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MAY 25, 1943.
BY A. P. C.

M. DEMEULENAERE
COMPUTING MECHANISM FOR CASH
REGISTER AND THE LIKE
Filed July 31, 1939

Serial No.
287,630

3 Sheets—Sheet 1

Fig. 1.

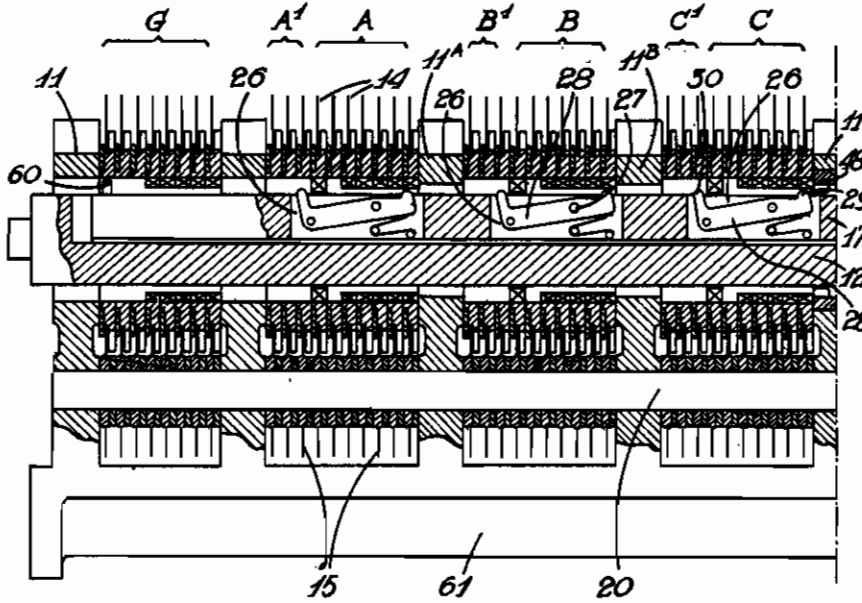
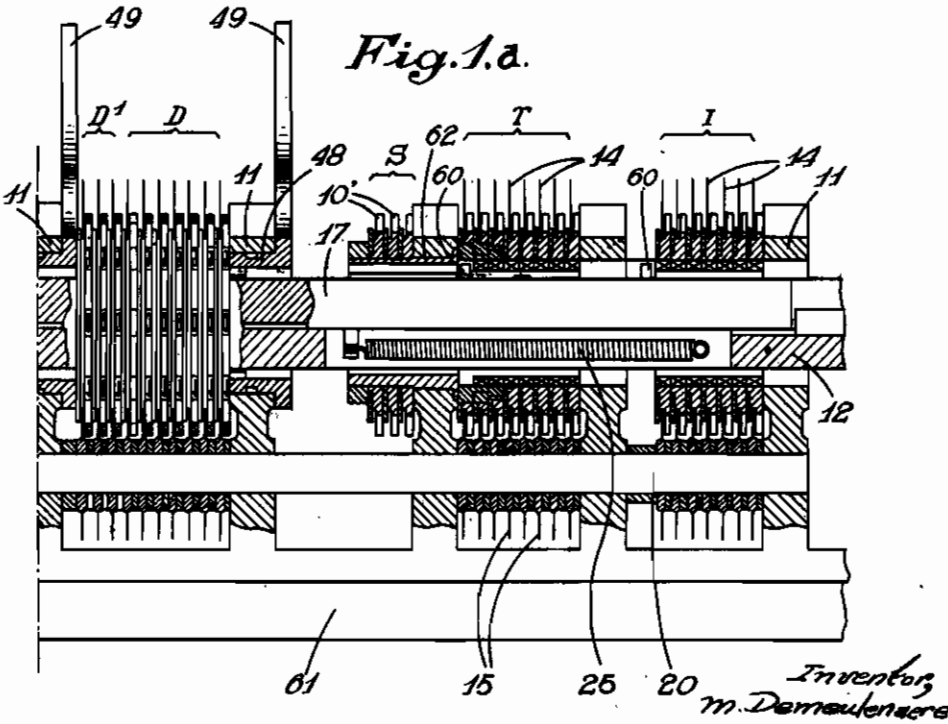


Fig. 1.a.



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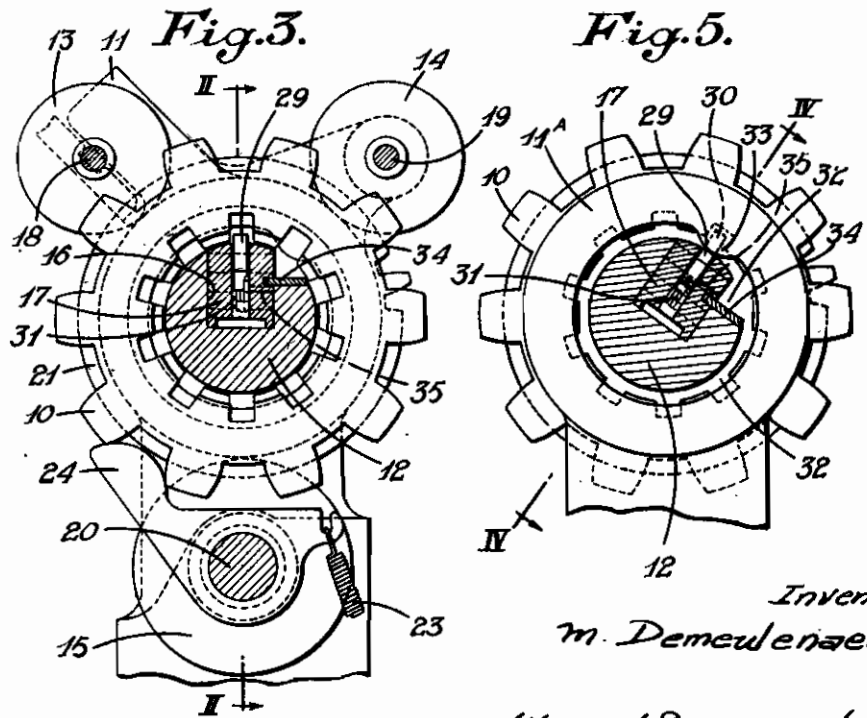
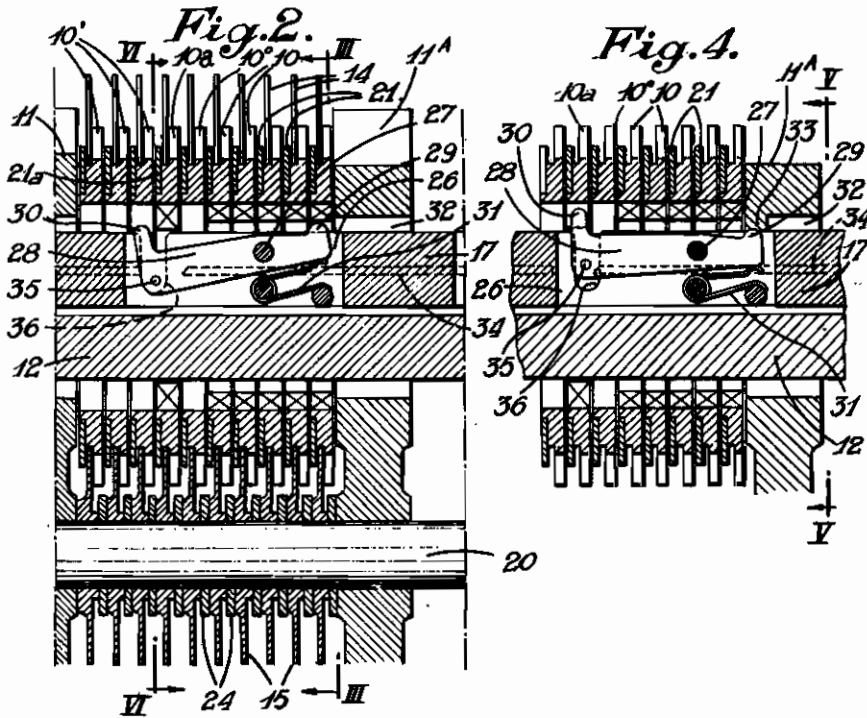
By: *Glascok Downing & Seibels*
Attys

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3 Sheets-Sheet 2



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3 Sheets—Sheet 3

Fig. 6.

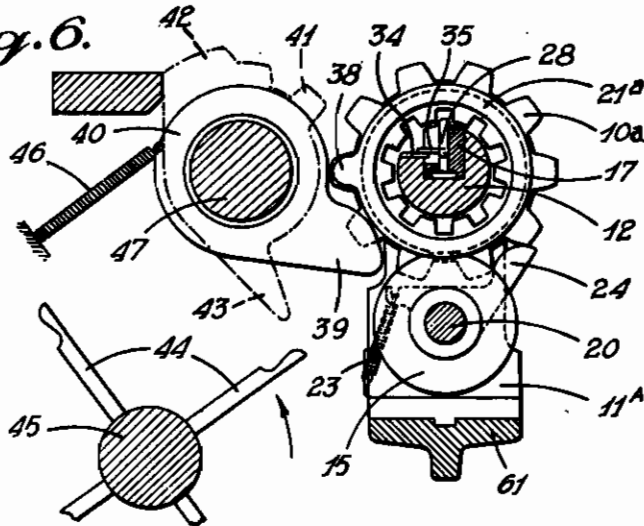


Fig. 8.

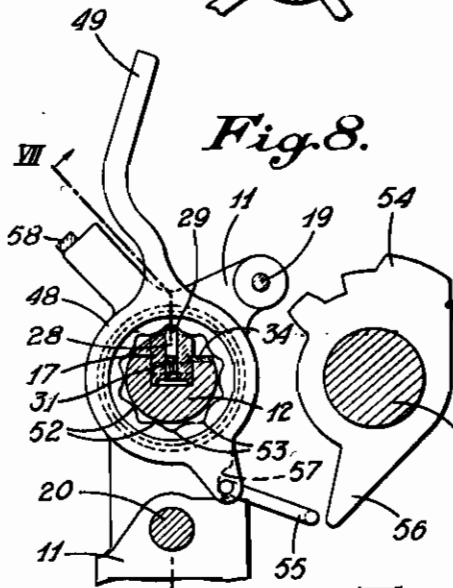


Fig. 7.

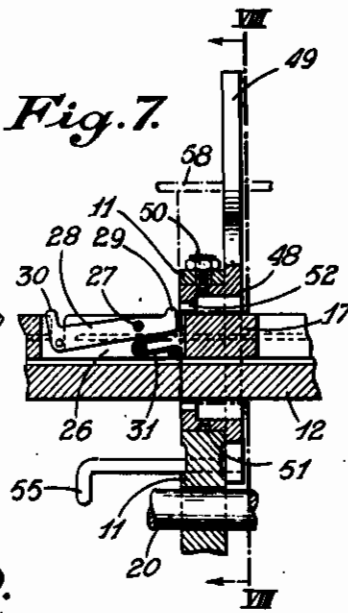
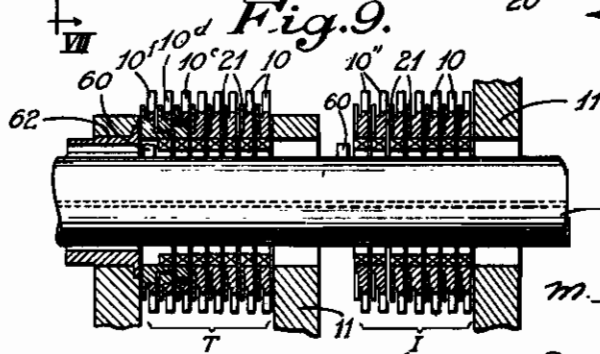


Fig. 9.



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ALIEN PROPERTY CUSTODIAN

COMPUTING MECHANISM FOR CASH REGISTER AND THE LIKE

Marcel Demeulenaere, Brussels, Belgium; vested
in the Alien Property Custodian

Application filed July 31, 1939

The present invention relates to computing mechanism for cash register and the like, and it has particular reference to mechanism of the kind disclosed in my co-pending patent application Serial No. 17,119 dated April 18, 1935, in which an operating member for controlling a plurality of totalisers extends through successive groups of annular discs or wheels forming said totalisers. In the mechanism described by way of example in my above mentioned patent application, selection of the individual totalisers which are to take part in an entry of an item is effected by an axial movement of the operating member in one direction and the subsequent operations necessary to perform the entry are carried out while the operating member is moved in reverse direction.

It is an object of the present invention to provide a mechanism that will be simpler and more convenient in operation, and in which the parts will move more smoothly than in my prior mechanism.

A further object is to provide a mechanism in which collapsible driving projections are so arranged on the operating member that the operations for selecting the individual totalisers and the operations for registering the amounts by means of the operative totalisers are controlled by a succession of axial movements of the operating member in the same direction, said axial movements alternating with rotational movements of the said member.

Still another object of my invention is to provide a mechanism having two different kinds of individual totalisers, some of them associated with fixed selectors and others with angularly movable selectors, permitting two or more individual totalisers being simultaneously selected by means of a single rotation of the operating member.

Further objects and advantages of my invention will be apparent from the following description taken in connection with the accompanying drawings illustrating by way of example an embodiment of my said invention.

In the drawings:

Fig. 1 is a longitudinal sectional view of the totalisers and indicator of a cash register machine.

Fig. 2 is a longitudinal section on a larger scale of an individual totaliser with the operating member extending therethrough.

Fig. 3 is a cross-sectional view on line III—III of Fig. 2.

Figs. 4 and 5 are views similar to Figs. 2 and 3 respectively showing the operating member in a different position.

Fig. 6 is a cross-sectional view on line VI—VI of Fig. 2, showing the co-operation of an individual totaliser with its operation counter.

Fig. 7 is a cross-sectional view on line VII—VII of Fig. 8, illustrating the selector for a goods totaliser.

Fig. 8 is an end view, partly in section on line VIII—VIII of Fig. 7, of the same selector.

Fig. 9 is a longitudinal sectional view of the indicator and the indicator totaliser of the machine.

The mechanism illustrated in Fig. 1 comprises from left to right: a general totaliser G, two individual totalisers A and B, each having its operation counter A' and B' respectively, two further individual totalisers C and D having each its operation counter C' and D' respectively, then an operation counter S, an indicator totaliser T and an indicator I. This arrangement is intended to permit, for instance, of registering separately the operations of two salesmen on the individual totalisers A and B hereinafter called personal totalisers and of recording the number of operations on the respective counters A' and B', further of separately registering the operations respecting two kinds of goods on the individual totalisers C and D hereinafter called goods totalisers and of recording the corresponding numbers of operations on the respective counters C' and D'. Simultaneously therewith the general totaliser G totalises all the operations effected during a predetermined period, say one day, and the general counter S records the total number of said operations. By the indicator I the amount of each operation is made visible and the indicator totaliser T adds if desired the total amounts of a plurality of successive operations.

The several totalisers and counters and the indicator comprise each a group of annular discs arranged side by side, said discs having each ten peripheral teeth bearing the figures 0 to 9 or conventional signs as will be explained later. Fixed spacing members II, IIIA etc. . . . carried by the general support 61 separate adjacent groups of discs from each other.

All the individual totalisers being of like construction, I shall describe in detail only one of them, i. e. the personal totaliser A illustrated in Figs. 2 to 5. As shown in Fig. 2, the totaliser comprises from right to left five annular discs 10 having each on its inner periphery ten teeth for operating said discs from the inside and a sixth disc 10' without inner teeth. The six discs forming totaliser A are capable of totalising amounts up to 9999, 99. On the left of disc 10° is a disc 10a which has inner teeth that are longer than those on the discs 10 and has outer teeth bearing no figure, but a conventional sign designating the particular totaliser considered, for example the sign A in the present instance. On the left of disc 10a are three further discs 10' without inner teeth, said discs 10' having

outer teeth bearing the figures 0 to 9. These three discs 10' form together the counter A' for counting the number of operations effected by totaliser A.

Through the discs of all the totalisers and through the spacing members 11 extends a rotary shaft 12. The said discs, however, are not carried by the shaft 12 as they are supported on carrying rollers 13, 14, 15, which are respectively carried by shafts 18, 19, 20 extending parallel to the shaft 12. Each disc 10 thus is supported coaxially to the shaft 12, but without contacting same. The rollers 13, 14, 15 engage in annular grooves formed between the outer teeth of the discs and rings 21 secured to the discs.

On the shaft 20 the rollers 15 alternate with pawls 24, pressed each against one of the totaliser discs by a spring 23 (Fig. 3). When they engage between two adjacent teeth on each disc, the pawls 24 hold all the discs in a predetermined angular position, so that the outer teeth of the discs, their inner teeth, and the intervals between teeth are each, respectively, in alignment.

The shaft 12 has a longitudinal groove 16 (Fig. 3) in which a spring controlled bar 17 is slidably arranged. In Fig. 1, the spring is shown at 25 and tends to move the bar towards the right. Opposite each individual totaliser, the bar 17 has an axial recess 26 which extends over its whole depth. In each recess 26 is pivoted on a cross-pin 27 a small lever 28 having at each end an upwardly directed projection, i. e. a driving projection 30 and a heel piece 29. The lever 28 is controlled by a spring 31 which tends to lift the heel piece 29. In this position (Fig. 2) the driving projection 30 projects above the upper edge of the bar 17 only very slightly, that is not sufficiently to engage the inner teeth of the discs 10, but enough to engage the longer inner teeth of disc 10a.

The selection of the desired totaliser is operated by means of the fixed members 11 which play the part of selectors, there being in the example illustrated in Fig. 1 a selector 11 on the right hand side of and corresponding to each individual totaliser. The selectors are of different constructions in the case of personal totalisers and in the case of goods totalisers.

A selector for a personal totaliser, for example selector 11A for totaliser A (Figs. 2 and 5), comprises a ring coaxial with shaft 12, and of larger diameter than said shaft so that a ring-shaped chamber 32 is left between the ring and the shaft. Into said chamber projects a boss 33 on the inner surface of the selector, which boss has smoothly inclined sides in the peripheral direction. When the axial and angular position of bar 17 (which rotates together with shaft 12) is such that the heel 29 comes opposite a boss 33, the heel is depressed against the action of its spring 31 and the projection 30 at the other end of the lever is raised well above the top edge of bar 17 as shown in Figs. 4 and 5. In this position of the lever 28, its projection 30 can engage with the inner teeth on the discs 10 of the totaliser considered which thus is selected.

In the several personal totalisers the boss 33 of each selector 11 is offset by one tenth of a revolution with respect to the boss 33 of the preceding selector. Thus in Fig. 5, the boss 33 of selector 11A is at an angle to the vertical plane passing through the totaliser discs corresponding to one tenth of a revolution and the boss of selector 11B is at angle to said plane corresponding to two tenths of a revolution, so that the

axis of each boss is in line with one of the line of notches between the inner teeth of the totaliser discs. It will be understood, therefore, that in order to select totaliser A or totaliser B, the bar 17 has to be moved axially until the heel 29 of each lever 28 registers with one of the bosses 33, then the shaft 12 has only to be rotated clockwise from the inoperative position shown in Fig. 3. If the rotation is through one tenth of a revolution (Fig. 5) totaliser A is selected, as has been explained. If the rotation is through two tenths of a revolution, totaliser B is selected, and thus the mechanism described can operate with as many as ten personal totalisers.

It is necessary to prevent that in a selected totaliser the driving projection 30 be again sunk in the recess 26 under the action of spring 31 as soon as a further axial movement of bar 17 will break the contact between the heel 29 and boss 33. To this end the following arrangement is provided in the operating member formed by bar 17 and shaft 12.

A locking blade 34 secured to the shaft 12 engages in a groove in the side of bar 17, so that it does not interfere with axial movement of said bar. The lever 28 has a laterally projecting pin 35 and opposite said pin is a notch 36 (Figs. 2 and 4) in bar 17 so that the pin 35 can freely move within said notch when the lever 28 swings about its pivot 27. This movement is possible as the blade 34 is cut away in the vicinity of each notch 36, as shown in Fig. 2 which illustrates the bar 17 in its extreme left position, and in Fig. 4 which illustrates the bar 17 in its selecting position. When, however, after the selection is effected, the bar 17 is again moved to the right in order to drive the discs 10, the pin 35 is locked either above the blade 34 if its lever 28 has selected a totaliser, or below the blade 34 if its lever 28 has eliminated a totaliser. The levers 28 thus remain locked during all the time required for the entry of an item, and they are freed only when at the end of the operation the bar 17 is returned to its inoperative position, i. e. to the extreme left position shown in Fig. 2.

The counter A' adjacent to the personal totaliser A must record a unit each time said totaliser is selected in order to partake in an entry. To this end, use is made of the disc 10a with long inner teeth. Said disc 10a (Figs. 2 and 6) has secured thereto a ring 21a which carries a cam 38 arranged to cooperate with a finger 39 on a member 40 loosely mounted on the carry-over shaft 47 which extends parallel to shaft 12. The angular position of cam 38 is such that when it rotates with shaft 12 and disc 10a through one tenth of a revolution during the selecting operation, cam 38 pushes on finger 39 at the very moment when totaliser A is selected by the contact of heel 29 with the boss 33 of selector 11A. At this moment a transfer member 42 secured to member 40 and facing the first disc 10' (i. e. the first from right to left in Fig. 2) of counter A' has rotated with member 40 so that its nose 43 is in a preparatory position and lies in the path of one of the arms 44 fixed on a shaft 45 whose rotation makes the transfers effective when the entry is completed, as explained in my co-pending patent application Serial No. 17,119.

Then, under the impulsion received from one of the arms 44, the nose 43 is rotated clockwise with member 42 (Fig. 6). The tooth 41 on member 42 comes into mesh with the teeth on the first disc 10' of counter A' and causes said disc to rotate through one tenth of a revolution, which

corresponds to the recording of one unit by the counter.

In totaliser B, the cam 38 is angularly offset by one tenth of a revolution backwards with respect to cam 38 of totaliser A. Thus in totaliser B the cam 38 places the member 40-43 into its preparatory position when the operator rotates the shaft 12 through two tenths of a revolution and selects totaliser B. In that case, the cam 38 of totaliser A having also rotated through two tenths of a revolution, leaves the corresponding finger 39 which is returned to its inoperative position together with its member 40-43 by a spring 46. Thus the counter B' will record one unit when the personal totaliser B has taken part in an entry.

It will be seen that the discs 10' of the counters (Figs. 1 and 2) do not require inner teeth since they are always driven from the outside by transfer members and not from the inside by driving projections such as 30.

The goods totalisers C and D are similar to the personal totalisers A and B, but their respective selectors are different from those described above in connection with the personal totalisers. One of the goods selectors is illustrated in sectional side elevation in Fig. 7 and in end elevation in Fig. 8. In a bore in the fixed member 11 situated on the right side (Fig. 1) of the totaliser considered, is rotatably mounted a ring 48 controlled from the outside by means of a handle 49 or in any other suitable way. Axial movement of ring 48 is prevented by a screw 50 which engages in a peripheral groove 51 in ring 48.

On its inner periphery the ring 48 has, on a portion only of its width, ten bosses 52 uniformly distributed over the periphery of said ring and separated from one another by notches 53. So long as the totaliser in question is not selected, the notches 53 are in line with the respective lines of notches between the inner teeth of the totaliser discs 10. In order to operate the selection of a goods totaliser the handle 49 with the ring 48 is rotated through one twentieth of a revolution so as to bring a boss 52 to a place normally occupied by a notch 53. Then, when the shaft 12 is rotated through any required amount of tenths of a revolution in order to select a personal totaliser, the lever 28 of the said goods totaliser partakes in this rotation and its heel 29 stops under one of the bosses 52 so that the goods totaliser is selected at the same time as the personal totaliser.

The goods counter C' (or D') of the goods totaliser which has been selected is actuated, like the counters A', B', by a transfer member 54 similar to member 42 and carried by the same shaft 47 (Fig. 8). However member 54 is not brought to its preparatory position by a cam rotating with one of the discs, but directly by a bent rod 55 carried by the ring 48, the end of said rod 55 pushing the nose 56 of member 54 when the ring 48 is rotated by means of the handle 49. This rotation, which is as stated through one twentieth of a revolution, is limited in one direction by the rod 55 itself which, when the totaliser is selected comes to lie against an abutment 57 on the support 11. In the other direction, the rotation of handle 49 is limited by a bar or stop 58 which is secured to the parts 11, as shown in Fig. 8.

When an amount is registered by one or more individual totalisers A, B, C, D, it is also registered by the general totaliser G. As the general totaliser does not give rise to a selection, it is not

driven by a collapsible projection 30, but is operated by a member or projection 60 which is simply fixed on bar 17. As shown, totaliser G has eight discs 10, five being with inner teeth and three without inner teeth. The last three discs which correspond to the higher numerical order (thousands, tens of thousands and hundreds of thousands) cannot be driven directly by the projection 60, but they are capable of being actuated by the transfer of units from the discs of a lower numerical order. This also applies to the "thousands" disc (the sixth from the right in Fig. 1) of each of the individual totalisers A, B, C, D. The carry-over mechanism being composed of parts similar to parts 40-43 need not be described in detail.

The indicator I indicates each item entered, and therefore it is also actuated by a projection 60 fixed on member 17. As the indicator is zeroized after each operation, it does not call for a transfer and it comprises only five discs 10 which are identical with the first five discs of each totaliser, and (on the left thereof in the drawing) two discs 10' which carry conventional signs designating the personal totaliser and the kind of goods, respectively, which have been selected. The operation of these two discs is identical with that of the discs 10d and 10f of totaliser T now to be described.

The indicator totaliser T is shown on the left of indicator I and its function is to add the amounts of a plurality of successive operations of which the total is to be printed on a ticket. Like the indicator I, totaliser T does not give rise to a selection and it is actuated by a driving projection 60 fixed on member 17. It comprises, from right to left in Fig. 9, five ordinary discs 10, than a disc 10c having only outer teeth, which disc 10c is narrower in the radial direction than the other discs. On the left the disc 10c are two discs 10d and 10f which differ from the ordinary discs in that their inner teeth are on a ring which is offset to the right by the thickness of one disc so that the inner teeth of disc 10d are located within disc 10c, whereas the inner teeth of disc 10f are located within disc 10d.

The five discs 10 of totaliser T take part in the registration of all amounts to be added by said totaliser. The "thousands" disc 10c is actuated only by transfers from its right hand neighbouring disc 10, as is the case in each of the totalisers in the mechanism considered. The discs 10d and 10f which are directly actuated by the projection 60 are respectively intended to enter a conventional sign identifying the kind of goods sold, and another sign identifying the personal totaliser that took part in the operation. It will be noticed that in the course of the selecting operations the projection 60 will actuate the disc 10f (which is the seventh from the right in Fig. 9) while the levers 28 have their projection 30 engaged in the seventh disc from the right in each totaliser (Fig. 4) and their heel 29 in register with the bosses 33 of the selectors 11.

In Fig. 1, it is seen that on the left side of the totaliser T are three discs 10' threaded on a sleeve 62. These discs 10' form together a general counter S which is actuated by transfers from the totaliser T. They count the total number of operations performed by the mechanism and the ordinal of each operation is printed on a ticket together with its amount by a suitable printing mechanism which does not form part of the present invention.

The operation of the mechanism now will be

described with reference to a numerical example. Let us suppose that a salesman A at the counter C of a store has sold goods for \$208.50. The bar 17 having been returned at the end of the preceding operation to its extreme left position (Figs. 1 and 2), the salesman now allows it to escape step by step towards the right under the action of spring 25, each escapement step being equal to the thickness of a disc 10. The control mechanism of the axial and angular movements of bar 17 and shaft 12 forms no part of the present invention and it may be of any suitable type, operated by keys or by a handle, for example of the type described in my co-pending patent application Serial No. 17,119.

After the first step to the right (Fig. 4), the projections 30 of levers 28 are in register with the discs 10a which have the longer inner teeth, while the heels 29 are in register with the bosses 33 or 52 of the selectors. The mechanism thus is ready for selecting the individual selectors. By means of the handle 49 of goods totaliser C, the salesman turns the ring 48 (Fig. 8) through one twentieth of a revolution and he thus brings a boss 52 over the heel 29 of lever 28 (It should be pointed out that this rotation could have taken place before instead of after the first axial escapement of bar 17, in which case the escapement step would have brought the heel 29 under the boss 52). The lever 28 then tilts, compressing its spring 31 and its driving projection 30 juts out of bar 17 to a sufficient extent to engage between the inner teeth of disc 10a. Goods totaliser C thus is selected and simultaneously the rod 55 moves transfer part 54 to its preparatory position so that counter C' may register one unit at the end of the operation. Immediately thereafter the salesman rotates clockwise shaft 12 through one tenth of a revolution, from the position shown in Fig. 3 to that shown in Fig. 5. The heel 29 of the lever 28 in the personal totaliser A stops exactly under a boss 33 and causes the projection 30 to rise as shown in Fig. 4. At this time the heel 29 of the lever 28 in the goods totaliser C is again under a boss 52 so that totaliser C is not affected and remains selected. During the rotation through one tenth of a revolution the projection 30 in totaliser A has moved with it the disc 10a owing to the long teeth of said disc. Together with disc 10a the ring 21a has also rotated through one tenth of a revolution and its cam 38 pushing on the finger 39 of member 40-43, has moved this member in its preparatory position for a transfer, so that the counter A' will mark one unit at the end of the entry of an item.

The first escapement step of bar 17 has also resulted in bringing the driving projection 60 for totaliser T (Fig. 9) into engagement with the inner teeth on disc 10f which thus is caused to take part in the subsequent rotation through one tenth of a revolution. This disc prepares the subsequent impression on the ticket of the letter A carried by the first outer tooth on disc 10f, which letter identifies the personal totaliser that has been selected. Likewise, in indicator I, the driving projection 60 has engaged the first disc 10' which also takes part in the subsequent rotation through one tenth of a revolution and causes the letter A to be displayed, thus showing that the personal totaliser A has been selected.

In the general totaliser G nothing has hap-

pened because there are no inner teeth in the seventh disc (from the right) into which the driving projection 60 is engaged.

The second step to the right of the bar 17 controlled by the operator brings all the raised projections 30 within discs 10 (i. e. in each totaliser the sixth disc from the right) so that said discs which have no inner teeth will not be driven when the shaft 12 is rotated. In totaliser T and indicator I, the projections 60 have come into engagement with the inner teeth on disc 10d and on disc 10' respectively. When the shaft 12 is rotated through a predetermined angle, a conventional sign, for example X, designating the kind of goods sold, is caused to appear on the outer teeth of said discs. A transfer member (not shown) prepares the carry-over, at the end of the operation of one unit to the counter S.

It is also to be observed that during the second step of bar 17, the pin or finger 35 on each of the levers 28 has contacted with the locking bar 34. The fingers 35 in the selected totalisers A and C are above the bar 34, while in totalisers B and D which have not been selected the fingers 35 are below the bar 34, all the levers 28 thus being locked in their respective positions until the end of the operation being effected.

The third step of bar 17 brings the operative projections 30 and 60 into the fifth disc (from the right) of each totaliser, which is the "hundreds" disc. The operator then rotates the shaft 12 with bar 17 through two tenths of a revolution, and in all the operative totalisers, namely G, A, C and T, as also in the indicator I, the "hundreds" disc is rotated through two tenths of a revolution, thus marking two hundred.

The fourth step brings the projections 30 and 60 into the "tens" discs but as the number to be entered has no tens, the operator does not rotate the shaft 12, and he immediately moves bar 17 a fifth step to the right and then rotates the shaft 12 through eight tenths of a revolution in order to mark eight units.

The operation thus is continued until the entire number is entered. At the end of the operation the operator rotates, by means of a crank or otherwise, the shaft 45 with the arms 44 which render effective all the transfers prepared either in the counters as described above, or/and in the totalisers themselves, in a well-known manner such as described for example in my aforesaid patent application Serial No. 17,119. The operator then moves the bar 17 to its starting or extreme left position, whereby the projections 30 of the levers 28 are again sunk into the recesses 26 by the respective springs 31, the pins 35 having come opposite the gaps in the bar 34 and having no more locking action on the levers. The mechanism thus is ready for a new selecting and registering operation.

The discs of the indicator I are zeroized after each operation in any convenient manner, for example as described in my said application Serial No. 17,119. The discs of totaliser T may also be zeroized, or they may add a plurality of amounts (as those of a customer's successive purchases) and then be zeroized after the total amount has been printed. The zeroizing mechanism may be of any known type, as that described in my said application No. 17,119.

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