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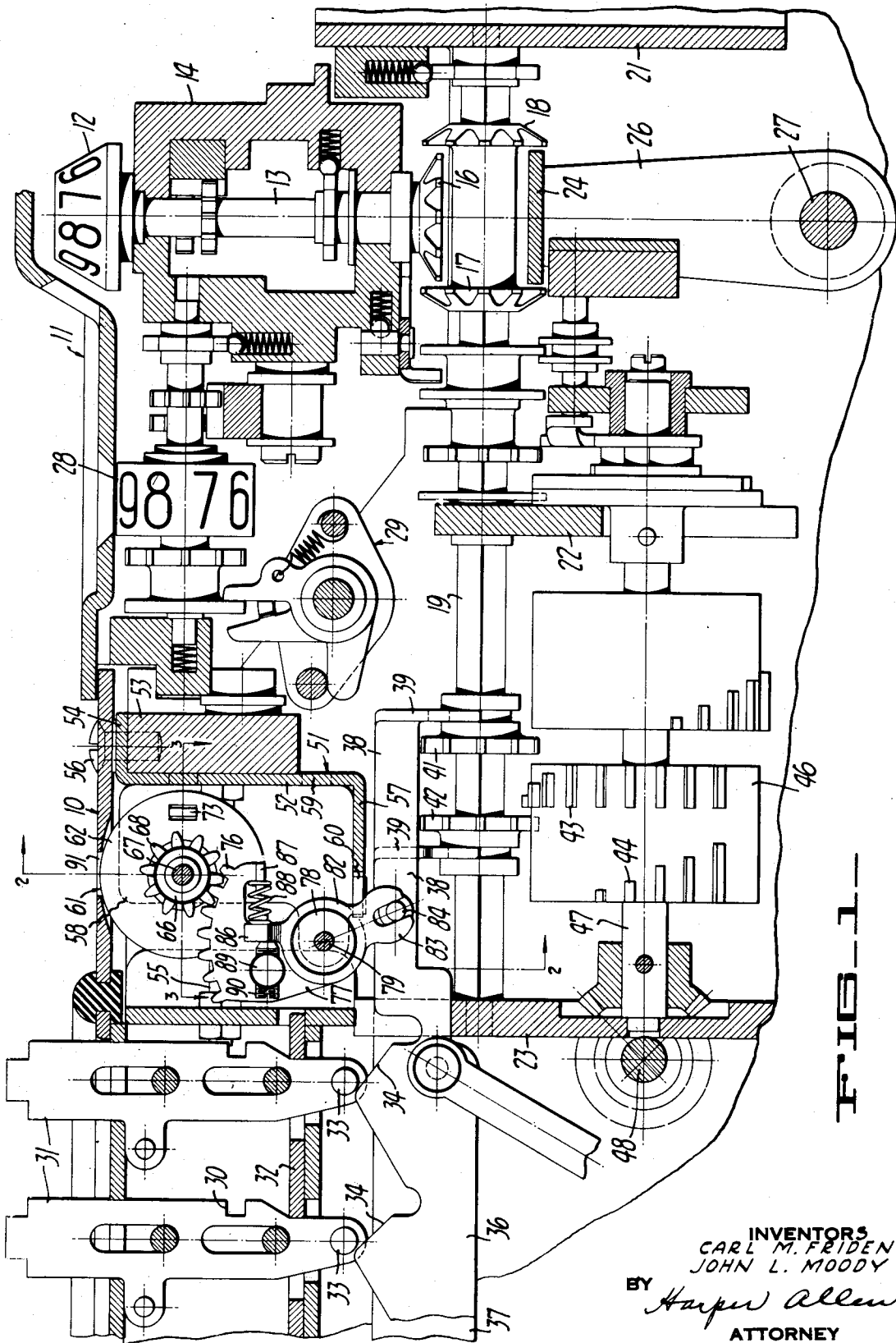
C. M. F. FRIDEN ET AL

2,279,456

CALCULATING MACHINE

Filed March 8, 1940

3 Sheets-Sheet 1



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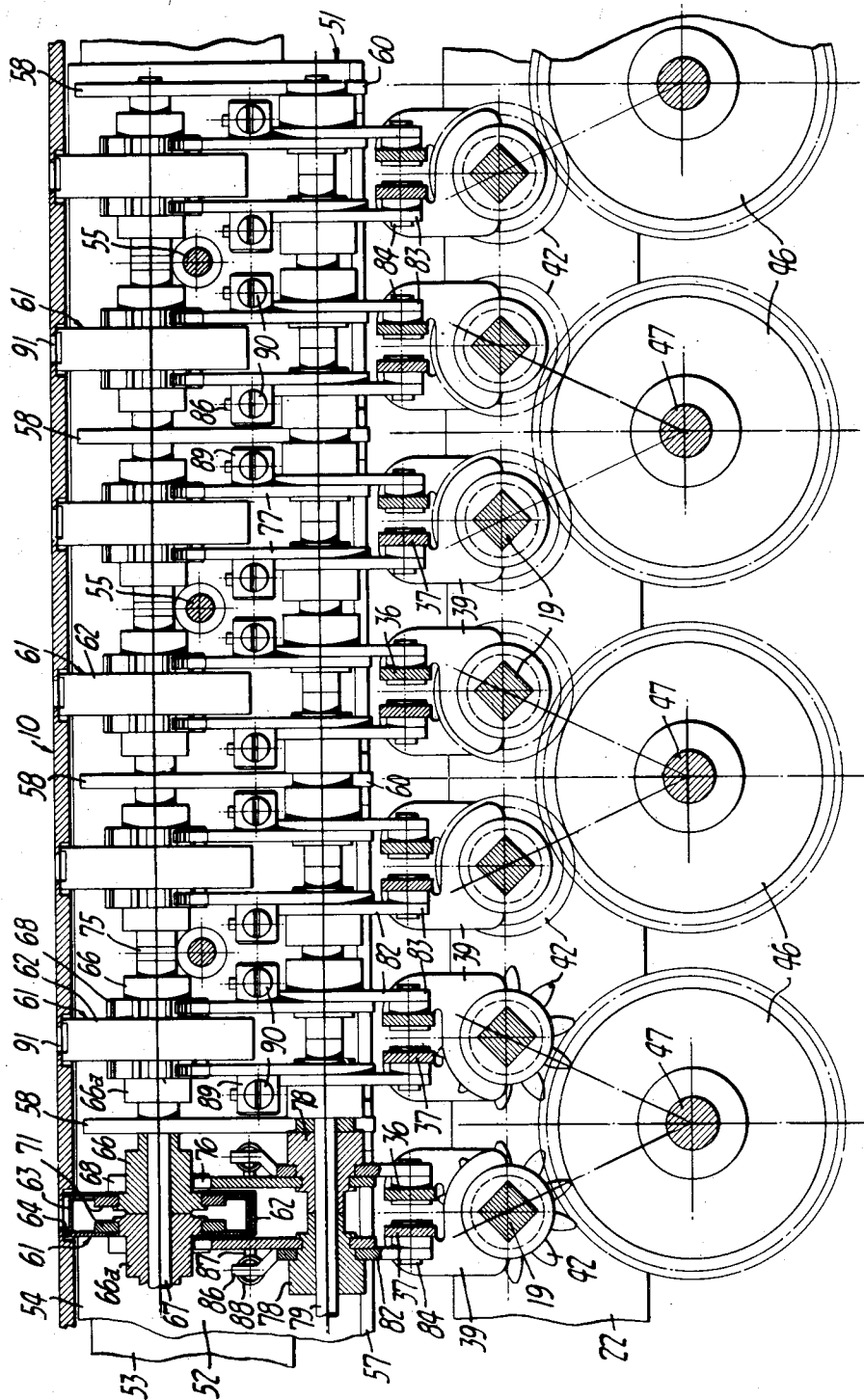


FIG. 2

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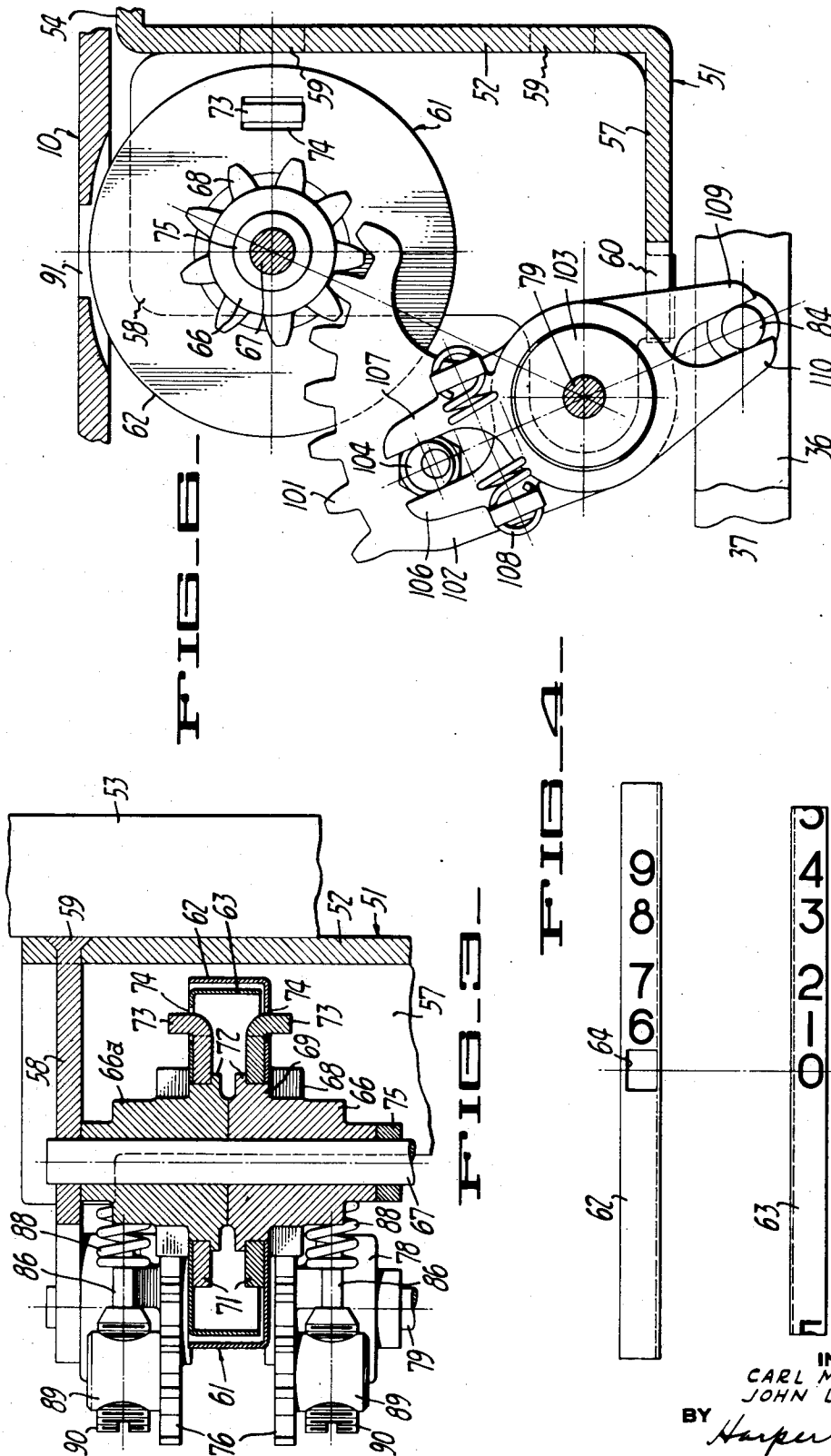
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CALCULATING MACHINE

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Application March 8, 1940, Serial No. 322,952

6 Claims. (Cl. 235—1)

This invention relates to calculating machines and is concerned more particularly with the provision of improved means for indicating and displaying the value set in the keyboard of such a machine.

It is a general object of the invention to provide an improved means for displaying values set in the keyboard of calculating machines or the like.

Another object of the invention is to provide improved indicating means for displaying the value set in the keyboard of a calculating machine wherein the selecting mechanism of the machine includes a pair of differentially settable slides for each order of the keyboard.

Other objects of the invention will be apparent from the following description of certain preferred embodiments of the invention as illustrated in the accompanying drawings, in which:

Fig. 1 is a fragmentary enlarged sectional view of a calculating machine embodying the instant invention.

Fig. 2 is a transverse sectional view of the machine shown in Fig. 1, the view being taken in planes indicated by lines 2—2 in Fig. 1. Only one of the ordinal indicating means is shown sectionalized as indicated by the upper portion of the line 2—2.

Fig. 3 is a horizontal sectional view through one of the ordinal indicating means.

Fig. 4 is a developed detail view of one of the elements of an ordinal indicating means.

Fig. 5 is a developed detail view of another element of an ordinal indicating means.

Fig. 6 is an enlarged sectional view illustrating a modified form of the invention.

The embodiment of the invention selected for illustration is shown in connection with a calculating machine of the type disclosed in the co-pending application of Carl M. F. Friden Serial No. 724,482, filed May 6, 1934, for Calculating machine. The machine includes a body 10 in which the keyboard and the selecting and actuating means are mounted, and a shiftable carriage 11 in which the accumulator and the revolutions counter are mounted.

Generally the accumulator may include a series of ordinal numeral wheels 12 each carried by a shaft 13 suitably journaled in carriage frame 14 and having numeral wheel gear 15 at its lower end for selective engagement by the aligned pair of plus-minus gears 17 and 18 slidably engaged with square shaft 19 journaled in transverse brackets 21, 22 and 23 carried by the frame of the machine. The adjustment of 55

the plus-minus gears 17, 18 may be controlled by a transverse strap 24 carried by one or more arms 25 from a rockable shaft 27 controlled in the usual manner for such machines.

The revolutions counter may include a series of numeral wheels 28 suitably journaled in the carriage frame and adapted to be operated by actuator 29 mounted in the body of the machine and operated in a conventional manner.

To introduce values in the machine for entry in the accumulator, the machine may be equipped in the usual manner with ordinal rows of numeral keys 31, only two keys of one row being shown in Fig. 1. The numeral keys 31 are suitably mounted for endwise movement and may be latched in depressed position by latching slide 32 adapted for cooperation with latching notches 33 in the keys. At its lower end each key 31 carries a pin 33 cooperatively related with a differential cam surface 34 of a value selecting slide 35 suitable mounted for endwise movement in the machine. As shown the value selecting slide 35 is adapted to cooperate with the keys from "6" to "9" while an adjacent similar slide 37 is adapted to cooperate with the keys 31 from "1" to "5" (not shown). Thus, a pair of value selecting slides is provided in each order of the machine for cooperation with a single bank of numeral keys 31. Slides 35 and 37 have respective rearward extensions 38 having downwardly bent forked ends 39 for engagement with the grooved hubs of ten-toothed gears 41 and 42 slidably and non-rotatably mounted on the associated shaft 19. The pair of gears 41 and 42 of each order of the machine are adapted for engagement with respective sets of stepped teeth 43, 44, carried by an actuating cylinder 45 secured on an actuating shaft 47 having a suitable bevel gear connection with a transverse drive shaft 48.

From the above description it will be seen that depression of one of the keys of "6" to "9" value of an order adjusts the ten-tooth gear 41 with respect to the teeth 43 of the associated actuating cylinder, while depression of a numeral key from "1" to "5" will effect setting of the ten-tooth gear 42 with respect to the stepped teeth 44, so that the adjusted gear 41 or 42 will receive a number of increments of value corresponding to its differentially set position with respect to the associated stepped teeth 43 or 44 and to transmit such increments of movement to the aligned numeral wheel 12 in the usual manner.

Value displaying means are provided for indicating and displaying the values of the de-

pressed numeral keys 31 and preferably this value displaying means is made as a single unit which may be pre-assembled and then installed in the machine.

The indicating unit includes a transverse frame means 51 (Figs. 1 and 2) having a vertical portion 52 in flush engagement with a side face of a transverse frame bar 53 of the machine and secured thereto by spacing studs 55. An offset upper flange 54 is provided on indicator frame 51 which engages the top surface of the bar 53 and is secured thereto as by one or more fastening screws 56, which also serve to hold the casing in place. At the lower end of the upright portion 52 a forwardly extending bottom flange 57 is provided. Mounted on indicator frame 51 are a series of upright plates 58 having extensions 59 riveted to the upright portion 52 of the plate and having bottom lugs 60 received in suitable aligned slots in the lower frame flange 57.

As seen in Fig. 2, indicator frame 51 referred to above serves to mount a series of ordinal indicators 61 preferably formed of a pair of nested indicating dials respectively associated with the pair of selecting slides of the aligned order of the selecting mechanism. As seen most clearly in Fig. 3, each indicator 61 includes an outer dial 62 and an inner dial 63. The outer dial 62 (Fig. 4) carries the figures from "6" to "9" adjacent an opening 64 for display of the inner dial 63 (Fig. 5) carrying the numerals 0 to 5. Each of the dials 62 and 63 are preferably substantially cup-shaped with their annular flanges facing in opposite directions in nested relation.

The dials 62 and 63 are similarly secured on similar gear hubs. Hub 66 of dial 62, for example, is journaled on transverse shaft 67, secured in the series of plates 58. Hub 66 has a full gear portion 68 and a half-gear portion 69. The reduced gear portion 69 may be formed at the same time as the full gear portion 68 and then machined to the desired diameter. Preferably the central opening of the indicator dial 62 and a thrust collar 71 associated therewith are stamped to mate with the gear portion 69 so as to be inserted thereover and provide a driving engagement around the entire periphery of the hub 66. After assembly of dial 62 and collar 71 thereon, a portion of the reduced gear 69 may be peened over or die-riveted as at 72 to hold the assembly in place. The thrust collar 71 is preferably provided with an offset lug 73 which extends through a close fitting opening 74 in the dial 62 to provide a drive engaging relation to absorb the major portion of the thrust therebetween. The dial 63 may be similarly mounted on its hub 66a, and the two hubs are dimensioned in length so that two indicators 61 will fit between an adjacent pair of plates 58, with a suitable spacing washer 75 inserted between the indicators.

The respective dials 62 and 63 are similarly connected to respective selecting slides 36 and 37 of the associated order of the selecting mechanism. The gear 68 of the dial 62, for example, meshes with an arcuate rack or gear section 76 on an adjusting arm 77 journaled on hub 78 secured on transverse shaft 79 carried by plates 58. Each adjusting arm is provided with an adjustable connection with an operating lever connected for adjustment by the associated slide. For this purpose, a lever 82 also journaled on hub 78 has a depending forked end 83 engaging a pin 84 on selecting slide 36. At its upper end,

lever 82 has an upstanding ear 86 (Fig. 1) opposed to an offset ear 87 of the arm 77, and a strong compression spring 88 is interposed therebetween. The arm 77 also carries a stud 89 having a transverse threaded aperture to receive an adjusting screw 90 abutting the ear 86 of the lever 82. Turning of the screw 90 will compress or allow expansion of the spring 88 and thereby effect relative adjustment between the arm 77 and lever 82 to accurately align the dial 62 with respect to the sight opening 91 in the casing. Dial 63 is similarly connected to selecting slide 37. The alignment between inner dial 63 and outer dial 62 is adjusted so that the numerals of the inner dial accurately register with the opening 64 in the outer dial.

In the normal position, that is with all keys in raised position, the zero on the inner dial 63 is visible through the opening 64. Upon depression of a key from "1" to "5", the inner dial 63 is rotated by adjustment of the selecting slide 37 to display the corresponding numeral, while similarly, if a key from "6" to "9" is depressed, outer dial 62 is rotated to display the corresponding numeral and at the same time to conceal the zero normally displayed by inner dial 63.

Fig. 6 illustrates a modified form of the invention which is constructed to minimize shock to the dials upon quick depression of a numeral key. The Fig. 6 construction is generally similar to that described above and similar parts being numbered similarly. As the two dials of each ordinal indicator are operated by identical mechanism, the operating means for only one of such dials will be described. The dial 62 as shown in Fig. 6 carries a gear 68 meshing with a gear sector 101 formed on an arm 102 suitably journaled on hub 103 carried by shaft 79. Arm 102 carries an eccentrically adjustable pin 104 which is engaged by the upper ends of a pair of similar levers 106, 107 suitably journaled on hub 103 carried by the shaft 79. The upper ends of the arms 106, 107 may be connected by a suitable tension spring 108. The lower opposed ends 109 and 110 of the respective arms 106, 107 engage a pin 84 carried by the selecting slide 36. It will be seen that upon rapid movement of the slide 36 to the right as viewed in Fig. 6, the arm 106, 109 will be rocked in a counter-clockwise direction positively by the slide 36 while the arm 107, 110 will be yieldably urged in such direction by the spring 108, so that the dial 62 can lag behind the actual setting movement of slide 36 and follow more slowly to its selected adjusted position.

We claim:

1. In a calculating machine having differential selecting mechanism including a pair of settable elements in each order adjustable to represent different value ranges of the same series of values, value displaying means including a pair of nested dials in each order mounted for independent movement, each of said dials being connected to one of the associated pair of said elements for adjustment thereby, the outer of said dials being apertured to permit viewing of the inner dial in the home position of said outer dial.

2. In a calculating machine having differential selecting mechanism including a pair of endwise movable slides in each order adjustable to represent different value ranges of the same series of values, value indicating means including a pair of overlapping indicator elements in each

order mounted for independent movement and connected respectively to a corresponding pair of said elements for adjustment thereby, said elements being constructed and arranged to provide for viewing of the inner of said elements with the outer of said elements in its home position.

3. In a calculating machine having differential selecting mechanism including a pair of settable elements in each order adjustable to represent different value ranges, value displaying means including a pair of nested dials mounted for independent movement and connected to said respective elements for adjustment thereby, the outer of said dials being apertured to permit viewing of the inner dial in the home position of said outer dial, the operating connectin between said elements and said dials including adjusting means providing for relative adjustment between said dials to insure alignment of the aperture in the outer of said dials with the numerals on the inner of said dials.

4. A dial assembly for a calculating machine comprising a supporting shaft and a pair of nested dials independently journaled on said shaft, said dials having overlapping circumferential flanges, one of said flanges bearing a value range of a series of values and the other of said flanges bearing a different value range of the same series of values whereby by selective adjustment of said dials any value of said series can be displayed, the outer of said flanges being

apertured to permit viewing of the inner of said flanges in a home position of said outer dial.

5. A dial assembly for a calculating machine comprising a supporting shaft and a pair of nested dials independently journaled on said shaft, each of said dials being cup-shaped to provide an indicia-bearing circumferential flange, said flanges being disposed in overlapping relation, said flanges bearing indicia representing different value ranges of the same series of values, whereby by selective adjustment of said dials any value of said series can be displayed, the outer of said flanges being apertured to permit viewing of the inner of said flanges in a home position of said outer dial.

6. A dial assembly for a calculating machine comprising a supporting shaft and a pair of nested dials independently journaled on said shaft, each of said dials being cup-shaped to provide an indicia-bearing circumferential flange, said flanges being disposed in overlapping relation, said flanges bearing indicia representing different value ranges of the same series of values, whereby by selective adjustment of said dials any value of said series can be displayed, the outer of said flanges being apertured to permit viewing of the inner of said flanges in a home position of said outer dial, and a gear secured to each of said dials.

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