Nov. 30, 1965 E. C. WALSH 3,220,645

CONVERSION OF COUNTERS TO ADDING MACHINES

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FIG. 1.

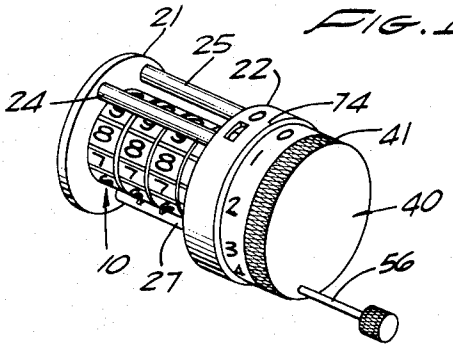


FIG. 3.

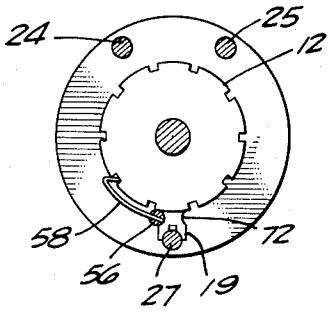


FIG. 2.

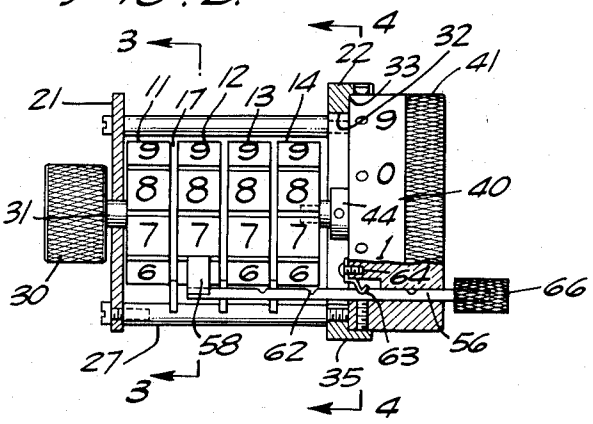
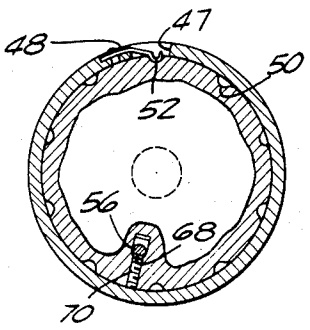


FIG. 4.



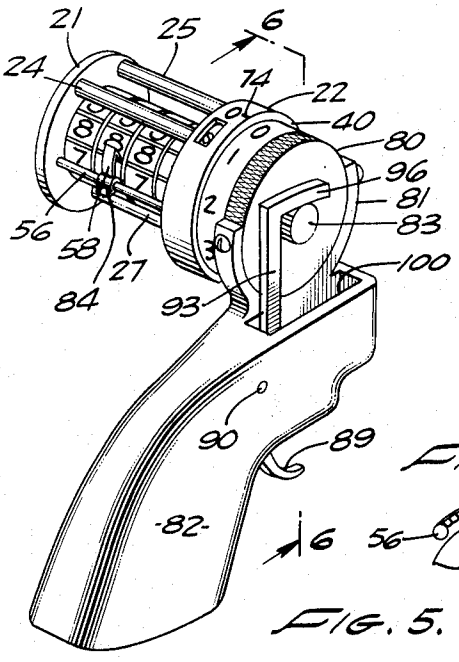


FIG. 5.

FIG. 5a.

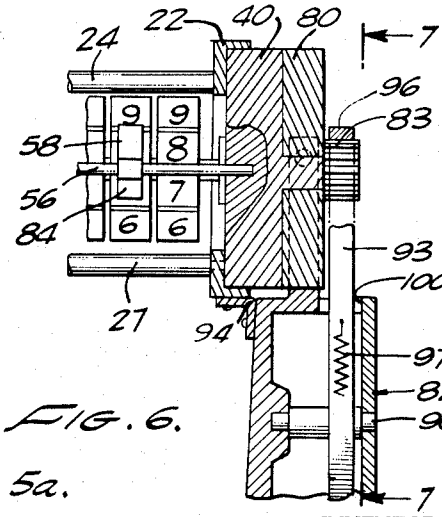


FIG. 6.

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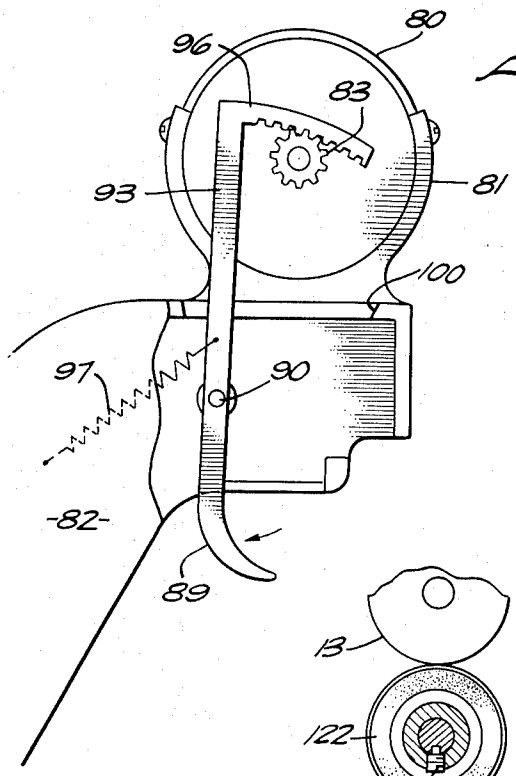

FIG. 7.

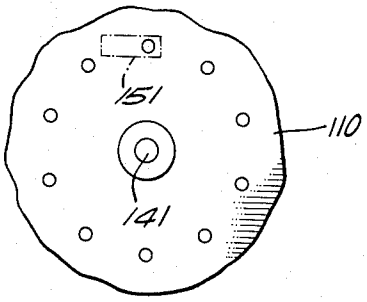

FIG. 11.

FIG. 10.

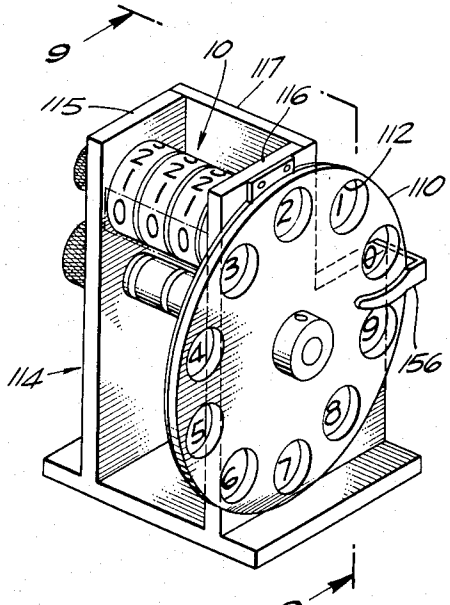

FIG. 8.

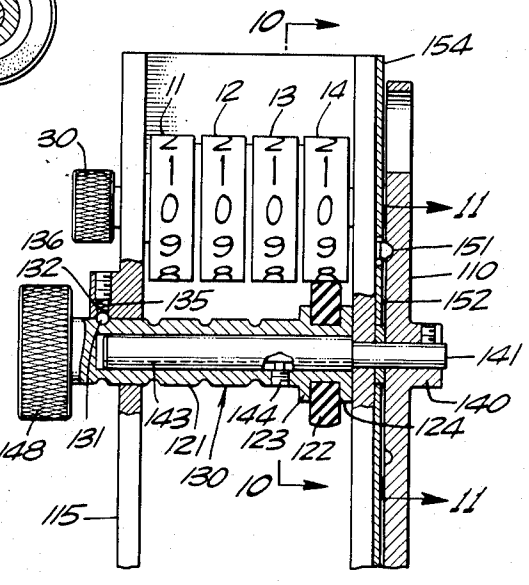

FIG. 9.

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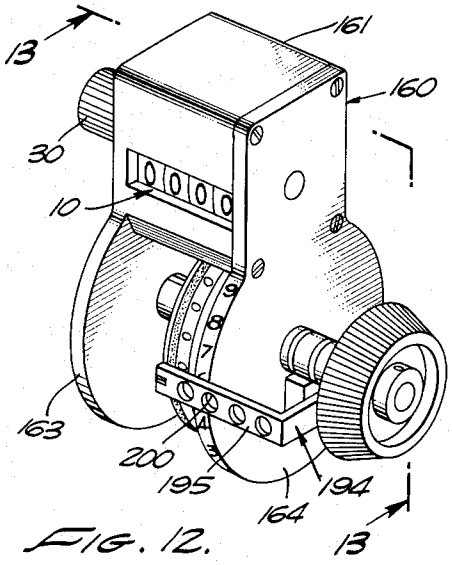
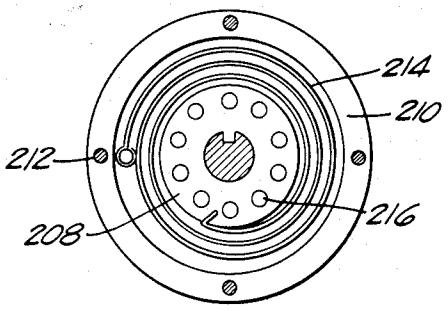


FIG. 12.

FIG. 15.



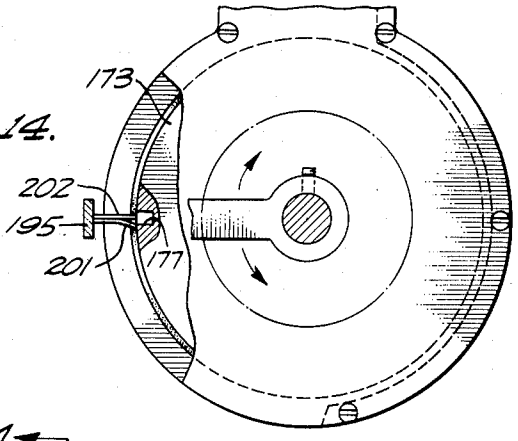


FIG. 14.

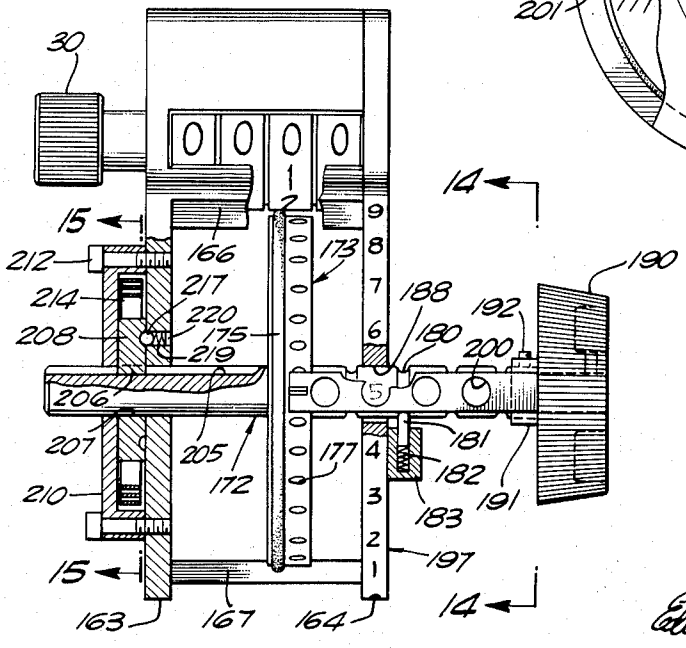


FIG. 13.

FIG. 16.

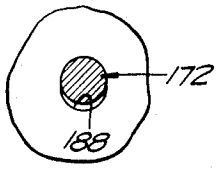


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FIG. 17.

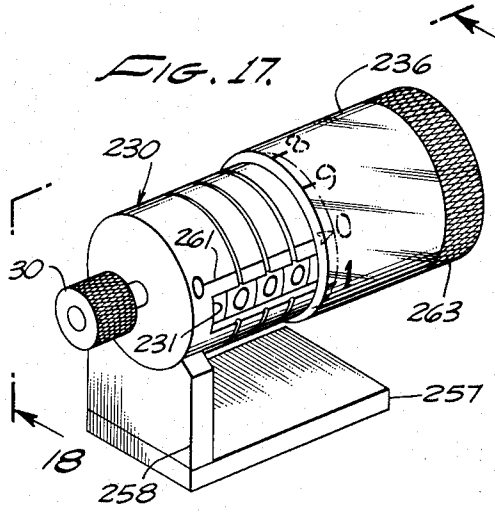
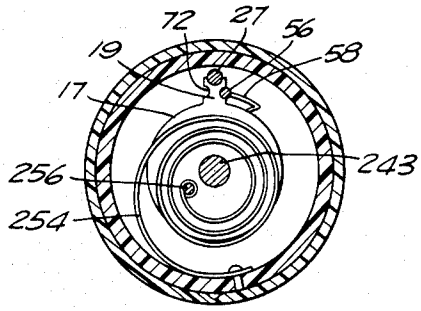


FIG. 19.



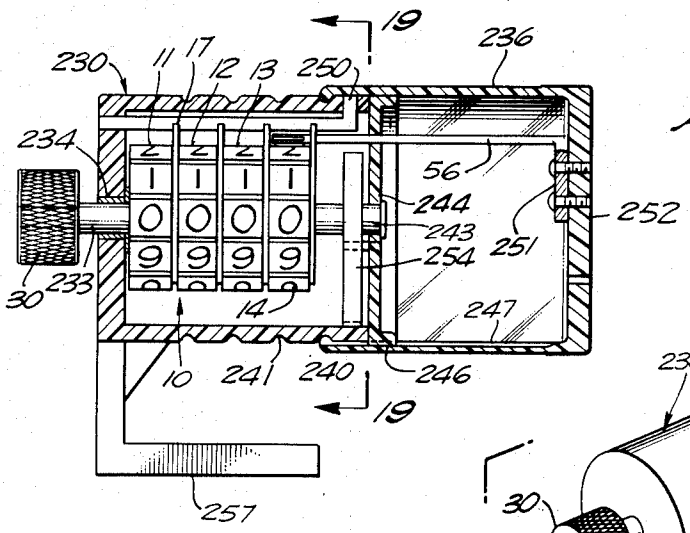


FIG. 18.

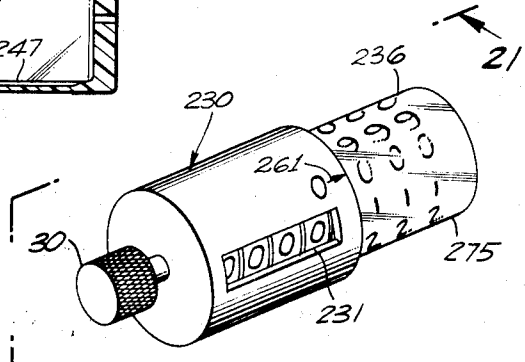
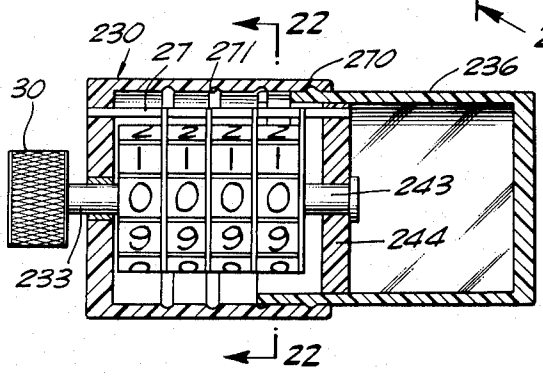


FIG. 20.

FIG. 21.



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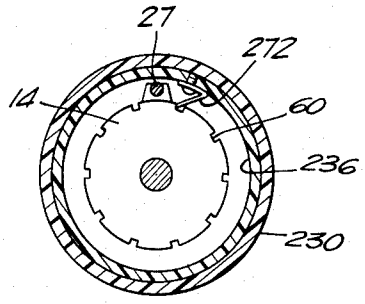
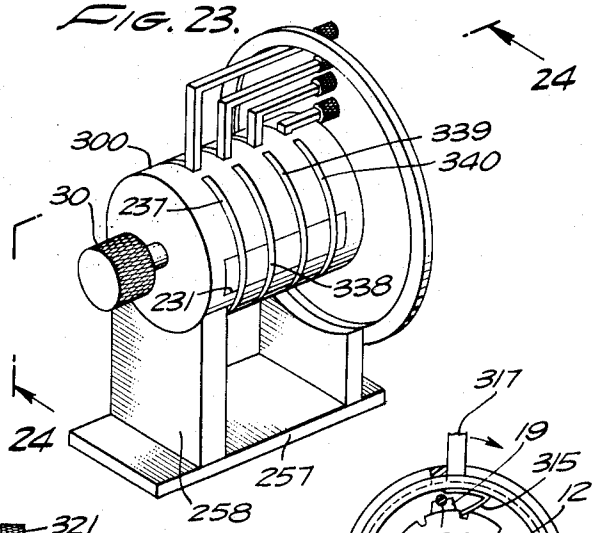


FIG. 22.

FIG. 23.



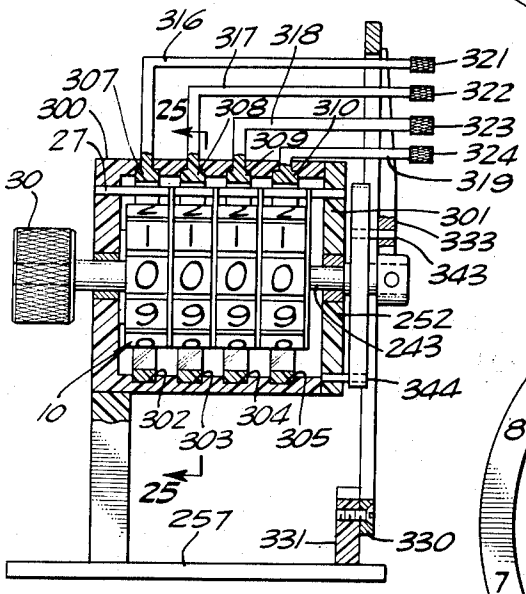


FIG. 24.

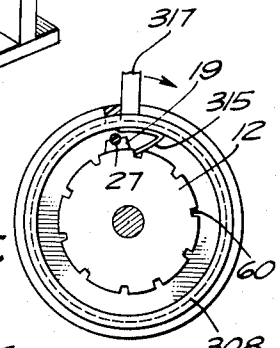
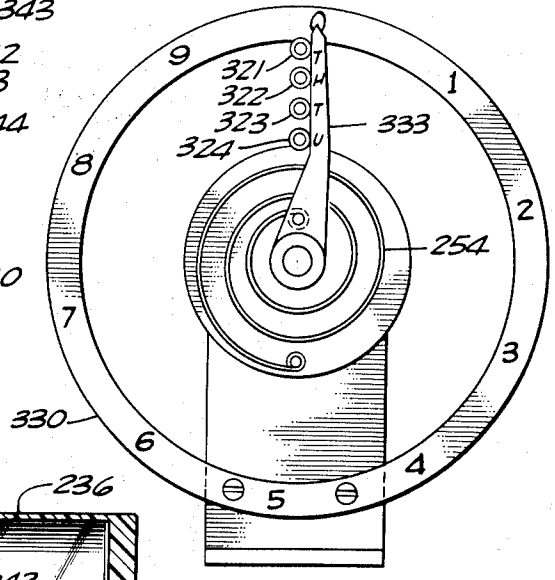


FIG. 25.

FIG. 26.



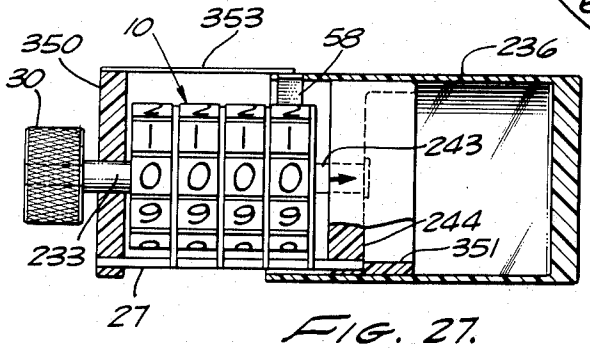


FIG. 27.

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United States Patent Office 3,220,645
Patented Nov. 30, 1965

3,220,645

CONVERSION OF COUNTERS TO ADDING MACHINES

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Filed May 6, 1963, Ser. No. 278,001
7 Claims. (Cl. 235—80)

This invention relates to small, compact calculating or adding machines and particularly machines of this nature which are produced by the conversion of mechanical counters or odometers.

This application is a continuation in part of previously filed application Serial No. 173,561, filed February 15, 1962. Devices of this invention may be realized by use of and conversion of counters or odometers of the type shown in detail in Patent No. 2,004,881. Counters, as shown in that patent have a reset mechanism whereby they may be easily reset to zero position of all the wheels. The counter wheels may be individually freely rotatable in counting direction.

By this invention, mechanical means are provided whereby individual wheels may be selectively manually rotated whereby to feed manual inputs selectively into individual wheels. In this manner, addition may be readily performed by the machine.

The primary object of the invention is to realize the foregoing results using counters or odometers of the type referred to.

Another object is to provide simplified and effective mechanical means for individually and selectively manually rotating the counter wheels, that is feeding digital inputs into them.

The invention is disclosed herein in various preferred forms. In some forms a rotatable pawl is used which is engageable with the counter wheels for feeding in the manual inputs. In other forms, a friction wheel is used which is engageable with the counter wheels for feeding in the inputs. Other objects of the invention include the realization of the desired results by the use of these particular mechanisms.

Further objects and additional advantages of the invention will become apparent from the following detailed description and annexed drawings wherein:

FIGURE 1 is a perspective view of one form of the invention;

FIGURE 2 is an elevational view of the form of the invention shown in FIGURE 1;

FIGURE 3 is a sectional view taken along the line **3—3** of FIGURE 2;

FIGURE 4 is a sectional view taken along the line **4—4** of FIGURE 2;

FIGURE 5 is a perspective view of a modified form of the invention;

FIGURE 5*a* is a view of a modified form of pawl.

FIGURE 6 is a view taken along the line **6—6** of FIGURE 5;

FIGURE 7 is a view taken along the line **7—7** of FIGURE 6;

FIGURE 8 is a perspective view of another form of the invention;

FIGURE 9 is a view taken along the line **9—9** of FIGURE 8;

FIGURE 10 is a view taken along the line **10—10** of FIGURE 9;

FIGURE 11 is a view taken along the line **11—11** of FIGURE 9;

FIGURE 12 is a perspective view of another form of the invention;

FIGURE 13 is a view taken along the line **13—13** of FIGURE 12;

FIGURE 14 is a view taken along the line **14—14** of FIGURE 13;

FIGURE 15 is a view taken along the line **15—15** of FIGURE 13;

FIGURE 16 is a detail view of a part of the device of FIGURES 12 to 15;

FIGURE 17 is a perspective view of a modified form of the invention;

FIGURE 18 is a view taken along the line **18—18** of FIGURE 17;

FIGURE 19 is a sectional view taken along the line **19—19** of FIGURE 18;

FIGURE 20 is a perspective view of a further modified form of the invention;

FIGURE 21 is a view taken along the line **21—21** of FIGURE 20;

FIGURE 22 is a sectional view taken along the line **22—22** of FIGURE 21;

FIGURE 23 is a perspective view of a further form of the invention;

FIGURE 24 is a view taken along the line **24—24** of FIGURE 23;

FIGURE 25 is a sectional view taken along the line **25—25** of FIGURE 24;

FIGURE 26 is an end view of the form of the invention of FIGURE 23;

FIGURE 27 is a sectional view of a further form of the invention;

Referring to FIGURES 1 to 4 of the drawings, these figures illustrate an adding machine made by conversion of a counter or odometer of the type shown in detail in Patent No. 2,004,881. The counter is designated generally by the numeral **10**. It is shown as having four wheels **11**, **12**, **13** and **14**. Carry-over or transfer means are provided internally between the wheels so that a full revolution of one wheel causes a one step revolution of the next adjacent wheel. In this counter there are provided spacers between the wheels, as designated at **17** in FIGURE 2. These spacers have extending fingers or yokes, as shown at **19**, by which the spacers may be held from rotation.

As shown, the counter is mounted by way of an end plate or disc **21** and an end ring **22**. Extending between these members are holding rods **24** and **25**, and the further holding rod **27** suitably attached to the end members **21** and **22**. The extending fingers **19** of the spacers are in the form of yokes, as shown in FIGURE 3, which engage the rod **27** which serves as a holding member to prevent rotation of the spacers.

Numeral **30** designates a reset knob which is provided with the counter and by which all of the wheels may be set to zero. The knob **30** is on a shaft **31** journaled in the disc **21**.

The ring **22** has a bore **32** and a counterbore **33** providing an extending skirt **35**. Journaled in the skirt **35** is a rotor **40** having a knurled part **41** adapted to be manually grasped. The rotor **40** has an extending collar **44** which is journaled on the shaft of the counter. The ring **22** has an opening **47**. Attached to the ring by a rivet or the like is an extending spring finger which extends into the opening **47** and which cooperates with depressions, as shown at **50** in the rotor **40**. There are ten of the depressions **50** spaced equally apart. The crimped end **52** of the spring finger **48** cooperates with them forming detents so as to accurately stop the rotor **40** in any one of ten positions. Opposite these positions there are inscribed on the rotor **40** the numerals or digits from 0 to 9, as shown in the figures.

Numeral **56** designates a stem journaled in a bore in the rotor **40**, parallel to its axis. On the end of this stem is a pawl **58** having a configuration as shown in FIGURE 3. Each of the counter wheels has ten equally spaced transverse surface grooves, as shown at **60** in FIGURE 3. The end of the pawl **58** is cooperable with

these grooves to rotate the counter wheels in one direction, but to slide freely over them in the opposite direction. The stem **56** is slidable in the rotor **40**. It has a group of four notches, as shown at **62**, cooperable with a crimped spring finger **63** attached to the inside surface of the rotor **40** by a screw **44** to provide spring detents establishing the positions of the stem **56**. The stem **56** has a knurled knob **66** on its end. The stem **56** has one flat surface **68**, as shown in FIGURE 4, cooperable with a radial screw **70** which prevents the stem **56** from rotating in its bore.

The extending fingers or yokes **19** are notched out arcuately as shown at **72** to allow increased angular movement of the stem **56**. The ring **22** has a reference line or marker **74** adjacent which is marked the numeral zero, as shown in FIGURE 1.

The operation of the device will now be described. The counter counts in a counterclockwise direction, looking at FIGURE 1. In the starting position the stem **56** is against the extending fingers **19**, as shown in FIGURE 3, which form a stop. The rotor **40** can be rotated clockwise manually carrying the stem **56** with it, such rotation is limited by engagement of stem **56** with the other side of the extending fingers **19**, as may be seen in FIGURE 3. The pawls **58** may, however, extend or protrude between adjacent of the fingers **19**.

In operation, any numeral or digit from one to nine may be fed into or applied to any one of the counter wheels **11** to **14**. This is done by rotating the rotor **40** clockwise to bring any numeral on it adjacent the reference line **74** on the ring **22**. The rotor **40** is then rotated back until the stem **56** engages the extending fingers **19**. When the pawl **58** is rotated clockwise, it slides over the counter wheels and when it is rotated back, the pawl **58** engages one of the grooves **60** and pulls the wheel around with it an amount corresponding to the number that was set opposite the reference line **74**. The stem **56** may be set so that the pawl **58** engages any one of the counter wheels. In this manner, any digit may be applied to any one of the counter wheels with the counter performing an adding function. That is, a digit may be applied to the units tens or hundreds wheel, etc., by positioning of the pawl **58** and manual rotation of the rotor **40**.

Preferably in operation, the machine may be held in the left hand with the rotor **40** rotated with the right hand. It is significant that while the rotor **40** is rotated in one direction the counter held in the left hand may be rotated in the opposite direction so that it is very easy to bring any numeral on rotor **40** opposite the reference line **74** on ring **22**. The rotor and the counter are then each rotated in the opposite direction.

A spring return may be provided, if desired, for returning the rotor **40** to initial position. Such a spring is not shown, but if used, it is simply connected between the collar **44** of rotor **40** in the interior of ring **22**. Thus, when rotor **40** is turned clockwise, the spring is tightened and when the rotor **40** is released, the spring returns the rotor to its starting or initial position, as shown in FIGURE 3.

The machine as shown in FIGURES 1 to 4 may, of course, be mounted on a base so that it is not necessary to hold it with the left hand. In these circumstances, the entire operation is performed with the right hand by manipulating the knob **66** and rotor **40**. Resetting to 0 is, of course, by the knob **30**.

From the foregoing, those skilled in the art will observe that the invention provides an extremely effective, but small, compact inexpensive adding machine which is very readily and easily operable and adapted for manifold uses.

FIGURES 5, 6 and 7 of the drawings show another form of the invention. In this form of the invention the rotor **40** is not simply turned manually as in the previous embodiment, but instead a pistol grip is provided with a trigger and gear mechanism for rotating the knob and feeding in the manual inputs. The machine is otherwise the same as the previous embodiment. The rotor **40** is journalled in a separate non-rotatable part **80** which is supported by a yoke **81** upstanding from a pistol grip **82** and for this purpose rotor **40** has a shaft on which is a pinion gear **83**.

The stem **56** extends from near the disc **21** and ring **22** to rotor **40**, similar to the showing of FIG. 2, but is fixedly mounted in rotor **40**. The pawl **58** slides on the stem **56** and has a finger **84** whereby it can be conveniently moved by the operator's thumb. The operating mechanism is within the pistol grip **82** which has an extending trigger **89** which, as will be described, is pivoted on a pivot pin **90**. The operator's thumb is in a position adjacent the rotor **40** to conveniently serve as a brake to control the movement of the rotor **40** as it is rotated. Any suitable means, such as bracket **94**, holds the ring **22** against rotation relative to the pistol grip **82**.

The trigger **89**, as shown in FIGURE 7, has an upward extending part **93** at the upper end of which is a partial sector gear **96** which cooperates with the pinion gear **83**. The trigger member is biased by a spring **97** within the pistol grip **82**. The member **93** extends out of the pistol grip through a slot **100**, as shown in FIGURE 5.

In the operation of the device the pawl **58** is manually adjusted to be opposite a desired counter wheel. The trigger **89** is pulled and this rotates the pinion gear **83** and rotor **40** to bring any desired numeral opposite the reference line **74**. As explained, the operator may use his thumb as a brake to conveniently stop and hold the rotor **40** at the desired position. When the trigger is released, the spring **97** returns the rotor **40** and pawl **58** to the initial position in the manner as described in connection with the previous embodiment. In this manner, the operator can hold the device in one hand while looking at a column of figures and can readily manually feed in any numeral to any one of the counter wheels.

FIGURES 5, 6 and 7 are illustrative of various manners in which the inputs can be manually fed in. This can be by means other than a trigger. A straight rack and pinion may be used. In such a variation the rack may be extending from the barrel part of the pistol grip. The device as a whole may then be simply thrust forward with the end of the rack engaged against an abutment so as to rotate the pinion **83** and feed in the inputs. Also, the rack may be operated simply in the manner of a plunger with a button on the end of it.

FIGURES 8 and 9 show another form of the invention wherein the inputs are by way of a rotor **110** resembling a telephone dial. This dial has ten equally spaced finger holes **112**. Illustratively the device comprises a frame **114** having uprights **115** and **116** spaced by a member **117**. The counter **10** has its shaft journaled in the uprights **115** and **116**. The spacers are held at the back of the counter, not shown in FIGURE 8. Beneath the counter is provided a rotating member in the form of a sleeve designated **121** journaled in the uprights **115** and **116**. Mounted on the sleeve **121** is a friction wheel **122** positioned between the flange **123** and **124**. This sleeve has circumferential grooves **130**, which cooperate with a detent ball **131**. This ball is in the end of a bore **132** in a boss extending from the upright **115**. The ball is urged into the grooves by a spring **135**, the bore being closed by a screw **136**.

The dial **110** has a hub **140** mounted on a shaft **141** which extends into the sleeve **130**. This shaft has a keyway **143** on one side which cooperates with the end of the screw **144** extending radially in the sleeve **130** so that the sleeve rotates with the shaft, but is slidable axially. On the end of the sleeve **130** is an adjusting knob **148** so that the sleeve and friction wheel **122** can be slid axially.

The dial **110** has a group of ten equally spaced depressions **151** cooperating with a knob on the end of a spring finger **152** providing detent stops for the ten positions of

the dial. In back of the dial is a member **154** having the numerals from zero to nine inscribed on it which are behind the openings in the dial **110**. Adjacent one of the finger holes in the dial is a finger stop member **156** suitably supported to cooperate with the manipulations of the dial.

The operation of this embodiment will be clear to those skilled in the art. Friction wheel **122** may be placed in engagement with any one of the counter wheels **11** to **14** to transmit movement to it. Any numeral or digit may be fed into any wheel by dialing of the dial **110**. For example, the operator merely inserts his finger into one of the holes in the dial **110** identified by that numeral and rotates it until his finger engages the stop. The friction wheel **122** then rotates the corresponding counter wheel a similar amount thereby feeding that numeral into that wheel. As stated, the friction wheel **122** is brought into engagement with any counter wheel by axial movement of the sleeve **130**.

From the foregoing, those skilled in the art will observe that this embodiment of the invention also provides a very effective, but simple, compact, inexpensive and easily manipulatable adding machine.

FIGURES 12 to 16 show another form of the invention, which in the present state of its development is considered to be the preferred form. The same type of counter is used in this form of the invention. The counter is housed in the housing of the counter designated generally at **160** having an upper rectilinear part **161**. The counter has depending circular side wall parts **163** and **164**, and a front arcuate opening terminated by the upper edge or surface **166** and a lower edge or surface **167**. The depending sides **163** and **164** are circular, as shown. Journaled in openings in the sides **163** and **164** is a transverse shaft **172**. Freely rotatable on this shaft, but movable axially with it, is a rotor or disc **173**. This disc has a circumferential groove in which is an O-ring **75** forming a tire for the rotor. This tire frictionally engages the adjacent counter wheel and may engage any one of the counter wheels. Preferably the rotor **173** is three times the size, or approximately three times the size of the counter wheels of the counter **10**. The rotor **173** has equally angularly spaced radial holes or bores **177** whereby it is operated. These holes are spaced so that ten of them occupy a part of the circumference of rotor **173**, which is equal to the complete circumference of one of the counter wheels. That is, movement of the rotor **173** in an amount equal to the spacing between the holes **177** will move a counter wheel an amount equivalent to one count, i.e., one-tenth of a revolution.

The shaft **172** has a group of annular grooves **180** in it spaced apart equal to the spacing between the counter wheels of the counter **10**. These grooves are cooperable with a detent plunger **181** in a bore **182** in a housing **183** on the side of side wall **164**. The plunger **181** forms a detent determining the axial positions of the shaft **172** and rotor **173** opposite the various counter wheels. The depending side wall **164** has a hole **188** in it which is slightly enlarged, as shown in FIGURE 16. The plunger **181** normally holds the shaft **172** against the upper side of the hole, as shown in FIGURE 16 and maintains the appropriate degree of friction between the tile **175** and a counter wheel so that rotation may be transferred to the counter wheel.

On the end of shaft **172** is an operating knob **190** for rotating the shaft. This knob may be attached by a collar **191** and set screw **192**. Attached to the collar **190** is an extending arm **194** having a part **195** extending over the side wall **164** and over the periphery of the rotor **173**. The arcuate edge of the side **164** has inscribed on it numerals from 1 to 9 as indicated at **197**. The part **195** of the arm **194** has four spaced holes in it as designated at **200** through which the numerals **197** may be seen.

At the end of the arm **195** there is a pawl which co-

operates with the holes or bores **177** in the rotor **173**. This pawl is formed by a flexible spring finger **201** extending from arm **195** and adjacent to it is a rigid extending finger **202**. When the knob **190** is rotated in a clockwise direction, as seen in FIGURE 12, the pawl **201** slides over the openings **177**. When the knob and shaft **172** rotate in the opposite direction, the pawl **201** engages in the hole **177** opposite to which it has been staopped and rotates the rotor **173** back with it.

Mounted on the outside of the side **163** is a return spring for returning the knob **190**, shaft **172** and rotor **173** after the knob and shaft have been rotated clockwise. The shaft **172** has a groove **205** in it cooperating with a key **206** extending inwardly from the bore **207** in a disc **208**. The disc **208** is in a cap or housing **210** attached to the side wall **163** by screws **212**. Between the disc **208** and the interior of the cap **210** there is provided a clock type return spring **214** for returning the shaft **172**, knob **190** and rotor **173**. On the inside of the disc **208** are a group of ten equally spaced depressions **216**. These depressions cooperate with a ball **217** to form spring detents determining ten positions of a shaft **172**. The ball **217** is urged toward the disc **208** by a spring **219** held by a screw **220**.

From the foregoing, those skilled in the art will readily understand the operation of this form of the invention. The device may be held in the left hand or it may be mounted on a base as desired. The knob **190**, shaft **172** and rotor **173** are slidable axially to bring the rotor **173** opposite any one of the counterwheels of the counter. The shaft slides through the disc **208** of the return spring mechanism and detent, provided by the ball **270**. The shaft is stopped in any one of its four positions opposite the counter wheels by the detent provided by the grooves **180** and the plunger **181**. The detent plunger **181** has the additional function of holding the shaft **172** in the position shown in FIGURE 16 providing appropriate frictional engagement between the tire **175** and the counter wheels. When the knob **190**, shaft **172** and rotor **173** are moved axially the knob and shaft may be tilted downward slightly against the plunger **181** moving the shaft **182** to the bottom of the hole **188**. This movement may be very slight, just enough to very slightly relieve the friction between the tire **175** and the counter wheels to allow easier sliding axial movement. The device may be operated without tilting the shaft **172** in this manner since the friction is not so great as to prevent it. However, by tilting the shaft slightly to relieve the friction wear between the tire **175** and the counter wheels is reduced.

After setting the rotor **173** opposite the desired counter wheel, the operator turns the knob **190** and arm **195** to bring it opposite the desired number on the edge of the side **164** of the machine. At this time, the pawl **201** will be engaged in a corresponding hole in the rotor **173** opposite that number along the edge **197**. The operator then simply releases the knob **190** and the shaft **172** and knob are returned by the spring **214** until the pawl members **201** and **202** come against the edge surface **167** which is the zero position. The rotor **173**, therefore, transfers a corresponding amount of rotation to the counter wheel so that a number of counts is fed in corresponding to that number to which the arm **195** is rotated. It will be observed that the entire operation is done with one hand and to feed in any numeral from one to nine at the most about a third of a revolution of the knob **190** is necessary, and for numerals less than nine, a corresponding fraction of this third of a revolution. The axial movements of the knob are quick and positive by reason of the detents and the angular rotative movements are easy and accurate and, therefore, adding can be performed rapidly. Resetting to zero is by the knob **30**, as in previous embodiments.

In the present embodiment it should be understood that the return spring can be omitted since the knob **190** can

very easily be returned manually. Also, the detent mechanism for axial movements of the shaft **172** may be omitted since the rotor **173** can readily be set opposite any one of the counter wheels without the detent. Instead of the rotor **173** having holes **177** in it, as shown, and having the pawl mechanism a conventional pawl and toothed ratchet may be used so that the knob **190** rotates freely in one direction and rotates the rotor **173** when rotated in the opposite direction. The arm **195** would indicate the axial and angular positions in the same manner.

FIGURES 17, 18 and 19 show a form of the invention similar to that of FIGURE 1. The same or similar corresponding parts are similarly numbered. In these figures, the counter **10** is mounted in a tubular plastic housing **230** having a window **231**. The counter shaft **233** is journaled in a bearing **234** in one end of the housing **230**. A second tubular housing **236** is provided which is preferably made of clear or transparent plastic. It fits around the outside of housing **230**. It has an internal end annular bead **240** engageable with annular grooves or rings **241** provided in a housing **230** to provide for predetermined detent stop positions.

The other end shaft **243** of the counter is journaled in a flanged plastic disc **244** which fits inside the housing or barrel **236**. The disc **244** is slidable within the barrel **236**, it having a key **246** which engagaes in a groove **247** inside the barrel **236**.

The counter **10** may be of the same construction as that of FIGURE 1. In these figures, however, the spacers **17** are held by the holder bar **27** which is positioned on the top side of the counter with an end portion **250** engaged in the end of the housing **230**, as shown.

The pawl carrying member **56** is in the form of a bracket having an end part **251** attached to the end wall **252** of the barrel **236**. It extends through a hole in the disc **244** so that the pawl **58** can be positioned to cooperate with any one of the counter wheels by moving the barrel or housing **236** to any one of its four positions.

Preferably a return spring **254** is provided. The inner end of it is connected by a pin **256** to the disc **244**. The other end of it is connected to the interior of the housing **230**, as shown in FIGURE 19. Preferably the machine is mounted on a base or platform **257** having an upright **258** supporting the housing **230**, as shown. The housing **230** has a reference line **261** on it and the barrel **236** is graduated bearing the numerals from zero to nine thereon, adjacent its end as shown. The other end of the barrel has a knurled part **263** to facilitate turning it manually.

From the foregoing, operation of the machine will be obvious to those skilled in the art. It may be operated by one hand while resting on its base. The barrel **236** is moved axially to feed in digits to any one of the counter wheels, that is for units, tens, hundreds or thousands. Any digit is then fed in by turning the barrel **236** until that digit is brought opposite the reference line **261**. When the barrel is released it returns to its initial position, as shown in FIGURE 19. In the form of the device shown, the pawl **58** slides over the grooves in the counter wheels when the barrel is turned clockwise and the counter wheels are turned when the barrel rotates in the opposite direction. It should be understood however, that the operation can be reversed, that is, the counter wheels can be turned when the barrel **236** is being manually turned in the clockwise direction with the pawls sliding over the counter wheels during the spring return. In either case, no governor is required to control the operation of the barrel **236**. Furthermore, of course, the device can be used without the return spring. In the device as shown, the window **231** and reading line of the counter **10** are spaced 90 degrees from the position of the holding bar **27**. These counters are commercially available in types having the holder bar spaced any desired number of degrees from the reading line.

From the foregoing it can be seen that the device provides an extremely simple, but practical, effective and economical adding machine of very small and compact size. Its operation is easy, but positive and the readout of the answer is very clear.

FIGURES 20, 21 and 22 show a form of the invention very similar to the form just described and similar parts are identified by similar reference numerals. In this form of the invention the barrel **236** fits inside of the housing **230**. It has an annular rib **270** engageable with any one of four annular grooves **271** within the housing **230** to establish four predetermined detent stops. The pawl **272** has the shape as shown in FIGURE 22 and is mounted on the inside of the end of the barrel **236**. The holder bar **27** engages a disc **244** in which the end shaft **243** of the counter is journaled. The disc **244** does not rotate in this embodiment, but is relatively slidable inside of the barrel **236**. This embodiment is like the previous embodiment, but uses fewer parts, preferably no return spring being used. The barrel **236** has a series of digits from zero to nine inscribed thereon, as shown at **275** so that these digits can be brought adjacent the reference line **261** when the barrel **236** is moved into its various positions.

The operation of this embodiment is like that of the previous embodiment. The barrel **236** is moved axially to any one of its axial positions and then rotated clockwise to a desired digital position and then rotated clockwise back to the starting position. It will be observed that the counter wheels are rotated by the pawl **272** when the barrel **236** is rotated back in a counterclockwise direction. The device of this embodiment, as shown, preferably does not have a support or stand so that an extremely compact adding machine is provided. When the barrel **236** is in its innermost position, the device can be made in a size occupying possibly less than two cubic inches.

FIGURES 23 to 26 show a modified form of the invention utilizing the same type of counter as designated at **10**. This embodiment provides a machine wherein no movement of manipulation is required to select the counter wheel to which the input is to be made. This form of the counter has a tubular plastic housing **300**, the shaft **243** being journaled in one end of it. The other end is closed by a disc **301**. Within the housing are provided spaced parallel annular grooves **302**, **303**, **304** and **305** in which are slidable ring members **307**, **308**, **309** and **310**. Each of these ring members carries on the inside thereof a pawl, as designated at **315**, similar to that of the previous embodiment. The counter wheels are similar to those of previous embodiments. A manual actuator is provided for each of the rings **307** to **310**, as designated at **316**, **317**, **318** and **319** having knurled knobs on their ends, as shown at **321**, **322**, **323** and **324**. These actuators are configurated as shown to extend forwardly. They extend through an indicator ring member **330** supported from an upright **331** on the base platform **257**. This ring has equally spaced numerical indications thereon from zero to nine, as shown in FIGURE 26.

Mounted on the extending end of the shaft **243** is a pointer member **333** movable opposite the numerical indications on the ring **330**.

The actuators **316** to **319** move in slots **337**, **338**, **339** and **340** in the housing **300**. These slots do not extend all the way around in the material of the housing, but are interrupted along an axial line at the position of the holder bar **27** which has a position as shown in FIGURE 25. The housing **300** has a window **231** spaced substantially 90 degrees from the holder bar **27** and the interruption in the slots **337** to **340**.

The extensions of the actuators **316** to **319** normally lie against the pointer **333** as shown. A return spring **254** preferably is provided, the inner end of which is connected by a pin **343** to the pointer **333** and the other end

of which is connected by a pin **344** to the end plate or disc **252** of the housing **300**.

From the foregoing, those skilled in the art will readily understand the operation of the present embodiment. To add in any digit from one to nine, whether in the units, tens, hundreds or thousands column, the operator need only grasp one of the actuating knobs **321** to **324** and turn that particular actuator. It is turned to that digit as indicated by the pointer **333 on the ring 330**. The pointer **333** need only be moved past that digit and that digit will be picked up and indicated when the pointer and actuator are returned by the return spring. An advantage of the present form of the invention is that it is convenient to add a column of figures by inserting the digits across the column like dialing a telephone number rather than adding vertical columns of figures. No additional manipulation is required to select the counter wheel to which a digit is to be added or inserted. Preferably the end knobs **321** to **324** are provided with holes so that they can be operated using a stylus, if desired. They can, if course, be larger than shown with correspondingly larger holes in them to more readily accommodate receiving the end of a stylus. If desired, the ring **330** may be made considerably smaller and may be on the inside of the innermost of the actuators, that is on the inside of the actuator **319**.

FIGURE 27 shows a form of the invention which is a slight modification of that shown in FIGURES 18 and 21. The counter **10** is the same. In this form of the invention, the counter end shafts are journaled in discs **350** and **244**, the disc **244** having an extending skirt **351**, this disc having relative sliding relationship with the barrel **236**. The pawl **58** is mounted inside the barrel. The holder bar **27** is at the bottom extending between the discs **350** and **244**. In this form of the invention no detents are used and no return spring so that it is only necessary to add to the counter the two discs and the barrel **236** with the pawl. An indicator pin may be provided as shown at **353** extending from the disc **350** to provide a reference line or mark.

The foregoing discloses in detail various preferred forms of the invention. It is to be understood that certain modifications and variations can be made in the forms of the invention shown. For example, in FIGURES 9 and 13 instead of using friction wheels, the drive wheels and counter wheels may be geared together or the driving wheel may be in the form of a sprocket wheel having teeth engageable with ribs on the counter wheels allowing for axial movement. While the devices are shown as being manually operated, it is to be understood that if desired, the rotatable input element could be driven by a miniature electric motor. In such an arrangement the motor is operated by a single, manual switch button. Closing of the switch energizes the motor driving the input rotor to the desired position; upon deenergization of the motor by opening the switch, the return spring returns the input rotor to the start position.

The device shown in FIGURES 23 and 24 may be modified to have the rings **307** to **310** on the outside of the housing **300** rather than on the inside with the pawls remaining on the inside. With this modification, the actuators **316** to **319** are omitted and the operator rotates the rings themselves which have numbers from 0 to 9 inscribed on them like they are on the rotor **236** of FIGURE 17.

In all modifications using a pawl, the pawl may be simply a resilient serrated member shaped as shown in FIGURE *5a*, so that it will slide over the counter wheels in one direction and frictionally engage with them and rotate them in the opposite direction. With this arrangement it is unnecessary to form the grooves in the counter wheels and the counter may be used in its commercial form without modification.

The foregoing disclosure is representative of preferred forms of the invention and is to be interpreted in all illustrative rather than a limiting sense, the invention to be accorded the full scope of the claims appended hereto.

I claim:

1. A calculating device comprising a counter having counter wheels having transfer means between the wheels whereby a predetermined revolution of a wheel imparts a step movement to an adjacent wheel, means for manually feeding numerical inputs selectively to individual counter wheels comprising a member selectively engageable with the periphery of any one of the counter wheels, and means for rotating said member about the axis of said counterwheel to impart a predetermined angular rotation to the selected counter wheel.

2. A device as in claim **1** wherein said member is mounted whereby to be movable axially with respect to the counter wheels for selective engagement with any one thereof.

3. A device as in claim **2** wherein said member is a ratchet pawl engageable with the periphery of the counter wheel.

4. A device as in claim **2** including a rotor operable to rotate said member to any one of a plurality of numerically identified positions.

5. A device as in claim **2** including gear means for rotating said member and a manually movable member for actuating said gear means.

6. A device as in claim **5** including a pistol grip support member having the calculator mounted thereon.

7. A device as in claim **1** including a cylindrical housing around said counter, a second cylindrical housing associated with said first cylindrical housing and movable axially of and rotatable with respect thereto, said member being carried by said second cylindrical housing.

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