March 28, 1939. A. B. MACHADO 2,152,199

CALCULATING MACHINE

Original Filed Jan. 23, 1933 4 Sheets-Sheet 1

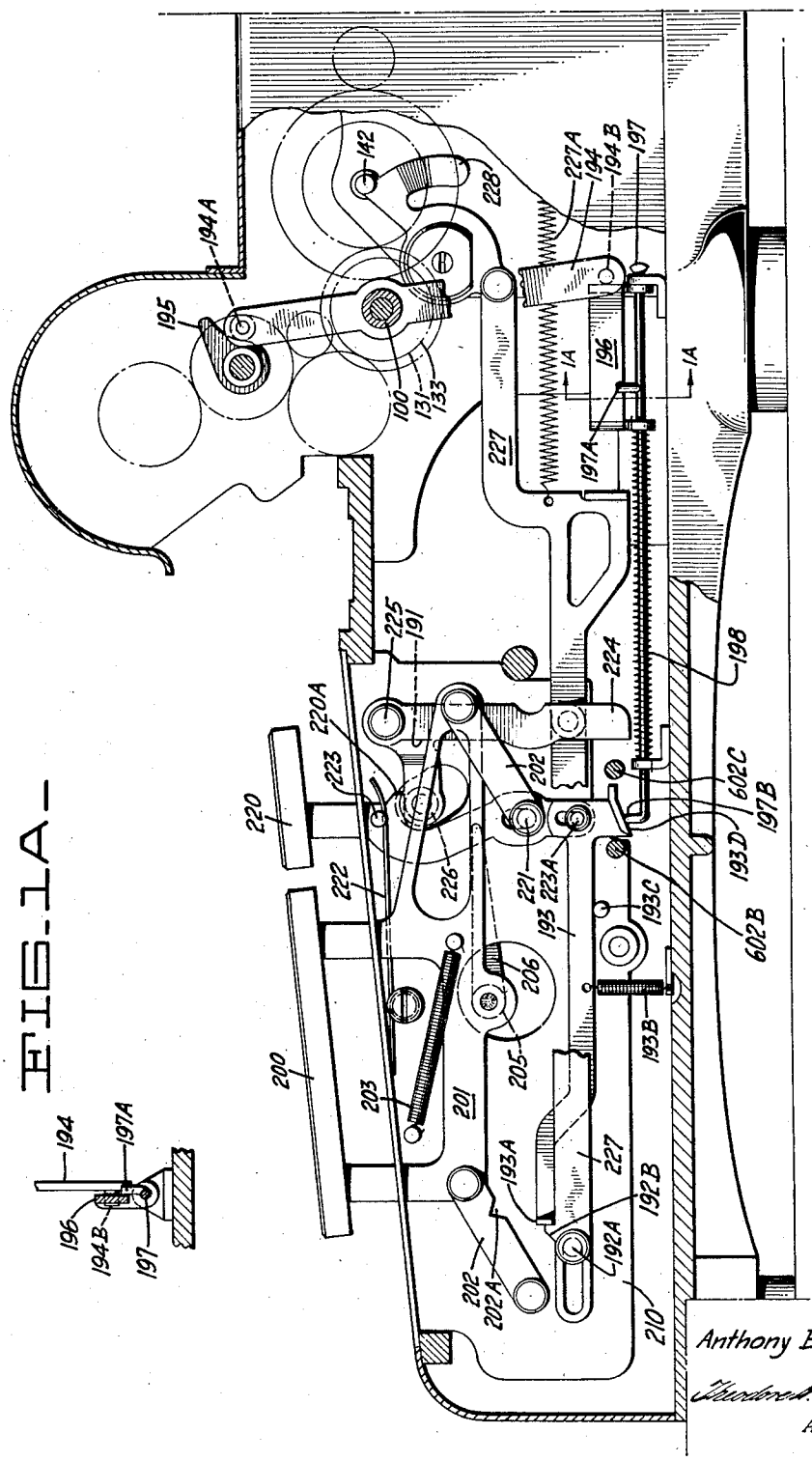

FIG. 1.

FIG. 1A.

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Original Filed Jan. 23, 1933 4 Sheets-Sheet 2

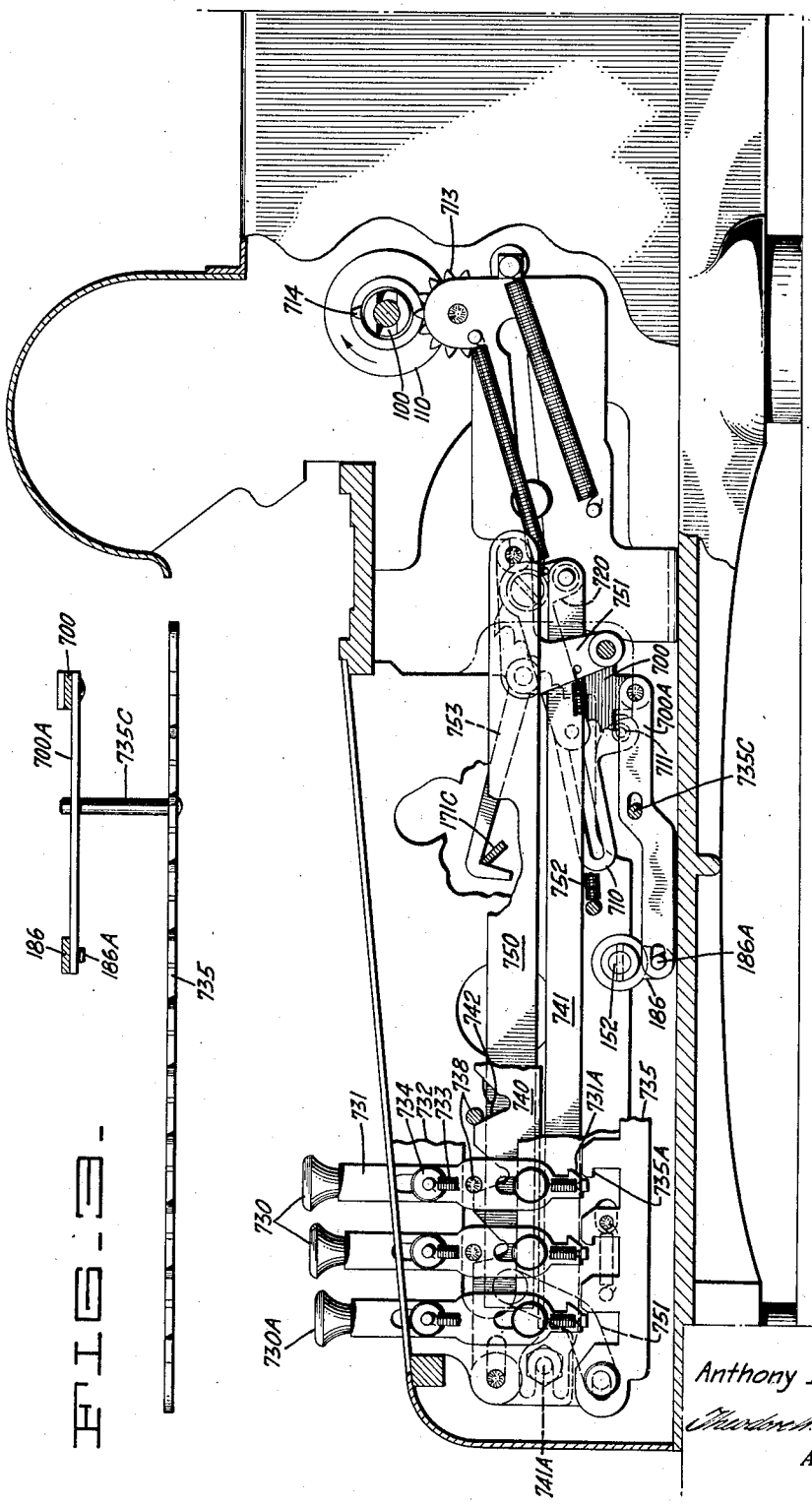

FIG-2-

FIG-3-

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CALCULATING MACHINE

Original Filed Jan. 23, 1933 4 Sheets-Sheet 3

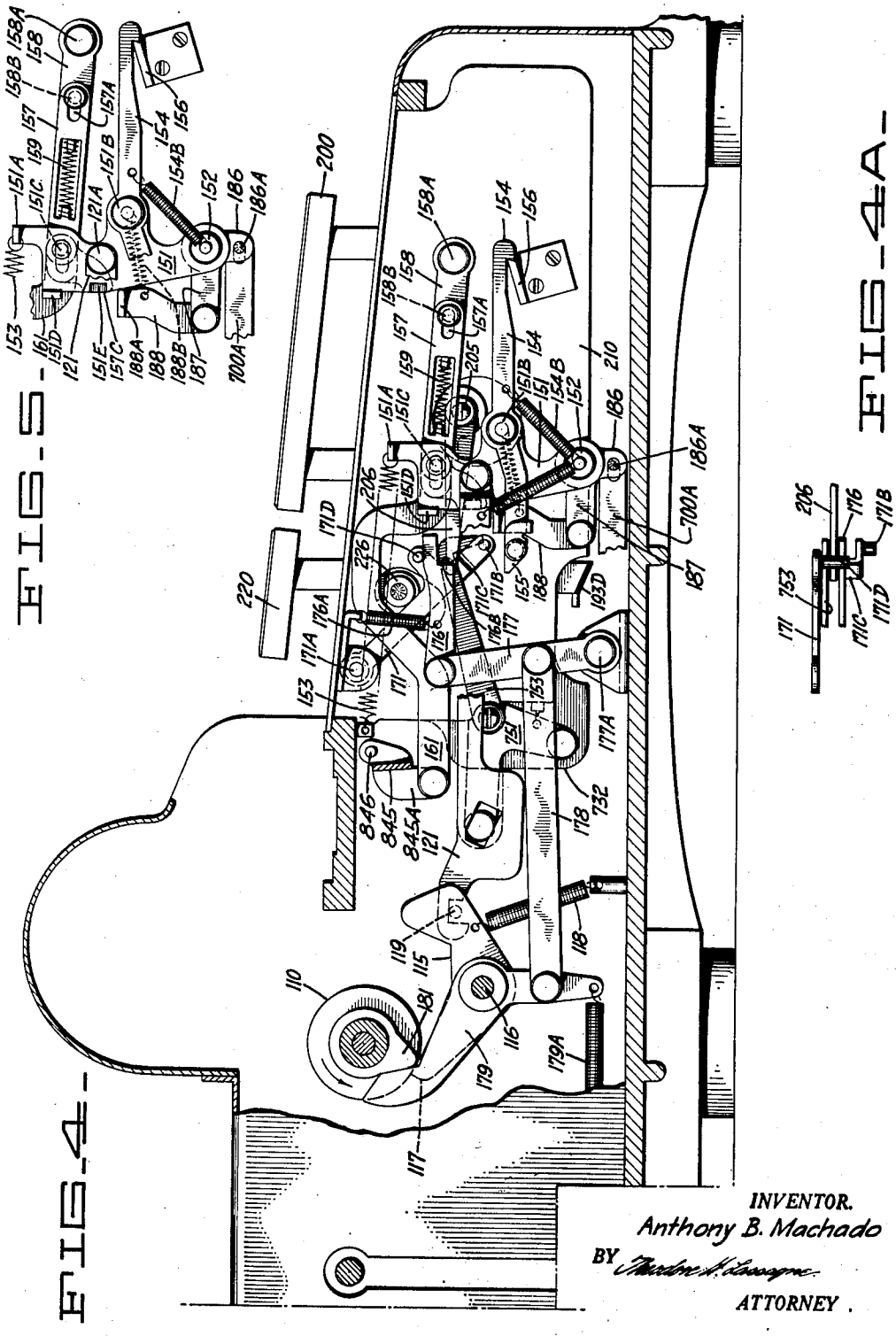

FIG-5-

FIG-4A-

FIG-4-

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CALCULATING MACHINE

Original Filed Jan. 23, 1933 4 Sheets-Sheet 4

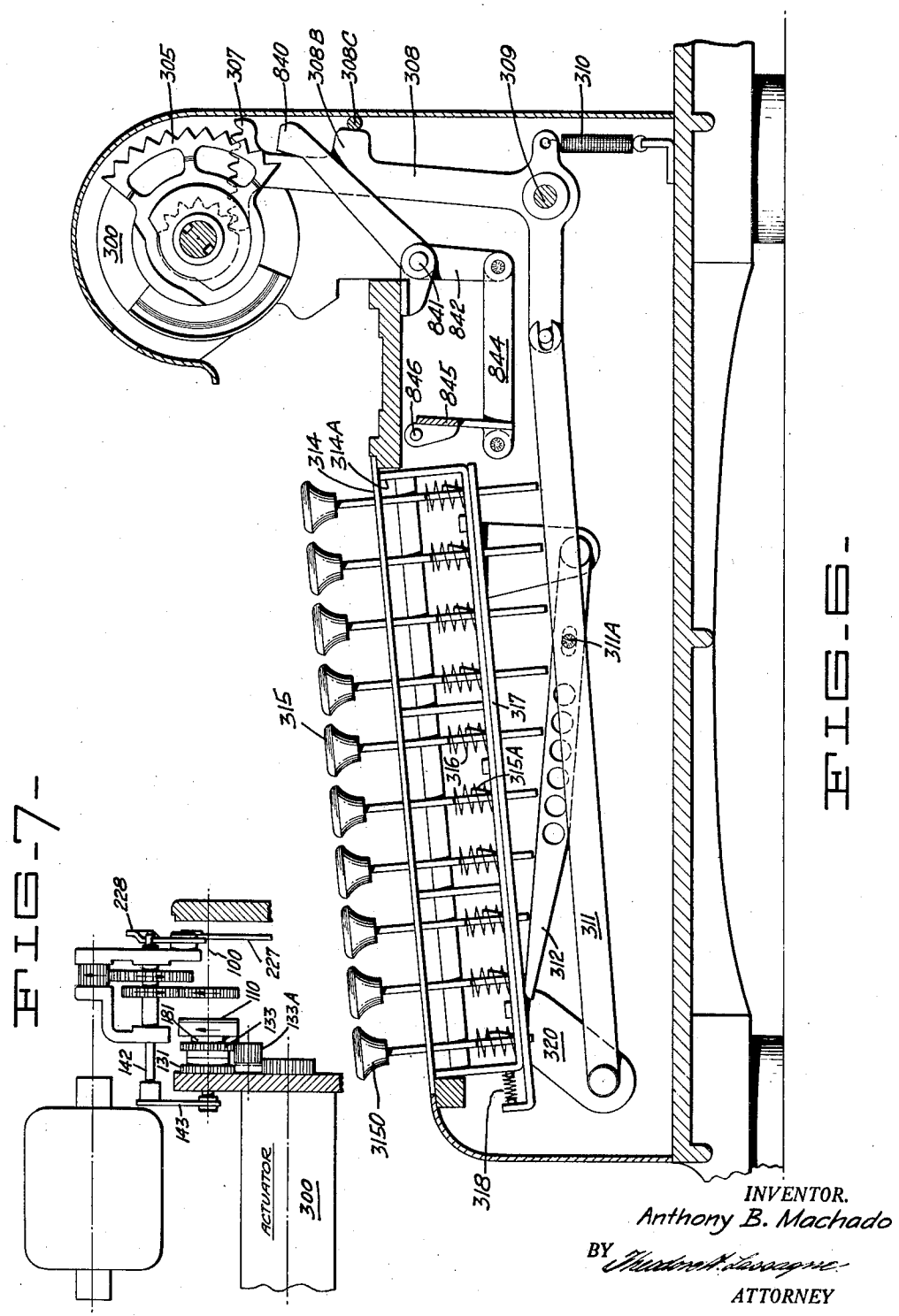

FIG-6-

FIG-7-

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UNITED STATES PATENT OFFICE

2,152,199

CALCULATING MACHINE

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Application January 23, 1933, Serial No. 653,085
Renewed May 29, 1937

6 Claims. (Cl. 235—79)

The present invention relates to calculating machines and the like adapted to perform the four cardinal calculations and combinations thereof, and particularly to the type in which a transmission mechanism is adapted to be controlled by a plurality of operation controlling devices to initiate a calculation involving one or more cycles of operation of the machine. The invention is concerned more particularly with means for reducing the force or pressure required to operate any control key or lever by the provision of power operated means for engaging or setting the various control devices to their respective positions.

It is an object of the invention to provide operation control devices which require a comparatively light pressure for movement thereof to operative position.

Another object of the invention is the provision of power operated means for engaging a clutch or transmission mechanism.

Another object of the invention is the provision of power operated means for positioning mechanism to initiate a subtractive operation.

Another object of the invention is the provision of power operated means for restoring the clutch engaging means to inoperative position.

Another object of the invention is the provision of power operated means for restoring the reversing control means to normal position.

Another object of the invention is the provision of means whereby a manually operable member is adapted to control one or more power operated machine controls.

Another object of the invention is the provision of power operated means for locking the selection mechanism during operation of the machine.

Other objects will appear as the description progresses.

The machine embodying the present invention is of the general type shown in the patent to Friden, Number 1,643,710, dated September 27, 1927, to which reference is hereby made for a disclosure of a complete calculating machine including mechanisms not specifically described herein. It is to be understood, however, that although the invention is shown applied to a machine of the general type disclosed in said patent, it is manifest that the invention is applicable in any machine which is power driven and in which various controlling mechanisms must be set at the beginning of a particular operation.

The invention possesses a plurality of advantageous features, some of which will be set forth in full in the following description, and while the preferred construction thereof is shown in the drawings accompanying the description, it is understood that the invention is capable of modification within the scope of the claims.

In the accompanying drawings:

Figure 1 is a longitudinal section taken from the right showing the plus and minus keys and the reversing control mechanism.

Figure 1A is a detail of the reversing control mechanism taken on section line 1A—1A of Figure 1.

Figure 2 is a longitudinal section taken from the right showing the multiplier keys and the multiplier control unit.

Figure 3 is a detail plan view of the multiplier key latching slide and the releasing means therefor.

Figure 4 is a longitudinal section taken from the left disclosing engaging means and the controlling means therefor.

Figure 4A is a detail in plan of a portion of this mechanism.

Figure 5 is a detail view in elevation of certain mechanisms shown in Figure 4.

Figure 6 is a longitudinal section taken from the right disclosing the numeral keys, the selecting mechanism, and the locking means therefor.

Figure 7 is a schematic plan view of the driving mechanism.

Calculating machines heretofore have been provided with power driven means for controlling the various operations thereof including devices which were settable by movement of various control keys against the tension of springs sufficiently strong to restore the mechanism to normal position upon completion of the operation. Calculating machines of this type are disclosed in the application of Avery and Lerch No. 405,127, filed November 6, 1929 and issued as Patent No. 2,022,103. In the type of machine where the operation initiating devices positively move the various controlling mechanisms to set position against the tension of springs or such, considerable pressure sometimes amounting to several pounds is required to move said operation initiating devices, which is undesirable in a machine and tiring to the operator.

The present invention provides power operated means for setting the various controlling mechanisms to operative position upon manipulation of the respective controlling keys so that the strong springs formerly used to provide for restoration of said mechanisms are eliminated, the controlling keys being provided with very light springs

only, so that the pressure required to operate them is materially reduced.

Differential mechanism

The machine embodying the present invention, shown in the accompanying drawings, is provided with a plurality of banks of numeral keys, one bank of which is shown in Figure 6, the said numeral keys **315** being mounted in a key frame comprising a top plate **314** and a strap **314A** attached thereto. Keys **315** are normally held in raised position by springs **316** bearing against the strap **314A** and suitable shoulders formed on the key stems. Disposed below and in contact with the strap **314A** is a slide **317** normally held in its forward position by a spring **318**. Slide **317** is provided with a plurality of apertures through which the key stems extend, and each key stem is provided with a lug **315A** which, when the key is depressed, causes rearward reciprocation of the slide **317**, and which, on return of the slide, engages thereunder to hold the key in depressed position. The clearance key **3150** is provided on its face with a longer camming projection which operates upon depression of the clearance key to move the slide rearwardly to release any depressed key.

The selecting bar or lever which is differentially depressed by operation of the different keys is positioned below the key stems and comprises a duplex lever. The main lever **311** is pivoted at its forward end to a tongue **320** depending from strap **314A** and is connected at its free or movable end with a bellcrank **308** pivoted at **309** and provided on its upper end with a rack **307** meshing with a gear integral with actuator selecting element **305**. Fulcrumed on a depending bracket near the rearward end of the key section is the secondary lever **312**, said lever being loosely pivoted to the main lever **311** as shown at **311A** (Figure 6). The arrangement of the duplex lever system is such that selecting element **305** is selectively rotated from one to nine increments upon depression of the corresponding numeral key **315**. The bellcrank **308** is shown in Figure 6 in its zero position, in which the lug **308B** engages a zero stop **308C** under the tension of spring **310**. Reference is hereby made to the above noted patent to Friden for a more detailed description of the differential selecting mechanism illustrated herein. The value to which the actuator **300** is set is entered into the accumulator **400** upon rotation of said actuator by means to be described hereinafter.

Means are provided for locking the settable selecting element **305** during rotation of actuator **300**. Said means comprises a locking dog **840** (Figure 6) secured on shaft **841** and adapted to be rocked into engagement with a notched portion of selecting element **305**. Arm **842** secured to shaft **841** is connected by link **844** with a bail **845** pivotally mounted on studs **846** and provided at its right end with an arm **845A** (Figure 4) to which a link **161** is pivoted. Upon depression of any operation initiating key, link **161** is moved rearwardly by means to be hereinafter described, thereby rocking bail **845** and, through link **844** (Figure 6), arm **842**, shaft **841**, and locking dogs **840**. Locking dogs **840** are maintained in locking position throughout the operation of the actuating mechanism and are thereafter returned to inoperative position through the above described linkage by means to be described hereinafter.

Driving mechanism

The machine is provided with a motor which drives, through suitable speed reducing gearing, the drive shaft **100** (Figures 2 and 7) of clutch **110** (Figure 4). Clutch **110** is of the type described in the above mentioned patent to Friden, the housing of said clutch being provided with an opening in the periphery thereof which is adapted to be engaged by nose **117** of clutch control bellcrank **115** to control engagement and disengagement of said clutch, as fully disclosed in the above mentioned patent.

Suitable reversing gearing is interposed between the clutch **110** and the actuator **300** (Figures 1 and 7) of the type described in the patent to Friden No. 1,682,901, dated September 4, 1928. Either gear **131** or gear **133** (Figures 1 and 7) may be caused to transmit rotation from the clutch housing to the actuator, depending upon the direction of rotation of the actuator to be effected. The gear **131** drives through a train of gearing to drive said actuator in an additive direction, while the gear **133** drives through a train of gearing including an idler **133A** and thus serving to drive said actuator in a subtractive direction. The drive from the clutch housing to the respective gear **131** or **133** is transmitted by a pin splined to said shaft and being shiftable into a seat in either of the respective gears **131** and **133** as described in the patent above referred to. A suitable shifting fork **143** is provided for shifting said pin from the seat in one gear to the seat in the other, said pin being normally disposed within the seat in the gear **131** in the position to drive said actuator in an additive direction.

Power operated clutch engaging means

The actuating cluch **110** (Figure 4) is controlled by the clutch release bellcrank **115** pivoted on shaft **116**. Said bellcrank is provided, on its forward arm, with a pin **119** which normally seats in a notch in the nose of a clutch control link **121**. The forward end of this link **121** is pivoted at **121A** (Figure 5) to the rockable plate **151** pivoted at **152** to supporting plate **210**. Plate **151** is constantly urged toward the rear of the machine by a strong tension spring **153** secured to an upstanding ear **151A** formed on said plate and a suitable pin on the frame of the machine (Figure 4). Said plate **151** is normally held against rearward movement by latching member **154** (Figures 4 and 5) pivoted at **151B** thereon, the forward end of said latching member being formed as a latching nose to engage a lug **156** secured to supporting plate **210**, and spring **118** then acts to maintain clutch **110** disengaged.

Means are provided for releasing latch **154** so that spring **153** may move plate **151** to the rear to cause engagement of the clutch. An arm **171** (Figures 4 and 4A) is pivoted at **171A** to an ear depending from the cover plate, and is provided with a pin **171B** on its free end which overlies a pawl **155** pivoted on the rearward end of latching lever **154**, said pawl being yieldable in a clockwise direction about its pivot point. Arm **171** is rocked downwardly by operation of any control key, in a manner to be hereinafter described, and upon such downward movement pin **171B** contacts the pawl **155**, and since said pawl is nonyieldable in this direction of movement, latching lever **154** is rocked in a counter-clockwise direction freeing plate **151** for rearward movement. It is to be noted that as the arm **171**, and pin **171B** thereon move upwardly at the end of the operation, pawl **155** yields to permit passage of said pin to the position shown in Figure 4 without affecting lever **154**.

Means are provided for limiting the rearward movement of plate 151 upon release of the latching means therefor, said means comprising an extensible spring linkage 157, 158. Link 158 of said double linkage is pivoted at 158A to supporting plate 210 and is provided with a pin 158B engaging a corresponding slot 157A in link 157. Links 157 and 158 are provided with elongated openings intermediate their length within which compression spring 159 is retained by suitable struck out legs. Pin 151C secured to the upper end of plate 151 extends through slots provided in the rearward ends of links 157 and 158 and also serves as a pivot for link 161 heretofore described as controlling locking means for the selecting mechanism. Thus the movement of pin 151C rearwardly, under influence of spring 153, is limited by the length of the slot in link 157. The slot in the rearward end of link 158 is longer than the corresponding slot in link 157 to permit movement of plate 151 and link 157 with respect thereto. The rocking movement of plate 151 toward the rear of the machine acts through link 121 to rock clutch release bellcrank 115 in a counter-clockwise direction against the tension of spring 118 to cause engagement of clutch 110, in which position it is maintained throughout the operation determined by the operated key.

Means are provided controlled by the release of the operated control key for restoring the clutch engaging means to inoperative position at the end of an operation. A pawl 176 (Figure 4) is pivoted at its rearward end to the upper end of an arm 177 pivoted on a suitable ear on the base plate at 177A. Arm 177 is connected by a link 178 with the lower arm of a bellcrank 179 loosely mounted on shaft 116, the upper arm thereof being held, by tension spring 179A, in engagement with a cam 181 secured to the housing of the actuating clutch 110. The rise on cam 181 is so positioned that it rocks the bellcrank 179 immediately before the end of each cycle of counter-clockwise rotation, so that bellcrank 179, link 178, arm 177, and pawl 176 are oscillated near the end of each cycle of operation. The nose of pawl 176 is adapted to engage, upon forward movement thereof, a lateral extension 151D on the upper rearward edge of plate 151 to rock said plate to inoperative position, where it is shown in Figure 4. This operation may occur when pawl 176 occupies the position shown in Figure 4. However, when arm 171 is moved downwardly by the operation of any control key, pin 171D thereon moves pawl 176 downwardly against the tension of spring 176A so that said pawl reciprocates beneath the lateral extension 151D on plate 151 as long as a control key is held in operating position. As will be described hereinafter, movement of any of the said control keys to inoperative position permits upward movement of arm 171 thereby permitting spring 176A to move pawl 176 into the plane of the lateral extension 151B whereupon its next forward movement will restore plate 151 to its forward position where it will be latched by latching member 154 engaging lug 156 under the influence of tension spring 154B.

Plus key control

Plus key 200 (Figures 1 and 4) comprises a frame 201 mounted on parallel links 202 for downward and rearward movement upon depression thereof against the tension of a spring 203 secured to frame 201 and supporting plate 210. A pin 205 secured to the frame 201 extends through the plate 210 and carries at the outer end thereof an arm 206 (Figure 4) the rearward nose of which overlies the offset portion 171C of arm 171 (see also Figure 4A). Thus depression of plus key 200 rocks arm 171 downwardly to release latch 154 thereby releasing plate 151 for rearward movement under the influence of tension spring 153 to cause engagement of the clutch in the manner heretofore described. Such downward movement of arm 171 also moves pawl 176 to inoperative position until the plus key is released whereupon pawl 176 and arm 171 rise under the influence of spring 176A, and pawl 176 during its next forward movement contacts lateral extension 151D on plate 151, restoring said plate to inoperaive position where it is latched by latching member 154.

Multiplier key control

A series of multiplier keys 730 (Figure 2), of differing numerical value, are mounted for vertical sliding movement on pins 734 on supporting plate 732, each key being normally maintained in its raised position by spring 733 tensioned between each upper pin 734 and a lateral extension on the lower end of each key stem 731. The lower end of each key stem 731 is provided with a nose 731A which is adapted upon depression of the key to cam a latching slide 735 to the right and thereafter to be positioned beneath a nose 735A on said slide to maintain the key in depressed position during the operation determined thereby. The key 730A at the forward end of the bank of keys 730 is a clearance key and its function is to move the slide 735 to cause the release of any key 730 which may be held depressed.

Means are provided whereby upon depression of any multiplier key a value is set into the multiplier control unit corresponding to the value of the depressed key. Each key stem 731 is provided with a laterally extending pin 738 which overlies a camming notch in a differential slide 740 slidably mounted on the plate 732. Slide 740 is moved longitudinally to a different position upon the depression of each of the keys 730, due to the differing inclinations of the sides of notches 742 formed in the upper surface of said slide. The opposite sides of each notch are complementally inclined to cause proper positioning of the slide upon depression of each key, regardless of the prior position of said slide, while the bottom of each notch is formed as a socket adapted to receive the pin 738 to accurately position said slide.

A link 741 connected to the forward end of slide 740 at 741A is connected at its rearward end to the short arm of a bellcrank 720, the longer arm of which operates a slide 710 for rocking movement therewith and which is capable of longitudinal movement with respect to said bellcrank, as fully set forth in the above mentioned patent to Friden. The arrangement is such that the differential positioning of slide 740 is transmitted through link 741 to bellcrank 720, thereby angularly positioning slide 710 and pin 711 carried on a depending ear thereof in a position corresponding to the value of the depressed key. In a manner fully set forth in the above mentioned patent, the slide 710 receives step by step movement from gear 713 (Figure 2) which is moved one increment by a single tooth 714 upon each rotation of clutch 110 to which said single tooth is secured. During the last increment of movement of slide 710, pin 711 contacts the aligned step of a stepped plate 700 moving the plate rearwardly to terminate the operation in a manner

fully set forth in the above mentioned patent to Friden. This movement of stepped plate 700 is utilized to arrest the machine even though one of the multiplier keys 730 remains depressed, as will be set forth hereinafter.

Means are provided for releasing the spring operated clutch engaging means upon depression of a multiplier key. Arranged at the side of slide 740 and directly below pins 738 thereon, is a bar 750 which is supported for parallel motion on links 751 and which is normally held in elevated position in contact with pins 738 by the spring 752. Due to the inclination of links 751 depression of a key 730 causes a rearward and downward movement of the bar 750 and a clockwise movement of links 751. Secured to the rearward link 751 and offset therefrom is a finger 753 (Figures 2 and 4) the hooked end of which overlies the offset portion 171C of arm 171 (see also Figure 4A). From the foregoing description it is seen that the described oscillation of the rearward link 751 through finger 753 rocks arm 171 downwardly to cause release of plate 151 to cause engagement of the clutch in the manner heretofore described.

Means are provided for enabling the power operated disabling means for the clutch engaging means after a number of rotations of the actuating mechanism corresponding to the value of the depressed multiplier key. Secured to a depending ear on plate 700 is a forwardly extending link 700A which is slotted intermediate its ends to receive a pin 735C secured to the latching slide 735 (Figures 2 and 3). Upon rearward movement of slide 700 during the last cycle of actuation determined by the depressed multiplier key, said movement occurring at approximately mid-cycle position as seen by the relative position of the tooth on single tooth gear 714 and gear 713, link 700A moves latching slide 735 to the rear thereby releasing nose 731A on key stem 731 from hook 735 beneath which it was held, so that multiplier key 730 is free to rise to inoperative position under the influence of its spring 733, thereby permitting parallel bar 750 to rise upwardly and link 751 to rock in a counter-clockwise direction thereby raising the hook 753 to the front and releasing arm 171 to permit pawl 176 to be positioned in front of the lateral extension 151D and restore plate 151 to inoperative position upon reciprocation of said pawl toward the end of the cycle then in progress.

Means are provided for disengaging the clutch and disabling the power operated clutch engaging means independently of the release of the multiplier key when said key is held depressed by the operator in which event pawl 176 is not permitted to move into the path of the lateral extension 151D on plate 151. Link 700A (Figure 2) is provided at the forward end thereof with a slot engaging a pin 186A on a short arm 186 secured to shaft 152 (Figures 2 and 4). Secured to shaft 152 adjacent to plate 151 is a short horizontal arm 187 (Figures 4 and 5) to the end of which is pivoted a vertical arm 188 provided at its upper end with a lateral extension 188A which lies to the rear of and is held in contact with plate 151 by a spring 188B tensioned between said arm 188 and pin 151B (Figure 5). Upon rearward movement of slide 700A toward the end of a multiplying operation, arm 186, shaft 152, and arm 187 are rocked in a clockwise direction as viewed in Figures 4 and 5 whereby arm 188 is moved upwardly until the lateral extension 188A thereon engages a notch 151E formed in the rearward edge of plate 151. It should be remembered that in the active position of plate 151 the linkage 157, 158 is in its extended position whereby the vertical edge 157C formed on the rearward end of link 157 is no longer aligned with the forward edge of plate 151 but occupies a position in alignment with the rear edge of slot 151E so that extension 188A is now free to enter and latch in said notch under the tension of spring 188B.

When arm 188 is in its upper position with lateral extension 188A lying in the notch 151E in plate 151, and pawl 176 is in its lower position, the rearward edge of extension 188A abuts the shoulder 176B formed on the pawl 176 so that said pawl is adapted upon reciprocation to contact extension 188A and rock the plate 151 to its forward inoperative position where it is retained by latching member 154. During the latter part of such movement spring linkage 157, 158 is compressed and after retraction of pawl 176 forward edge 157C of link 157 moves into alignment with the rearward edge of plate 151 carrying lateral extension 188A out of engagement with the notch 151E, thereby permitting downward movement of arm 188 when the depressed multiplier key has been released.

Minus key control

Minus key 220 (Figures 1 and 4) is mounted for vertical sliding movement by means of a slot formed therein engaging a stud 221 on the supporting plate 210. A wire spring 222 engages pin 223 on the stem of said key and urges said key to raised position. The intermediate portion of the stem of the minus key 220 is curved forwardly and carries a rearwardly extending finger 220A which overlies a roller 226 on the horizontal arm of a bellcrank 224 pivoted at 225. Upon depression of the key 220 bellcrank 224 is rocked in a counter-clockwise direrction. As shown in Figure 4, roller 226 on bellcrank 224 overlies arm 171 so that such movement of the bellcrank causes downward rocking movement of arm 171 to control the operation of the clutch engaging and disengaging mechanism in the same manner as described in operation thereof under control plus key 200.

Power operated reversing control

Power operated means are provided for setting the reversing gearing to determine subtractive operation of the actuating mechanism. As previously described, camming member 228 (Figures 1 and 7) controls the position of shaft 142 and thereby the setting of the reversing gearing. Connected to said camming member is a link 227 to which is attached a strong tension spring 227A, the other end of said spring being secured to the frame of the machine, this arrangement tending to move link 227 rearwardly and rock member 228 to set the reversing gearing 131, 132 for subtractive operation. Link 227 is normally latched in forward position and means are provided for tripping its latching means upon depression of a negative initiating key. Link 227 is supported intermediate its ends by an arm 191 pivoted on stud 225 and is slotted at its forward end to engage a stud 192A on supporting plate 210. Link 227 is provided on its upper forward edge with a lug 192B which is adapted to be engaged by a lateral extension 193A on the forward end of latching member 193 when link 227 is in its forward position. Latching member 193 is adapted to oscillate about a stud 193C on the supporting plate 210, being urged into latching position by a spring 193B

tensioned between the forward end of said latching member and a suitable lug on the base plate.

Latching member 193 is provided at its rearward end with a nose, the upper portion of which is slotted to receive a pin 223A on minus key 220 and which is provided with a lateral camming extension 193D adapted to cooperate with a pin 602B on the division slide as described hereinafter. Pins 223A and 602B are adapted respectively upon operation of the minus key and the division slide to rock latching member 193 about pin 193C whereby its forward end is raised from engagement with the lug 192B on link 227, thus freeing link 227 to move rearwardly under the influence of spring 227A to set the reversing gearing. The setting of the reversing gearing is accomplished before the engagement of the clutch as pin 171B (Figure 4) is spaced a sufficient distance above pawl 155 to allow time for such setting before latching member 154 is moved to inoperative position.

Power operated means are provided for restoring the reversing mechanism to its normal positive position at the conclusion of subtractive operation. Said means comprises a two-armed lever 194 (Figures 1 and 1A) loosely mounted on the drive shaft 100 and being provided at its upper end with a roller 194A which engages the periphery of a cam 195 secured to a shaft driven in time with the actuating mechanism so that lever 194 is reciprocated once for each operation of the actuating mechanism. Means are provided for enabling the power operated restoring means during the last cycle of actuation determined by the operated control key. Interponent 196 (Figures 1 and 1A) rotatably and slidably mounted on a rod 197 which is retained in suitable supports on the base plate, said rod being provided with a finger 197A engaged by interponent 196 under the influence of a spring 198 which serves as both a compression and a coil spring. One end of said spring 198 is secured to the forward support for rod 197 while the other end is fastened to rockable interponent 196 so that said interponent is urged in a clockwise direction as viewed in Figure 1A against finger 197A.

Upon movement of latching member 193 to inoperative position lateral camming extension 193D formed thereon engages bent end 197B of rod 197 rocking said rod and interponent 196 in a counter-clockwise direction (Figure 1A) out of the path of a pin 194B on the lower arm of lever 194. When the operated control key is released the nose of latching member 193 moves upwardly thereby permitting rod 197 and interponent 196 to be restored by spring 198 to the position shown in Figure 1. In that position pin 194B on the lower arm of lever 194 is adapted upon subsequent reciprocation of said lever to contact interponent 196 moving the same forwardly and thereby link 227, a lateral extension of which abuts the forward edge of interponent 196 when said link is positioned to determine subtractive operation. Upon rearward movement of link 227, latching member 193 becomes effective to retain the reversing control means in additive position as shown in Figure 1.

Interlocking means are provided for preventing simultaneous operation of plus key 200 and minus key 220. Upon depression of plus key 200 forward supporting link 202 therefor is adapted to overlie lateral extension 193A on lever 193 to prevent movement thereof by minus key 220 in the manner described heretofore. Upon depression of minus key 220 lateral extension 193A moves into engagement with notch 202A in link 202 thereby preventing depression of plus key 200.

Division key control

Means are provided for enabling the power operated clutch engaging means upon movement of the division control means to operative position. The specific construction of the division control mechanism is not essential to an understanding of the invention and is not described herein, reference being made to the British patent to Friden No. 342,044, accepted January 29, 1931 for a full disclosure of the same. Upon operation of the division key, pin 602C (Figure 1) lying in front of the vertical arm of bellcrank 224 is moved rearwardly and rocks said bellcrank whereby roller 226 depresses link 171 to control the release of plate 151 to engage clutch 110 in the manner previously described under the heading of "Minus key control".

I claim:

1. In a motor driven calculating machine having cyclically operable actuating mechanism and a controllable transmission between said mechanism and the motor; the combination of means including a spring-urged member movable to control said transmission to cause connection of said motor with said actuating mechanism, means driven by said motor for moving said member against the tension of its spring, and a member for rendering said motor driven means ineffective to thereby prevent operation of said transmission controlling means by said motor driven means during multicyclic operation of said machine.

2. In a motor driven calculating machine having cyclically operable actuating mechanism and a controllable transmission between said mechanism and the motor; the combination of means including a spring-urged member movable to control said transmission to cause connection of said motor with said actuating mechanism, means for restraining said member against such movement, means driven by said motor for returning said member into engagement with said restraining means, and an operation controlling element for concurrently tripping said restraining means and rendering said returning means ineffective.

3. In a motor driven calculating machine, a spring-pressed control member movable between two positions, means for restraining said member in its first position, means for tripping said restraining means, a motor driven element, and means operated thereby for restoring said member to said first position, means for altering the path of movement of said restoring means so as to render it ineffective to restore said member, and a shiftable interponent for rendering said restoring means effective to restore said member during its movement in said altered path.

4. In a motor driven calculating machine, actuating mechanism and selecting mechanism therefor, driving means for said actuating means including a clutch, means for introducing values into said selecting mechanism, means for locking the selecting mechanism in set position, means for causing engagement of said clutch, means to control operation of said locking means and said engagement causing means seriatim, including an energy storing mechanism normally restrained in an energy storing position, and manually operable means to release said mechanism.

5. In a motor driven calculating machine having cyclically operable actuating mechanism and a controllable transmission between said mecha-

nism and the motor; the combination of means including a spring-urged member movable to control said transmission to cause connection of said motor with said actuating mechanism, means for restraining said member against such movement, a manually operable device for releasing said member from said restraining means, and means operable by said motor and controlled by said manually operable device upon manual release thereof, to move said member into engagement with said restraining means.

6. In a motor driven calculating machine having cyclically operable actuating mechanism and reversible power transmission between said mechanism and the motor; the combination of means including a spring-urged member movable to control said transmission to effect connection of the motor with the actuating mechanism, means for restraining said member against such movement, a plurality of manually operable devices for releasing said member from said restraining means, and means controlled by one of said devices for reversing said transmission.

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