting machine mechanism is operated by a conventional type of start-stop motor **36** (Fig. 8) such as is disclosed in the co-pending application for Letters Patent of the United States, Serial Number 697,449, filed November 10, 1933, by Charles H. Arnold, which application issued into Patent No. 2,142,341 on January 3, 1939. The armature shaft of the motor **36** is geared to the driving member of a clutch **37**, the driven member of which is connected by a link **38** to an arm **39**, secured on the righthand end of a main shaft **40**, journaled in the frames **30** and **31**.

Releasing the machine for operation causes the clutch **37** to be engaged, and simultaneously closes the switch for the motor **36**. Rotation of the motor **36**, by means of the link **38** and the arm **39**, oscillates the main shaft **40** first counter-clockwise and then back to normal position through an approximate angle of 60 degrees. One such oscillation of the main shaft **40** is referred to herein as a cycle of operation, and after said shaft has completed its cycle of operation the clutch **37** is automatically disengaged and the switch for the motor **36** is simultaneously opened to terminate operation of the machine. The arm **39** (Figs. 5 and 8) carries a roller **41**, which cooperates with a camming slot **42** in a plate **43**, secured on a leading frame shaft **44**. Consequently one cycle of movement of said arm **39** rocks the shaft **44** first counter-clockwise and then back to normal position.

The arm **39** (Fig. 5) is connected by a shiftable link **45** to an arm **46** flexibly connected to an arm **47** secured on a printer shaft **48** journaled in the right frame **30** and the printer framework (not shown). One cycle of movement of the arm **39**, by means of the link **45**, rocks the shaft **48**, first clockwise and back to normal position, to cause the printer mechanism to function.

In overdraft operations the arm **39** and the shaft **40** operate automatically through four cycles of movement to transpose the complementary amount of an overdraft to a true negative amount and record said true negative amount. During the first three or transposing cycles of an overdraft operation the link **45** is automatically disconnected from the arm **39** to render the printing mechanism inoperative so that the results of the transposing cycles will not be recorded upon the record material. In the last cycle of an overdraft operation the link **45** is automatically connected to the arm **39** so that the true negative amount of the overdraft will be recorded during this cycle. The overdraft printer controlling mechanism, mentioned above, is not hereshown but is fully disclosed in U. S. Patent No. 2,079,355 issued May 4, 1937, to Charles L. Lee.

Keyboard and actuator mechanism

The keyboard of the accounting machine consists of a plurality of rows of amount keys and one row of control keys, the latter adapted to control all functions of the machine with the exception of addition. Inasmuch as the keyboard mechanism is substantially duplicated in each amount bank, it is believed that the description of the penny bank, shown in Fig. 1, will be sufficient for a thorough understanding of the keyboard mechanism.

The keyboard framework consists of a top plate 49, two end plates (not shown) and a partition plate 50 for each row of amount keys, said keyboard framework forming an integral unit which is suspended between the frames 30 and 31 and secured in place by means of screws in cooperation with holes in opposite edges of the keyboard top plate 49 and corresponding threaded holes in the frames 30 and 31. Each amount bank consists of nine amount keys 51, numbered from 1 to 9 inclusive, slidably mounted in the keyboard framework by means of the undercut upper ends of the stems of said keys, which extend through corresponding slots in the top plate 49, and by means of square studs 52 on the lower ends of the stems of said keys, which extend through vertical slots (not shown) in the corresponding partition plate 50. Springs (not shown), which are laced around studs in the keys 51 and stationary studs in the partition plates 50, urge said keys upwardly to maintain the shoulders on the upper ends thereof in contact with the bottom of the plate 49.

Each amount bank has a locking detent 53 and a control plate 54 mounted for horizontal sliding movement between rollers 55, journaled on studs 56 secured in the partition plate 50 and each amount key 51 carries a stud 57 which cooperates with a corresponding hook on the detent 53 and a corresponding angular camming surface on the control plate 54. A spring 58 tensioned between the control plate 54 and the detent 53 urges them rearwardly and forwardly, respectively.

Depressing one of the amount keys 51, by means of the stud 57 in cooperation with the angular nose on the corresponding hook of the detent 53, shifts said detent rearwardly, against the action of the spring 58, until the hook passes beyond said stud 57, whereupon the spring 58 returns the detent 53 forwardly, to latch the key in depressed position. During operation of the machine the detent 53 is locked against rearward movement, by mechanism not shown, to lock the depressed key against release and to lock the other amount keys in this bank, against depression.

Depressing one of the amount keys 51 also causes the stud 57, in cooperation with the corresponding angular camming surface on the control plate 54, to shift said control plate forwardly, against the action of the spring 58, to cause the forward end of said control plate, in cooperation with a bent-over ear 59 on a zero latch 60 mounted on a rod 61 supported by the keyboard framework, to rock said zero latch 60 counter-clockwise. Counter-clockwise movement of the latch 60 disengages a hook thereof from a block 62 secured to an actuator 63, for this particular amount bank, mounted for horizontal sliding movement by means of a slotted rod 64 and a slotted bar 65, both of which are supported between the frames 30 and 31.

Depressing one of the amount keys 51 also moves the stud 52 therein in the path of the corresponding one of a series of graduated steps 66 on the actuator 63. The actuator 63 has a vertical slot 67 which straddles a stud 68 in a downward extension of a printer control segment 69, free on the shaft 44. A spring 70, tensioned between the segment 69 and the cross-bar of a leading frame 71, said cross-bar extending between similar arms 72 secured to the shaft 44, maintains a beak 73 of said segment in contact with said cross-bar.

Initial movement counter-clockwise of the shaft 44, as explained in connection with Fig. 8, carries the leading frame 71 in unison therewith and said leading frame, by means of the spring 70 (Fig. 1), carries the segment 69 and the actuator 63 in unison therewith until the corresponding one of the graduated steps 66 contacts the stud 52 of the depressed amount key 51. This positions the actuator 63 and the segment 69 in proportion to the depressed key and said segment, by means of a link 74 connecting an extension of said segment to a printing sector 75 for this particular amount bank, also positions said sector in accordance with the depressed amount key. The leading frame 71 completes its initial movement counter-clockwise, independent of the segment 69, flexing the spring 70. The sector 75 is pivotally connected to the upper end of an arm 76, free on the shaft 48, and a control plate 77, free on the shaft 48, is also connected to said arm 76.

When the segment 69 moves out of zero position, a stud 78 in an extension thereof, in cooperation with an arcuate surface on the tail of a zero elimination pawl 79, rocks said pawl counter-clockwise, against the action of a spring 80, to move a tooth 85 of said pawl out of engagement with a corresponding tooth of the plate 77, to free the arm 76 and sector 75 for printing movement. After the actuator 63 and the segment 69 have been positioned, an aliner 86 is rocked into engagement with one of a series of teeth 87 to retain said segment 69, the actuator 63 and the sector 75 in set positions until printing has been effected.

After the printing sector 75 has been positioned and after the leading frame 71 has completed its initial movement counter-clockwise, an impression latch 84 is rocked counter-clockwise out of engagement with a tooth 88 on the plate 77 to release said plate, the arm 76, and the sector 75 to the action of a spring 89. The spring 89 moves the plate 77, the arm 76 and the sector 75 rearwardly causing said printing sector, in cooperation with an inking ribbon (not shown), to print the value of the depressed key upon the record material wound around a platen roll 90 mounted in the framework of a traveling carriage presently to be described. After printing has been effected, the aliner 86 is rocked out of engagement with the teeth 87, and the leading frame 71 is returned to its original position, and in its return movement clockwise, returns the segment 69 and the actuator 63 to zero positions.

Immediately after the actuator 63 has been returned to zero position, and prior to the termination of machine operation, a key release shaft 91 (Fig. 1), journaled in the keyboard framework, and an arm 92, integral therewith, receive counter-clockwise movement. Counter-clockwise movement of the arm 92 causes a stud 93 therein, in cooperation with an angular camming surface on an upward extension 94 of the detent 53, to shift said detent rearwardly to release the depressed key. The stud 93, in cooperation with an angular camming surface on an upward projection 95 of the control plate 54, shifts said control plate forwardly, to rock the zero latch 60 to ineffective position. However, this shifting of the control plate 54 is of importance only in total and sub-total operations and is merely an incidental occurrence in adding and subtracting operations. After the amount keys have been released, the zero latch 60 again becomes effective to retain the actuator 63 and

printer control segment 69 in zero positions, as here shown.

Totalizers

In its present embodiment the machine of this invention has two totalizer lines, a #1 or balance totalizer line (Fig. 1) and a #2 or adding totalizer line. However, it is merely a matter of assembly to add additional totalizers in back of the #1 and #2 totalizers. The totalizer lines have a wheel for each denominational order and these wheels are adapted to be actuated by rack teeth in the rearwardly disposed ends of the actuators 63.

In adding operations the wheels of the selected totalizer are engaged with the actuators 63 after said actuators have completed their initial movement rearwardly, and return movement forwardly of said actuators adds the amount set up on the keyboard in the wheels of the selected totalizer. After the actuators have completed their return movement forwardly, the wheels of the selected totalizer are disengaged therefrom. In subtract operations, the wheels of the #1 or balance totalizer are engaged with the actuators 63 prior to their initial movement rearwardly, which movement reversely rotates said wheels to subtract therefrom the amount set up on the keyboard. Amounts are carried or transferred from lower to higher order totalizer wheels by means of the well known transfer mechanism, shown in part in Fig. 1.

In total and sub-total operations the wheels of the selected totalizer are engaged with the actuators 63 prior to the initial movement rearwardly of said actuators. The shaft 91 and the arms 92 function to release any amount keys inadvertently depressed and to rock the zero latches 60 to ineffective positions, so that the actuators 63 will be free to move under control of the leading frame 71. The actuators 63 in their initial movement rearwardly reversely rotate the wheels of the selected totalizer until a tooth on the transfer cam (not shown), carried by each totalizer wheel, contacts the add-transfer pawl to locate the wheels of the selected totalizer in zero position and to position the actuators 63 and the printing sectors 75 in proportion to the amount on said totalizer wheels. In total operations, after the amount of the total has been recorded, the wheels of the totalizer are moved out of engagement with the actuators 63, prior to their return movement forwardly, and therefore remain in a cleared or zeroized condition. In sub-total operations the wheels of the selected totalizer remain in engagement with the actuators 63 during their return movement forwardly, and are thus returned to their original positions.

As previously stated, the machine embodying this invention has a typewriter keyboard and mechanism for typing data of a descriptive nature upon the record material. The typewriter mechanism will be explained later in connection with the traveling carriage mechanism.

Traveling carriage

The platen roll 90 (Fig. 1) is mounted in the framework of a traveling carriage 96 supported for horizontal shifting movement upon the case 35 by means of a rail 97, on the back of said carriage, in cooperation with a corresponding rail 98 mounted upon the case 35, both of said rails having matched angular grooves therein, which in cooperation with ball bearings 99 permit free and easy movement of the traveling carriage while maintaining said carriage in accurate alinement. The front of the traveling carriage is supported by rollers 100 mounted thereon, in cooperation with a rail 101 secured to the case 35.

The present machine is shown equipped with a non-rockable platen roll. However, if desired, the machine may be equipped with a front feeding device for rocking the platen roll away from printing position, to a more accessible position, for the removal and insertion of record material therearound.

Hydraulic connection mechanism

As previously explained, the traveling carriage 96 is driven in its working or letter-spacing direction and in its return direction through a hydraulic connecting device which will now be explained.

Secured on the back of the traveling carriage 96 (Figs. 1, 8 and 10) is a horizontal rack 102, the inverted teeth of which mesh with a gear 103 secured on one end of a short shaft 104 journaled in a bushing supported by upturned ears 105 of a shelf-like plate 106 secured to the back of the case 35 and supported by angular legs 107 extending between said shelf and the case 35.

Fast on the other end of the shaft 104 is a bevel gear 108 which meshes with similar bevel reversing gears 109 and 115 free on a shaft 110 journaled in upturned ears 111 of the bracket 106. Integral with the gear 109 is a clutch member 112 having teeth adapted to cooperate with similar teeth in a clutch member 113 slidably mounted on the shaft 110 by means of clutch cuts, in said member, in cooperation with corresponding tenons on a sleeve 114 secured on said shaft 110. Thus the clutch member 113 is arranged to revolve in unison with the shaft 110 and to be shifted horizontally in relation to said shaft, at the same time. The bevel gear 115 has integral therewith a clutch member 116, the teeth of which are adapted to cooperate with the teeth of a clutch member 117, similar to the clutch member 113, and connected to a sleeve 118, integral with the shaft 110, in exactly the same manner as the clutch member 113 is connected to the sleeve 114.

The hydraulic device, which moves the traveling carriage in its working and return directions, is driven by a small continuously operating motor 119 (Figs. 8 and 10) mounted on a bracket 120 secured to the machine base 32. The shaft of the motor 119 is connected by a flexible coupling 121 to the shaft of a worm gear 122, said gear rotatably supported in a housing 123 secured to the bracket 120.

The worm gear 122 meshes with and drives a worm gear 124 (Fig. 10), fast on the lower end of a vertical shaft 125, journaled in the housing 123, in a bent-over portion of the bracket 120, and in a bushing in the shelf 106. Fast on the shaft 125 is a gear 126, which meshes with and drives a gear 127 secured on a trunnion 128 (Fig. 4), the lower end of said trunnion being journaled in a bushing in the bent-over portion of the bracket 120 and the upper end integral with a bottom plate 129 of a hydraulic connection housing 130.

The hydraulic connection housing consists of a series of plates including the plate 129, an oil recess plate 135, a recess cover plate 136, an intermediate cover plate or baffle 137 and a top plate 138, all of said plates secured in an integral unit by means of a series of screws 139. Free on an upward tenon of the trunnion 128 (Figs. 4 and 9) is a gear 140 which meshes with companion gears 141 and 142 free on studs 143 and 144 secured in the plate 129. The gear 140 is secured to the

lower end of a shaft 145 which extends through an oil seal 146, contained in a bushing in the cover plate 138, and the upper end of said shaft 145 is journaled in a bushing in the shelf 106. Secured to the upper end of the shaft 145 (Figs. 8 and 10) is a bevel gear 147 which meshes with a similar bevel gear 148 secured on the right-hand end of the shaft 110.

The periphery of the teeth of the gears 140, 141 and 142, (Fig. 9) closely fit corresponding arcuate surfaces in the recess in the plate 135, and together with a viscous fluid, such as oil, contained in said recess form a hydraulic connection which, when the housing 130 (Fig. 8) is revolved by the motor 119, tends to revolve the shaft 145 in the same direction. The revolving action of the hydraulic connection is regulated by screws 149 and 150 (Figs. 4 and 9) threaded into by-pass slots cut in similar web portions of the recess in the plate 135. In other words, the screws 149 and 150 form a means of regulating the flow of oil between the two intake and two output oil compartments, formed by the gears 140, 141 and 142 and the recess in the plate 135, and this regulation of the flow of oil controls the revolving influence that the housing 130 has upon the shaft 145.

The opening between the plates 136 and 137 forms a supply reservoir which is partly filled with oil and is connected to the intake compartments of the hydraulic connection by holes 151 in the plate 136, through which the oil is supplied to the hydraulic connection as needed. The plate 137 forms a baffle to prevent the oil from working out of the top of the housing 130 and a flanged bushing 152, secured on the shaft 145, whirls the oil, that tends to creep up the shaft 145, back into the supply reservoir.

The hydraulic connection forms a non-positive connection between the motor 119 and the traveling carriage 96 for driving said traveling carriage in its working or tabulating direction, and in its return direction. However, it is obvious that the traveling carriage may be held stationary against the action of the hydraulic connection or, if necessary, returned in the opposite direction against the action of said clutch. When the traveling carriage is retained stationary, the action of the hydraulic connection simply builds up pressure, which is dissipated in the form of heat.

Control of carriage movement

Normally the clutch members 116 and 117 (Fig. 10) are engaged, and this tends to drive the traveling carriage in its working or tabulating direction. When the traveling carriage approaches the end of its tabulating movement, clutch control mechanism is rendered effective to automatically disengage the clutch member 117 from the member 116 and simultaneously engage the member 113 with the member 112, whereupon the action of the hydraulic connection is reversed to return the traveling carriage to its extreme righthand or initial position. When the carriage nears the end of its return movement the clutch control mechanism is again rendered effective to disengage the clutch members 112 and 113 and simultaneously engage the clutch members 116 and 117, so that the action of the hydraulic connection again tends to drive the traveling carriage in its working direction. The mechanism for controlling engaging and disengaging of the clutch members 113 and 117 will now be described.

The clutch members 113 and 117 (Figs. 10, 15 and 16) each has an annular groove into which extend, respectively, studs 153 and 154 secured to bars 155 and 156 respectively, each being slidably mounted on a bar 157, by means of two studs in each of said bars 155 and 156 in cooperation with their respective horizontal slots in said bar 157. The bar 157 is also mounted for horizontal sliding movement by means of horizontal slots therein in cooperation with studs 158 and 159 in similar brackets 160 and 161 secured to the shelf 106. A spring 162 tensioned between the bars 155 and 156 urges said bars toward each other and forms a yielding connection to prevent damage in case the teeth of the clutch members 113 and 117 engage the tops of the teeth of their corresponding clutch members, when said members 113 and 117 are shifted to effective position. In the center of the bar 157 (Figs. 8, 10 and 16) is a stud 163 engaged by a helical cam groove cut in the periphery of a shifting cam 164 free on a shaft 165 journaled in upturned ears 166, 167 and 168 of the shelf 106. The shaft 165 is operatively connected to the motor 119 by a bevel gear 180, fast on said shaft, which meshes with a similar gear 181 secured on the upper end of the shaft 125.

Referring to Figs. 8, 10 and 14, integral with the cam 164 is a drum cam 169 having a node 170, on the face thereof, adapted to cooperate with studs 171 and 172 in the arms of a yoke 173 free on a vertical rod 174 supported by the shelf 106 and a bracket 175 secured to said shelf. Extensions of the studs 171 and 172 (Fig. 14) engage an annular groove in a clutch member 176, slidable on the shaft 165, and having tenons 177 which engage corresponding spline cuts in a collar 178 secured on said shaft 165. The teeth of the clutch member 176 are adapted to cooperate with teeth 179 cut in the cam 169. A spring 185 (Figs. 11 and 14), connected to the yoke 173 and a latch 186 pivoted to the bracket 106, is tensioned to urge the teeth of the clutch member 176 into engagement with the teeth 179. However, the latch 186, in cooperation with a tooth 187 on the lower arm of the yoke 173, normally holds the clutch member 176 in ineffective position, as here shown.

The latch 186 (Figs. 11 and 14) has a camming slot 188 therein, which cooperates with a stud 189 in one end of a bar 190 connected by a link 191 to the lower arm of the yoke 173. A spring 192, tensioned between the lower arm of the yoke 173 and the bar 190, urges said bar counter-clockwise to yieldingly hold the stud 189 in the righthand or upper portion of the slot 188. The stud 189 (Figs. 10 and 11) coacts with the end of a lever 193 pivoted on a stud 194, in the shelf 106, said stud also forming a pivot for the latch 186. The other end of the lever 193 is pivotally connected to a bar 195, slotted to embrace a stud 196 secured in the shelf 106.

As previously explained, with the clutch members 116 and 117 engaged, as shown in Fig. 10, the hydraulic mechanism drives the traveling carriage toward the left or in a working or tabulating direction. When the traveling carriage nears the end of its tabulating movement, a cam block 198 (Fig. 10) mounted thereon, engages the angular nose of the bar 195 and shifts said bar rearwardly to rock the lever 193 counter-clockwise, causing said lever, in cooperation with the stud 189, to rock the latch 186 out of engagement with the tooth 187 on the arm of the yoke 173. This releases the yoke 173 to the

action of the spring 185 (Figs. 11 and 14) which immediately rocks said yoke clockwise to engage the teeth of the clutch member 176 with the teeth 179.

The motor 119 continuously revolves the shaft 165 in the direction indicated by the arrows. Consequently the clutch member 176 immediately revolves the cams 169 and 164 in unison with said shaft 165. After the cams 169 and 164 have completed 180 degrees of movement or one-half a revolution, the node 170 of the cam 169 engages the stud 172 to restore the yoke 173 counter-clockwise and to disengage the clutch member 176 from the teeth 179. A retaining member, later described, arrests and retains the cams 169 and 164 in the normal position or in said 180-degree moved position. The latch 186, which has been rendered effective in a manner presently to be described, again reengages the tooth 187 to retain the yoke 173 and the clutch member 176 in ineffective positions.

Clockwise engaging movement of the yoke 173 (Fig. 11), after the latch 186 has been disengaged therefrom, causes a bent-over ear 199, on an extension of the lower arm of said yoke 173, to engage and rock the bar 190 clockwise, against the action of the spring 192. Clockwise movement of the bar 190 moves the stud 189 out of the upper portion of the slot 188, whereupon the camming action between said stud 189 and said slot 188 assists the spring 185 in returning the latch 186 clockwise into the path of the tooth 187, so that said latch will be effective to engage said tooth to retain the yoke 173 in its normal or ineffective position when the yoke is returned to this position by the cam 170, and regardless of whether or not the block 198 retains the lever 193 and stud 189 in latch disengaging positions.

180 degrees rotation of the cam 164 (Figs. 10 and 16) causes the groove therein, in cooperation with the stud 163, to shift the bar 157 toward the left, as here viewed, to disengage the clutch member 117 from its corresponding member 116 and to simultaneously engage the clutch member 113 with its corresponding member 112. This reverses the direction of rotation of the gears 108 and 103, thereby causing the hydraulic device to return the traveling carriage from the limit of its working movement toward the right to initial or starting position.

When the traveling carriage nears the end of its return movement, a camming block 199, similar to the block 198, engages the angular nose of the bar 195 and shifts said bar rearwardly to again disengage the latch 186 from the tooth 187 to engage the clutch member 176 (Fig. 14) with the teeth 179, whereupon the shaft 165 revolves the cams 169 and 164 another 180 degrees of movement, until the node 170 of the cam 164 engages the stud 171 to disengage the clutch member 176 from the teeth 179 in exactly the same manner as explained above. This one-half revolution of the cam 164 shifts the bar 157 toward the right, as viewed in Fig. 10, to reengage the member 117 and to simultaneously disengage the clutch member 113 to again permit the hydraulic clutch device to yieldingly urge the traveling carriage in its working or letter-spacing direction.

When the carriage is returned to starting position the escapement mechanism, later to be described, holds said carriage against tabulating movement, consequently the block 199 retains the lever 193 in latch disengaging position, therefore in order to prevent repeat engaging movements of the yoke 173 and unnecessary shifting of the clutch members 113 and 117, it is necessary to render the latch 186 effective in the manner explained above, irrespective of the position of said lever 193.

A spring pulled retaining pawl 230 (Figs. 10, 13 and 14) pivotally mounted on a bracket 231 secured on the shelf 106, in cooperation with two diametrically opposed V notches in a disc 232 integral with the cams 164 and 169, retains said cams, the bar 157 and the clutch members 113 and 117 in either of their two positions, when the clutch member 176 is disengaged.

The cam blocks 198 and 199 (Figs. 1 and 12) are adjustably mounted, in relation to the angular nose of the bar 195, by means of screws 182 threaded in said blocks, in cooperation with a series of holes 183 in a downward extension of an angle bar 200 secured to the back of the traveling carriage 96, said downward extension of the bar 200 fitting snugly in horizontal slots in said cam blocks 198 and 199.

Carriage escapement mechanism

As previously explained, the hydraulic clutch device normally functions to constantly urge the traveling carriage in working or letter-spacing direction, and said carriage is restrained or held against such movement by an escapement mechanism which is operated by the typewriter keys to letter-space the traveling carriage, and which is rendered ineffective by the tabulating mechanism when the traveling carriage is released for tabulating movement. The manner in which the typewriter keys operate the escapement mechanism will now be described.

Directing attention to Figs. 3 and 5, a typewriter key lever 201, which is representative of the full complement of typewriter keys, is pivoted on a rod 202, supported by the frames 30 and 31, and said key lever carries a stud 203, which cooperates with the camming slot in a type operating lever 204, pivoted on a rod 205, supported by the frames 30 and 31. The upper end of the lever 204 cooperates with a universal bar 206 mounted in slots in two similar forwardly extending arms of a yoke 207, said arms being pivoted on studs 208 in similar bent-over portions of a bracket 209, said bracket in turn being pivoted on studs 210 in extensions of the escapement frame 33. Rearward extensions of the yoke 207 (Figs. 2 and 3) support a pin 211, which fits loosely in a hole in a downward extension of a lever 212 free on a stud 213 secured in the frame 33.

Pivotally connected to an upward extension of the lever 212 is a bracket 214, having secured in a bent-over ear thereof one end of a rod 215 the other end of said rod fitting loosely in a hole in an extension of a lever 216 free on a stud 217 fast in the frame 33. Also fulcrumed on the stud 217 is an escapement pawl 218 urged counter-clockwise by a spring 219 to normally maintain a tooth thereof in engagement with the teeth of an escapement ratchet 220 secured on the downward end of a vertical shaft 221 journaled in a bushing 222 (Fig. 2) in the frame 33. The shaft 221 has secured on the upper end thereof a pinion 223 which meshes with a horizontal rack 224 secured to the framework of the traveling carriage 96. The spring 219 normally maintains an extension of the pawl 218 in contact with an eccentric 225, by means of which the tooth of said pawl is adjusted in relation to the teeth of the ratchet 220.

The lever 216 is adjusted in relation to the yoke 207 by means of an adjustable collar 226, free on the rod 215, and its cooperating adjusting and locking nuts. A spring 227, tensioned between the pivot for the bracket 214 and an extension of the lever 216, normally maintains said extension in contact with the collar 226.

Depressing the key 201 (Fig. 5) rocks the lever 204 counter-clockwise, causing the upper end of said lever, in cooperation with the universal bar 206, to shift the yoke 207 forwardly. Forward movement of the yoke 207 rocks the lever 212 (Fig. 2) clockwise, which movement by means of the rod 215 rocks the lever 216 also clockwise to disengage the tooth of the escapement pawl 218 from the teeth of the ratchet 220. This frees the traveling carriage 96 to the action of the hydraulic device, which letter-spaces said traveling carriage toward the left, as viewed in Fig. 10, until a tooth of said ratchet 220 contacts a stop pawl 228 pivoted on the lever 216. When the key 201 is released the yoke 207 is spring-returned rearwardly to return the lever 212 (Fig. 2) counter-clockwise, which in turn permits the spring 227 to return the lever 216 counter-clockwise (Fig. 3) to move the stop pawl 228 out of the path of the teeth of the ratchet 220 and to simultaneously move the escapement pawl 218 back into the path of said teeth, to permit the traveling carriage to move the equivalent of one tooth of said ratchet 220 to letter-space the record material wound around the platen roll of said carriage.

When the traveling carriage is returned, from the terminus of its letter-spacing movement, to starting position the ratchet 220 is reversely rotated, whereupon the teeth thereof ratchet over or by-pass the tooth of the escapement pawl 218.

In addition to the reversing cam block 199 (Fig. 10) a positive stop is provided to insure termination of return movement of the traveling carriage. This mechanism includes a lug 229 on a return marginal stop 235 (Fig. 6) adjustably mounted on a stop bar 236 secured to the framework of the traveling carriage 96, in cooperation with the upper end of a stop plunger 237 slidably mounted in a recessed portion of the frame 34 and retained in said recess by means of screws 238, in cooperation with slots in said plunger 237.

Typewriter tabulating mechanism

The upper end of the plunger 237 is always in the path of the lug 229 to insure termination of the return movement of the traveling carriage 96 in the manner explained above, and in addition manipulative means is provided for raising said plunger into the path of typewriter tabulating stops mounted on the stop bar 236 and for simultaneously disengaging the escapement mechanism to permit the traveling carriage to tabulate under influence of the hydraulic mechanism until such movement is terminated by one of said stops contacting said plunger 237.

A spring 239 (Fig. 6) urges the plunger 237 upwardly, to normally maintain a square stud 240 therein in contact with a rounded nose on an extension of a lever 241 pivoted on a stud 242 in the frame 34. A spring 243, which is strong enough to overcome the action of the spring 239, urges the lever 241 clockwise to normally maintain an extension 244 thereof in contact with a pad 234 formed on the frame 34. The lever 241 positions the plunger 237 so that the upper end thereof is just beneath and out of the path of a lug 245 on a typewriter tabulating stop 246, adjustably mounted on the stop bar 236. The lever 241 has a nose 247 which underlies a hook-shaped extension of a lever 248 pivoted on a stud 249 in the frame 34. A notch 250, in another extension of the lever 248, engages a rearward extension of a lever 251 pivoted on a stud 252 (Fig. 5) in the frame 30. The lever 251 terminates in a finger-piece 253, which is conveniently located to the right of the typewriter keyboard where it may be easily reached by the operator.

Depressing the lever 251 rocks the levers 248 and 241 counter-clockwise and clockwise, respectively, as viewed in Fig. 5, and clockwise and counter-clockwise, as viewed in Fig. 6, against the action of the spring 243, to lift the rounded nose of said lever 241 away from the stud 240 to permit the spring 239 to carry the plunger 237 upwardly into the path of the lug 245 on the stop 246. The extension 244 of the lever 241 (Figs. 5 and 6) overlies a stud 254 in a plunger 256 mounted to slide vertically in a slot in the pad 234 on the frame 34. The plunger 256 (Fig. 2) has an aperture into which projects an extension of a bell crank 257 pivoted on a bracket 258 secured to the frame 34. The bell crank 257 is pivotally connected, by a link 259, to one arm of a lever 260 free on a stud 261 in the frame 33. Another arm of the lever 260 is connected, by a link 262, to an arm of a yoke 263 rotatable on a rod 264 supported by downwardly extending ears of the frame 33.

Depression of the lever 251 (Figs. 5 and 6) and consequent downward movement of the extension 244 of the lever 241, causes said extension, in cooperation with the stud 254 to shift the plunger 256 downwardly to rock the bell crank 257 counter-clockwise, as viewed in Fig. 2, which in turn rocks the lever 260 and the yoke 263 clockwise. Clockwise movement of the yoke 263 causes an upwardly extending arm 265 thereof to engage an extension 266 (Fig. 3) of the escapement pawl 218 and rock the tooth of said escapement pawl out of engagement with the teeth of the ratchet 220, to release the traveling carriage 96 to the action of the hydraulic device, shown in Fig. 10, which immediately tabulates said carriage until the lug 245 (Fig. 6) on the stop 246 contacts the plunger 237. Releasing the manipulative lever 251 permits the spring 243 to return the lever 241 clockwise to move the upper end of the plunger 237 out of the path of the lug 245 and to permit a spring 267 (Fig. 2) to return the lever 260 and the yoke 263 counter-clockwise, to effectuate the escapement mechanism to hold the carriage against further tabulating movement.

Automatic tabulating mechanism

In addition to the manual means for tabulating the traveling carriage, just described, there is also an automatic means sometimes called the accounting machine tabulating means, for tabulating the traveling carriage to align the different columns on the record material with the accounting machine and typewriter printing means. Ordinarily, the automatic tabulating means functions, during machine operation, immediately after printing has been effected. However, the automatic tabulating means is subject to manual control, by means of which it may be made to function at will without operating the machine. The automatic tabulating mechanism is not in any way connected with or dependent upon the manually operated typewriter tabulating means just described, and may be properly termed a complete tabulating mecha-

nism in itself, having its own set of stops and their associated control and stop plungers.

Referring to Fig. 5, initial movement counter-clockwise of the arm 39 moves the link 45 upwardly, as previously explained, causing an angular nose on a spring-pulled hook 268, mounted thereon, to by-pass a stud 269 in a lever 270, loose on a stud 271 in the frame 30, whereupon said hook 268 latches over said stud 269. Return movement clockwise of the arm 39, and consequent downward movement of the link 45 causes the hook 268, in cooperation with the stud 269, to carry the lever 270 downwardly in unison therewith.

The lever 270 (Figs. 5, 6 and 7) is slotted to receive one end of a lever 272 fulcrumed on a stud 273 in the frame 34, while another extension of said lever 272 underlies an arm of a lever 274 pivoted on a stud 275 in the frame 34. A spring 276 urges the lever 274 counter-clockwise as viewed in Figs. 6 and 7, to normally maintain a raised surface thereof against the pad 234.

Downward movement of the lever 270 rocks the lever 274 clockwise, against the action of the spring 276, causing a pad on the bottom surface of said lever, in cooperation with the stud 254, to shift the plunger 256 downwardly (see also Figs. 2 and 3) to disengage the escapement pawl 218, in the manner explained earlier herein, to release the traveling carriage 96 to the action of the hydraulic device, which immediately moves said carriage toward the left (Fig. 10) or in tabulating direction.

The lever 274 (Fig. 7) carries a stud 277 which extends through a slot in the lower end of a tabulating stop plunger 278, the upper end of which fits loosely in a slot 279 in a built-up portion of the frame 34. A torsion spring 280, in cooperation with a stud 281 in the bar 278, urges said bar upwardly in unison with the lever 274. Clockwise movement of the lever 274 causes a square stud 282 therein to move beyond the latching surface of a hook 283, free on a stud 284 in the frame 34, whereupon a torsion spring 285 urges said hook clockwise into the path of the stud 282, to obstruct counter-clockwise movement of the lever 274 when the hook 268 (Fig. 5) rides off the stud 269, near the end of return movement downwardly of the link 45. Clockwise movement of the hook 283, under influence of the spring 285, causes a hump 286 thereon to engage and rock the plunger 278 counter-clockwise, into contact with the left wall (Fig. 7) of the slot 279.

The stud 281 (Fig. 6) extends through a slot in an escapement control plunger 292 adjacent the stop plunger 278, the upper end of said plunger 292 fitting loosely in the slot 279, and the lower end being pivotally connected to a lever 293 fulcrumed on the stud 275. The lever 293 is similar in outline to the lever 274 and has a downwardly extending pad which cooperates with the stud 254 in exactly the same manner as said lever 274. A spring 294 urges the plunger 292 counter-clockwise to normally maintain an undercut portion on the upper end thereof in contact with a square stud 295 in an arm 296 pivoted on a screw stud 297 in the frame 34. The arm 296 is urged clockwise by a spring 298 into contact with a stop stud in the frame 34. The stud 281 carries the plunger 292 upwardly in unison with the plunger 278 until the notch, in said plunger 292, moves beyond the stud 295, whereupon the spring 294 urges said plunger 292 counter-clockwise to engage said notch with the stud 295, to obstruct downward movement of said plunger 292.

Upward movement of the plungers 278 and 292, in the manner explained above, moves their respective extensions 299 and 300 into the path of a stopping lug 301 (Fig. 5) on a tabulating stop 302 adjustably mounted on the stop bar 236. Near the end of the tabulating movement, toward the right as viewed in Figs. 6 and 7, of the traveling carriage, the lug 301 engages the extension 299 and carries the plunger 278 clockwise into contact with the righthand wall of the slot 279 in the frame 34, whereupon tabulating movement of the traveling carriage is terminated. This clockwise movement of the plunger 278 rocks the hook 283 out of engagement with the stud 282 to release the lever 274 to the action of the spring 276, which immediately returns said lever and the plunger 278 downwardly to the position shown in Fig. 7. The projection 299 protrudes far enough beyond the projection 300 of the plunger 292 to prevent the lug 301 from engaging said projection 300 when the plunger 278 is rocked into contact with the right wall of the slot 279.

Downward movement of the plunger 278, as explained above, moves the projection 299 thereof out of the path of the lug 301, thereby permitting the traveling carriage to tabulate a slight distance farther, until said lug 301 contacts the projection 300 of the plunger 292 and rocks said plunger clockwise to disengage the notch therein from the stud 295. Upon being thus released, the plunger 292 and the lever 293 are returned downwardly, and counter-clockwise respectively, to normal position, by a torsion spring 291 (Fig. 6), thereby releasing the plunger 256 and connected mechanism, to the action of the spring 261 (Fig. 2), which immediately rocks the yoke 263 counter-clockwise to move the arm 265 (Fig. 3) out of engagement with the extension 266, of the pawl 218, to permit said pawl to return into engagement with the teeth of the ratchet 220 to hold the traveling carriage against further tabulating movement.

In case the traveling carriage 96 is returned toward starting position when the plungers 278 and 292 (Figs. 6 and 7) are in upward or effective positions, angular surfaces on the upper ends of said plungers permit the lug 301 to cam said plungers downwardly until said lug by-passes said plungers. The slot in the lower end of the plunger 278 permits such downward movement thereof independently of the lever 274, and the spring-pulled arm 296 permits such downward movement of the plunger 292. After the lug 301 has by-passed the plungers 278 and 292, they are immediately spring-returned upwardly to effective positions.

Sometimes it is desirable to tabulate the traveling carriage without operating the machine, and in the machine embodying the present invention this is effected by depressing a tabulating key 303 (Fig. 5), which renders the accounting machine tabulating mechanism effective by rocking the lever 270 clockwise in exactly the same manner as the hook 268 rocks said lever upon operation of the machine.

The upper end of the key 303 passes through a slot in the keyboard top plate, while the lower end of said key is slotted to embrace a stud (not shown) in a bracket (not shown) secured to the righthand plate of the keyboard framework. Pivotally mounted on the stem of the key 303 is a latch 304 urged clockwise by a spring 305 to normally maintain a bent-over ear of said latch in

contact with the edge of the key 303. The spring 305 also normally maintains the key 303 in its upward or undepressed position.

Depressing the tabulating key 303 causes the latch 304, in cooperation with an extension 307 of an arm 308 free on the stud 252 and yoked to an arm 309 also free on said stud 252, to rock said arms counter - clockwise. Counter - clockwise movement of the arm 309, by means of a stud 310 in the upper end thereof, in cooperating with an extending finger 311 of the lever 270, rocks said lever clockwise to cause the accounting machine tabulating mechanism to function in exactly the same manner as explained above. The finger 311 permits the lever 270 to move independently of the arm 309 and connected mechanism, when said lever 270 is operated automatically by the hook 268. After the tabulating mechanism has been rendered effective, continued depression of the key 303 causes an extension 314 of the latch 304 to engage a stud 315 in the frame 30 to disengage said latch from the extension 307 to prevent obstruction of the downward movement of the plungers 278 and 292 (Fig. 6) in case the tabulating key 303 is retained depressed.

Operation

It is believed that a thorough understanding of the operation of the hydraulic drive for the traveling carriage will have been obtained from a perusal of the foregoing specifications. Nevertheless, a brief outline of operation will now be given.

The stop bar 236 (Figs. 1 and 6), generally carries one of the stops 302 for each columnar division of the record material, and these stops are properly located on said bar 236 to position their corresponding columns on the record material opposite the accounting machine recording mechanism. In addition to stopping tabulating movement of the traveling carriage the stops 302 also have one or more downwardly depending camming lugs 312 which, in cooperation with the upturned ends of corresponding hanging bar levers 313, select and condition the different totalizers of the machine for addition, and select and condition the #1 or balance totalizer for addition or subtraction.

With the traveling carriage 96 in its starting position, which is determined by the first stop 302 in cooperation with the plungers 278 and 292 (Fig. 6), the data to be printed in the first column of the record material is set up on the keyboard, and upon operation of the machine this data is printed in the first column. After printing has been completed, the hook 268 (Fig. 5) rocks the lever 270 clockwise to release the traveling carriage to the action of the hydraulic device, which immediately moves said traveling carriage in a tabulating direction until the stop 302 for the second column of the record material contacts the plungers 278 and 292 to terminate tabulating movement of said traveling carriage. If there is any descriptive data to be typed in the second column of the record material, the typewriter keys are used for this purpose, after which the amount of the transaction is set up on the accounting machine keys and the machine released for operation. During operation of the machine the traveling carriage is again released for tabulation, and this sequence of operation continues as long as there are stops 302 for columnar divisions of the record material.

It has been explained that the camming lugs 312 (Fig. 6) on the stops 302, in cooperation with the hanging bar levers 313, select and condition the various totalizers for addition and subtraction. If the traveling carriage rebounds excessively when the tabulating movement thereof is terminated, the lugs 312 are momentarily moved out of register with the proper hanging bar levers and possibly into register with improper ones, and if the machine is released at this instant, the result will be mal-operation. The hydraulic device, explained above, provides a steady flow of power, not positive in its action, for moving the traveling carriage in tabulating and return directions, thereby overcoming any tendency for excessive rebounding thereof, thus eliminating the possibility of mal-operations from this source.

After printing has been completed, in the extreme righthand column of the record material, automatic tabulation of the traveling carriage causes the block 198 (Fig. 10), in cooperation with the angular nose of the bar 195 to shift the clutch members 113 and 117 to reverse the gearing for the hydraulic mechanism to cause the traveling carriage to be returned toward starting position. While the carriage is being returned in starting direction, the lugs 301 of the stops 302 ride over the angular surfaces of the plungers 278 and 292 as the functioning of the automatic tabulating mechanism, just prior to reversing of the carriage movement, left these bars in their upward positions and the escapement mechanism ineffective.

When the traveling carriage arrives at starting position the cam block 199 (Fig. 10), in cooperation with the angular nose of the bar 175, again reverses the gearing for the hydraulic mechanism to terminate return movement of the traveling carriage. Inasmuch as the escapement mechanism is still disconnected and the tabulating plungers are still in the path of the stops 302 (Fig. 6), the traveling carriage starts moving in a tabulating direction, as soon as the block 199 (Fig. 10) reverses the gearing for the hydraulic mechanism. The traveling carriage moves in tabulating direction until the stop 302 for the first columnar position of the record material contacts the tabulating plungers 278 and 292 to locate the first division of said record material opposite the printing mechanism.

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

What is claimed is:

1. In a machine of the character described, the combination of a continuously running motor; an element movable in two directions; a device forming a non-positive connection between the motor and the element; means including shiftable reversing gears to connect the device to the element; means to shift the reversing gears to reverse the movement of the element; and means operated by the element, when it approaches the limit of its movement in either direction, to connect the last-named means to the motor, whereby the reversing gears are shifted by the motor to cause said element to be driven in each of its two directions.

2. In a machine of the class described, the combination of a continuously running motor; a hydraulic device driven by the motor; an element adapted to be moved in either of two directions by the hydraulic device; reversible means

to connect the hydraulic device to the element, to move said element in either of its two directions; normally ineffective means, operated by the motor, to reverse the reversible means; and means operated by the element, when it reaches the terminus of its movement in either direction, to render the normally ineffective means effective to reverse the direction of movement of said element.

3. In a machine of the class described, the combination of a hydraulic device; means to drive the hydraulic device; an element adapted to be moved in either of two directions by the hydraulic device; means, including reverse gearing and clutches therefor, to connect the hydraulic device to the element; normally ineffective means, operated by the driving means, to engage and disengage the clutches; and means actuated by the element, when it approaches the limit of its movement in either direction, to render the engaging and disengaging means for the clutches effective to reverse the direction of movement of said element.

4. In a machine of the class described, the combination of a cushioned power transmitting device; means to drive the power transmitting device; an element adapted to be moved in either of two directions by the power transmitting device; reversing gears connected to the element; clutches to connect the reversing gears to the power transmitting device; normally ineffective means, operated by the driving means, to engage and disengage the clutches; and means actuated by the element when it nears the terminus of its movement in either direction to render the engaging and disengaging means for the clutches effective to reverse the direction of movement of said element.

5. In a machine of the character described, the combination of a hydraulic device; a continuously running motor to drive the hydraulic device; an element adapted to be moved in either of two directions by the hydraulic device; a reversible power transmitting contrivance to connect the hydraulic device to the element; normally ineffective means operated by the motor to reverse the reversible power transmitting contrivance; a clutch to connect the reversing means to the motor; means actuated by the element, near the terminus of its movement in either direction, to render the clutch effective to reverse the direction of movement of said element; and means whereby the reversing means disengages the clutch after the power transmitting contrivance has been reversed.

6. In a machine of the class described, the combination of a hydraulic device; a continuously running motor to drive the hydraulic device; an element adapted to be moved in either of two directions by the hydraulic device; reversing gears connected to the element; clutches, comprising members connected to the reversing gears and corresponding members connected to the hydraulic device, to transmit power from said hydraulic device to the element; means operated by the motor to alternately engage and disengage the clutch members to cause the element to be moved in either of its two directions; and means actuated by the element, near the end of its movement in either direction, to render the engaging and disengaging means effective to reverse the direction of movement of said element.

7. In a machine of the character described, the combination of a hydraulic device; a continuously running motor to drive the hydraulic device; an element adapted to be moved in either of two directions by the hydraulic device; a reversible power transmitting contrivance to connect the hydraulic device to the element; means operated by the motor to reverse the power transmitting contrivance; a clutch to connect the reversing means to the motor; a latch to hold the clutch in ineffective position; means actuated by the element, near the end of its movement in either direction, to disengage the latch to render the clutch effective to reverse the direction of movement of said element; means actuated by the reversing means to disengage the clutch, after the direction of movement of the element has been reversed; and means to render the latch effective, irrespective of the latch disengaging means, to retain the clutch in disengaged position.

8. In a machine of the character described, the combination of a hydraulic device; a continuously running motor to drive the hydraulic device; an element adapted to be moved in either of two directions by the hydraulic device; reversing gears connected to the element; clutches, comprising members connected to the reversing gears and members connected to the hydraulic device, to transmit power from said hydraulic device to the element; means operated by the motor to alternately engage and disengage the clutch members to cause the element to be moved in either of its two directions; a clutch to connect the engaging and disengaging means to the motor; means including a latch to hold the clutch for the engaging and disengaging means in ineffective position; means actuated by the element, when it nears the end of its movement in either direction, to disengage the latch to render the clutch for the engaging and disengaging means effective to reverse the direction of movement of said element; means actuated by the engaging and disengaging means to disengage the clutch therefor, after the direction of movement of the element has been reversed; and means to restore the latch to effective position, irrespective of the latch disengaging means, to retain the clutch for the engaging and disengaging means in disengaged position.

9. In a machine of the class described, the combination of a continuously running motor; a hydraulic power transmitting device operated by the motor; a laterally shiftable element adapted to be moved in either of two directions by the hydraulic device; reversing gears connected to the element; clutches, comprising members connected to the reversing gears and members connected to the hydraulic device; means including a shiftable bar and a cam, to shift said bar, to alternately engage and disengage the clutch members to cause the hydraulic device to move the element in either of its two directions; a clutch to connect the cam to the motor; a latch to normally hold the clutch for the cam out of engagement; means operated by the element, near the terminus of its movement in either direction, to disengage the latch to cause the clutch for the cam to become effective to reverse the direction of movement of said element; means operated by the motor to disengage the clutch for the cam, after the direction of movement of the element has been reversed; and means, rendered effective by movement of the clutch for the cam to engaging position, to restore the latch to effective position, irrespective of its disengaging means, to prevent repeat engagements of said clutch.

10. In a machine of the class described, the

combination of a constantly acting fluid operated power device non-positive in action; a motor to actuate the device; a laterally shiftable element adapted to be moved in either of two directions by the power device; a shiftable power transmitting contrivance for connecting the fluid operated power device to the element; means to shift said power transmitting contrivance to reverse the direction of movement of said element; and means rendered effective by the element, when the element nears the terminus of its movement in either direction, to connect the shifting means to the motor whereby the motor becomes active to shift the power transmitting contrivance.

11. In a machine of the class described, the combination of a constantly acting fluid operated power device non-positive in action; a motor to actuate the device, a laterally shiftable element adapted to be moved in either of two directions by the power device; reversing gears connected to the element; means operated by the motor to alternately couple and uncouple the reversing gears to and from the power device to reverse the direction of travel of the element; and means actuated by the element, when it nears the limit of its movement in either direction to connect the coupling and uncoupling means to the motor to render the coupling and uncoupling means active.

12. In a machine of the class described, the combination of an element movable in a horizontal plane in either of two directions; a continuously running motor; a hydraulic device adapted to form a non-positive operating connection between the motor and the element; reversing gears connected to the element; clutches connecting the reversing gears to the hydraulic device; means operated by the motor to alternately engage and disengage the clutches to move the element in either of its two directions; and means actuated by the element, near the end of its movement in either direction, to render the engaging and disengaging means effective to reverse the direction of movement of said element.

13. In a machine of the class described, the combination of a laterally movable traveling carriage adapted to be moved from starting position in a working direction and returned to starting position; a device to move the traveling carriage in its working and return directions; a motor to operate the device; means to control the direction of movement of the carriage; and means operated by the traveling carriage near the terminus of its movement in either direction to couple the control means to the motor whereby the motor operates the control means to cause the device to reverse the direction of movement of said carriage.

14. In a machine of the class described, having printing means, the combination of a laterally movable traveling carriage to present record material to the printing means; a continuously running motor to move the carriage in either of two directions; a hydraulic device adapted to form an impositive operating connection between the motor and the carriage; a reversing mechanism between the hydraulic device and the carriage to control the direction of movement of said carriage; connections between the reversing mechanism and the motor; and means rendered effective by the carriage to cause said connections to be operated by the motor to actuate the reversing mechanism.

15. In a machine of the class described, the combination of a laterally movable traveling carriage; a continuously running motor to move the carriage in either of two directions; a hydraulic device adapted to form an impositive operating connection between the motor and the carriage; reversing gears connected to the carriage; clutches connecting the reversing gears to the hydraulic device; normally ineffective means, operated by the motor, to alternately engage and disengage the clutches to reverse the direction of movement of the carriage; and means actuated by the carriage, near the end of its movement in either direction, to effectuate the engaging and disengaging means.

16. In a machine of the class described, the combination of a traveling carriage movable in two directions in a horizontal plane; a continuously running motor; a hydraulic device forming a non-positive connection between the motor and the carriage, to yieldingly move said carriage in either of its two directions, reversing gears connected to the carriage; clutches connecting the reversing gears to the hydraulic device; normally ineffective means, operated by the motor, to alternately engage and disengage the clutches; and means actuated by the carriage, when it approaches the terminus of its movement in either direction, to render the engaging and disengaging means for the clutches effective to change the direction of movement of said carriage.

17. In a machine of the class described, the combination of an element adapted to be moved in two directions, with change of direction; a fluid-operated power source non-positive in action; a main operating means to operate the power source always in the same direction; a transmission shaft driven by the power source; reversing gears free on the shaft and connected to the element; clutch members rotatable with the shaft and movable into and out of engagement with the reversing gears to alternately lock said gears to the shaft to move the element in either of its two directions; normally ineffective means driven directly by the main operating means to engage and disengage the clutch members; and means, comprising members adjustably mounted on the element, and mechanism cooperating therewith, effective when said element nears the terminus of its movement in either direction to connect the mechanism with the main operating means to render the clutch engaging and disengaging means effective to change the direction of movement of said element.

18. In a machine of the class described, the combination of an element adapted to be moved in two directions, with change of direction; a continuously operating power source; a power transmitting shaft; a hydraulic device forming a non-positive connection between the power source and the shaft; reversing gears free on the shaft and connected to the element; clutch members rotatable with the shaft and movable into and out of engagement with the reversing gears to alternately lock said gears to the shaft to cause the element to be yieldingly urged in either of its two directions; means actuated by the power source to engage and disengage the clutch members; normally ineffective means to connect the clutch engaging and disengaging means to the power source; and means actuated by the element, near the terminus of its movement in either direction, to render the connecting means, for the clutch engaging and disengaging means, effective to reverse the direction of movement of said element.

19. In a machine of the class described, having a traveling carriage adapted to be moved from initial position in a working direction and returned to initial position, the combination of a continuously running motor; a hydraulic device operated by the motor; a shaft driven by the hydraulic device; reversing gears free on the shaft and connected to the traveling carriage, said reversing gears having clutch teeth therein; clutch members rotatable with the shaft; means to move the clutch members in and out of engagement with the teeth in the reversing gears to alternately connect said gears to the shaft to form a non-positive connection between the motor and the carriage to move said carriage in either working or return direction; means to connect the moving means to the motor; a latch to hold the connecting means, for the moving means, in ineffective position; means, including adjustable members on the carriage, to disengage the latch, when said carriage nears the end of its movement in either direction, to reverse the direction of movement of said carriage; and means operated by the moving means to return the connecting means into engagement with the latch.

20. In a machine of the class described, having a traveling carriage adapted to be moved from an initial position in a working direction and returned to initial position, the combination of a continuously running motor; a shaft; a hydraulic device forming an impositive connection between the motor and the shaft, to yieldingly and constantly urge said shaft in a certain direction; reversing gears free on the shaft and connected to the carriage; means to alternately connect and disconnect the reversing gears to and from the shaft to move the carriage in either working or return direction; means operated by the motor to actuate the connecting and disconnecting means; a clutch to connect the actuating means to the motor; a latch to normally hold the clutch out of engagement with the actuating means; means, comprising elements associated with the latch, and members on the traveling carriage cooperating with said element, when said carriage reaches the end of its movement in either working or return direction, to move the latch to ineffective position to cause the actuating means to function to reverse the direction of movement of said carriage; means adjusted by the actuating means to disengage the clutch after the direction of movement of the carriage has been reversed; and means operating in unison with the clutch to restore the latch to effective position, irrespective of the latch disengaging means, to retain said clutch disengaged.

21. In a machine of the class described having a traveling carriage adapted to be moved from an initial position in a working direction and returned to initial position, the combination of a continuously running motor; a primary shaft; a hydraulic device forming a non-positive connection between the motor and the primary shaft, to yieldingly and constantly urge said shaft in a certain direction; a secondary shaft connected to the traveling carriage by a pinion and a rack; two similar reversing gears free on the primary shaft and in constant mesh with a gear fast on the secondary shaft; clutch members, for each of the reversing gears, said clutch members rotatable with the shaft; means to alternately move the clutch members into and out of engagement with their respective reversing gears, to cause the hydraulic device to move the carriage in either working or return direction; means operated by the motor to actuate the moving means; a clutch to connect the actuating means to the motor; a latch, normally effective, to hold the clutch, for the actuating means, out of engagement with said actuating means; means to disengage the latch; adjustable members on the carriage adapted to actuate the latch disengaging means, when said carriage nears the terminus of its movement in either working or return direction, to cause the actuating means to function to reverse the direction of movement of said carriage; and means, operating in unison with the actuating means and effective after the direction of movement of the carriage has been reversed, to disengage the last named clutch.

22. In a machine of the character described, having a traveling carriage adapted to be moved from an intial position in a working direction and returned to initial position, the combination of a continuously running motor; a primary shaft having a positive connection to the motor and adapted to be constantly rotated in a certain direction by said motor; a secondary shaft; a hydraulic device forming a non-positive connection between the primary shaft and the secondary shaft to constantly urge said secondary shaft in a certain direction; two reversing gears free on the secondary shaft and meshing with a gear connected to the carriage; a clutch member for each of the reversing gears, said members mounted on the secondary shaft and rotatable in unison therewith to move the carriage in tabulating and working directions; means to alternately move the clutch members into and out of engagement with their respective gears to reverse the direction of movement of the carriage; means to actuate the moving means; a clutch to connect the actuating means to the primary shaft; means including a latch to hold the last-named clutch in ineffective position; means to disengage the latch; adjustable members mounted on the carriage in relation to the extreme movement thereof in either direction and cooperating with the disengaging means to release the latch to cause the actuating means to function to reverse the direction of movement of said carriage; means operated by the primary shaft to disengage the last-named clutch after the direction of movement of the carriage has been reversed; and means, associated with the last-named clutch, to restore the latch to effective position, regardless of the effectiveness of the latch disengaging means, to retain said clutch disengaged.

23. In a machine of the class described, having a traveling carriage movable in either of two directions, the combination of a motor; a hydraulic device driven by the motor and forming a non-positive operating connection between the motor and the carriage; a reversible power transmitting contrivance to connect the hydraulic device to the carriage; means operated by the motor to reverse the power transmitting contrivance to change the direction of movement of the carriage; a clutch to connect the reversing means to the motor; a member to engage and disengage the clutch; yieldable means to move the member and the clutch to engaged positions; a latch to hold the member against engaging movement; means actuated by the carriage, near the end of its movement in either direction, to disengage the latch to permit the member to engage the clutch to reverse the direction of movement of said carriage; means whereby the engaging movement of the member renders the latch effective irrespective of the latch disengaging means; and means,

operating in unison with the reversing means, to move the member and the clutch to disengaged positions, after the direction of movement of the carriage has been reversed, whereupon the latch retains said member and said clutch in disengaged positions.

24. In a machine of the class described, a traveling paper carriage adapted to be arrested in various positions during the course of its travel; a motor to move the carriage in a certain direction and in reverse direction; a reversing mechanism to determine the direction of travel of the paper carriage; a fluid-operated connecting device non-positive in action between the motor and the traveling paper carriage, said connecting device being constantly driven in the same direction by the motor while the carriage is stationary and when moving in either direction; and means controlled by the paper carriage when the paper carriage approaches the limit of its movement in either direction to actuate the reversing mechanism to thereby cause reverse movement of the paper carriage, said means to actuate the reversing mechanism including connections directly between the motor and the last-named means to cause the last-named means to be actuated by the motor.

25. In a machine of the class described, a hydraulic connection; a continuously running motor to always drive the hydraulic connection in the same direction; a traveling paper carriage connected to the hydraulic connection to be driven in either of two directions by the hydraulic connection; and a shiftable reversing means to control the direction of movement of the traveling paper carriage, in combination with means actuated by the motor to shift the reversing means to reverse the direction of travel of the traveling paper carriage, said means being normally disconnected from the motor, and means operable by the traveling paper carriage when it reaches the limit of travel in either direction to connect the normally disconnected means to the motor to be actuated thereby.

26. In a machine of the class described, a continuously running motor; a traveling paper carriage movable in two directions by the motor; and driving means between the motor and the traveling paper carriage, said driving means including a non-positive connection and shiftable reversing gears to control the movement of the traveling paper carriage in either of its two directions, in combination with means to shift the reversing gears into either of two positions, and means controlled by the traveling paper carriage to connect the last-named means to the motor to be operated thereby.

27. In a machine of the class described, a continuously running motor; a paper carriage movable in either of two directions by said motor; driving means between the motor and the paper carriage, said driving means including a hydraulic connecting device and reversing means between the hydraulic connecting device and the carriage to determine the direction of movement of the carriage, in combination with a clutch member connected with the continuously running motor, means to operate the reversing means, and means actuated by the carriage to connect the clutch member to the last-named means to cause the motor through the last-named means to operate the reversing means.

28. In a machine of the class described, a continuously running motor; a paper carriage movable in either of two directions by said motor; driving means between the motor and the paper carriage, said driving means including a hydraulic connecting device and reversing means comprising shiftable reversing gears between the hydraulic connecting device and the carriage to determine the direction of movement of the carriage, in combination with a clutch member connected with continuously running motor, a cam to shift the reversing gears, and means controlled by the carriage to connect the clutch member to the cam, to cause the continuously running motor through said cam to shift the reversing gears.

29. In a machine of the class described, a continuously running motor; a paper carriage movable in either of two directions by said motor; driving means between the motor and the paper carriage, said driving means including a hydraulic connection and means comprising a reversible power transmission between the hydraulic device and the paper carriage, said power transmission adapted to be adjusted to reverse the direction of movement of said paper carriage, in combination with a normally inactive means, operable by the motor, to adjust the power transmission device, and means controlled by the paper carriage to connect the normally inactive means to the continuously running motor to cause the motor through the inactive means to adjust the power transmission device so that the driving means moves the paper carriage in the direction opposite to its last movement.

30. In a machine of the class described, a paper carriage movable in a horizontal plane in either of two directions; a continuously running motor; operating means between the motor and the paper carriage, said operating means including a hydraulic device and a reversing mechanism between the hydraulic device and the paper carriage to control the movement of the carriage in either of its two directions, in combination with normally idle means to actuate the reversing mechanism to reverse the direction of movement of the paper carriage, and means actuated by the carriage near the end of its movement in either direction to connect the normally idle means to the continuously running motor to cause the normally idle means to be operated directly by the motor, whereby the reversing mechanism is operated by the motor.

31. In a machine of the class described having recording media, a laterally movable traveling carriage, adapted to be moved from starting position in a working direction and to be returned from a working position to starting position, to present record material to the recording media; driving means including a device non-positive in action and a reversing mechanism, to move the carriage in its working and return directions; and power means to operate the driving means, in combination with means to adjust the reversing means to control the direction of movement of the carriage by the driving means, and means rendered effective by the carriage to connect the last-named means to the power means for operation thereby.

32. In a machine of the class described having recording media; a motor, a laterally movable traveling carriage, adapted to be moved from starting position in a working direction and returned to starting position, said carriage adapted to be arrested in various columnar positions to present record material to the recording media; and driving means including a hydraulic device, non-positive in action, and reversing mechanism for moving said carriage in its working and re-

turn directions; in combination with normally idle means to adjust the reversing mechanism to control the direction of movement of the traveling carriage by the driving means; and mechanism actuated by the traveling carriage to connect the normally idle means to the motor to render the normally idle means active to adjust the reversing gears to cause the traveling carriage to reverse its direction of movement.

33. In a machine of the class described, the combination of a constantly acting power device non-positive in action; a motor to operate said device; a laterally shiftable element adapted to be moved in either of two directions by the power device; a reversible power transmitting contrivance for connecting the power device to the element; means to adjust the reversible power transmitting contrivance to reverse the direction of power transmission; and means controlled by the element, near the limit of its movement in either direction, to connect the adjusting means to the motor to cause the adjusting means to adjust the contrivance to cause the power transmitting contrivance to be actuated to reverse the direction of movement of said element.

34. In a machine of the class described, having a traveling carriage adapted to be moved from an initial position in a working direction and returned to initial position, a continuously running motor; a transmission shaft; reversing gears free on the transmission shaft and connected to the carriage; clutch members rotatable with the shaft; means to alternately move the clutch members into and out of engagement with the reversing gears to alternately connect said gears to the shaft; a hydraulic device forming a fluid connection between the shaft and the motor to impositively urge the carriage in either its working or return direction; means to hold the carriage against movement in working direction, irrespective of the action of the hydraulic device; and means to release the holding means to permit movement of the carriage; in combination with means rendered effective when the carriage nears the terminus of its movement to connect the moving means for the clutch members to the motor to operate the moving means to reverse the movement of the carriage by action of the hydraulic device to return the carriage to initial position, said means also adapted to be rendered effective when the carriage nears the terminus of its return movement to again operate the moving means to reverse the movement of the carriage by action of the hydraulic device to cause said hydraulic device to again urge said carriage in its working direction.

35. In a machine of the class described, the combination of a traveling paper carriage; a power means; connections between the power means and the carriage to move the carriage in working direction and reversely; and means controlled by the carriage and operated by other connections to the power means to cause said first-named connections to reverse the movement of the carriage.

36. In a machine of the class described, the combination of a traveling paper carriage; a power means; connections between the power means and the carriage to move the carriage in working direction and reversely; means operated directly by other connections to the power means to operate certain elements of said first-named connections to cause said first-named connections to reverse the movement of the carriage by the power means; and means operated by the carriage to render the directly operated means operable.

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