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TOTALIZER SELECTING ASSEMBLY

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3 Sheets-Sheet 1

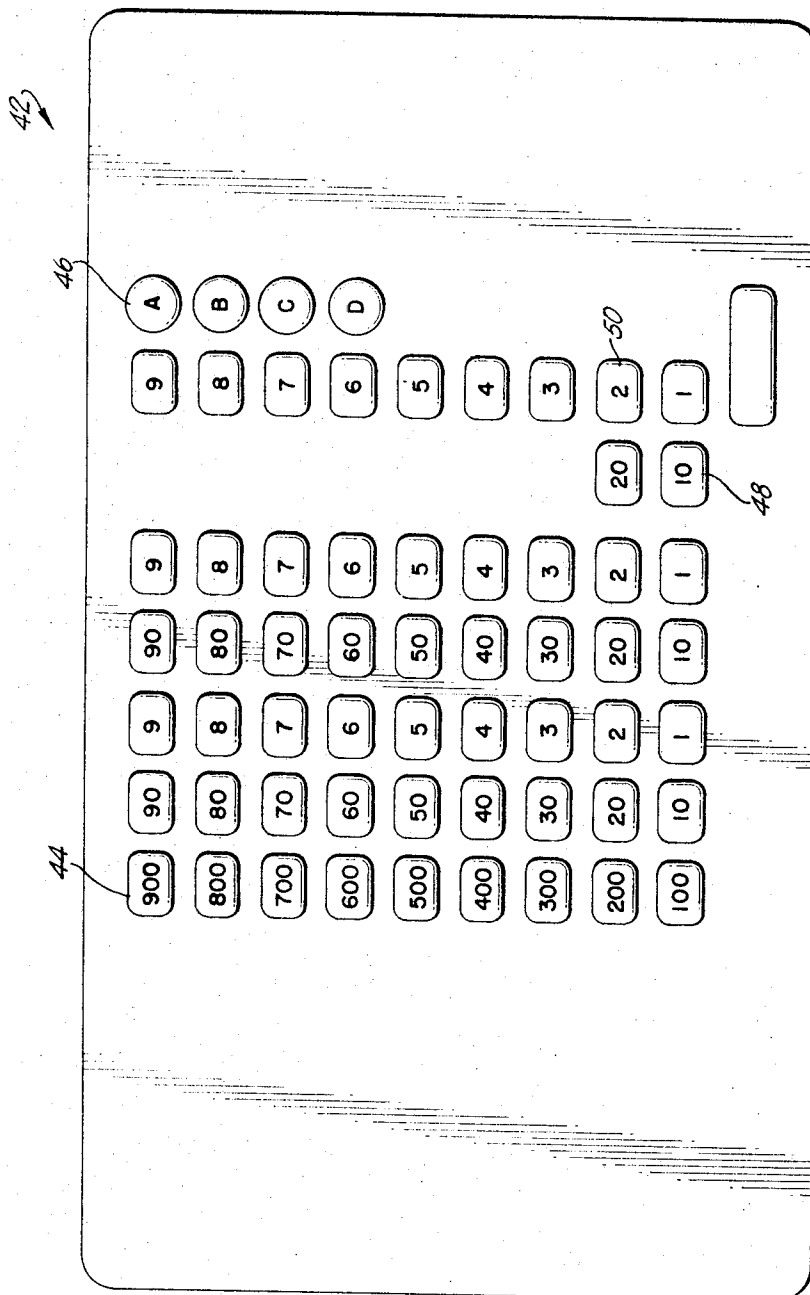


Fig. 1

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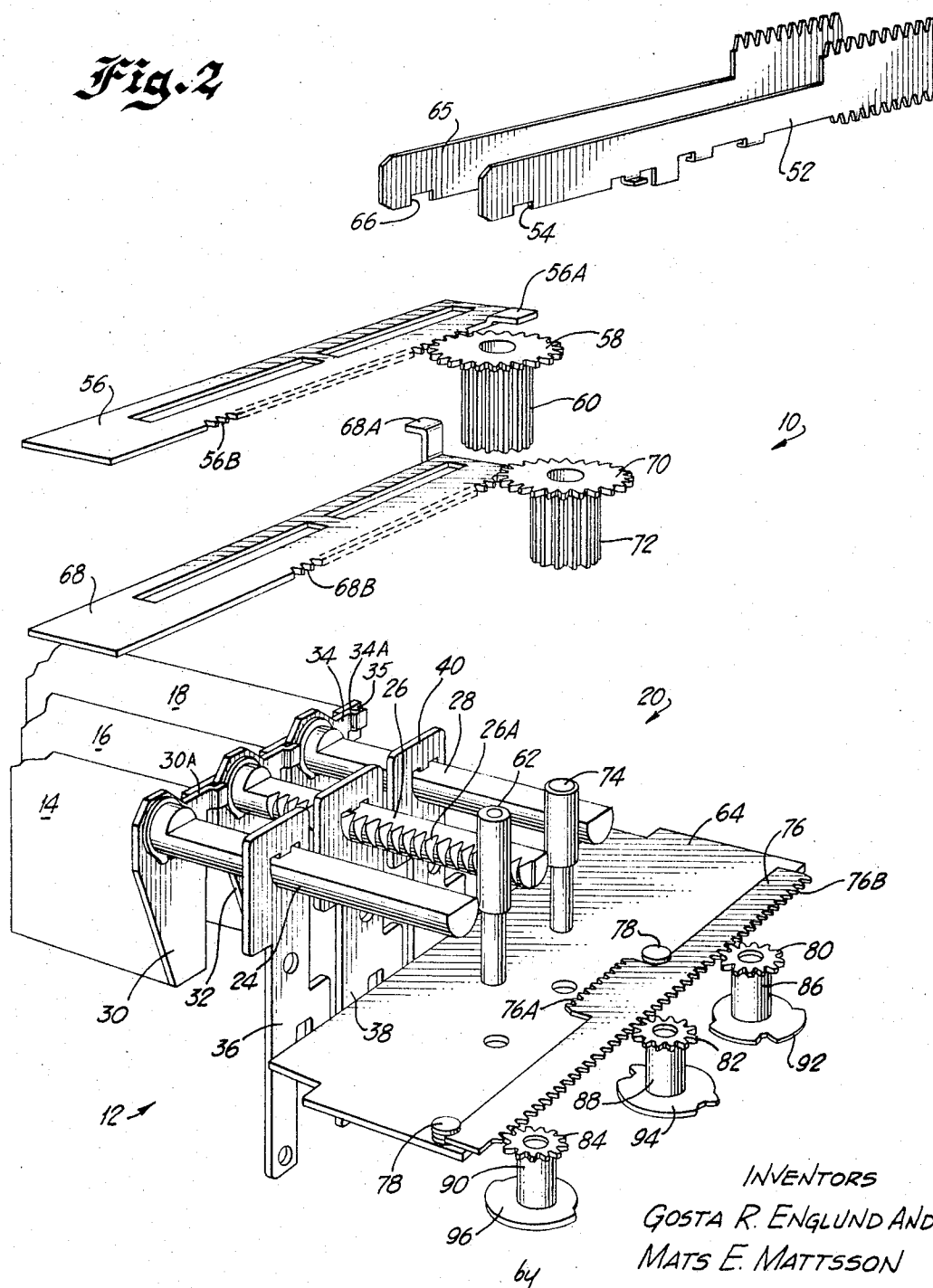
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3 Sheets-Sheet 2



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3,362,631

## TOTALIZER SELECTING ASSEMBLY

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This invention relates to an accounting machine, and more particularly, to a new and improved totalizer selecting assembly for an accounting machine.

Accounting machines, such as cash registers, commonly include a number of totalizers which are selected during the cyclic operation of the machine to receive or transmit value representations. As an example, some cash registers include a group of separate totalizers mounted on a single shaft, and the shaft is shifted axially to place the totalizer elements of a single totalizer in a position in which they can be coupled to value setting and receiving elements, commonly differentially settable elements. This arrangement suffers from the deficiency that the number of different sets of totalizer elements that can be carried on a single shaft without unduly increasing the overall length of the shaft and also the size of the cash register housing are restricted. The length of movement required to effect the selection of one of the sets when a large number are carried on a single shaft also becomes unduly large. However, it is desirable and even necessary in some applications to be able to provide a number of separate totalizers that is much larger than can be carried on a single shaft, commonly ten, and to be able to effect a selection of one of the totalizers within a single operating cycle without allotting a greater than normal portion of the machine operating cycle to the selection of totalizers.

Attempts have been made in the past to provide arrangements possessing the capability of selecting one totalizer from a large number thereof. One such arrangement is shown in Swedish Patent No. 190,951 wherein the individual totalizers each includes an individual shaft, and groups of the shafts are carried on different rotatable drums. These drums are rotated to select a group of totalizers, and a single one of the selected group of totalizers on the different drums is then coupled to the setting means. However, this construction also requires an excessive amount of space.

Accordingly, one object of the present invention is to provide a new and improved accounting machine.

Another object is to provide an accounting machine including new and improved totalizer selecting means.

A further object is to provide an accounting machine including new and improved means for selecting a desired totalizer from a large group thereof.

A further object is to provide a new and improved totalizer selecting assembly in which a plurality of totalizer groups each containing a number of individual totalizers is commonly moved in a first direction in accordance with a first item of selecting information and one of the groups is individually moved in a second direction in accordance with a second item of totalizer selecting information.

A further object is to provide a new and improved totalizer selecting assembly in which a plurality of totalizer shafts each carrying a plurality of individual totalizers is moved axially to select individual totalizers on all of the shafts and one of the shafts is then shifted to couple the totalizer on only this one of the shafts to the setting means.

In accordance with these and many other objects, an

embodiment of the invention comprises an accounting machine or cash register including a plurality of totalizers. The totalizers are divided into groups, and each group of totalizers numbering, for instance, ten, is carried on a single totalizer shaft. A supporting structure is provided for the totalizer shafts by which the shafts are all coupled for common axial movement, and each shaft is capable of individual movement in a direction generally transverse to the direction of axial movement.

To provide means for selecting a single one of the plurality of totalizers, the cash register includes two manually settable means, each providing a separate item of totalizer selecting information. In a typical construction in which the totalizers are individually identified by two digit decimal designations, the tens and units digits of identified designation provide two separate items of selecting information. One assembly is controlled by the setting of the manual means representing the value of the units digit to produce a corresponding axial movement of all of the totalizer shafts so that one set of totalizer elements on each of the shafts is moved to a position in which it can be coupled with the value receiving or setting means, commonly differentially settable amount assemblies in the cash register. A second control assembly is set by the second item of totalizer selecting information, such as the tens digit of the designation of the desired totalizer, to shift a single one of the axially adjusted totalizer shafts upwardly to couple the previously selected totalizer on this totalizer shaft to the value setting means. In this manner, by commonly adjusting all of the totalizer shafts in an axial direction and by then elevating a selected one of the totalizer shafts, a selected one of a large number of totalizers can be selected and coupled to the value setting and receiving means.

Many other objects and advantages of the present invention will become apparent from considering the following detailed description in conjunction with the drawings in which:

FIG. 1 is a schematic top plan view of a keyboard for a cash register embodying the present invention;

FIG. 2 is an exploded perspective view of a totalizer selecting assembly embodying the present invention; and

FIG. 3 is another exploded perspective view illustrating a totalizer shaft elevating mechanism included in the selecting assembly.

Referring now more specifically to the drawings, therein is illustrated a totalizer selecting assembly indicated generally as 10 (FIG. 2) which embodies the present invention and which is adapted for use with accounting machines such as cash registers. The assembly 10 is controlled by totalizer selecting data items to select a particular one of a plurality of totalizers in a totalizer assembly 12 which includes three totalizer lines 14, 16, and 18 each consisting of a plurality of individual totalizers. The assembly 10 includes a first control or selecting assembly indicated generally as 20 (FIG. 2) which shifts all of the totalizer lines 14, 16, and 18 axially in accordance with a first item of totalizer selecting information. This movement places a single totalizer on each of the three lines 14, 16, and 18 in a position in which it can be coupled to the value setting means. The assembly also includes a second control assembly indicated generally as 22 (FIG. 3) which is controlled by a second item of totalizer selecting information to shift a selected one of the totalizer lines 14, 16, and 18 relative to the remaining lines to place the previously selected totalizer thereon in a coupled relation with the value setting elements.

Although the assembly 10 can be used with accounting machines or cash registers of many different types, the assembly 10 is illustrated and described with reference to

the cash register shown in application Ser. No. 179,595, filed Mar. 14, 1962, now Patent No. 3,263,915. The construction of the totalizer assembly 12 is substantially identical to that disclosed therein, and a substantial part of the control assemblies 20 and 22 is also identical to that shown and described in detail therein. Accordingly, only a brief description of these known components is included herein.

The construction of the totalizer assembly 12 (FIG. 2) is substantially identical to that shown and described in the above-identified disclosure and includes the three totalizer lines 14, 16, and 18. Each of these totalizer lines includes, for instance, ten separate totalizers each comprising a group of totalizing elements. The elements in the lines 14, 16, and 18 are mounted on a corresponding one of three totalizer shafts 24, 26, and 28. The totalizer lines 14, 16, and 18 include end plate structures 30, 32, 34 which overlap each other and which include overlapping lugs or offset projections, such as the projection 30A on the end plate 30, to couple the three totalizer lines 14, 16, and 18 for common movement along the axis of the totalizer shafts 24, 26, and 28 while permitting individual reciprocating or vertical up and down movement of each of the totalizer lines 14, 16, and 18 or their related shafts 24, 26, and 28. This coupling for obtaining common axial movement and individual vertically directed up and down movement is best illustrated by the structure of a projection 34A on the end plate 34 which projection is not used for coupling in the illustrated machine. The projection 34A defines a slot 35 in which the edge of an adjacent end plate could be received for sliding vertical movement. Thus, the left-hand edge (FIG. 2) of the end plate 32 is received in the slot in the projection 30A, and the slot in the projection on the end plate 32 slidably receives the left-hand edge of the end plate 34. In other words, the totalizer line 14, for instance, can be moved upwardly and downwardly relative to the axis of the shaft 24 independently of any corresponding movement of the totalizer lines 16 and 18.

To provide means for imparting this up and down or reciprocating movement transverse to the axis of the totalizer shafts 24, 26, and 28, the opposite ends of these shafts are slidably mounted in pairs of plates or slides 36, 38, and 40, respectively, only one of each pair of which is shown in FIG. 2 of the drawings. The plates 36, 38, and 40 are movable between a normal lowermost position in which the totalizer elements on the totalizer lines 14, 16, and 18 are engaged with tens transfer or carry mechanisms carried on the frame of the cash register, a center position in which the totalizers in the lines 14, 16, and 18 are spaced from the tens transfer mechanisms to permit axial adjustment of the shafts 24, 26, and 28, and an uppermost position in which the totalizer elements are coupled with the setting elements. This vertical shifting movement of the totalizer lines 14, 16, and 18 is carried out under the control of the second control assembly 22.

The control assemblies 20 and 22 for effecting the selection of a given one of the totalizers in the totalizer assembly 12 are controlled by any suitable means for supplying items of totalizer selecting data. In the illustrated embodiment, this information is provided from a manually actuated keyboard assembly indicated generally as 42 (FIG. 1). The keyboard assembly includes five banks of amount keys 44 of any suitable construction which selectively control the positioning of differential assemblies of any suitable construction, such as those shown and described in detail in the above-identified disclosure. The keyboard assembly 42 also includes a plurality of clerk or function keys 46.

To provide means for selecting a desired accumulator, the keyboard assembly 42 also includes two banks of totalizer selecting keys 48 and 50. In the illustrated cash register, it is assumed that the totalizer assembly 12 includes, for instance, thirty separate totalizers designated

as "00-29." The totalizer line 14 is assumed to include the totalizers designated "00-09," the totalizer line 16 to include the totalizers "10-19," and the totalizer line 18 to include the totalizers designated "20-29." With this arrangement, an individual totalizer is selected by specifying the tens and units digits of its designation. The keys 48 in the keyboard assembly 42 provide the tens selection digit, and the keys 50 provide the units selection digit. Each of the key banks including the keys 48 and 50 controls an individual differential assembly of the type shown in the above-identified disclosure which is operated in the cycle of the cash register prior to the time at which the differential assemblies controlled by the banks of amount keys are operated, which latter differential assemblies provide the value setting and receiving means. The differential assemblies controlled by the units digit keys 50 controls the operation of the assembly 20 to axially position the totalizer lines 14, 16, and 18 in a common selecting position, and the differential assembly controlled by the tens digit keys 48 controls the assembly 22 to selectively elevate one of the totalizer lines 14, 16, and 18 into a coupled relation with the value setting means in accordance with the value of the tens digit.

The assembly 20 (FIG. 2) includes an indicator slide 52 which forms a part of and is set to a position corresponding to the position of the differential assembly set by the units digit keys 50. The slide 52 includes a recess 54 in which is received a lug 56A projecting from a slide 56. One edge of the slide 56 is provided with a toothed portion 56B which engages a gear 58 that is secured to the upper end of a barrel gear 60. The joined gears 58, 60 are rotatably mounted on a post 62 which is carried on a supporting plate 64. The barrel gear 60 meshes with a toothed portion 26A on the totalizer shaft 26. Accordingly, when the indicator slide 52 is set, the totalizer shaft 26 is set to a corresponding position. Since the end plates 30, 32, and 34 on the totalizer lines 14, 16, 18 are coupled together, the setting of the totalizer shaft 26 to a particular position along its axis sets the two remaining totalizer shafts 24 and 28 and thus the three totalizer lines 14, 16, and 18 in a common position in which one totalizer on each of these lines is disposed beneath or in alignment with corresponding toothed elements in the differential assemblies controlled by the amount keys 44. This axial movement of the totalizer lines 14, 16, and 18 occurs following the elevation of these lines to their center position by the control assembly 22.

The differential assembly set by the tens digit keys 48 controls the operation of the assembly 22 to elevate a selected one of the totalizer lines 14, 16, and 18 to couple one of the three totalizers previously selected by the assembly 20 into engagement with the value setting means. More specifically, the differential assembly controlled by the tens digit keys 48 sets a rack 65 to a setting corresponding to the depressed key. The rack 65 includes a notch 66 in which is received a lug 68A on a rack 68 slidably mounted on the frame of the cash register. The rack 68 includes a toothed portion 68B which meshes with the teeth on a gear 70. The gear 70 is rigidly secured to the upper end of a barrel gear 72. The connected gears 70 and 72 are rotatably mounted on a shaft 74 carried on the plate 64. The teeth on the barrel gear 72 mesh with a toothed portion 76A on a rack 76 that is slidably mounted on the upper surface of the plate 64 by a plurality of headed studs or guide members 78.

The rack 76 includes a second toothed portion 76B which meshes with a plurality of gears 80, 82, and 84. The gears 80, 82, and 84 are secured to the upper end of three sleeves 86, 88, and 90, respectively, to the lower ends of which are secured three coded cams 92, 94, and 96. When the indicator rack 65 is set to its three different positions corresponding to the tens digits "0," "1," and "2," the three controls cams 92, 94, and 96 are set in corresponding settings through the linkage described above. The configurations of the cams 92, 94, and 96 are

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such that the control assembly 22 elevates the totalizer line 14 to couple the selected totalizer thereon to the value setting means when the value of the tens digit is "0." Similarly, the configurations on the cams 92 and 94 cause the elevation of the totalizer lines 18 and 16 when the values of the tens digits are "2" and "1," respectively.

FIG. 3 of the drawings illustrates the portion of the control assembly 22 which is controlled by the cam 96 and which is used to control the raising and lowering of the totalizer line 14 containing the ten individual totalizers designated as "00-09." The mechanisms controlled by the cams 92 and 94 are identical. As set forth above, the totalizer shaft 24 in the totalizer line 14 is carried on two supporting plates or slides 36 which are slidably mounted for vertical movement on the frame of the cash register. The vertical movement of the slides or supports 36 is controlled by a pair of cams 100 which are secured to a shaft 102 that is rotatably mounted on the frame. One of the cams 100 is disposed adjacent and engages a pair of cam follower rollers 104 carried on the support 36 adjacent one end of the shaft 24, and the other cam 100 is disposed adjacent and engages a similar pair of rollers 104 carried on the support 36 adjacent the other end of the shaft 24. Two depending arm portions 36A on the support 36 define two vertical recesses through which the shaft 102 extends and serve to guide the vertical movement of the slides 36.

In the normal position of the cash register between cycles of operation, the upper roller 104 engages a surface 100A on the cam 100 and the lower roller 104 engages a surface 100C to place the supports 36 in a lowermost position in which the accumulator or totalizer elements engage the tens transfer mechanism. When the shaft 102 is rotated slightly in a clockwise direction, both of the upper and lower rollers 104 engage cam surfaces 100B on the cam 100. In this position, the supports 36 are elevated slightly to lift the totalizer elements out of engagement with the tens transfer assembly. If the shaft 102 is rotated further in a clockwise direction, the upper roller 104 engages the surface 100C, and the lower roller engages the surface 100A so that the supports 36 are elevated to the uppermost position. In this position, the selected set of totalizer elements engages the value setting means. In this manner, the three totalizer lines 14, 16, and 18 are raised and lowered by rotating or pivoting the shafts 102.

All of the shafts 102 are pivoted to raise all of the supports 36, 38, and 40 to the center position during each cycle of operation of the cash register, and these supports are selectively lowered to the lower position or elevated to their upper or coupled position under the control of three identical controlled coupling assemblies similar to an assembly 106 illustrated in FIG. 3 of the drawings. The controlled coupling assembly 106 includes a pair of links or brackets 108 and 110 which are pivotally mounted on one end of the shaft 102 and rigidly connected by a shaft 111. One edge of the bracket 110 is provided with a notch 110A in which is received the end of a shaft 112 that is secured to and carried on a pair of brackets 114 and 116. The bracket 114 is slidably mounted on the shaft 102, and the bracket 116 is slidably mounted on a hub 118 that is pinned to the end of the shaft 102 and rigidly secured to another bracket 120. The bracket 120 includes a notch 120A in which the shaft 112 is disposed.

When the rigidly connected brackets 114 and 116 are shifted to the left, the end of the shaft 112 enters the notch 110A so that movement of the shaft or rod 111 is transmitted through the shaft 112, the bracket 120, and the hub 118 to the shaft 102, thereby permitting this shift to be rotated or pivoted in response to deflection or movement of the shaft 111. Alternatively, if the brackets 114 and 116 are shifted to the right so that the end of the shaft 112 is moved out of the notch 110A, the movement of the rod or shaft 11 is not transmitted to the

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bracket 120, and the shaft 102 for raising and lowering the slides or supports 36 is not moved.

To provide for selectively rendering the controlled coupling 106 effective and ineffective to raise and lower the accumulator shaft 24, a cam follower slide 122 is slidably mounted on the housing immediately adjacent the cam 96 with a pair of cam follower pins 124 and 126 engaging the coded outer periphery of the cam. The slide 122 includes a notch 122A in which the upper edge of the bracket 114 is received. Therefore, whenever the slide 122 is shifted to the left by the cam 96, the end of the shaft 112 is moved into the notch 110A to place the coupling 106 in an effective or motion transmitting condition. Alternatively, when the slide 122 is shifted to the right by the cam 96, the end of the shaft 112 is moved out of the notch 110A, and the controlled coupling 106 is placed in an ineffective setting or a setting in which motion is not transmitted.

The control assembly 22 includes means for moving all of the totalizer lines 14, 16, and 18 to their intermediate position during each cycle of operation of the cash register to permit the axial movement of the totalizer shafts 24, 26, and 28. This function is performed by a disconnecting slide 130 and a locking slide 132 which normally occupy the positions shown in FIG. 3 at the beginning of a cycle of operation. An end 111A of the shaft 111 is normally disposed between a shoulder 130A on the slide 130 and a shoulder 132A on the slide 132, and a lug 120B on the bracket 120 is normally disposed between a shoulder 130B on the slide 130 and a shoulder 132B on the slide 132. At a time in the cycle of operation of the cash register at which the totalizer shafts 24, 26, and 28 are to be axially adjusted, suitable drive means of the type disclosed and described in the above-identified disclosure move the slide 130 to the left and the slide 132 to the right (FIG. 3) so that the end 111A of the shaft 111 is pressed between the shoulders 130A and 132A, and the lug 120B is pressed between the shoulders 130B and 132B. This pivots the shaft 102 to its center position so that the slides 36 are elevated from their lowermost position to their center position in which the shaft 24 can be axially adjusted. The controlled couplings 106 for the shafts 26 and 28 are similarly actuated. The movement of the shaft 111 caused by clamping the end 111A thereof between the shoulders 132A and 130A moves the shaft 111 to a neutral or center position.

The drive means for the slides 130 and 132 then moves the slide 130 to the right and the slide 132 to the left to release the shaft end 111A and the lug 120B. Assuming that the totalizer to be coupled during this cycle of operation is on the shaft 24, the coupling 106 is in an effective setting, and the couplings 106 for the shafts 26 and 28 will be in an ineffective setting. When the coupling 106 is in an ineffective setting a lug 116A on the bracket 116 is aligned with a projection 130C on the slide 130. When this slide is reset, the associated coupling 106 is in an ineffective setting and the projection 130C bears against the lug 116A during the resetting movement and pivots the shaft 102 in a counterclockwise direction to the normal position shown in FIG. 3 to lower the supports for the totalizer lines that are not to be coupled to the value setting means. In the assumed example, this would mean that the supports 38 and 40 would be lowered.

To provide means for selectively elevating any one of the totalizer lines 14, 16, and 18 into a coupled relation with the value setting means, a plurality of slides similar to a slide 134 for the totalizer line 14 is provided. Each of these slides includes a pair of projections similar to a pair of projections 134A on the slide 134 between which the corresponding shaft 111 is received. The slide 134 is selectively shifted to the left and to the right, in list, read, and reset timing under the control of the means shown and described in detail in the above-

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identified disclosure. In the assumed example in which the totalizer shaft 24 is to be elevated, the slide 134 moves to the left at the proper time in the cycle of operation of the cash register to swing the shaft 111 to the left. This is effective through the controlled coupling assembly 106 to pivot the shaft 102 further in a clockwise direction from its center position to elevate the slides 36. This elevation of the slides 36 moves the totalizer elements selected by axial movement of the shaft 24 into engagement with the value setting elements. When the proper time for lowering the totalizer line 14 is reached, the slide 134 is moved to the right in FIG. 3 to pivot the shaft 102 in a counterclockwise direction and lower the totalizer line 14 to its lower position in which it is coupled to the tens transfer mechanism. Any movement imparted to the slides similar to the slide 134 which are coupled to the shafts 111 in the assemblies 106 for the totalizer lines 16 and 18 is not effective to shift the position of these lines from their lower position inasmuch as their couplings 106 are in an ineffective position, and movement of the shaft 111 is not transmitted to the hubs 118 secured to the corresponding shafts 102.

Accordingly, the assembly 10 includes means for adjusting the totalizer lines 14, 16, and 18 axially in accordance with the value of the units selecting digit to select one totalizer on each of the totalizer lines 14, 16, and 18 and for coupling one of the three selected totalizers to the value selecting elements in accordance with the value of the tens selection digit. Further, this ability to select a single totalizer from a large number thereof can be accomplished with only minor modifications in some parts of the structure shown in the above-identified disclosure which is capable of selecting a single totalizer on a single totalizer line.

Although the present invention has been described with reference to a single illustrative embodiment thereof, it should be understood that numerous other modifications and embodiments can be devised by those skilled in the art that will fall within the spirit and scope of the principles of this invention.

What is claimed as new and desired to be secured by Letters Patent of the United States is:

1. A totalizer selecting apparatus for selectively coupling totalizers and totalizer setting means under the control of two items of selecting information comprising
  - a plurality of separate totalizer groups each including more than one totalizer,
  - supporting means mounting the totalizer groups for movement,
  - a first assembly for moving all of the totalizer groups in one direction to a setting corresponding to the first item of selecting information, and
  - a second assembly for effecting relative movement between the totalizer setting means and a selected one

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only of the totalizer groups in a second direction in accordance with the second item of selecting information to couple the selected totalizer in the one totalizer group with the totalizer setting means.

2. The apparatus set forth in claim 1
  - in which each of the totalizer groups includes a shaft carrying totalizer elements,
  - in which the supporting means includes means for mounting the shafts for axial movement and for movement generally transverse to axial movement, and
  - in which the first assembly includes means for moving the shafts of all of the totalizer groups in an axial direction.
3. The apparatus set forth in claim 2
  - in which the supporting means includes structure coupling the shafts for common movement in an axial direction and affording individual reciprocating movement of each shaft relative to the other shafts in a direction generally transverse to the direction of axial movement.
4. The apparatus set forth in claim 3
  - in which one of the shafts includes a toothed portion, and
  - in which the first assembly includes gear means engaging the toothed portion.
5. The apparatus set forth in claim 3
  - in which the second assembly includes means individually coupled to each of the shafts for reciprocating the associated shaft into a coupled relation with the setting means.
6. The apparatus set forth in claim 5
  - in which the means individually coupled to the shafts includes a coupling assembly operable to an effective setting in which motion is transmitted to the shaft and to an ineffective setting in which motion is not transmitted to the shaft, and
  - which includes drive means connected to the coupling assemblies for imparting motion thereto.
7. The apparatus set forth in claim 6
  - in which the second assembly includes means selectively movable to different settings in accordance with the second item of selecting information for moving the coupling assembly between its effective and ineffective positions.

#### References Cited

##### UNITED STATES PATENTS

|           |         |                       |           |
|-----------|---------|-----------------------|-----------|
| 2,696,944 | 12/1954 | Goodbar et al. ....   | 235—60    |
| 2,759,667 | 8/1956  | Werner et al. ....    | 235—6     |
| 2,762,561 | 9/1956  | Campos .....          | 235—60.48 |
| 2,911,141 | 11/1959 | Jackson et al. ....   | 235—6     |
| 2,930,523 | 3/1960  | Christen et al. ....  | 235—60.2  |
| 3,092,313 | 6/1963  | Eberhardt et al. .... | 235—60.3  |

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