E. THOMAS.

TYPE WRITING MACHINE.

APPLICATION FILED JULY 6, 1917.

**1,292,152.**

Patented Jan. 21, 1919.

4 SHEETS—SHEET 1.

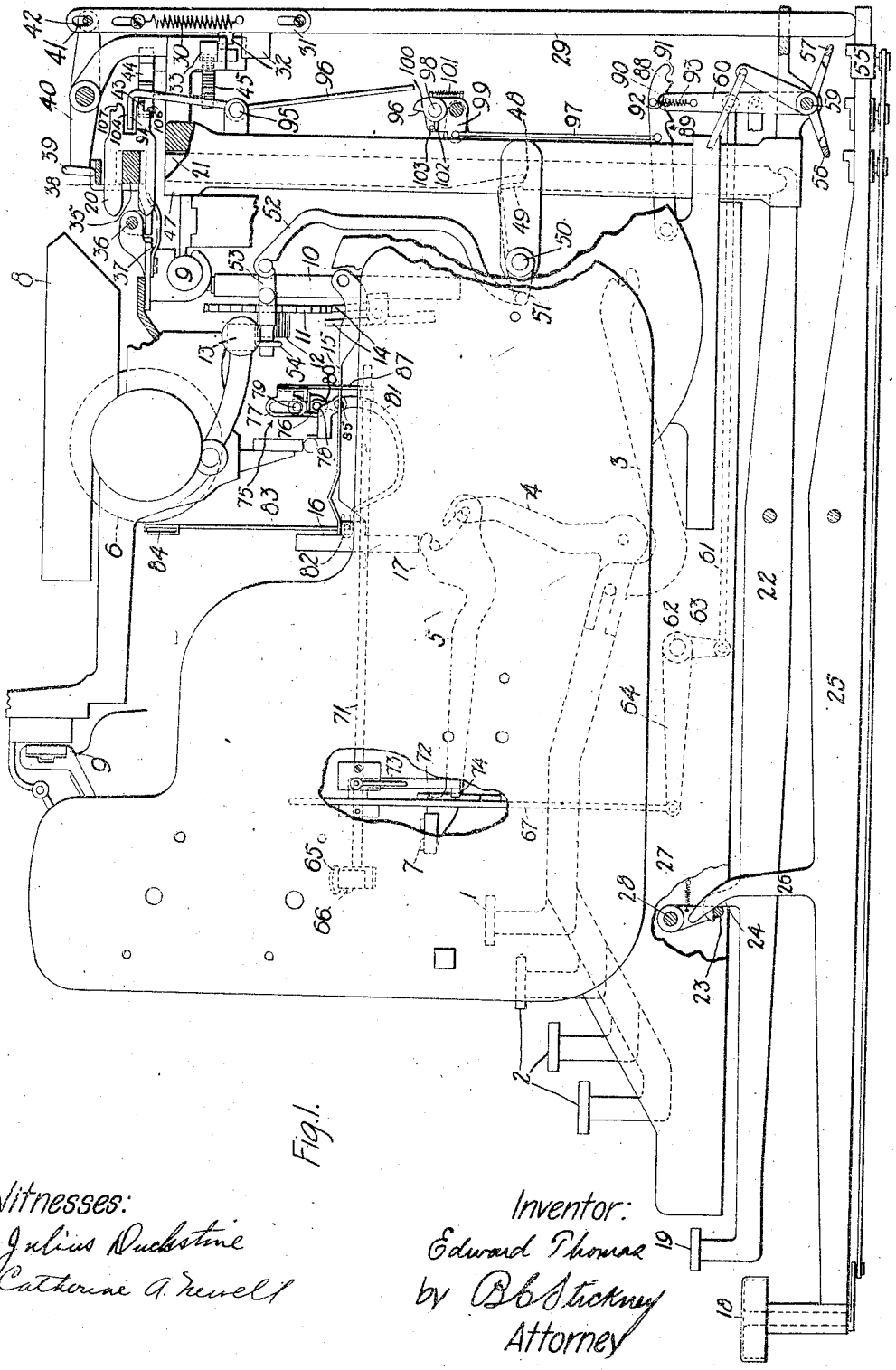

Fig. 1.

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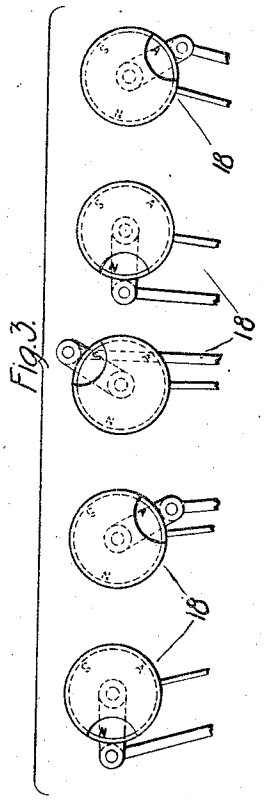


Fig. 3.

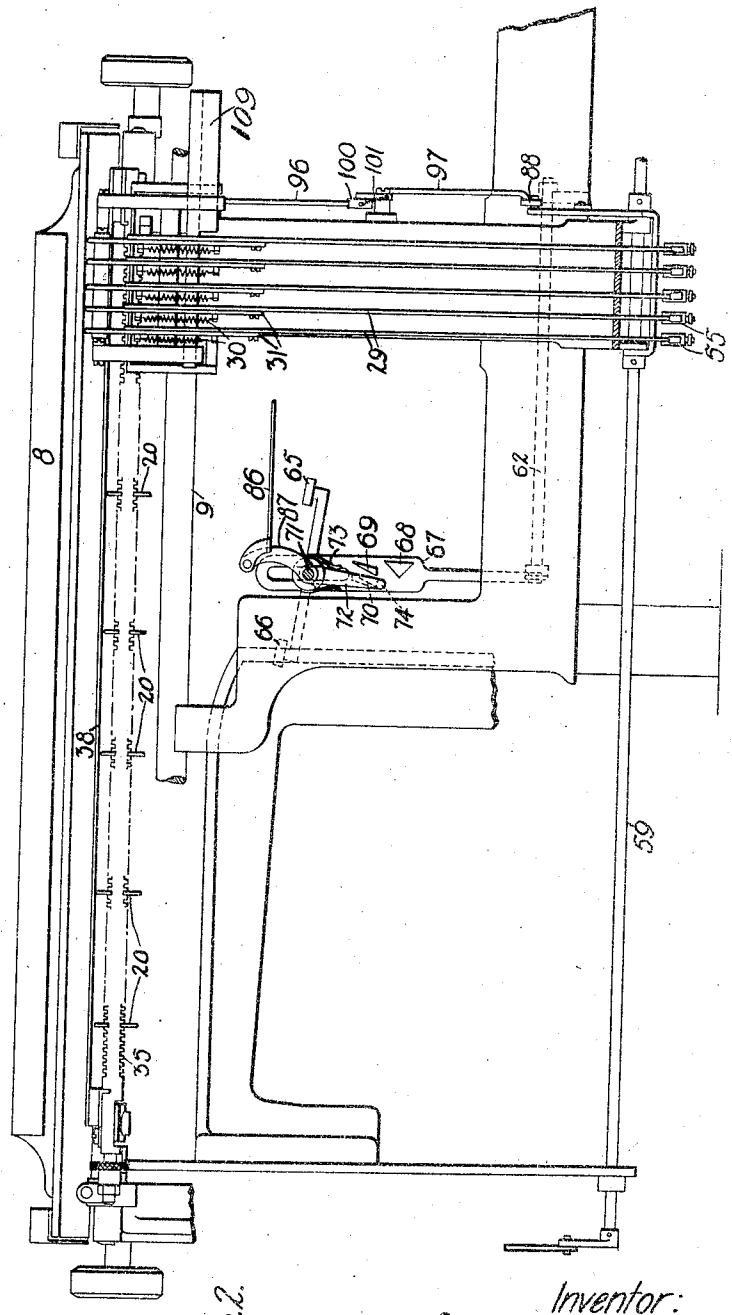


Fig. 2.

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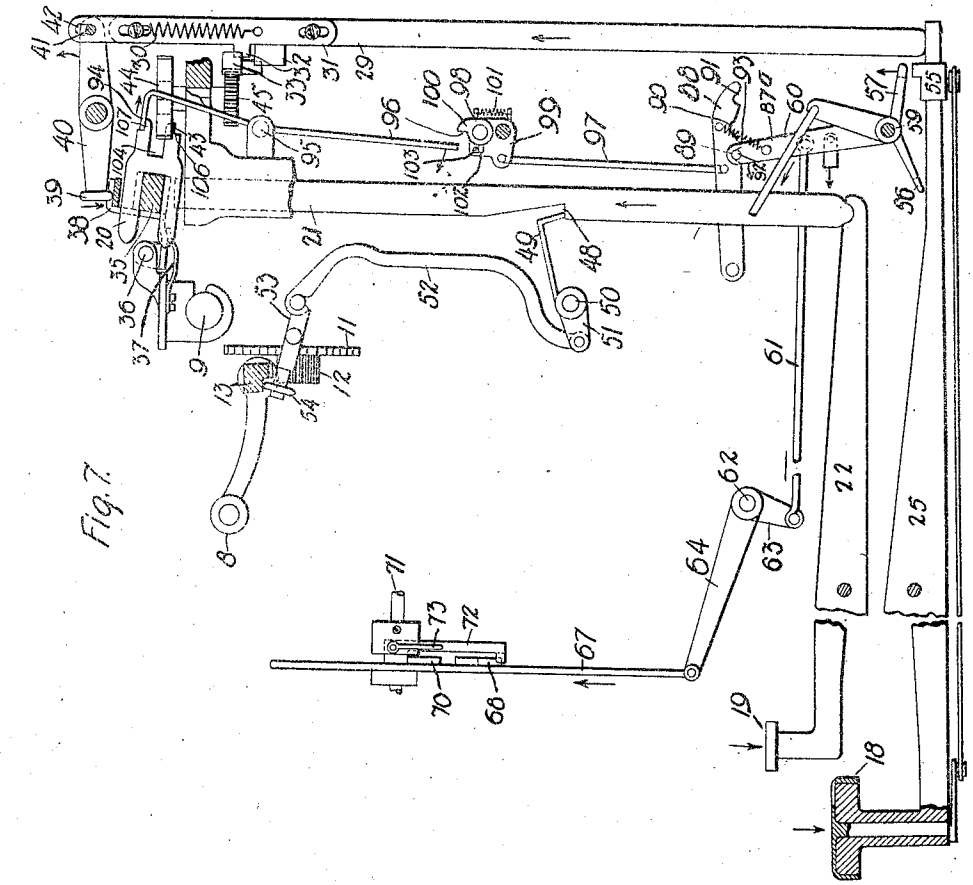

Fig. 7.

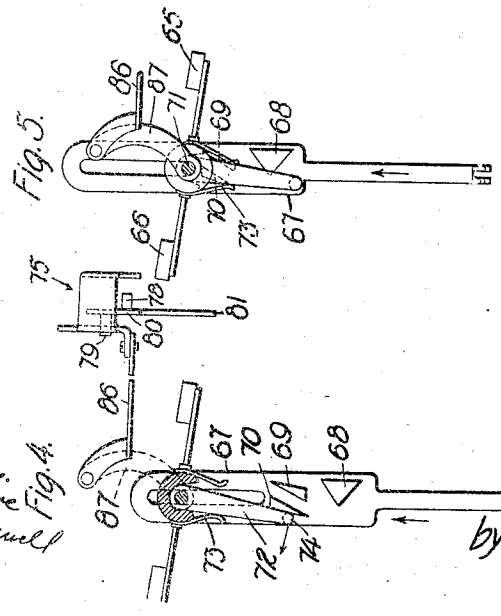

Fig. 5.

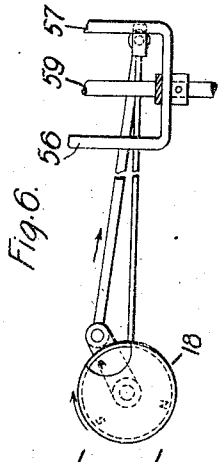

Fig. 6.



Fig. 4.

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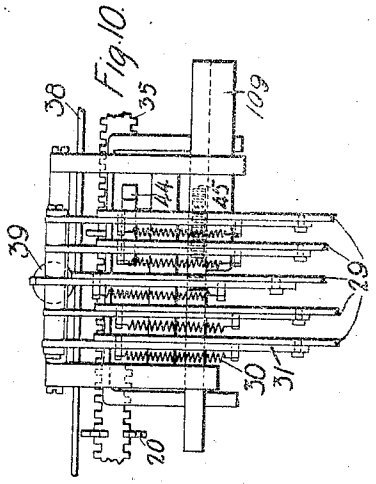


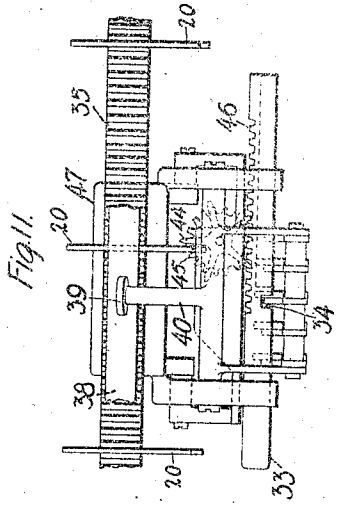


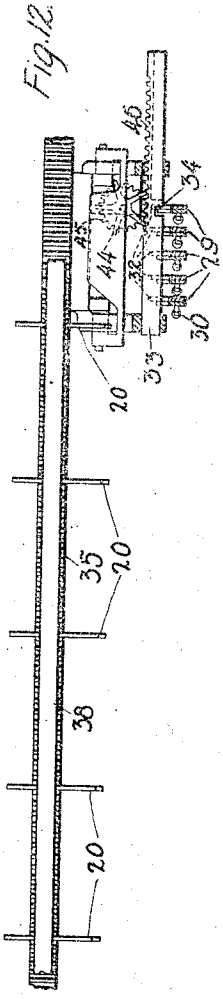


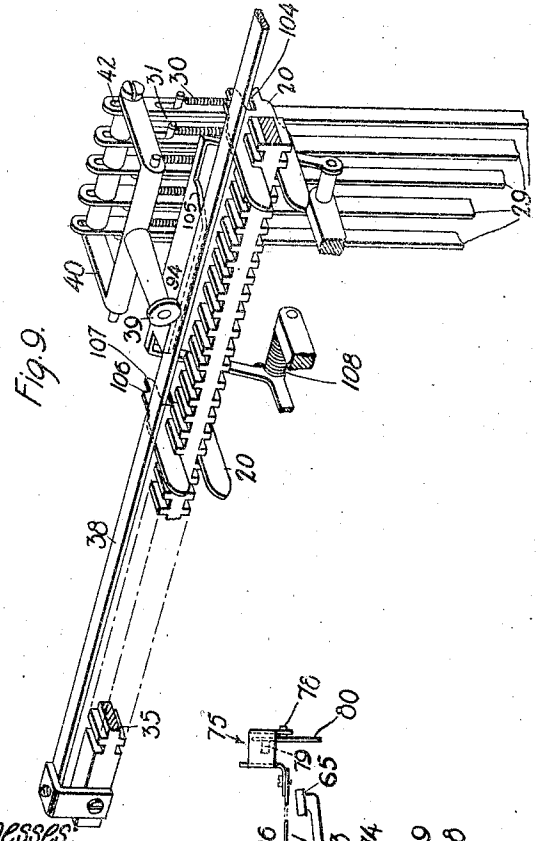


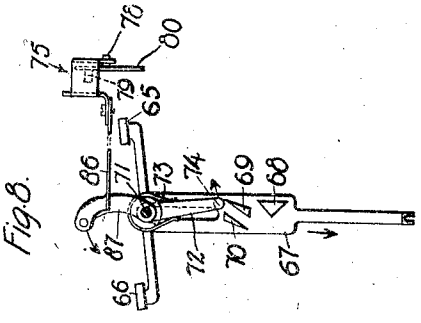


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# UNITED STATES PATENT OFFICE.

EDWARD THOMAS, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO UNDERWOOD COMPUTING MACHINE COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

## TYPE-WRITING MACHINE.

1,292,152. Specification of Letters Patent. Patented Jan. 21, 1919.

Original application filed August 1, 1913, Serial No. 782,391. Divided and this application filed July 6, 1917. Serial No. 178,892.

*To all whom it may concern:*

Be it known that I, EDWARD THOMAS, a citizen of the United States, residing in New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

My invention relates to typewriting machines, and is herein disclosed as applied to an Underwood typewriting machine, having incorporated therein certain of the column-selecting devices disclosed in the patent to Wernery, No. 1,108,415, dated August 25, 1914.

One of the objects of the present invention is to provide means whereby the typewriting machine may automatically become effective to write in a predetermined color, in any selected column, and also to provide means whereby, after the typewriting machine thus becomes effective to write in such column, the color of the writing may be changed at the will of the operative, irrespective of the previously determined setting. To effect this result, I provide that the pivoted column stop rack bar in the Wernery patent, after being swung to effective position, may be held in said position by suitably formed coöperating column stops, and that the means for setting and holding said column stops in this effective position may also be effective to shift and then maintain the printing color of the typewriter, unless the color is otherwise manually selected independently later.

For shifting the ribbon color, I have found it convenient to provide shiftable indicators on the column-selecting keys, which may be settable to indicate the color selected, with the result that, when any key is depressed, it will thereby select the proper color, and the column-selecting stop may be effective to maintain said setting as described above.

This application is a division of my copending application No. 782,391, filed August 1, 1913.

Other features and advantages will hereinafter appear.

In the accompanying drawings,

Figure 1 is a sectional side view of an Underwood typewriting machine, showing my invention as applied thereto.

Fig. 2 is a rear view of the same.

Fig. 3 is a plan view of the column-selecting keys.

Fig. 4 is a view of the typewriter ribbon-shifting mechanism in the act of being shifted from a manual setting to black in a column where it would ordinarily write red.

Fig. 5 is a view of the same at the completion of its movement.

Fig. 6 is a diagrammatic view, showing the connection between the shiftable cap of a column-selecting key and ribbon-shifting device.

Fig. 7 is a sectional side view, largely diagrammatic, showing the ribbon being shifted into the position seen in Fig. 5.

Fig. 8 is a view similar to Fig. 5, but showing the ribbon-shifting device shifted to the opposite extremity of its throw.

Fig. 9 is a perspective view of part of the column-selecting mechanism.

Fig. 10 is a rear view of the same.

Fig. 11 is a plan view of the same.

Fig. 12 is a view showing the parts at Fig. 11 on a smaller scale, and in section, in part, on a lower level.

In the usual Underwood typewriting machine, numeral keys 1 and alphabet keys 2 depress key levers 3, rocking elbow levers 4 forwardly so as to thereby swing type-bars 5 upwardly and rearwardly against a platen 6, so as to cause type 7 on said type-bars 5 to print on a work-sheet passed around the platen 6. Said platen is mounted in a carriage 8 which travels on rails 9, being drawn by a spring-barrel 10, and its travel is controlled by an escapement wheel 11 connected to a pinion 12, which pinion meshes with a rack bar 13 attached to the typewriter carriage. Said escapement wheel is controlled by dogs 14, said dogs being rocked by a frame 15 forming part of a universal bar 16, said universal bar being operated by heels 17 on the type-bars every time a type prints on the platen 6.

In order to rapidly position the typewriter carriage 8 at any desired column, there are provided column-selecting keys 18

and decimal-selecting keys 19, which, by their conjoint action, are adapted to release the typewriter carriage and cause it to travel forward freely until the carriage is arrested by a column stop 20, which is intercepted by a projected counter stop 21. To effect this, the decimal-selecting keys 19, when depressed, swing down their key-levers 22, thus raising the counter stops 21, there being one counter stop 21 for each key 19. These keys and counter stops may be of the usual Underwood construction.

The decimal-selecting keys 19 are, however, normally locked against depression by means of a universal bail 23, which underlies all the hooks 24, there being one hook on each key-lever 22. The depression of any column-selecting key 18, however, is adapted to release all the decimal keys 19, and for this purpose, the key-lever 25 for each column-selecting key 18 is provided with a camming extension 26, which, when a key 18 is depressed, cams forwardly the bail 23 carrying it clear of all the hooks 24, with the result that when any column-selecting key 18 is depressed, any decimal-selecting key 19 may thereafter be depressed.

The bail 23 is normally held in place by a spring 27, and is pivoted on the sides of the machine at 28. When any column-selecting key 18 is depressed, it tends to move the stops 20 within the range of the counter stops 21, said stops 20 being normally out of the reach of said counter stops. To effect this, each column-selecting key 18 has resting on the rear end of its key-lever 25 a plunger 29, to which is fastened the upper end of a spring 30, the lower end of said spring being attached to a slide 31, so that the depression of any column-selecting key 18 will tension its spring 30 and tend to move its slide 31 upwardly.

The slides 31 are, however, normally kept against moving upwardly, because they have lugs 32, which underlie a column-selecting slide 33, said slide 33, however, being slotted at 34 (Fig. 12), to permit any lug 32 to slip therethrough when the slide 33 is in the proper position. Said slide 33 acts as a column-selecting device, and is adapted to position its slot 34 so as to permit the proper lug 32 to rise upward when the typewriter carriage arrives at the proper column, when the slipping upward of the lug 32 causes the column stops 20 to immediately move within the range of the counter stops 21. To effect this, the column stops 20 are mounted on a rack bar 35, which is pivotally mounted at 36 on the typewriter carriage, and is normally held upward by a flat spring 37 so as to hold the stops 20 clear of the counter stops 21. When, however, any lug 32 slips into the slot 34, its spring 30 overcomes the spring 37, thus moving the stops 20 downwardly, in the manner described above.

To permit this to be done, the rack bar 35 carries a plate or rail 38 on which runs idly a roll 39, said roll being mounted on the front end of a lever 40 of which the rear end carries a bail 41, said bail extending through a slot 42 in every slide 31, with the result that when any slide 31 moves upwardly it catches the bail 41, raising said bail and swinging down the roll 39, thus causing the roll to depress the column-stop bar 35. Thus, it will be seen that any column-selecting key 18 may be fully depressed to release the decimal-selecting keys 19, but that the column-selecting key 18 does not become effective until its spring 30 becomes effective.

In order to properly position the notch 34, to cause it to release the proper lug 32 at the right column in the travel of the typewriter carriage, the slide 33 is adapted to be moved intermittently by the typewriter carriage; this being effected by rearward extensions 43 on the column stops 20. These extensions, during the travel of the typewriter carriage, engage the teeth of a star wheel 44 to turn that wheel intermittently, with the result that the wheel 44 is turned identical distances by every stop-bar extension 43. Said star wheel 44 is fast to a pinion 45, which meshes with a rack bar 46 forming part of the slide 33, with the result that every time a stop 20 carries its extension 43 past the star wheel 44, it moves the slide 33 one step, thus shifting the slot 34 from its position opposite one lug 32 to a position opposite the next lug 32. Thus, it will be seen that the slide 33 selectively releases the lugs 32, permitting any lug which is tensioned upwardly by its spring 30, to be released at the proper time.

In order to provide that the lugs 32 shall be freed at the right time, the star wheel 44 is positioned near one side of the usual casing 47 (Fig. 11), in which the counter stops 21 are placed; this being done to insure that the slide 33 will only be moved when no column stop 20 is above the counter stops 21.

In order to release the typewriter carriage to permit it to travel along until it is arrested by the stop 20, the usual Underwood escapement-release mechanism may be utilized. This includes a heel 48 on each counter stop 21, each heel engaging a short universal bar 49, pivoted at 50, having a forward extension 51, with the result that when any counter stop 21 is raised by depression of its key 19, the extension 51 is depressed, drawing down the usual link 52 to rock the usual pivoted lever 53, thus causing a roll 54 on the front end of said lever to lift the rack bar 13 out of the pinion 12, with the result that the spring-barrel 10 draws the typewriter carriage freely to the left until arrested by a column stop 20 coming into contact with a counter stop 21.

Whenever a column-selecting key 18 is de-

pressed, it not only releases the decimal-selecting keys 19, but also may be effective to shift the typewriter-ribbon mechanism, to cause it to write in one or another of two selected colors. For this purpose, each column-selecting key-lever 25 has at its rear end a shiftable lug or interponent 55, which is adapted to be positioned under one or the other end of a double bail having arms 56 and 57.

The bail 56, 57 is fast to a rock shaft 59 to which also is fast a rock arm 60, said rock arm pivoted to a forwardly-extending link 61 which is adapted to rock a rock shaft 62 by means of a rock arm 63, so that a second rock arm 64 on said shaft 62 will operate a bichrome-ribbon mechanism including keys 65 and 66 of about the usual form. For operating the keys 65 and 66, there is provided a shiftable cam plate 67 pivotally connected to the rock arm 64, so that it will have an up-and-down motion, and cams 68, 69 and 70 thereon will be able to rock the shaft 71, to which the keys 65 and 66 are fast. To do this, there is provided an arm 72 having a limited rocking motion on the shaft 71 and held normally at right angles to the plane of the keys 65 and 66 by means of a fairly strong spring 73. This spring 73 permits the arm 72 to rotate the shaft 71 and at the same time to be overthrown with respect to said shaft, thus permitting the cams 68, 69 and 70, if necessary, to overthrow the arm 72 without wrecking the bichrome mechanism.

The cam 68 is adapted to depress the key 65 no matter which way the cam plate 67 is shifted. To effect this, the cam 68 is formed as an isosceles triangle having its apex near the medial line of the plate 67. The cam 70 is so formed that the cam plate 67, in moving from the Fig. 2 position to the Fig. 8 position, will shift the arm 72 to the right, thus depressing the key 66. The cam 69 is so formed as to reverse the action of the cam 70 when the cam plate 67 is moved in the reverse direction. To permit these actions, the arm 72 has a pin 74 acting as a follower to run on the face of the cams. In order to permit the cam plate 67 to rise, as shown in Fig. 4 with the arm 72 already at its left-hand position, it is necessary to permit the arm 72 to be overthrown, and it is to permit this overthrow that the spring 73 is included in the connections.

The bichrome shaft 71 is herein shown as operating the usual Underwood bichrome mechanism. This mechanism includes the usual shiftable actuator 75 on the universal bar 16, said actuator having two slots 76 and 77 which are adapted to alternatively engage, respectively, actuating pins 78 and 79, which are fast on an upwardly-projecting arm 80 of a ribbon actuator 81, with the result that every rearward motion of the universal bar 16 rocks the actuator 81 to swing its front end 82 upwardly, thus lifting a ribbon carrier 83, so that a ribbon passing through slot 84 of the ribbon carrier will be raised to the printing point.

Since the pin 78 is relatively close to pivot 85 of the actuator 81, it will give the actuator a large throw and cause it to raise the lower stripe of a ribbon in the slot 84 into effective position. If, on the other hand, the upper pivot pin 79 engages the actuator, the ribbon carrier is given a smaller throw, with the result that only the upper stripe of the ribbon is raised to the printing point. Thus, the ribbon may comprise two stripes of different colors, the lower one usually being red, with the result that the ribbon causes the machine to print red whenever the actuator 75 is shifted to the appropriate position to cause said action.

For shifting the actuator 75, there is provided the usual link 86, which is pivoted to the usual rock arm 87 at the rear end of the rock shaft 71 on which keys 65 and 66 are mounted.

In order to hold the ribbon at a selected color, after being so positioned, there is provided an extension 87[a] of the rock arm 60, which is adapted to be detained in any one of three positions, thus holding the ribbon-bichrome mechanism in any one of three positions; two of these positions being usually for writing in black, and one for writing in red. The detaining means herein illustrated include a detent arm 88, which is pivoted on the framework of the typewriter carriage, and is provided with three notches 89, 90 and 91, any one of which is adapted to engage a pin 92 on the extension 87[a], the one engaged depending upon the position of the rock arm 60.

In order to hold the notches 89, 90 and 91 in effective position to detain the rock arm 60, a spring 93 is connected to both the extension 87[a] and to the detent arm 88, constantly tending to draw them together with the result that when the pin 92 sets itself in any of the notches 89, 90 or 91, it will be held there unless forcibly moved away. Thus the ribbon mechanism when set to write in a different color, will remain continually at that color until released.

Since it is desirable to release the color printing mechanism at the end of a column, there is provided for accomplishing this, a column determining plate 94 which is pivoted on the frame of the machine at 95 and is adapted to catch over a depressed column stop 20, with the result that the plate 94 holds the column stop bar 35 downward until the column stop 20, which is effective to catch the plate, passes beyond said plate. Then the stop escapes from it and the column stop bar rises. To the plate 94 there is fastened a downwardly-projecting arm 96

which is adapted to control the detent arm 88 in such a way that when the plate 94 releases the stop 20 which it has been holding, it lifts the detent arm 88 and allows the spring 93 to return the ribbon controlled mechanism to its normal central position in which the rock arm 60 stands vertically, as seen in Fig. 1. To attain this result, the detent arm 88 is pivotally connected by a link 97 to a one-way dog 98 which is adapted to be struck by the projection 96 when the plate 94 escapes from the stop 20. The connections are such, that the one-way dog 98 when thus struck, lifts the detent arm 88, thus permitting the spring 93 to become effective. The one-way dog 98 is herein shown as including a body 99 on which is pivoted a catch 100 which is normally held in the vertical position seen in Fig. 7, by a spring 101, thus holding a tail 102 against a pin 103 on the body 99. The structure is such that the projection 96, in swinging rearwardly from the position seen in Fig. 7, will strike against the pivoted catch 100 which is prevented from turning on the body 99, and therefore turns the body 99 on its pivot, lifting the detent arm 88. The normal position of the projection 96 is seen in Fig. 1. In order to enable the stops 20 to pass idly by the holding plate 94, each stop is slotted at its rear end at 104.

As the typewriter carriage travels along in being brought to a given column by the column-selecting keys, the stops 20 would tend to strike the edge of the plate 94, thereby blocking the typewriter carriage. To prevent this, the right-hand edge of the plate 94 is formed as a cam 105 (Fig. 9), which is adapted to catch against an edge 106 on each column stop and to overlie a rearward projection 107 on the column stop, this latter projection serving to catch under the plate 94 and thereby hold the column stop and column-stop bar down. When any stop releases the plate 94, said plate is swung forwardly by means of a comparatively strong spring 108, said spring serving to drive the projection 96 of the plate rearwardly with enough strength to release the detent 88 in the manner described above.

The mechanism so far has been described as one for automatically making a given color of the typewriter ribbon effective. The typewriter ribbon may, however, be made effective to print in another color after having been automatically set in the manner described above. For this purpose, the pin 74, unless actually being shifted always stands clear of each cam 68, 69 and 70, with the result that the pin can be freely moved by depressing either of the keys 65 or 66, if it is desired to shift the ribbon color manually. Thus the mechanism provides means whereby the selection of the ribbon color may be normally ineffective, may become automatically effective by operation of the column-selecting keys, or after being automatically selected, may be manually altered. In order to prevent the depression of a column-selecting key, after the typewriter carriage has passed the column at which the key might properly be operable, the slide 33 is provided with a lug or projection 109, extending leftwardly from the slot or notch 34. This projection is of such a size that it passes just above the lugs 32, with the result that after the slot 34 has passed any lug 32, the projection 109 stands just above the lug, and, by blocking the movement of the lug, locks its key.

Variations may be resorted to within the scope of the invention, and portions of the improvements may be used without others.

Having thus described my invention, I claim:

1. In a typewriting machine, the combination with column-selecting keys, of settable means associated with each column-selecting key for determining whether the typewriting mechanism shall write red or black.

2. In a typewriting machine, the combination with a traveling carriage and column-selecting keys therefor, of a polychrome ribbon, and means including a device mounted on each column-selecting key for determining in what color the typewriter shall write in the column selected by the key operated.

3. In a typewriting machine, the combination with a traveling carriage and identical stops settable thereon, of means for arresting said carriage by said stops, said stops being normally in an ineffective position, column-selecting keys, a connection between said column-selecting keys and said stops for moving the stops to effective position when they approach the column selected by the key operated, a polychrome ribbon for said machine, and means including a device settable on each column-selecting key for determining in what color the typewriter shall write in a given column.

4. In a typewriting machine, the combination with a traveling carriage and column-selecting keys, of levers for said keys, an interponent settable on each of said levers, and means on each key for setting said interponent.

5. In a typewriting machine, the combination with column-selecting keys, of a traveling carriage, and means for preventing the operation of any column-selecting key after said carriage has passed the column which the column-selecting key is adapted to select.

6. In a typewriting machine, the combination with column-selecting keys and means associated with said keys for determining the color in which typewriting should be done, of a traveling carriage, and means for preventing the operation of any

column-selecting key after said carriage has passed the column which the column-selecting key is adapted to select.

7. In a typewriting machine, the combination with column-selecting keys and means associated with said keys for determining the color in which typewriting should be done, of a traveling carriage, and means for preventing the operation of any column-selecting key after said carriage has passed the column which the column-selecting key is adapted to select, the connections between the column-selecting keys and the ribbon mechanism being such, that after the ribbon mechanism has been set by a column-selecting key, it may be manually altered irrespective of such setting.

8. In a typewriting machine, the combination with a traveling carriage and column stops therefor, of keys for selecting columns in the travel of said carriage by said stops, a color-controlling mechanism for said typewriter, means controlled by said stops for determining the length of column over which a given color shall be selected, and means whereby said column keys determine the selected color.

9. In a typewriting machine, the combination with a traveling carriage, of column-selecting keys for positioning said carriage, a color-controlling mechanism for said typewriting machine, means associated with each column-selecting key for setting said color-controlling mechanism, a catch for holding said mechanism in whatever position it is set, and a device for releasing said catch when the typewriter passes beyond a predetermined column.

10. In a typewriting machine, the combination with column-selecting keys, of a color-controlling mechanism for the typewriter, a cam-plate, a series of cams on said plate, a follower adapted to be operated by said cams for changing the color-printing mechanism, means operated by a column-selecting key for variably shifting said plate, and a device settable to determine how said key shall position said plate, said cams shifting said follower in passing from one position of rest of the cam-plate to another, and adapted to permit the follower to be shifted independently of the cams in the position of rest of the cam-plate.

11. In a typewriting machine, the combination with column-selecting keys, of color-controlling mechanism for the typewriting machine, a follower for operating said color-controlling mechanism, a cam-plate adapted to be shifted, and including cams for moving said follower while being shifted, connections from said column-selecting keys for variably shifting the cam plate, and devices settable on said keys to determine how any column-selecting key shall shift said cam-plate when operated, said cam-plate adapted in a position of rest to permit the follower to be adjusted independently of the cams.

12. In a typewriting machine, the combination with a bichrome mechanism including manual-setting means, of a cam plate including several cams for automatically setting the bichrome mechanism in accordance with the travel of the typewriter carriage, keys forming part of said manual-setting means, and a follower on which said cams are effective to do the setting during their shifting, said follower normally lying between said cams in any set position, so that the manual setting means may be operated.

13. In a typewriting machine, the combination with a polychrome mechanism, of means for setting said mechanism at the travel of the typewriter carriage, a catch for holding it set, and means for releasing said catch by the travel of the typewriter carriage.

14. In a typewriting machine, the combination with a traveling carriage and polychrome mechanism for writing selectively in columns determined by said carriage, of column-selecting keys for setting said polychrome mechanism, and a carriage-controlled catch for releasing said mechanism.

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