

PATENT SPECIFICATION

408,633

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PROVISIONAL SPECIFICATION.



Improvements in or relating to Calculating or Adding Machines.

We, PETERS LIMITED, a British Company, of Westland Works, Yeovil, in the County of Somerset, and GUY BAZELEY PETER, of Westland Works, aforesaid, a subject of the King of Great Britain, do hereby declare the nature of this invention to be as follows:—

This invention relates to calculating or adding machines of the multiple bank type having a series of ordinal keys in each bank and in which depression of one of the keys causes through the medium of interengaging means the rotation of a numeral wheel. The invention has particular reference to machines known as partial keyboard machines in which for example only five keys are provided in each bank or column and in which for the purpose of adding the numerals "6", "7", "8" or "9" it is necessary to depress certain of the keys twice. In the Specification of our prior Patents Nos. 360,375 and 360,376 actuating and transfer mechanisms applicable to partial keyboard machines are disclosed.

It is the object of the present invention to effect certain improvements in the mechanisms disclosed in these two prior Patent Specifications. As referred to in the two prior Patent Specifications above mentioned an actuating lever is provided in each bank or column which is turned about its pivot upon depression of one or other of the keys of the associated bank. Movement of the actuating lever is communicated to a gear segment pivotally mounted on a segment lever so as to rotate a pinion in the associated column. When the pinion passes beyond the "9" position a transfer is effected and the pinion in the adjacent column of higher order is moved forward one tooth. This movement is effected through the medium of a transfer lever which is moved by a cam in one column and has a transfer pawl which projects into engagement with the pinion in an adjacent column of higher order. At the appropriate time the cam permits the transfer lever to move so as to effect the transfer operation.

There is provided in the present invention means for preventing movement of the transfer lever to effect the

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transfer operation, until after the actuating lever in an adjacent column of higher order returns to its initial position. By these means it is possible to actuate any number of columns simultaneously without causing interference between the actuating and transfer movements. For the purpose of preventing operation of the transfer lever as aforesaid another lever may be provided (hereinafter referred to as the "duplex" lever) this lever having two arms one of which extends into one column to be engaged by one arm of the said transfer lever whilst the other arm extends into the adjacent column of higher order into a position in which it can be engaged by a lug on the actuating lever or on the gear segment or segment lever. In the normal position of the duplex lever it is maintained in engagement with the lug on the actuating lever or other member as aforesaid through the medium of a spring which may be connected to a pawl associated with one of the pinions of the numeral wheels. The said duplex lever may be pivoted towards the upper part of the machine and upon a transverse spindle in such a manner that the arm of the duplex lever which can engage the transfer lever extends downwardly and is so constructed that it can be engaged by the transfer lever for a considerable portion of the travel of the said lever when it is moved by its associated transfer cam. The downwardly extending arm of the duplex lever is preferably provided with a curved portion adapted to lie against a lug on the transfer lever. The end of the downwardly extending arm of the duplex lever is adapted to spring into the path of the lug on the transfer lever when the latter is passing the zero position and is about to be returned under the influence of its associated spring to its initial position to effect the transfer operation as hereinafter referred to. If desired the downwardly extending arm on the duplex lever may be provided with a notch for engagement with the lug on the transfer lever. Normally the curved portion on the duplex lever is held out of engagement with the lug on the transfer lever

due to the engagement of the other arm of the duplex lever with the lug on the actuating lever or some other part of the lever system in the adjacent column of higher order. When however the last mentioned actuating lever is moved as a result of actuation of a key the curved portion of the duplex lever is caused to move by its spring into the path of the lug on the transfer lever. If at this time the key actuation is occurring in one of the lower columns so as to cause the associated transfer cam to move the transfer lever into a position to effect the transfer operation, the lug on the transfer lever is caught on the end of the curved arm of the duplex lever and passes into engagement with the aforesaid notch if the latter is provided. The transfer operation is thus delayed until the actuating lever in the adjacent column of higher order is returned to its initial position when the aforesaid lug thereon engages the other arm of the duplex lever and causes the said duplex lever to be moved out of engagement with the lug on the transfer lever permitting the latter to be rotated to its initial position so as to effect the transfer operation.

The actuating lever may be provided, as described in the aforesaid prior Patent Specifications, with inclined surfaces or serrations so that the proper extent of movement can be imparted to the said lever upon depression of one of the keys. In accordance with the present construction a single actuating lever may be provided in each column for the five keys pivoted at the rear of the machine preferably beyond the fifth key and on a pivot located below the pivot of the segment lever. The segment lever which carries the segment which is moved into engagement with the pinion is pivotally mounted more or less midway of the length of the key bank. The segment lever may be provided with stops which co-operate with the keys for limiting the movement imparted to the segment lever but instead of having five stops as described in the above mentioned prior Patent Specifications only four stops may be provided the stop for the fifth key being afforded by the engagement of the segment lever with a spindle or bar of the machine. The said spindle or bar may pass through a slot in the segment lever which is so shaped and dimensioned that the spindle or bar serves to limit not only the movement of the segment lever on depression of one of the keys but also the return movement of the said lever. The actuating lever and the segment levers may be resiliently connected together by a spring attached to the rear end of the actuating lever and to a point beyond the pivot of the segment lever whereby both levers are held normally at the top or uppermost position. The gear segment in each column referred to in the above mentioned prior Patent Specifications when applied to a calculating machine for operation on the decimal system of notation is provided with ten teeth for co-operation with pinions also having ten teeth. In the present construction whilst providing the pinions with ten teeth it is preferred only to provide the gear segment with teeth corresponding in number to the number of keys in each bank. In the present example in which five keys are provided the gear segment will be provided with five teeth. The gear segment may be pivotally mounted upon an arm extending from the segment lever the said arm extending into proximity to a downwardly extending arm of a transfer pawl provided on the said transfer lever the arrangement being such that on the return movement of the transfer lever to effect the transfer operation and when the transfer operation has been completed the downwardly extending arm on the transfer pawl comes into engagement with the pivot or boss of the gear segment so that the transfer pawl is held in mesh with its associated pinion in order that the pinion cannot be thrown by its momentum beyond the one tooth movement necessary to effect the transfer operation. When however the cam associated with the transfer lever is rotated to move the transfer lever against the tension of its associated spring the downwardly extending arm on the said transfer pawl is moved away from the said pivot or boss to release the pinion held by the transfer pawl. Similarly the said pinion is released upon key actuation in the same column as the transfer pawl as the pivot or boss is moved away from the downwardly extending arm of the transfer pawl upon movement of the segment lever. The gear segment in the present embodiment is provided with two arms one of which is provided with the said teeth and projects upwardly above the aforesaid pivot or boss whilst the other arm projects in the opposite direction this latter arm constituting an abutment. The segment lever may be provided with a pair of lugs projecting into the path of the gear segment one of the said lugs being located on one side of the said pivot or boss whilst the other lug is located on the opposite side to co-operate with the said abutment. The upper end of the gear segment may also be provided with a lug which co-operates with the aforesaid lug provided on the actuating lever. On the downward stroke of one of the keys of the associated

bank the actuating lever is turned about its pivot and the lug thereon engages the lug on the gear segment with a sliding action and moves the latter into engagement with the teeth of the pinion, movement of the gear segment into mesh with the pinion being limited due to the engagement of one of the lugs on the segment lever with the said abutment on the gear segment. As aforesaid the pivot of the actuating lever lies behind that of the segment lever and is so placed that the path of the lug on the actuating lever nearly coincides with the path of that portion of the gear segment with which it engages whereby there is the minimum of sliding movement between the two. Upon the return stroke of the actuating and segment levers the lug on the actuating lever moves away from the lug on the gear segment and due to the pinion being prevented from anti-clockwise rotation by means of its pawl the gear segment moves out of gear with the pinion until finally in its normal position it leaves the gear altogether. The out of gear movement of the gear segment is limited due to the engagement of the other lug on the segment lever with the gear segment. Other means may if desired be provided for limiting the movement of the gear segment.

Due to the provision of the duplex lever in each column as aforesaid it is possible to actuate any number of columns simultaneously without causing interference be-

tween the actuating and transfer operations. It has been found possible to make the pinion and its associated parts so light that the transfer operations take place with extreme rapidity so that even under high speed actuation the operations are always completed without risk of interference by subsequent actuations.

Means for zeroizing may be provided similar to those described in the Specification of our prior Patent No. 360,377 but as the segment lever has only five teeth it will be understood that during the zeroizing operation it is necessary to actuate the gear segment twice in order to effect the zero setting. In the present case we may provide a zeroizing lever co-operating with a transverse rail or bar which is so arranged as to drive the gear segments in the same way as they are driven by the actuating levers although during the zeroizing operation the actuating levers remain in their uppermost position.

Although in the above description the decimal system of notation has been referred to it will be appreciated that other systems of notation may be employed for example the English monetary system.

Dated this 12th day of October, 1932.

HASELTINE, LAKE & Co.,
28, Southampton Buildings, London,
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U.S.A.,
Agents for the Applicants.

COMPLETE SPECIFICATION.

Improvements in or relating to Calculating or Adding Machines

We, PETERS LIMITED, a British Company, of Westland Works, Yeovil, in the County of Somerset, and GUY BAZELEY PETER, of Westland Works, aforesaid, a subject of the King of Great Britain, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to calculating or adding machines of the multiple bank type having a series of ordinal keys in each bank and in which depression of one of the keys causes through the medium of interengaging means the rotation of a numeral wheel. The invention has particular although not exclusive reference to machines known as partial keyboard machines in which for example only five keys are provided in each bank or column and in which for the purpose of adding

the numerals "6", "7", "8" or "9" it is necessary to depress certain of the keys twice. In the Specifications of our prior Patents Nos. 360,375 and 360,376 actuating and transfer mechanisms applicable to partial keyboard machines are disclosed.

It is the object of the present invention to effect certain improvements in the mechanisms disclosed in these two prior Patent Specifications. As referred to in the two prior Patent Specifications above mentioned, an actuating lever is provided in each bank or column which is turned about its pivot upon depression of one or other of the keys of the associated bank. Movement of the actuating lever is communicated to a gear segment pivotally mounted on a segment lever so as to rotate a pinion in the associated column. When the pinion passes beyond the "9" position a transfer is effected and the pinion

in the adjacent column of higher order is moved forward one tooth. This movement is effected through the medium of a transfer lever which is actuated by a cam in one column and has a transfer pawl that projects into engagement with the pinion in an adjacent column of higher order. At the appropriate time the cam permits the transfer lever to move so as to effect the transfer operation.

According to the present invention a calculating or adding machine comprises a pinion in each column which is constrained to move only in one direction, the said pinion being directly engaged and actuated by a gear segment when the keys of the column are actuated, a transfer lever in each column which is positively moved in one direction during key actuation and which is permitted to move in the opposite direction to effect the transfer operation, and means for preventing movement of the transfer lever in any column to effect the transfer operation to the next higher column when actuation is taking place in the said next higher column until after a movable part or lever in the said higher column is returned to its initial position. By these means it is possible to actuate any number of columns simultaneously without causing interference between the actuating and transfer movements.

A cash receiving, registering and indicating machine has been proposed, in which numeral wheels were rotated through trains of gearing from gear segments operated by the keys of the machine, the last gear of each train rotating in both directions and being connected to the associated numeral wheel by a ratchet wheel constrained to move in one direction only by a spring-pressed pawl. In this prior proposal means were provided for preventing a transfer or carry if actuation were taking place in the next higher column, the said means comprising a spring finger on a cam operated lever, the said spring finger co-operating with an annular flange on the side of the last gear wheel in each train, the arrangement being such that if the said gear wheel were in an intermediate position the flange thereon prevented movement of the cam operated lever to effect a transfer or carry until the gear wheel were returned to its initial position when a slot in the flange permitted the spring finger to move inwardly to allow a transfer or carry to be effected. The feature of the present invention referred to above differentiates from this prior proposal in that the pinion which is constrained to move in one direction only is directly actuated and engaged by the gear segment, whereas in the prior proposal the gear wheel which is directly

engaged by the gear segment is positively rotated thereby in both directions and that the ratchet wheel which is constrained to move in one direction only is not directly actuated by the gear segment.

More specifically the calculating or adding machine in accordance with the invention comprises a pinion in each column adapted to be rotated by a gear segment, the said pinion being constrained to move only in one direction when the keys of the column are actuated, a cam in fixed connection with each pinion and rotated thereby, a spring controlled transfer lever in each column which is positively moved in one direction by the said cam and which is permitted to spring back in the opposite direction to effect the transfer operation, a spring controlled pivoted duplex lever or catch having an arm adapted to move into the path of the transfer lever when actuation is taking place in the next higher column but which is held out of the path of the transfer lever by an actuating lever or an associated movable member in the next higher column when the actuating lever or associated member returns to or is in its initial position. The duplex lever preferably has two arms one of which extends into one column to be engaged by the transfer lever to prevent operation of the latter lever at the appropriate time whilst the other arm extends into the adjacent column of higher order into a position in which it can be engaged for example by the actuating lever, the gear segment or segment lever to move it to a position to release the transfer lever. Thus for example during duplex operations, namely, when keys in adjacent columns are depressed simultaneously the transfer operation from the column of lower order to the adjacent column of higher order is prevented until the levers in the column of higher order are returned to their initial positions.

The present invention also provides an improved construction of gear segment and other associated parts as hereinafter more fully referred to.

In order that the said invention may be clearly understood and readily carried into effect the same will now be more fully described with reference to the accompanying drawings, in which:—

Figure 1 is a perspective view of a section of a partial keyboard calculating or adding machine embodying the invention, certain parts having been omitted for the sake of clarity; and

Figure 2 is a side elevation of a modified construction of duplex lever.

In the drawing the invention is illustrated as applied by way of example to a partial keyboard machine.

In Figure 1 of the drawings one section or bank of a partial keyboard calculating or adding machine is illustrated it being appreciated that several sections or banks are employed and arranged side by side in the actual machine. The present embodiment illustrates a machine for operating on the decimal system of notation and in the example shown five keys, 3, 4, 5, 6 and 7 are employed in each section or bank. The keys co-operate with a pivoted actuating lever 8 which imparts motion to a pivoted segment lever 9 in the manner hereinafter to be described. The reference numeral 10 indicates a transfer lever similar to the construction shown in the specifications of our prior Patents above referred to, the transfer lever 10 being pivotally mounted on a spindle 11 and normally urged into the position shown by means of a spring 12. The arm 13 of the transfer lever projects in one bank or column whilst the other arm 14 lies in the adjacent bank or column of higher order. The reference numeral 15 indicates a ten toothed pinion which is adapted to be rotated in a clockwise direction when any one of the keys in the associated column is depressed through the medium of a gear segment 16 carried by the segment lever 9 the pinion rotating a numeral wheel not shown but described in the prior Specifications above mentioned. The pinion 15 is rotatably mounted on a transverse spindle 17 and fixed to each pinion is a snail cam which co-operates with a lug 27 on the arm 13 of each transfer lever in each bank and moves the arm 13 in a clockwise direction until the peak of the cam is reached when the said arm is moved in an anti-clockwise direction under the action of the spring 12 to effect the transfer operation. The snail cam for actuating the arm 13 of the transfer lever shown is not illustrated in the drawings but the snail cam in the adjacent column of higher order is indicated by the reference numeral 18. The arm 14 of the transfer lever 10 carries a transfer pawl 19 which is pivotally mounted on the arm 14 at 20 and is connected to a spring 21 the pawl 19 being adapted to be moved into engagement with the pinion 15 to move it forward one tooth when the arm 13 of the transfer lever 10 is permitted to move in an anti-clockwise direction during the transfer operation.

In accordance with the main feature of the present invention means are provided for preventing movement of the transfer lever 10 to effect the transfer operation until the movable parts or levers in the adjacent column of higher order which column includes the pinion which is moved forward one tooth are returned to their

initial position. The means according to the invention includes a duplex lever 22 pivoted on a spindle 23 towards the upper part of the machine, the duplex lever having a downwardly extending arm 24 extending in one column to engage the arm 13 of the transfer lever 10 and having another arm 25 extending into the adjacent column of higher order and into a position in which it can be engaged by a movable part of the lever system such as the segment lever 9, gear segment 16 or actuating lever 8. In the example shown the arm 24 is adapted to be engaged by a lug 26 on the end of the actuating lever 8. The arm 24 of the duplex lever is provided with a curved portions as shown which is adapted to be engaged by the lug 27 on the arm 13 of the transfer lever 10 for a considerable length of travel of the said lever 10 when it is moved by its associated transfer or snail cam. The end of the arm 24 of the duplex lever 22 is adapted to move into the path of the lug 27 when the transfer lever is passing the zero position and is about to be returned under the influence of the spring 12 to its initial position to effect the transfer operation. In the preferred construction shown in Figure 1 the arm 24 of the duplex lever is provided with a notch 28 for engagement with the lug 27 on the transfer lever and for limiting the duplex lever when moving into engagement with the lug 27. Normally the arm 24 of the duplex lever is held out of engagement with the lug 27 due to the engagement of the arm 25 of the duplex lever with the lug 26 on the actuating lever 8. When, however, the actuating lever 8 is moved as a result of key actuation the arm 24 of the duplex lever is caused to move by a spring 29 into the path of the lug 27 on the transfer lever 10 the spring 29 in the example shown being connected to a pawl 30 which prevents anti-clockwise rotation of the pinion 15. If at this time key actuation is occurring in the adjacent column of lower order so as to cause the transfer cam to move the transfer lever 10 into position to effect the transfer operation the lug 27 on the transfer lever is caught on the end of the arm 24 of the duplex lever and passes into engagement with the notch 28; the transfer operation is thus delayed until the actuating lever 8 in the adjacent column of higher order is returned to its initial position when the lug 26 thereon engages the arm 25 of the duplex lever and causes the latter to be moved out of engagement with the lug 27 on the transfer lever permitting the latter to be rotated in an anti-clockwise direction to its initial position to enable the pawl 19 on the transfer lever to effect the

transfer operation.

The actuating lever 8 in the example shown and as described in the aforesaid prior Patent specifications is provided with inclined surfaces or serrations 32 so that the proper extent of movement can be imparted to the said lever 8 on depression of one of the keys. In the present construction a single actuating lever is provided as shown in each column for the five keys and is pivoted at the rear of the machine on a spindle 33 the spindle being located beyond the fifth key and in a position below the pivot 34 of the segment lever 9. The segment lever 9 is pivotally mounted on the pivot 34 more or less midway of the length of the key bank the segment lever being provided with stops 35 for limiting the movement imparted to the segment lever but instead of having five stops as described in the above mentioned prior Patent Specification only four stops are provided the stop for the fifth key being afforded by the engagement of the segment lever 9 with a spindle or bar 36. As shown the spindle or bar 36 passes through a slot 37 in the segment lever 9 the slot being so shaped and dimensioned that the spindle or bar 36 serves to limit not only the movement of the segment lever 9 on depression of one of the keys but also the return movement of the said lever. The actuating lever 8 and segment lever 9 are resiliently connected together by a spring 38 so that the two levers are held normally at the top or uppermost position as shown. The gear segment in each column as referred to in the above mentioned prior Patent Specifications when applied to a calculating machine for operating on the decimal system of notation is provided with ten teeth for co-operation with a pinion also provided with ten teeth. In the present construction whilst providing the pinion with ten teeth the gear segments 16 in the partial keyboard machine shown are provided with gear teeth corresponding in number to the number of keys in each bank. In the embodiment shown in the drawings five teeth are provided on the gear segment 16 since there are only five keys in each column. The gear segment 16 is pivotally mounted at 40 on an arm 41 of the segment lever 9 the said arm extending into proximity to a downwardly extending arm 42 on the transfer pawl 19, the arrangement being such that on the return movement of the transfer lever to effect the transfer operation and when the transfer operation is completed the downwardly extending arm 42 on the transfer pawl 19 comes into engagement with the pivot or boss 40 of the gear segment so that the transfer pawl is held in mesh with

its associated pinion in order that the pinion cannot be thrown by its momentum beyond the one tooth movement necessary to effect the transfer operation. When, however, the cam associated with the transfer lever 10 is rotated to move the transfer lever against the tension of the spring 12 the downwardly extending arm 42 on the transfer pawl is moved away from the pivot or boss 40 to release the pinion held by the transfer pawl. Similarly the said pinion is released upon key actuation in the same column as the transfer pawl as the pivot or boss 40 is moved away from the downwardly extending arm 42 of the transfer pawl upon movement of the segment lever 9. The gear segment 16 in the present embodiment is constituted by two arms one of which is provided with the said teeth and projects upwardly from the aforesaid pivot or boss 40 whilst the other arm projects in the opposite direction this latter arm constituting an abutment 43 for the purpose hereinafter described. The arm 41 of the segment lever 9 is provided with a pair of lugs 44 and 45 projecting into the path of the gear segment one of the lugs 44 being on one side of the pivot or boss 40 whilst the other lug is located on the opposite side to co-operate with the abutment 43. The upper end of the gear segment 16 is provided with a lug 46 which co-operates with the lug 26 on the actuating lever 8 on the downward stroke of one of the keys of the associated bank. When the actuating lever 8 is turned about its pivot 33 the lug 26 thereon engages the lug 46 with a sliding action and moves the gear segment into engagement with the teeth of the pinion 15 the movement of the gear segment into mesh with the pinion being limited due to engagement of the lug 45 with the abutment 43. As aforesaid, the pivot of the actuating lever 33 lies behind that of the segment lever 9 and is so situated and the path of the lug 26 on the actuating lever nearly coincides with the path of that portion of the gear segment with which it engages whereby there is a minimum amount of sliding movement between the two. Upon the return stroke of the actuating and segment levers the lug 26 on the actuating lever moves away from the lug 46 on the gear segment and due to the pinion 15 being prevented from anti-clockwise rotation by means of its pawl 30 the gear segment 16 moves out of gear with the pinion 15 until finally in its normal position it leaves the gear altogether. The out of gear movement of the gear segment is limited due to the engagement of the lug 44 with the gear segment. Other means may if desired be provided for limiting the movement of the

gear segment.

The curvature of the arm 24 of the duplex lever is not an essential feature. In Figure 2 of the drawings a modified construction is shown in which the arm 24 is straight and instead of providing the notch 28 on the arm 24 as shown in Figure 1 the lug 27 on the transfer lever 10 engages beneath the end of the arm 24 as shown in Figure 2 the clockwise movement of the arm 24 being limited by a fixed stop 48. The dotted line position shown in Figure 2 indicates the relative positions of the transfer lever 10 and the arm 24 of the duplex lever when the latter is in position to prevent the transfer operation.

Due to the provision of the duplex lever in each column as aforesaid it is possible to actuate any number of columns simultaneously without causing interference between the actuating and transfer operations. It has been found possible to make the pinion and its associated parts so light that the transfer operations take place with extreme rapidity so that even under high speed actuation the operations are always completed without risk of interference by subsequent actuations.

Means for zeroizing may be provided similar to those described in the Specification of our prior Patent No. 360,377 but as the segment lever in the present embodiment has only five teeth it will be understood that during the zeroizing operation it is necessary to actuate the gear segment twice in order to effect the zero setting. In the present case we may provide a zeroizing lever co-operating with a transverse rail or bar which is so arranged as to drive the gear segments in the same way as they are driven by the actuating levers although during the zeroizing operation the actuating levers remain in their uppermost position.

Although in the above description the invention has been described in conjunction with a partial keyboard calculating or adding machine, it is to be understood that the invention is not to be limited thereto since certain features, notably the duplex lever, can be applied to full keyboard machines. It will be appreciated that in a full keyboard machine operating on the decimal system of notation the gear segment will be provided with ten teeth and if desired more than one actuating lever or more than one segment lever can be used as described in the specifications of our prior Patents above referred to.

Although in the above description the decimal system of notation has been referred to it will be appreciated that other systems of notation may be employed for example the English monetary system.

Having now particularly described and

ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A calculating or adding machine of the kind referred to, comprising in each column a pinion which is constrained to move only in one direction, the said pinion being directly engaged and actuated by a gear segment when the keys of the column are actuated, a transfer lever in each column which is positively moved in one direction during key actuation and which is permitted to move in the opposite direction to effect the transfer operation, and means for preventing movement of the transfer lever in any column to effect the transfer operation to the next higher column when actuation is taking place in the said next higher column until after a movable part or lever in the said higher column is returned to its initial position for the purposes specified.

2. A calculating or adding machine of the kind referred to, comprising a pinion in each column adapted to be rotated by a gear segment the said pinion being constrained to move only in one direction when the keys of the column are actuated, a cam in fixed connection with each pinion and rotated thereby, a spring controlled transfer lever in each column which is positively moved in one direction by the said cam and which is permitted to spring back in the opposite direction to effect the transfer operation, a spring controlled pivoted duplex lever or catch having an arm adapted to move into the path of the transfer lever when actuation is taking place in the next higher column but which is held out of the path of the transfer lever by an actuating lever or an associated movable member in the next higher column when the actuating lever or associated member returns to or is in its initial position.

3. A calculating or adding machine as in claim 1 or 2, including a duplex lever having two arms one of which extends into a bank or column to be engaged by the transfer lever and the other of which extends into an adjacent column of higher order to be engaged by a movable part or lever in that column.

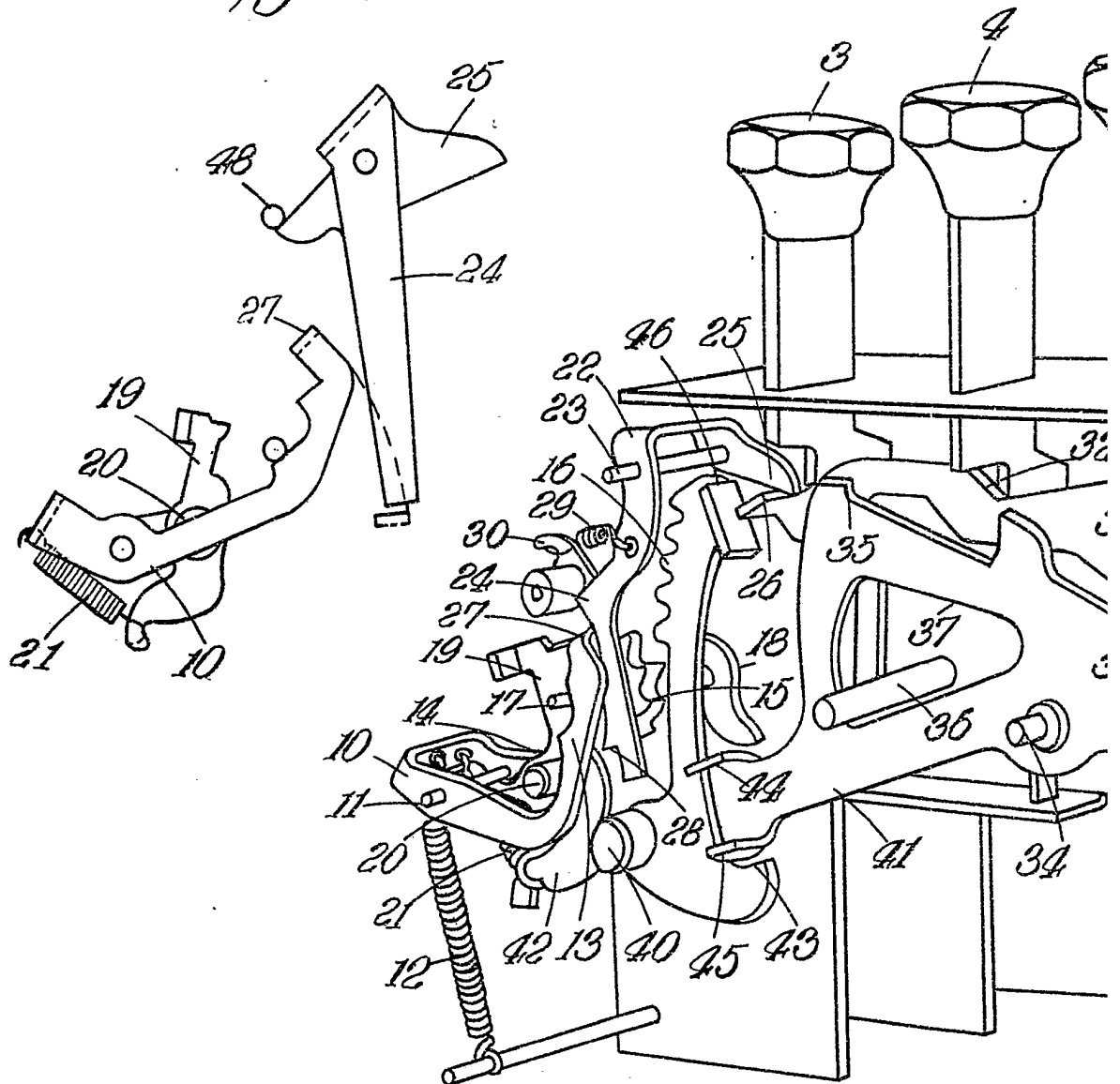
4. A calculating or adding machine as in claim 3, wherein the arm of the duplex lever extending into the column of lower order is adapted to engage and hold the transfer lever until the other arm of the duplex lever is engaged by a movable part or lever in the adjacent column of higher order to cause the first mentioned arm to be moved out of engagement with the transfer lever to permit the latter to effect the transfer operation.

5. A calculating or adding machine as in claim 3 or 4, wherein the transfer lever has a lug with which the end of one arm of the said duplex lever is adapted to engage to hold the transfer lever in position the said arm being if desired provided with a notch for the purpose specified.
6. A calculating or adding machine as in claim 3, 4, or 5, wherein an actuating lever is provided in each column or bank said actuating lever being adapted to engage the other arm of the duplex lever for the purpose specified.
7. A calculating or adding machine as in any of the preceding claims, wherein each transfer lever is provided with a transfer pawl having an arm which is adapted to engage a movable part of the lever system for the purpose specified.
8. A calculating or adding machine as in any of the preceding claims, having a partial keyboard and including a segment lever in each bank or column, wherein each segment lever carries a gear segment provided with teeth corresponding in number to the number of keys in each bank or column.
9. A calculating or adding machine as in any of the preceding claims, and including an actuating lever in each bank or column and a segment lever and gear segment, wherein the gear segment is adapted to be moved into engagement with a co-operating pinion through the medium of the actuating lever engaging the upper end of the gear segment.
10. A calculating or adding machine as in claim 3, including a gear segment in each column and with if desired any of the features set forth in claims 4 to 7 or 9, wherein a lug is provided on the actuating lever the said lug being adapted to engage the gear segment for the purpose specified and being also adapted to engage the other arm of the duplex lever also for the purpose specified.
11. A calculating or adding machine as in any of the preceding claims and including a gear segment in each column, wherein the gear segment comprises a two armed lever which is pivotally mounted on an extension of a segment lever means being provided such as a pair of lugs on the segment lever each lug extending on different sides of the pivot of the gear segment for the purpose of limiting the movement of the said gear segment.
12. A calculating or adding machine as in any of the preceding claims, including an actuating lever and a segment lever in each bank or column the actuating lever being pivoted at the rear of the machine and the segment lever being pivoted more or less midway of the bank or column the pivot of the actuating lever being disposed below the pivot of the said segment lever.
13. A calculating or adding machine as in claim 12, wherein each actuating lever and segment lever in each column is interconnected by means of a spring for the purpose specified.
14. A calculating or adding machine as in any of the preceding claims, including a segment lever in each bank or column, wherein each segment lever is provided with stops for engagement with certain of the keys whereas the stop for another key is provided by a slot in the segment lever co-operating with a transverse spindle or bar.
15. A calculating or adding machine constructed, arranged and adapted to operate substantially as described or as shown in the accompanying drawings.

Dated this 15th day of September, 1933.

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Agents for the Applicants.

Fig. 2.



[This Drawing is a full-size reproduction of the Original.]

Fig. 1.

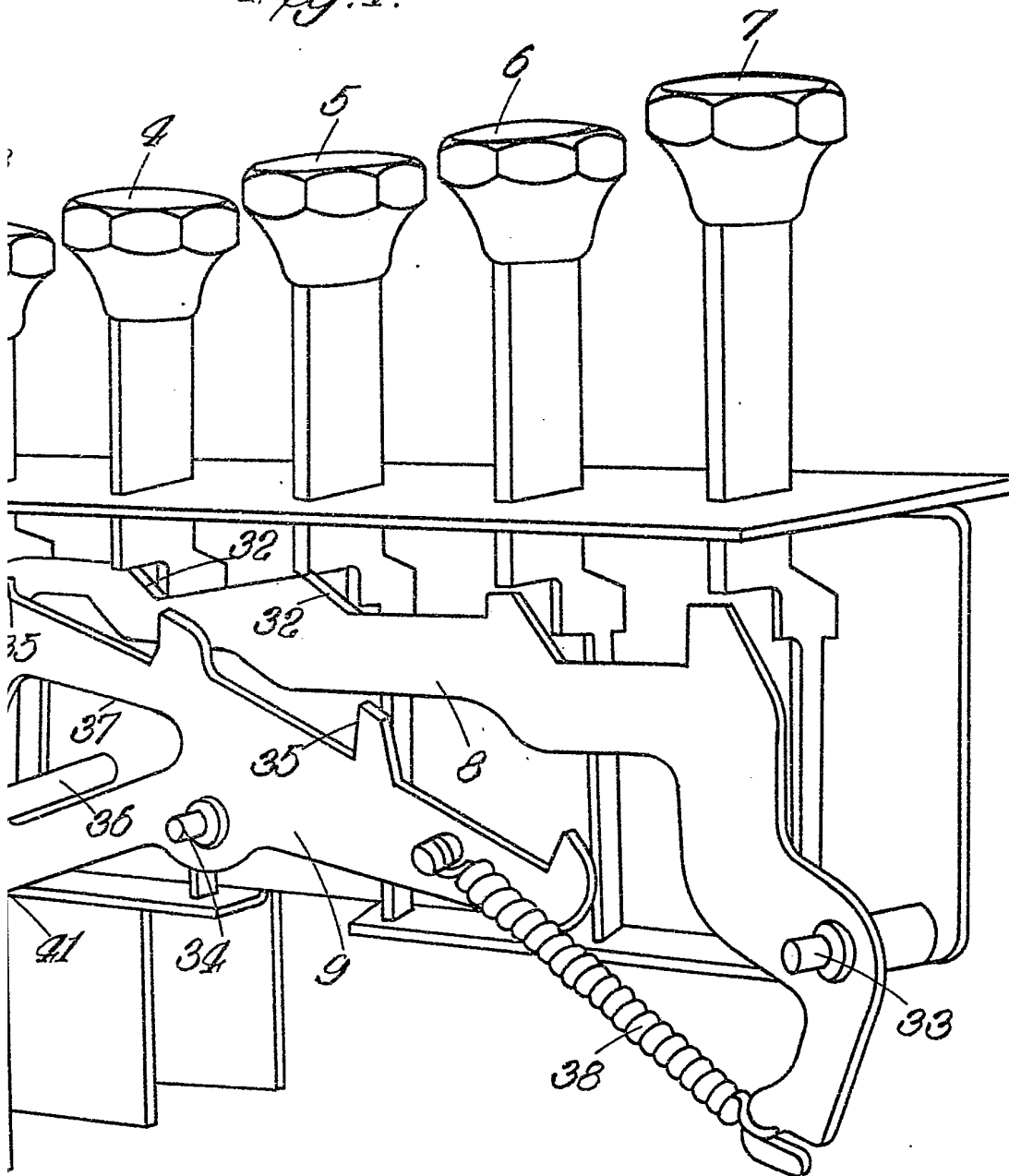


Fig. 1.

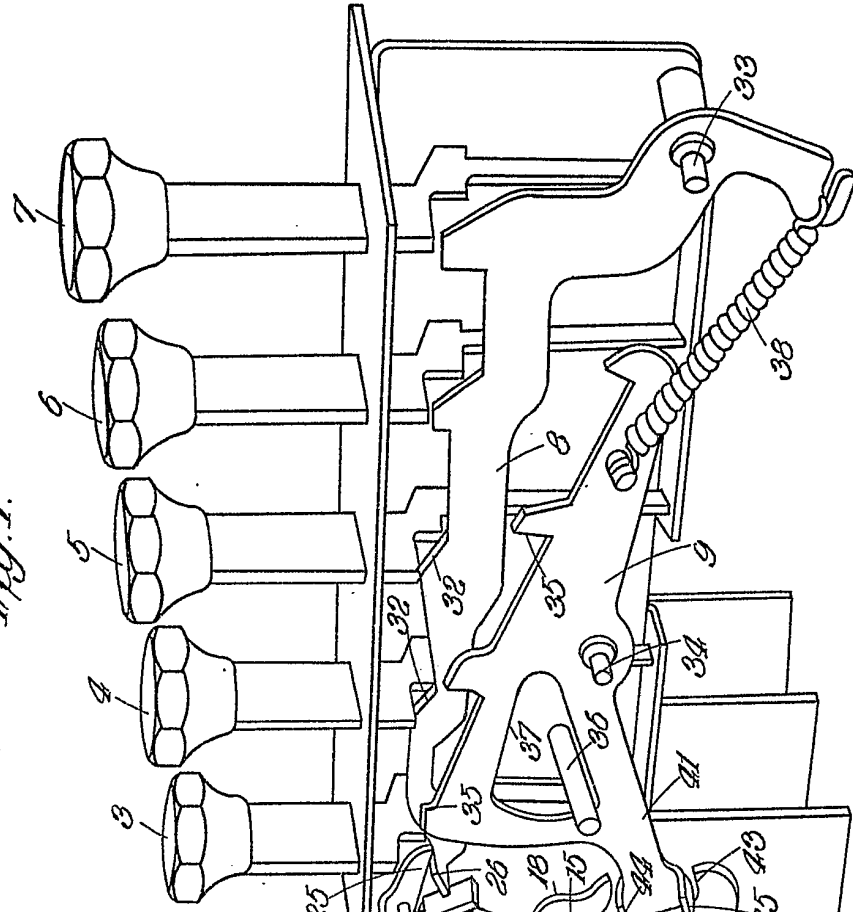
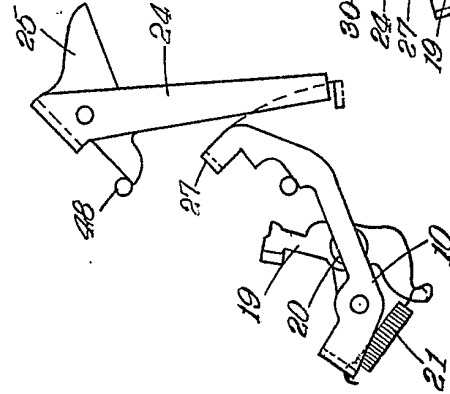


Fig. 2.



[This Drawing is a full-size reproduction of the Original.]