June 8, 1943. F. J. ROUAN 2,321,425

TOTALIZER ACTUATOR

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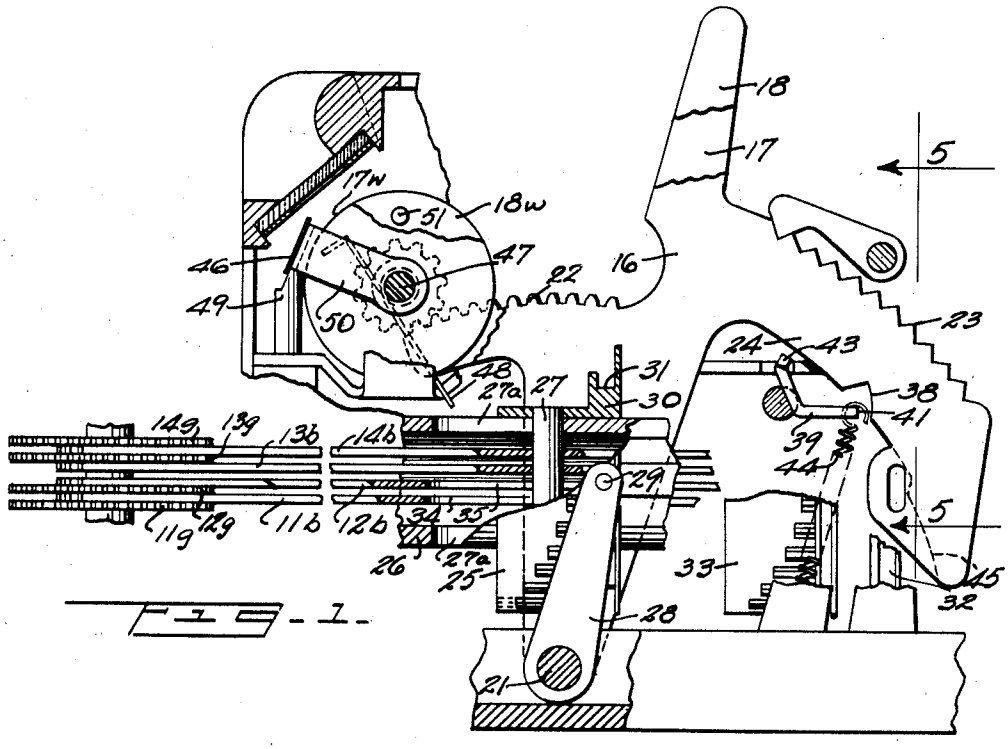


FIG. 1.

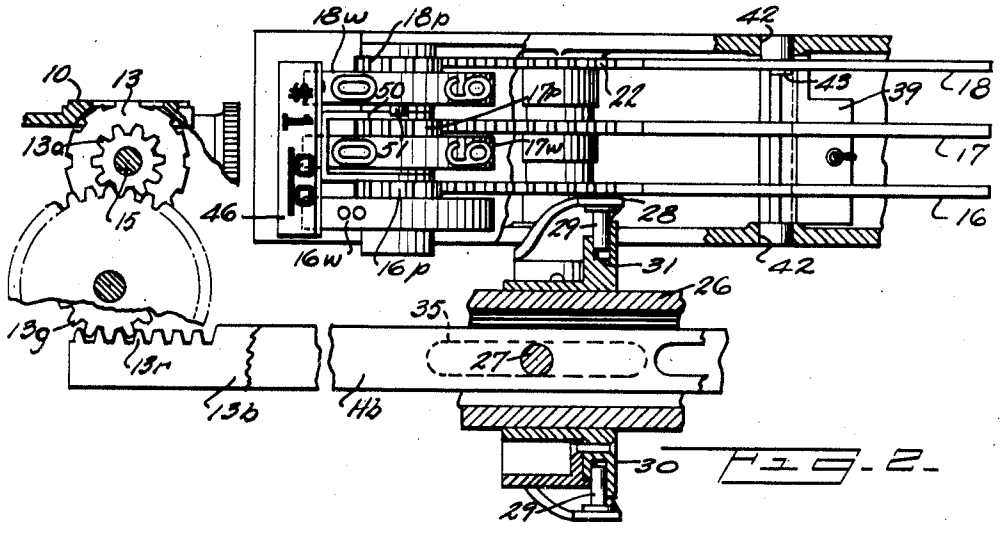


FIG. 2.

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FIG. 3.

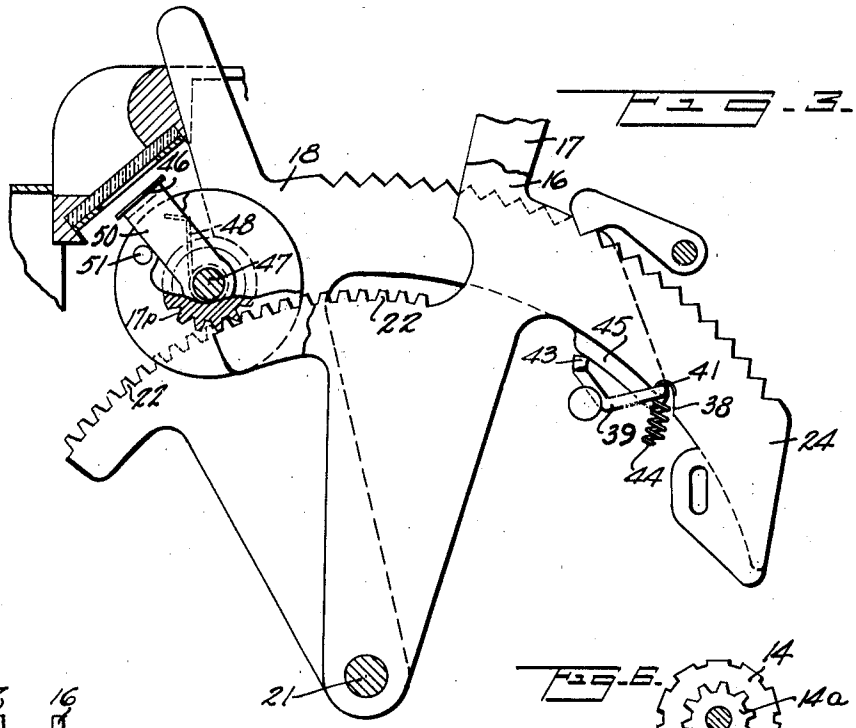


FIG. 6.

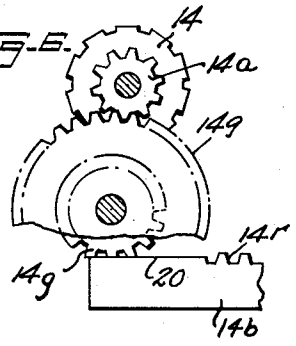
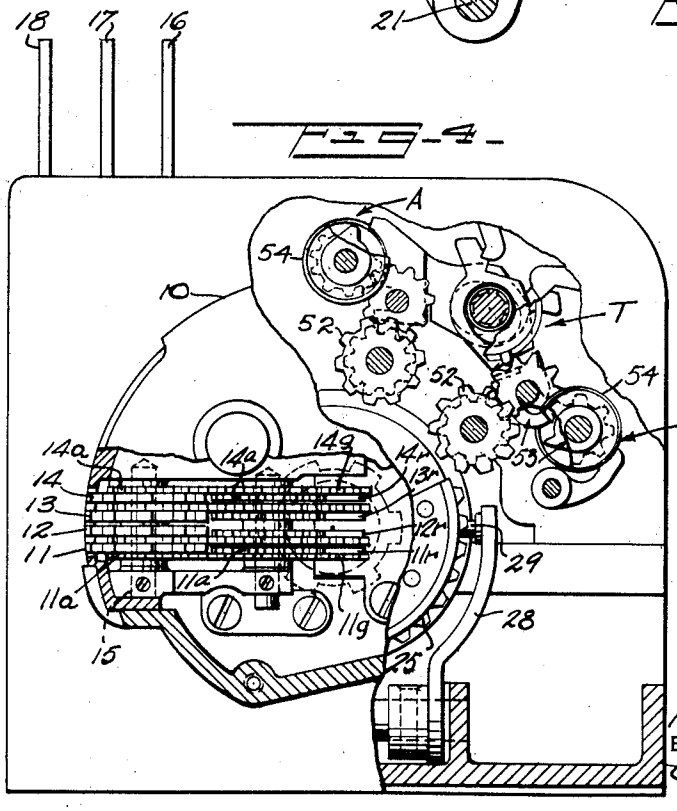


FIG. 4.



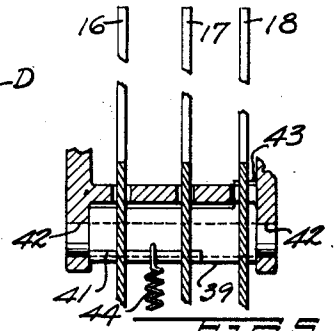


FIG. 5.

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Patented June 8, 1943 2,321,425

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2,321,425

TOTALIZER ACTUATOR

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Application January 11, 1941, Serial No. 374,075

7 Claims. (Cl. 235—101)

This invention relates to a value printing and registering machine and more particularly to the mechanism for setting the value type wheels and register actuating mechanism.

In value printing machines such as metered mailing machines, having means for the printing of omni values, the value type wheels are adapted to be set by means of setting levers. Each setting lever is adapted to adjust a type wheel associated therewith, and is further adapted to effect control of the setting of a register actuator.

In the present invention it is the principal object to provide means whereby, the setting lever of highest order is adapted to be adjusted to a point beyond that which is normally provided in the setting of the digits "0" through "9" to thereby effect the setting of a value greater than the "9" value, and further to adjust register actuator means in such manner as to effect the registration of the said greater value during a machine cycle of operation.

It is another object of the invention to provide means whereby the additional setting of the setting lever of highest order is made possible only when the setting levers of lower order are in their "0" positions to thereby prevent misregistration in the actuation of the value registering mechanism.

With the above and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that various changes in the precise embodiment of the invention herein disclosed may be made within the scope of what is claimed without departing from the spirit of the invention.

A preferred embodiment of the invention is illustrated in the accompanying drawings, wherein;

Fig. 1 is a side elevational view, with parts broken away and parts in section, showing the setting levers in their "0" positions and includes connections with the type wheels and totalizer actuating gears;

Fig. 2 is a plan view of Fig. 1;

Fig. 3 is a side elevational view of a setting lever of highest order in the position of extreme adjustment;

Fig. 4 is a front elevational view of a postage meter unit, with parts broken away, showing a portion of a delayed transfer totalizer and actuator;

Fig. 5 is a detail sectional view taken on the line 5—5 of Fig. 1; and

Fig. 6 is a detailed elevational view showing gearing and rack connections to a type wheel of highest order.

Referring to the drawings in detail, a rotary printing drum 10 has four type wheels mounted therein, designated by the reference character 11 for a ½¢ type wheel, 12 for a units type wheel, 13 for a tens type wheel, and 14 for a hundreds type wheel. Fixed to each of the type wheels are pinions designated as 11*a*, 12*a*, 13*a* and 14*a*, which are associated with the type wheels 11, 12, 13 and 14 respectively. Said type wheels and pinions are further mounted upon a stud 15 supported within the printing drum 10 and are normally in a horizontal position when the drum is in its home position.

The pinions 11*a*, 12*a*, 13*a* and 14*a* are connected with a series of racks 11*r*, 12*r*, 13*r* and 14*r* respectively, there being also suitable intermediate gearing 11*g*, 12*g*, 13*g* and 14*g* between said pinions and racks respectively. The rack portions form a part of rack bars 11*b*, 12*b*, 13*b* and 14*b* respectively, which extend into the meter unit where they are arranged for connection with setting levers 16, 17, and 18. The setting lever 16 is associated with the rack bar 11*b*, the setting lever 17 is associated with the rack bar 12*b*, and the setting lever 18 is associated with the combined rack bars 13*b* and 14*b*.

The setting levers are pivotally mounted as at 21 and each is adapted to control a variable toothed or mutilated gear member when setting of the type wheels is effected. As best shown in Fig. 1, each setting lever includes a forwardly disposed rack segment 22 and a notched detent rack 23, the latter being provided on a rearwardly disposed wing 24.

A variable toothed gear 25 is connected with the setting lever of highest order 18 in such manner that it may be adjusted longitudinally during a type wheel setting operation. Said variable toothed gear is also rotated with the printing drum 10 during a printing operation to effect actuation of a totalizer unit in a manner to be later described. The variable toothed gear 25 is secured to a hollow shaft 26 by means of a pin 27, which pin passes therethrough, and is slidable within longitudinal slots 27*a*—27*a* in the shaft. Upon rotation of said shaft 26, which may be provided by any suitable means, the variable toothed gear 25 will be driven. The pin 27 is further connected with two of the rack members 13*b* and 14*b*, which are associated with

the type wheels 13 and 14 of the tens and hundreds order respectively. Any longitudinal movement therefore, of the variable toothed gear 25, will also effect movement of the rack bars 13b and 14b and thereby cause adjustment of the type wheels 13 and 14.

Adjustment of the variable toothed gear 25 is provided by means of a yoke member 28 which rocks with the setting lever 18 about the pivot 21, and which has pins 29—29 projecting therefrom which engage a slot 31 in a flange 30 at one end of the variable toothed gear.

The two setting levers 16 and 17 are connected with variable toothed gears 32—33 respectively in a manner similar to that described for the setting lever 18, the only difference being that each is connected with a single rack bar 11b and 12b respectively instead of two rack bars. Further description of the structure of said latter variable toothed gears 32 and 33 is not deemed necessary because the invention is more directly associated with the setting lever of highest order which in this disclosure is the tens setting lever 18. It may be stated here however, that the rack bars 11b and 12b, which are associated with the setting levers of lower order 16 and 17, have slots 34—35, therein respectively through which the pin 27 of the variable toothed gear 25 extends. By means of said slots 34—35, clearance is provided for either the adjustment of the variable toothed gear 25 or the individual adjustment of the rack bars 11b or 12b.

The elements of particular importance are those which are associated with the setting of the type wheel of highest order to a value which is greater than that normally settable. In this particular disclosure it involves the setting of four type wheels by means of three setting levers. The setting of the fourth type wheel is effected by means of the third setting lever 18, and is accomplished by providing means whereby the said setting lever 18 is permitted to move one step beyond the setting lever of next lower order, thus moving the type wheel associated therewith from a "9" to a "0" position, and by means of a connection now to be described, moving the fourth or hundreds type wheel 14 to a "1" position.

When moving the setting lever 18 from the "0" to the "9" position, both rack bars 13b and 14b are moved simultaneously, but only the rack 13r is effective in rotating its associated type wheel 13. As viewed from Fig. 6, the rack bar 14b, which is associated with the hundreds type wheel 14, has a rack 14r consisting of only two teeth, which are positioned so as to engage a pinion 14g at the time the tens type wheel is moved from the "9" to a "0" position. Forwardly of the teeth, the rack bar 14r is further provided with one flat edge 20 which is adapted to engage with the ends of three teeth of the said pinion 14a, which teeth have their ends cut back to thus permit same to become locked against the edge 20. In this manner the flat edge 20 will move across the pinion teeth as the rack 14b is moved, through the adjustment of the setting lever 18. The pinion 14a will thus remain immovable until the two teeth of the rack portion 14r become engaged therewith. Hence, the hundreds type wheel is normally locked during the setting of each of the other type wheels during their normal setting from "0" through the "9" positions, or during the setting of the half cent type wheel from the "0" to the ½¢ position.

Before making an adjustment of the hundreds type wheel to the "1" position, it is important that each of the setting levers of lower order, including the type wheels associated therewith, be in a zero position. It may be well to state here that owing to the fact that only three variable toothed gear members are provided, one for the half cent order, one for the units order, and one for the tens order, a totalizer mechanism which is indicated generally at "T", will normally be adapted to register the total resulting from the highest denomination on each of said variable toothed gears, which would be nine teeth on each of the tens and units gears and the one-half value on the one-half cent variable toothed gear, providing the sum total of 99½¢. Any value higher than the 99½¢, if desired, would require another variable toothed gear. But, according to the arrangement of the present structure, it is possible to raise this total value by including another tooth on the variable toothed gear of highest order, thus making a total of ten teeth. Before the tenth tooth portion of said gear is permitted to be adjusted to the latter position however, the units or one-half cent type wheels and related variable toothed gears must be in their "0" positions. If the latter type wheels were not in their "0" positions the variable toothed gears of lower order would actuate the totalizers, and if a transfer should occur between the tens and hundreds totalizer a misregister of the totalizer mechanism would occur.

Provision is therefore made to prevent the setting of the tens setting lever 18 to the last position arranged therefor, until each of the setting levers of lower order are in their "0" positions. Said provision comprises the notching of the underside of the wing portion 24 of each of the levers of lower order, as indicated at 38, and mounting a bail 39 in such manner that one edge 41 thereof will be adapted to move freely into the notched portions 38 when the setting levers of lower order are in their zero positions. To accomplish this, the bail 39 is pivotally mounted in bearings 42—42, as best shown in Fig. 5, and has one forwardly projecting lip 43, which is normally urged against the underside of the setting lever of highest order 18, by means of a spring 44.

On the lower edge of the wing 24 of the tens setting lever 18, is a cam lug 45, which lug is adapted to engage the lip 43 when the said tens setting lever is advanced to its final setting position, that is, from the "9" to the "10" position. Said movement to the last position is permitted only when the notches 38 in the wing portions of the two setting levers of lower order are opposite the bail edge 41, and this only occurs when the two setting levers of lower order are in their "0" positions. If either of the setting levers of lower order is not in a "0" position, and it is intended to move the setting lever of highest order from the "9" to "10" position, the edge 41 of the bail 39 will become jammed against the lower surface of the wing and thereby prevent movement of the setting lever of highest order.

During the setting of the setting levers, the rack segment portions 22 of each segment are adapted to set indicator wheels 16w, 17w and 18w, which wheels are mounted on a shaft 47 and agree with the setting levers 16, 17 and 18 respectively. Pinions 16p, 17p and 18p are also associated with each of the indicator wheels respectively and mesh directly with the rack portions of the rack segments 22.

Normally, the said indicator wheels would be adapted to register the total value of 99½¢, but with the addition of the extra movement of the tens lever it is possible to set up a dollar value. To provide for the indication of said dollar value, a one-dollar indicator plate **46** is mounted upon a U-shaped support **50**, which support is pivotally mounted upon the indicator wheel supporting shaft **47** and is normally urged toward a stop **49** by means of a spring **48**. One leg of the U-shaped portion of the indicator lies adjacent the tens indicator wheel **18***w*, and when the said wheel is rotated from the "9" to the next higher or "0" position, a pin **51**, projecting from the side of said tens wheel and in the path of the said leg, will engage with the leg and move the indicator **46** to the indicating position of Fig. 3.

The registering mechanism or totalizer which is of the delayed transfer type is best shown in Fig. 4 and generally comprises an ascending totalizer indicated at A and a descending totalizer indicated at D. Each of the totalizers includes transmission gears **52**, which are adapted to be engaged by the variable toothed gears **25**, **32** or **33**, and are thereby rotated in accordance with the number of teeth which agree with the value printed. As is common in totalizing mechanisms of this character, at the time the transmission gears are actuated by the variable toothed gears, and cause associated indicator wheels **54—54** to be moved beyond a "9" position, transfer members, such as indicated at **53**, will be pre-set for a transfer operation. Then through a later part of the cycle, the transfer is completed between a register wheel of lower and a wheel of higher order. A complete description of the registering mechanism may be found in co-pending application Serial No. 374,076, now Patent Number 2,306,500, issued December 29, 1942.

In the operation of the device, the mechanism for preventing misregistration, which is particularly pertinent to the features claimed, will now be described by way of a specific example.

Assuming that the reading on the register is as follows:

TH H T U ½
0 9.9 9 ½

and that the amount $1.09½ is to be added, the several steps of operation are as follows:

	TH	H	T	H	½	
A	1	0	.0	9	0	Condition of register after effecting transfer
X		1	.1	1		Transfer as set from wheel of lower order
B	0	9	.9	8	0	Condition of register after entry
C	0	9	.9	9	½	Number standing in register A
D			10	9	½	Number to be entered

To clearly understand the problem, the value (109½) which is to be entered must first be properly separated as in row D, i. e. (10—9—½). As shown above, the ½¢ value is entered in the ½¢ column and the units value 9 is in the units column. But the tens and hundreds values 1 and 0 are entered as 10 in the tens column, because the tens mutilated gear **25** has ten teeth instead of the usual nine. Hence, the tens register wheel will be rotated a full revolution, and will always effect a transfer setting operation.

Analyzing the above problem therefore, the direct addition to the digits ½, 9 and 10 of row D in the order named to the number standing in the register (09.99½) will result in the reading 09.980 of row B and transfers will be set for entry into the units, tens and hundreds values in the manner indicated in row X. For instance, the value ½ of row D when added to the value ½ of row C will provide a "0" in row B, and a transfer setting for entry in the units column; the units value 9 of row D when added to the value 9 row C will provide an "8" in row B, and a transfer setting for entry in the tens column; and finally the tens value 10 of row D when added to the value 9 row C will provide a 9 in row B, and a transfer setting for entry in the hundreds column. Following the setting of the transfers, said transfers are added to the columns of row B, first the units column "8" and "1" to obtain 9; then the tens column "9" and "1" to obtain "0," but an additional transfer setting which should occur here is lost because there had previously been a transfer setting when the value 10 was entered, and two transfers in one value wheel during a single cycle of operation cannot be effected in any tens register mechanism. Hence, the reading in the hundreds column remains at "0" instead of "1," and after the final transfer from the hundreds to the thousands column, the total value reading will be 10.090 instead of 11.090, an obvious misregister.

By way of the above example, it will be seen that the provision of means to prevent the setting of the setting lever of highest order to its final setting position until all levers of lower order are in their "0" positions, is the solution of a problem, which if not provided would result in misregistration of the registering or totalizer mechanism.

Having described the invention, what is claimed is:

1. In a mechanism of the character described having totalizer wheels and totalizer mechanism embodying delayed transfer and actuator members; setting members for adjusting the totalizer actuators, one of said setting members being capable of being advanced beyond the maximum setting position of the other setting members, and means for preventing such latter setting unless the setting members for totalizer actuators of lower order are set at 0.

2. In a device of the character described having totalizer wheels including ½ cent, units, tens and hundreds wheels, a totalizer actuator and an actuator setting member for each of the ½ cent, units and tens totalizer wheels, the tens setting member being adapted to be advanced beyond the distance of the units setting member to a 1.00 position, and means to prevent the setting of the tens setting member to the 1.00 position unless each of the setting members of lower order are in their "0" positions, whereby a transfer setting in the wheels of the lower order and the possibility of a transfer on a transfer from the tens to the hundreds wheel with its consequent misregister is prevented.

3. In a device of the character described having totalizer wheels including delayed transfer and actuator mechanism, said actuator mechanism including a normal nine toothed and a ten toothed member, said ten toothed member being adapted to effect rotation of a totalizer wheel through a full revolution and to further effect a tens transfer setting during each machine cycle of operation, manual setting members con-

nected with the actuator mechanism, the setting member of highest order being associated with the ten toothed actuator member, and means controlled by the setting member of lower order to prevent the setting of the setting member of highest order to the tenth tooth position until the setting member of lower order is in a "0" position, whereby a transfer on a transfer during a cycle of operation is prevented.

4. In a device of the character described having totalizer wheels embodying delayed transfer and actuator mechanism, said actuator mechanism including a ten toothed member representing the highest order of value for effecting the registration of a value one digit beyond the normal nine digit values, manual setting members connected with the actuator mechanism to adjust same to a desired value position including the position represented by the tenth tooth of the ten toothed actuator member, and means for preventing the setting of the ten toothed actuator member to the tenth tooth position until setting members of a lower order are adjusted to their "0" setting positions, to thereby prevent a transfer on a transfer in the totalizer wheel which is controlled by the ten toothed actuator member.

5. In a device of the character described having units, tens and hundreds totalizer wheels and embodying delayed transfer and actuator mechanism, said actuator mechanism including a ten toothed member associated with the tens totalizer wheel for effecting one complete rotation of said tens wheel and consequently effecting a tens transfer setting from the tens to the hundreds wheel during a cycle of machine operation, manual setting members connected with the actuator mechanism to adjust same to a desired value including the value represented by the tenth tooth of the ten toothed actuator member, and means for preventing the setting of the ten toothed actuator to the tenth tooth position until the unit setting member is adjusted to "0" position, whereby transfer on a transfer from the tens wheel to the hundreds wheel is prevented.

6. In a device of the character described having totalizer wheels embodying delayed transfer and actuator mechanism, said actuator mechanism including a ten toothed member to provide for a value one digit beyond the normal nine digit values and representing the highest order of a plurality of value orders, manual setting members representing value orders up to and including a tens value order and connected with the actuator mechanism of said value orders to adjust each to one of the normal nine digit values, said tens value setting member being adapted to be adjusted to a tenth digit value and effect setting of the tenth tooth of the ten toothed actuator member to thus provide for a transfer to the hundreds totalizer wheel during a cycle of machine operation, and means for preventing the setting of the tens value setting member and ten toothed actuator to the tenth tooth position until the setting members of lower order are adjusted to their zero setting positions.

7. In a device of the character described having totalizer wheels embodying delayed transfer and actuator mechanism, said actuator mechanism including a ten toothed member representing the highest order of value for effecting the registration of a value one digit beyond the normal nine digit values, manual setting members connected with the actuator mechanism to adjust same to a desired value position including the position represented by the tenth tooth of the ten toothed actuator member, and movable obstruction means movable when the setting member of highest order effects movement of the ten toothed actuator member to the tenth tooth position but immovable when any setting lever of lower order is not in "0" position, to thereby prevent a transfer on a transfer in the totalizer wheel which is controlled by the ten toothed actuator member.

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