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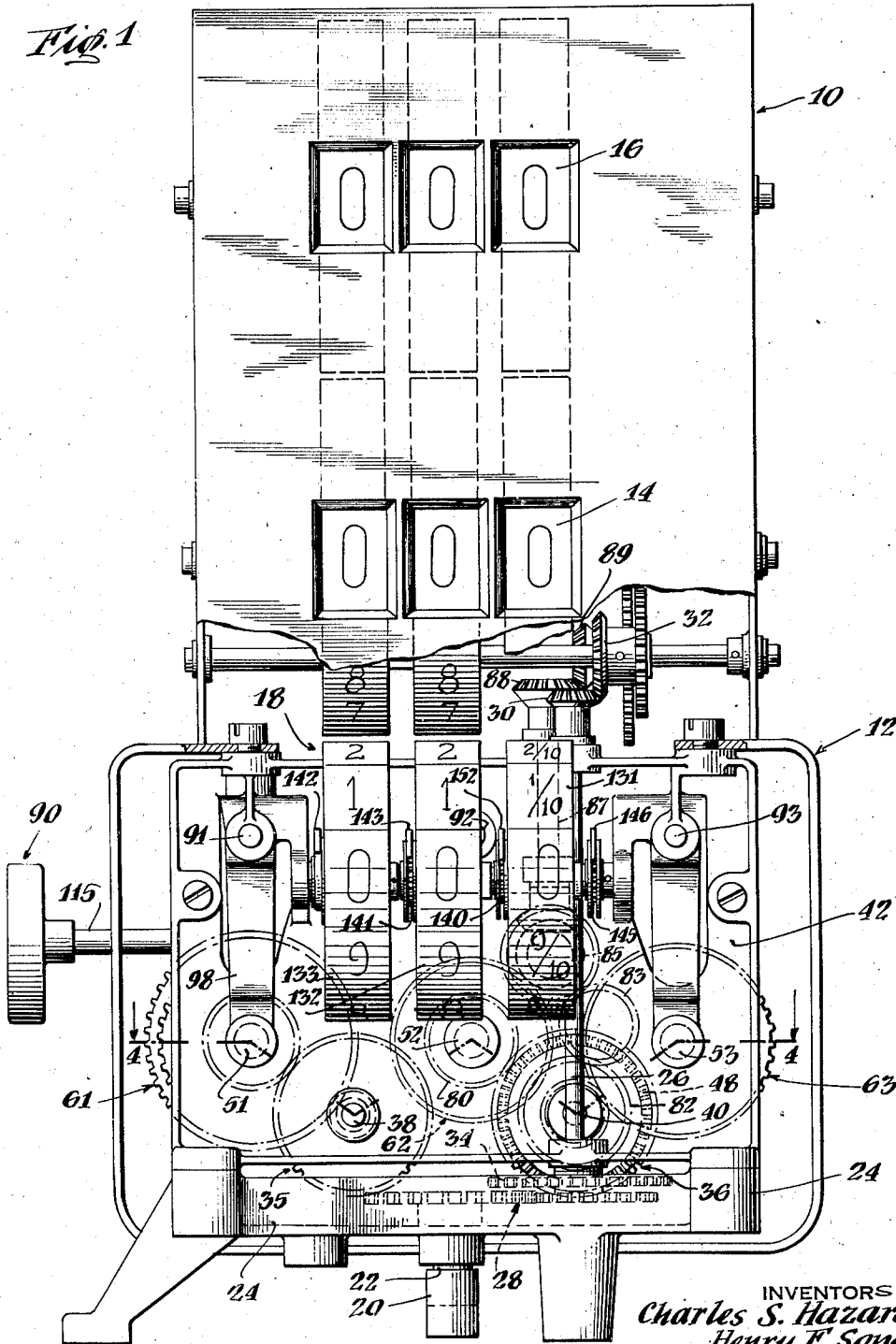
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2,375,787

SINGLE KNOB PRICE SETTING MECHANISM

Filed Oct. 6, 1939

5 Sheets-Sheet 1



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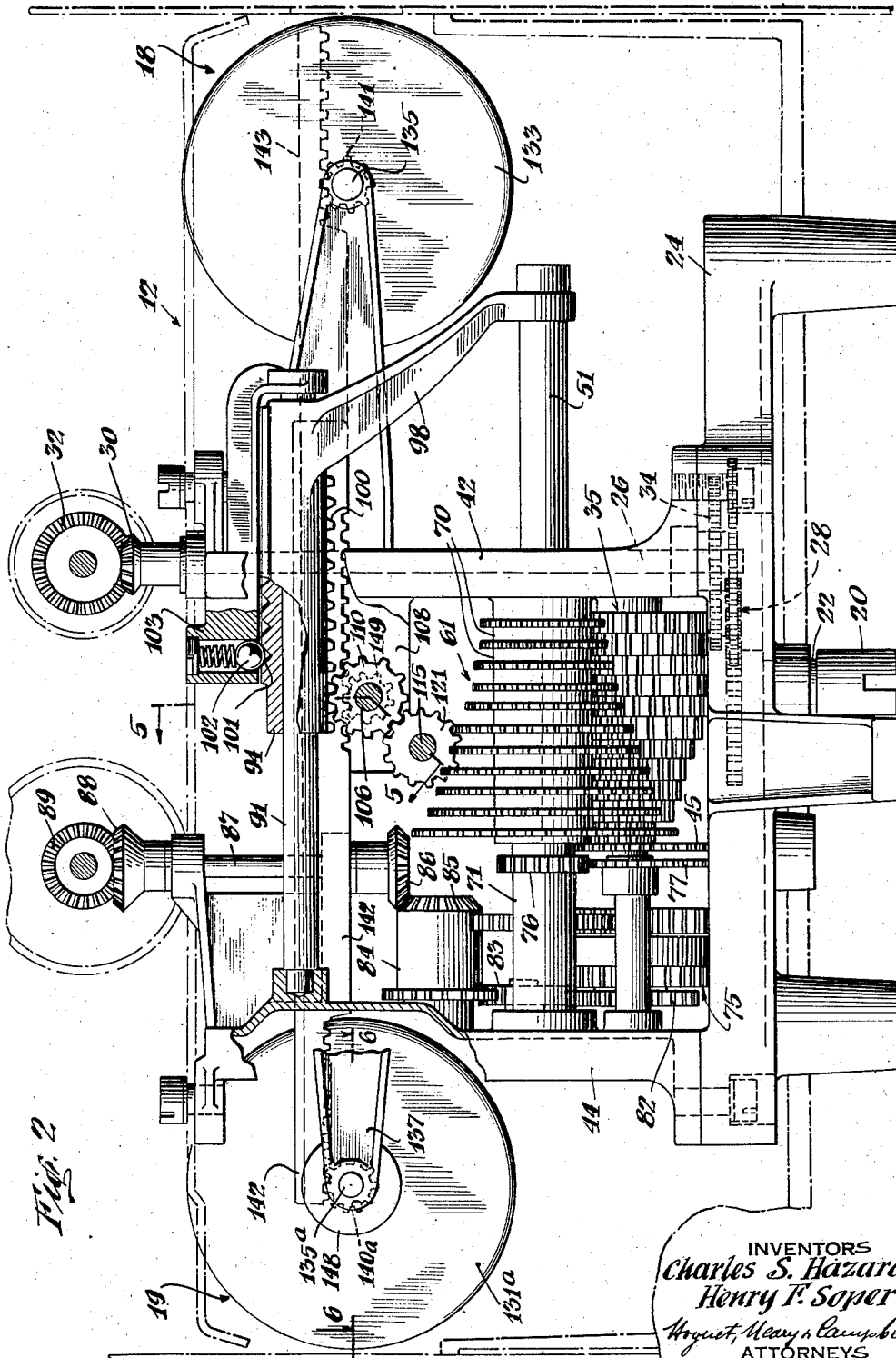
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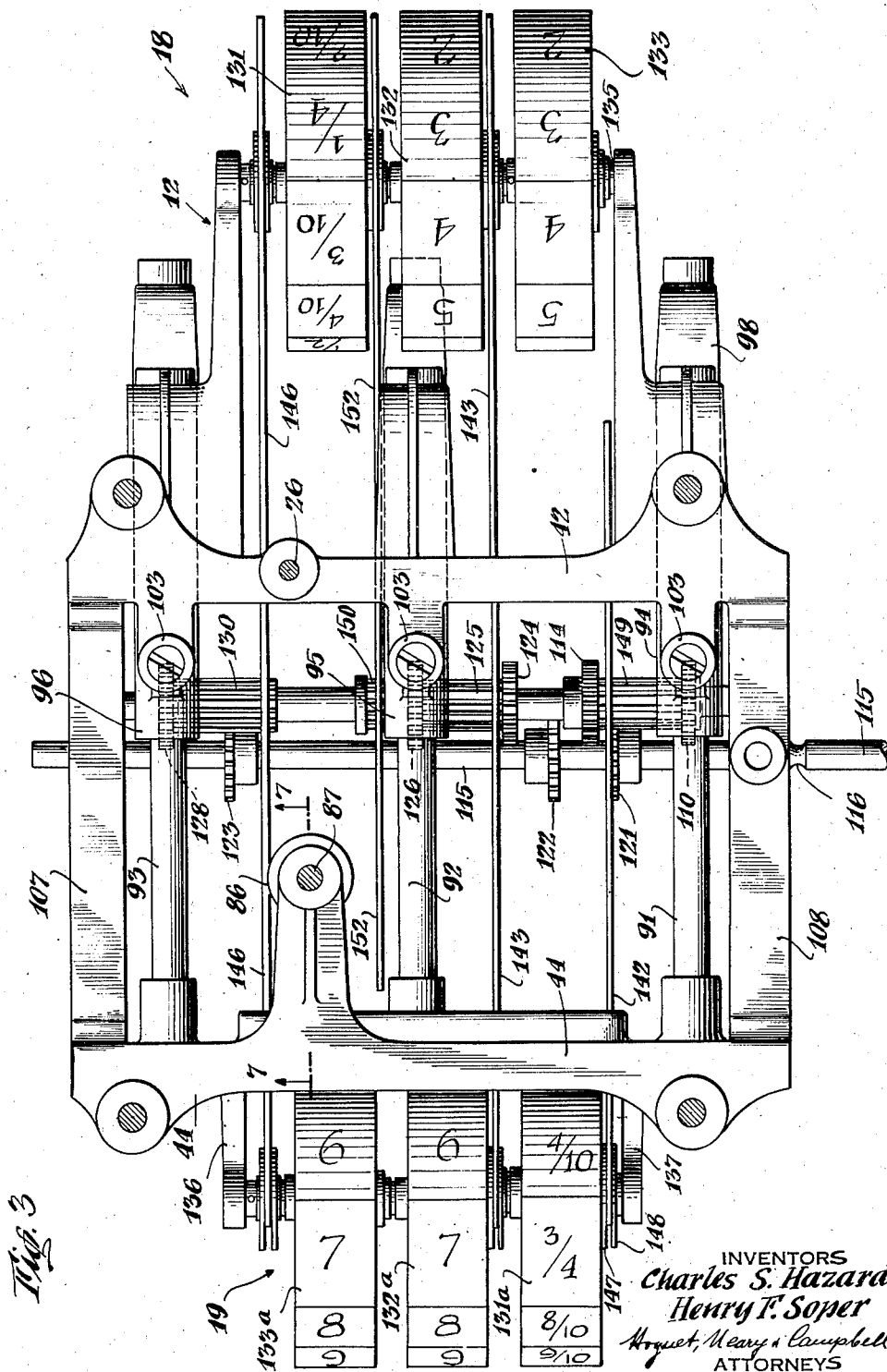
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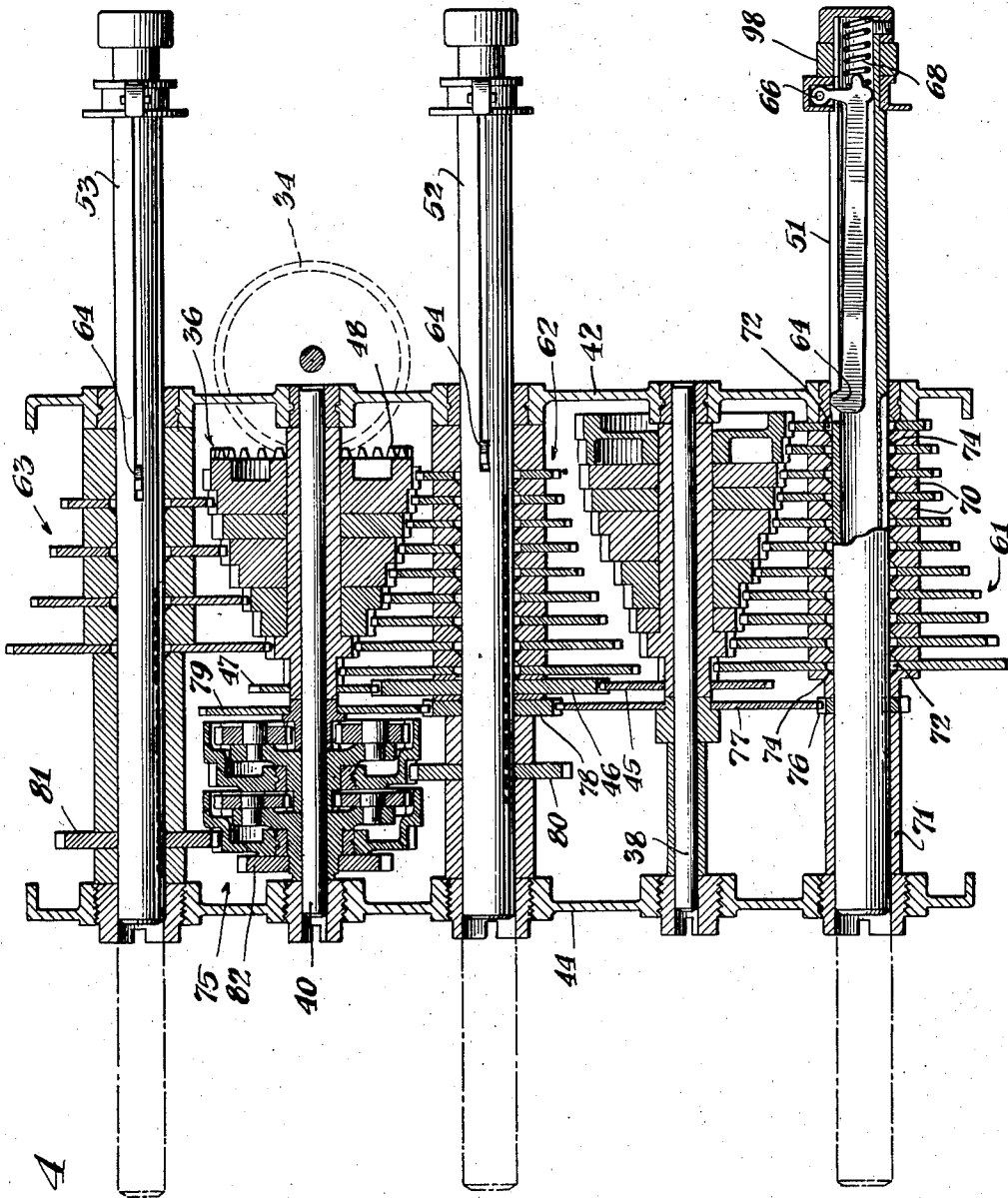


Fig. 4

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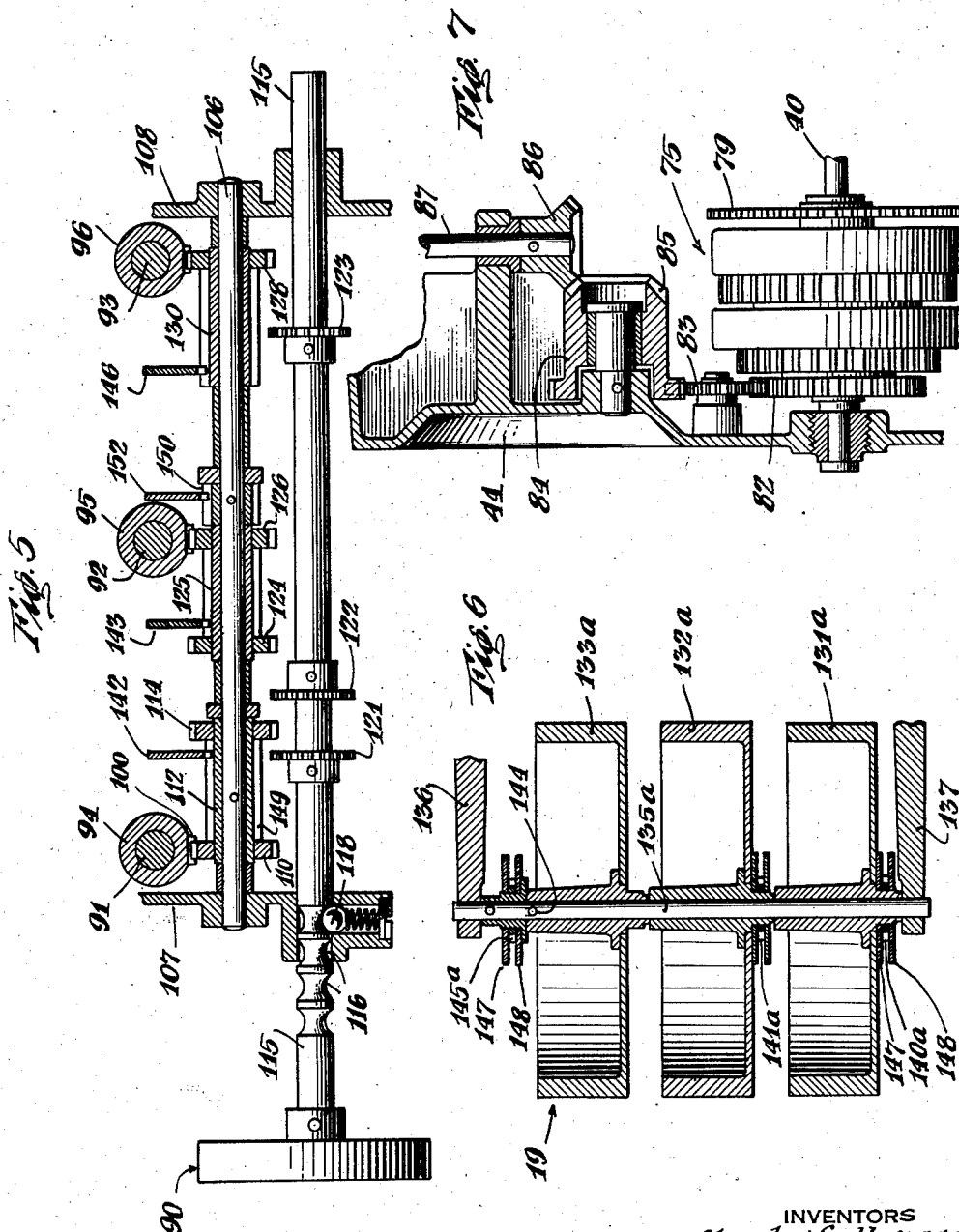
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SINGLE KNOB PRICE SETTING MECHANISM

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SINGLE KNOB PRICE SETTING MECHANISM

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This invention relates to price setting mechanism for registers, such for example, as are used in computing devices for indicating the amount, cost and price of the material being registered.

One of the objects of the invention is to provide an improved, accurate and compact price setting mechanism having a single manually actuatable member for changing the setting thereof.

Other objects and features of the invention are the provision of gear ratio selecting devices in the order of fractions, units and tens or other multiples having a manually actuatable member for actuating the devices to change the gear ratios thereof; the provision of indicating elements having indicia in the order of fractions, units and tens or other multiples operatively connected to corresponding gear ratio selecting devices for indicating the setting thereof; and the provision of an improved rack and pinion arrangement whereby the gear ratio selecting devices and corresponding indicating elements are selectively actuatable by operation of a single manually actuatable member.

Additional objects and features of the invention will become apparent upon consideration of the following detailed description and the appended claims when read in connection with the accompanying drawings, in which:

Figure 1 is a view in vertical elevation of a computing device with a part of the casing broken away to show the details of the price setting mechanism and the driving connection therefrom to the registering mechanism;

Figure 2 is a view in vertical elevation of the lefthand side of Figure 1 with parts broken away to show certain details of the price setting mechanism;

Figure 3 is a fragmentary plan view of the price setting mechanism showing the connecting arrangement between the manually actuatable member and the rack means of the gear ratio selecting devices and the price indicating elements;

Figure 4 is a sectional view taken along line 4—4 of Figure 1 showing details of the gear ratio selecting mechanism;

Figure 5 is a sectional view taken approximately along line 5—5 of Figure 2 showing the detailed construction of the manually actuatable member and the associated mechanism;

Figure 6 is a sectional view taken along line 6—6 of Figure 2 showing the driving connections of a bank of price indicating elements; and

Figure 7 is a sectional view taken along line 7—7 of Figure 3 showing the driving connection to the cost indicating counters of the register.

Referring to Figure 1 of the drawings, a computing device is illustrated comprising a register 10 and a price setting mechanism 12. The

register is of the type provided with sets of counters 14 and 16 for the front and back sides of the register to indicate the amount and cost, respectively, of the material being registered. The price setting mechanism with which the register is associated is provided with banks of indicating elements 18 and 19 (Fig. 3) disposed at the front and back sides of the price setting mechanism for view with the counters of the register. The computing device is thus arranged to indicate the amount, cost and price of the material being registered from two opposed sides of the computing device.

Referring to Figures 1 and 2 of the drawings, the driving connection to the price setting or variator mechanism comprises a coupling 20 depending on a stud shaft 22 appropriately mounted in the lower portion of the frame 24, the coupling 20 being connectable to a meter or other source of power. The stud shaft 22 is connected to a shaft 26 by appropriate gearing indicated generally at 28. The shaft 26 extends upwardly through the frame 24 to transmit movement to the bevel gears 30 and 32 to drive the numeral wheels of the amount or volume register 14 in accordance with the movement of the meter or other source of power. The gearing of the variator mechanism is driven from the gearing 28 by a gear 34 (Figs. 1 and 4).

The driving gears of the variator mechanism comprise two sets of gears 35 and 36 of different diameter arranged in the general shape of stepped cones. The gears of each set are secured together for rotation as a unit upon shafts 38 and 40, respectively. The shafts 38 and 40 are supported in substantially parallel relation by frame members 42 and 44. The gear units 35 and 36 are interconnected for simultaneous movement by a gear train comprising gears 45, 46 and 47, gear 46 being an idler gear while gears 45 and 47 are directly connected to the units 35 and 36, respectively. The gear 34 drives the gear units 35 and 36 by meshing with the teeth of a crown gear 48 carried at the base of the cone-shaped unit 36.

Cooperating with the gear units 35 and 36 and loosely mounted on hollow shafts 51, 52 and 53 are three sets of gears 61, 62 and 63. The gears 61 associated with the shaft 51 are in constant mesh with gears of the unit 35 and provide therewith gear ratios in the order of predetermined fractions of a unit. The gears 62 associated with the shaft 52 are in constant mesh with the gears of cone 36 and provide gear ratios in the order of units from one to nine. The gears 63 associated with the shaft 53 are in constant mesh with certain gears of the unit 36 for the purpose of providing gear ratios in the order of tens. These gear ratios, however, may be provided to represent a multiple other than tens should such be desirable, reference being had by way of ex-

ample to currencies of other denominations such as the British pence, shilling and pound. It is to be understood, therefore, that the variator mechanism of this invention contemplates any desired order of gear ratio selections, the order of fractions, units and tens being by way of illustration only.

In order to vary the gear ratio of the variator mechanism, the shafts 51, 52 and 53 are each provided with a key 64 for selectively connecting to the respective shaft any one of the loose gears associated therewith. Each key 64, as illustrated in connection with shaft 51 (Fig. 4), is pivotally mounted within the hollow shaft at 66. A spring 68 urges the key in a direction to lockingly connect the loosely mounted gears to the shaft as the shaft is shifted axially, the loosely mounted gears being maintained in axial position by spacer elements 70, and a sleeve 71. Each of the gears 61 is provided with internal recesses 72 for cooperation with the key 64. The spacers 70 are provided with beveled edges 74 adjacent the inner edges of adjacent gears whereby the key 64 is adapted to disengage and reengage adjacent gears by axial movement of the shaft 51. By this structural arrangement the shafts 51, 52 and 53 are adapted by axial movement to be selectively connected with appropriate gear ratios in the order of fractions, units and tens, respectively; thus providing a computing ratio corresponding to the desired price displayed by the indicators 18 and 19.

For the purpose of integrating the movements of the shafts 51, 52 and 53, a differential gearing 75 is shown mounted on shaft 40. The movement of shaft 51 is transmitted to the differential gearing through gears 76, 77, 78 and 79, gears 77 and 78 acting as idler gears while gear 76 is slidably keyed to the shaft 51. The movements of shafts 52 and 53 are transmitted to the appropriate gears of the differential gearing by slidably keyed gears 80 and 81, respectively.

Referring to Figures 2, 4 and 7 of the drawings, the driving connection between the differential gearing and the cost register is as follows: The transmitting gear 82 of the differential gearing 75 drives through an idler gear 83, a gear unit 84 which is provided with beveled teeth 85 adapted to mesh with a bevel gear 86 carried by a vertical shaft 87. The shaft 87 extends upwardly of the variator mechanism and carries a bevel gear 88 which meshes with bevel gear 89. An appropriate gearing is operatively connected with the gear 89 within the housing of the register 10 for driving the numeral wheels of the cost register 16.

The axial movements of the shiftable shafts 51, 52 and 53 are selectively controlled from a single manually actuatable member 90. The member 90 is adapted for push-pull adjustment for selective engagement by means of a pinion and rack arrangement, whereby either shaft 51, 52 or 53 is moved axially by rotation of the member 90. To transmit the movement of the manually actuatable member 90 to the shafts 51, 52 and 53, three shafts 91, 92 and 93, upon which sleeves 94, 95 and 96 are slidably mounted, are appropriately supported in the frame members 42 and 44. Since each sleeve is similarly constructed and operatively connected to one of the shafts 51, 52 and 53, the sleeve 94 only will be described in detail.

The sleeve 94, as shown in Figure 2, is provided with an arm 98 which is coupled to the hollow shaft 51. The sleeve 94 is adapted to be shifted axially on the shaft 91 for the purpose of

selectively moving the shaft 51 to change the connection between shaft 51 and the gears loosely associated therewith. The movement of the sleeve 94 is controlled by rack teeth 100 on the lower side of the sleeve which mesh with pinion member 90. The upper side of the sleeve is provided with recesses at 101 for cooperation with a spring biased detent 102 mounted on an arm 103 of the frame member 42, the recesses 101 corresponding in number and position with respect to the gears 61. Thus, when the key 64 engages one of the gears 61, the detent 102 enters a corresponding recess 101 to resiliently hold the shaft 51 in gear connecting position.

The rack teeth 100 of the several sleeves are driven from a pinion equipped shaft 106 (Fig. 5) rotatably supported by frame members 107 and 108. The rack teeth 100 of the sleeve 94 are in constant mesh with a pinion 110 carried by a sleeve 112 which is keyed to the shaft 106. Also carried by the sleeve 112 is a second pinion 114 which is adapted to be engaged and driven by actuation of the member 90 which includes a shaft 115 carrying pinions 121, 122 and 123. The shaft 115 is mounted for axial and rotary movement in the frame members 107 and 108, the shaft being provided with annular grooves 116 for engagement by a spring biased detent 118 to resiliently hold the shaft in axially shifted positions.

When it is desirable to change the fractions selector device, the shaft 115 is shifted axially until the pinion 121 engages the pinion 114. A turning movement of the member 90 will then be transmitted through pinions 121, 114, sleeve 112 and pinion 110 to the rack teeth 100 of sleeve 94. Movement of the sleeve 94 causes the hollow shaft 51 to move axially enabling the key 64 to disengage one and engage another of the plurality of gears 61. The selective movements of the units and tens selector devices are similarly controlled from the member 90. For example, when it is desired to vary the setting of the units selector device, the shaft 115 is shifted to a position disengaging the fractions gear train and bringing pinion 122 into meshing engagement with a pinion 124 carried by a sleeve 125 upon which a rack engaging pinion 126 is mounted. Thus, by rotating the shaft 115 during the engagement of pinions 122 and 124, the sleeve 95 which controls the shaft 52 is actuated. Likewise, the pinion 123 may be brought into engagement with a pinion 128 which meshes with the rack teeth of sleeve 96. It will thus be readily apparent, that a shifting movement of the shaft 115 provides for the selective control of the several gear ratios selecting devices to which the sleeves 94, 95 and 96 are connected.

The price indicators 18 and 19 comprise banks of numeral wheels 131, 132 and 133 and 131a, 132a and 133a, respectively, for indicating the setting of the variator mechanism in the order of fractions, units and tens. Each indicator is similarly constructed, and for detailed illustration reference is had to Figure 6, which shows the left-hand bank of indicators 19 of Figure 2 in section. The numeral wheels 131a, 132a and 133a are supported on a shaft 135a rotatably mounted on arms 136 and 137 extending laterally from the frame member 44. The fractions numeral wheel 131a and units numeral wheel 132a are rotatably mounted on the shaft 135a and provided with pinion 140a and 141a which are in meshing engagement with rack members 142 and

143, respectively (Fig. 3). The tens numeral wheel 133a is keyed to the shaft 135a at 144, a pinion 145a being keyed to the shaft for the purpose of driving the tens numeral wheel from a rack 146. Each numeral wheel driving pinion is provided with side discs 147 and 148 to maintain the associated rack in meshing engagement with the respective pinion.

The numeral wheels 131, 132 and 133 of the indicator 18 at the right-hand side of Figures 2 and 3 are, of course, reversed with respect to the corresponding wheels of indicator 19. The tens wheel 133, as in the case of the tens wheel 133a, is secured to the shafts 35 through which it is driven from the pinion 145.

The rack arrangement for driving the numeral wheels of the price indicators 18 and 19 is best illustrated in Figures 3 and 5. To drive the fractions numeral wheels 131 and 131a, the sleeve 112 is provided with teeth 149 which mesh with the teeth of the rack 142, a second pinion sleeve 150 being keyed to the shaft 106 to transmit movement simultaneously with sleeve 112 to the rack 152. The racks 142 and 152 are in constant mesh with pinions 140a and 140, respectively, to drive the fractions numeral wheels. The sleeves 125 and 130 are likewise provided with teeth for meshing engagement with the racks 143 and 146, respectively, which in turn mesh with the pinions 141, 141a and 145, 145a to drive the corresponding numeral wheels 132, 132a and 133, 133a. It will thus be apparent that any adjustment of the gear ratio selector devices will produce a corresponding change in the position and, therefore, the price indications of the numeral wheels of indicators 18 and 19.

The operation in changing the variator mechanism from one setting to another is carried out by actuation of the single manually actuatable member 90. For a change in the fractions gear ratio, the shaft 115 is shifted axially until the gear 121 is meshed with gear 114. The member 90 is then rotated in the desired direction to either reduce or increase the fractions indications viewable on the fractions numeral wheels 131, 131a. The movement of the numeral wheels 131 and 131a indicates a corresponding movement or change in the position of the shaft 51 whereby key 64 connects the desired gear to the shaft 51. A change in the units or tens gear ratio is carried out in the same manner; that is, the shaft 115 is shifted to cause the proper pinion engagement whereby the desired change is effected by rotation of the member 90. The detents 102 resiliently hold the shafts 51, 52 and 53 in the desired position so that the keys of those respective shafts are prevented from coming to rest between adjacent gears, the keys being forced into engagement with either one or the other of adjacent gears.

While the invention has been illustrated and described in the form of a price setting mechanism for use in computing devices, it is recognized that the invention may be applied in a variable speed device not involving price or cost characteristics. It is therefore to be understood that the expression "price setting mechanism," as used in the appended claims, is to be regarded as covering variable speed mechanism generally. It will also be readily apparent to those skilled in the art that many changes may be made in the structure of the embodiment illustrated and described without departing from the spirit of the invention. For these reasons it is to be under-

stood that the present embodiment is to be regarded as illustrative of the invention and not in restriction thereof.

We claim:

1. In a machine of the class described driving means including a plurality of gears of different diameter, a plurality of shafts, a set of gears rotatably mounted on each of said shafts, the gears of each set being in constant mesh with gears of said driving means to provide gear ratios of higher and lower order, means operatively associated with said shafts to intergrade the movement thereof to provide a driving movement in accordance with a gear ratio setting, a means associated with each shaft for selectively establishing driving connection between such shaft and one of the gears associated therewith, a member actuatable to select any one of the connection establishing means, and said member being further actuatable to thereby move the selected connection establishing means into connection with a particular gear on the shaft with which the selected connection establishing means is associated.

2. In a machine of the class described, driving means including a plurality of gears of different diameters, a plurality of shafts, means operatively associated with said shafts to integrate the movements thereof to provide a driving movement in accordance with a selected gear ratio setting, gear means associated with each of said shafts, said shafts being shiftable to positions for establishing connections through said gear means between each respective shaft and a selected one of said plurality of gears, a means associated with each shaft for shiftablely adjusting said shaft, a member actuatable to select any desired one of the adjustable means, and said member being further actuatable to operate the selected adjusting means to thereby shift the shaft associated therewith whereby the shafts can be selectively moved to vary the connections between the shafts and said plurality of gears.

3. In a machine of the class described, driving means including a plurality of gears of different diameter, a plurality of shafts, means operatively associated with said shafts to integrate the movements thereof to provide a driving movement in accordance with a setting thereof, gear means associated with each of said shafts, said shafts being reciprocable to positions for establishing connections through said gear means between each respective shaft and a selected one of said plurality of gears, fixed shafts arranged adjacent said movable shafts, a sleeve provided with rack teeth mounted for axial movement on each of the fixed shafts, means operatively connecting each sleeve to one of said movable shafts, and means shiftable to selectively engage one of said racks and rotatable to actuate the rack and thereby shift axially the reciprocable shaft associated therewith.

4. In a machine of the class described, a plurality of change speed devices, each of said devices having adjustable means for adjusting the ratio of such device, each of said adjustable means having a rack, a member having pinion means, said member being actuatable to cause said pinion means to selectively establish a driving connection with any desired one of the racks, and said member being rotatable to operate the selected rack to thereby set a desired speed ratio on the device associated with the selected rack.

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