Dec. 4, 1928. **1,693,766**

A. SCHUBODE

CALCULATING MACHINE

Original Filed Feb. 7, 1925 **3 Sheets-Sheet 1**

Fig. 1.

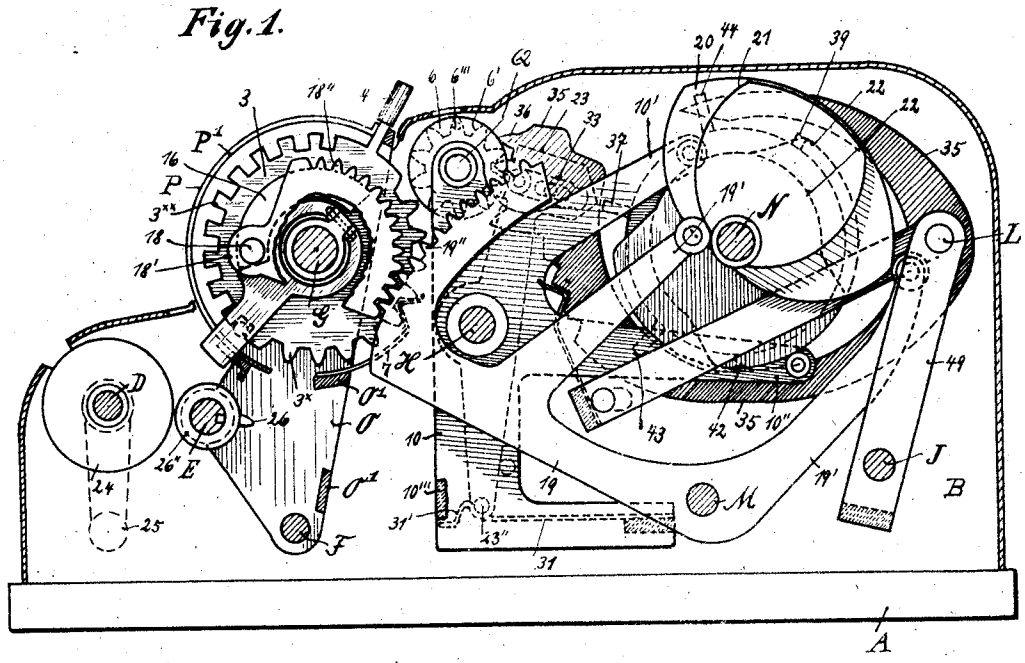
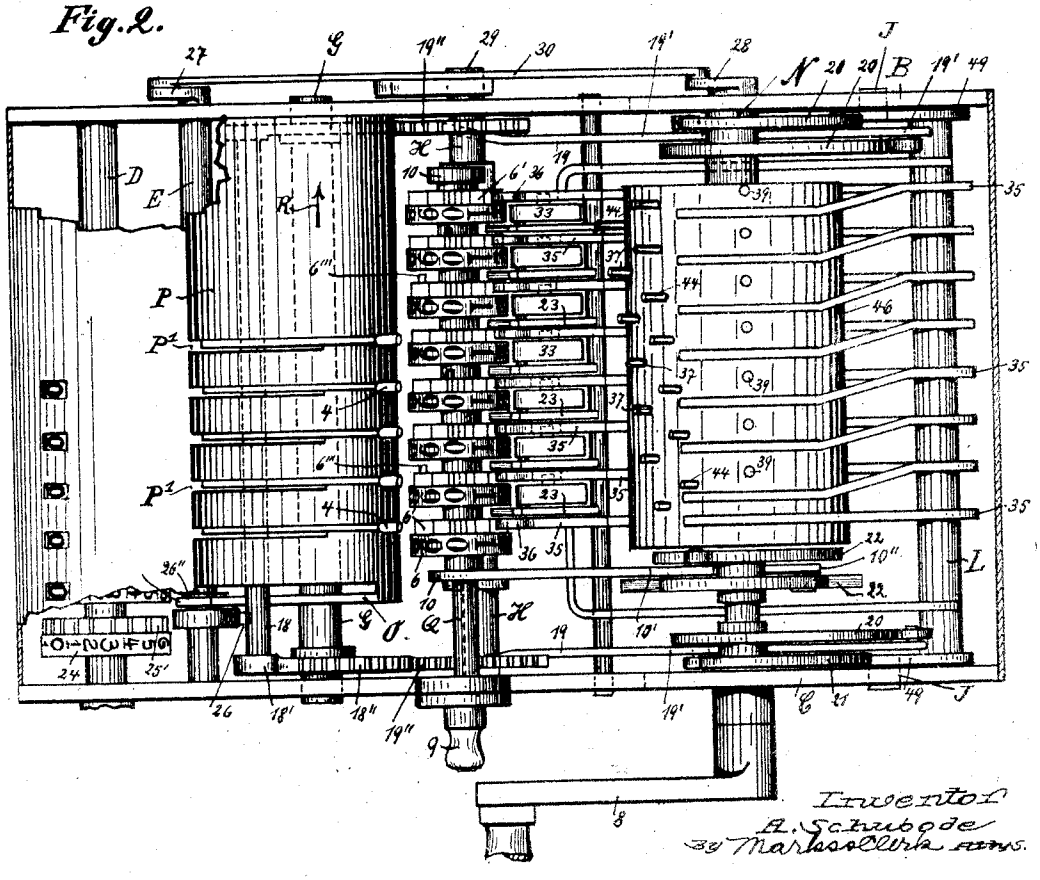


Fig. 2.



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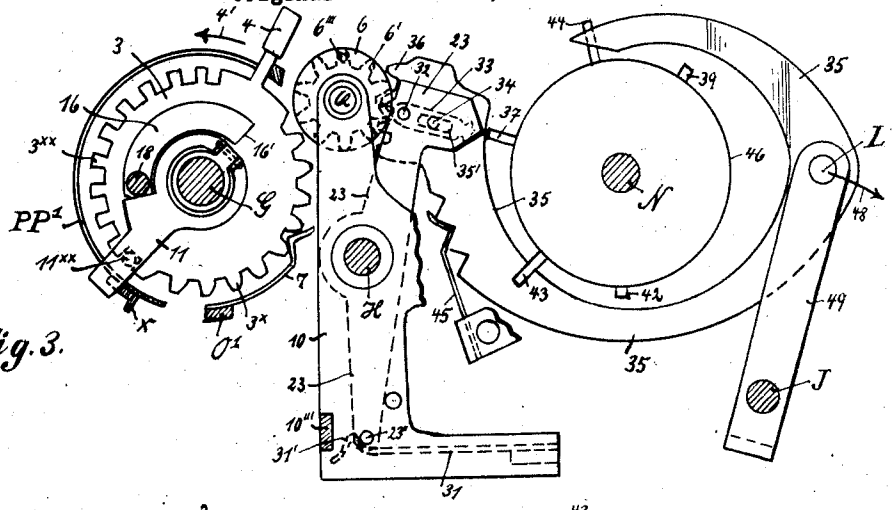


Fig. 3.

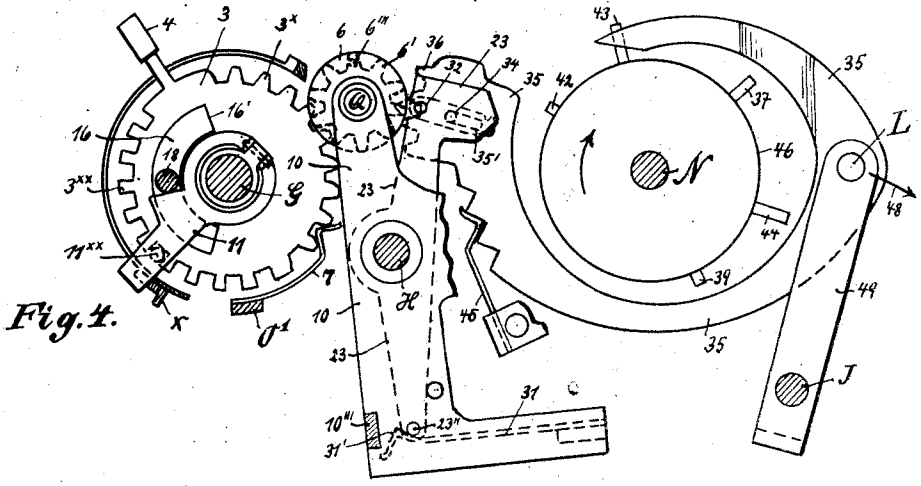


Fig. 4.

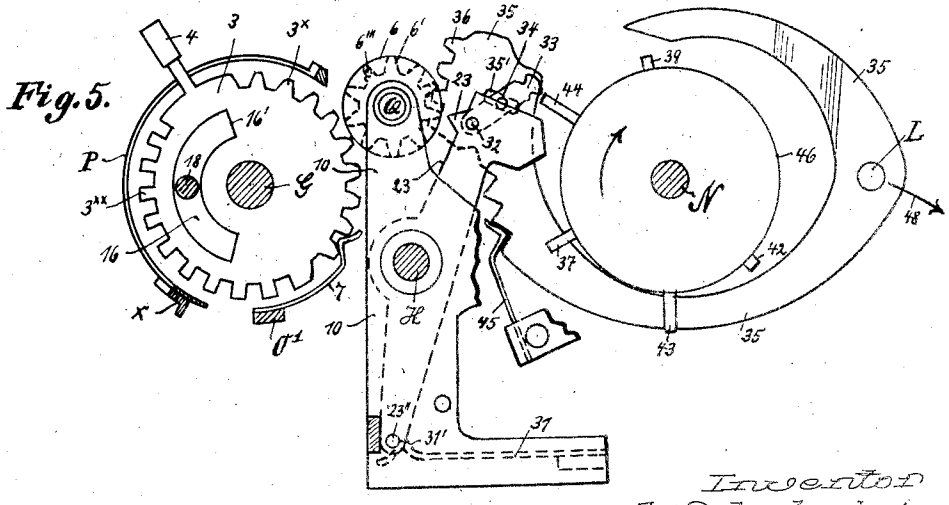


Fig. 5.

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CALCULATING MACHINE

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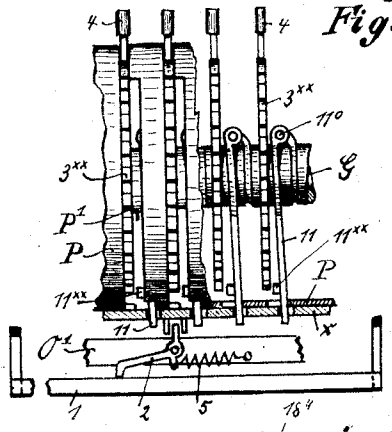


Fig. 6.

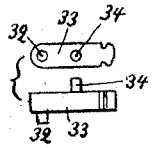


Fig. 7.

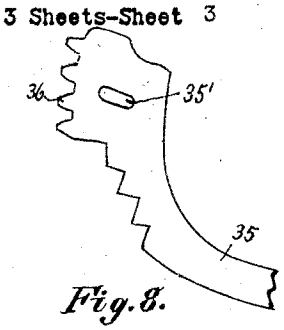


Fig. 8.

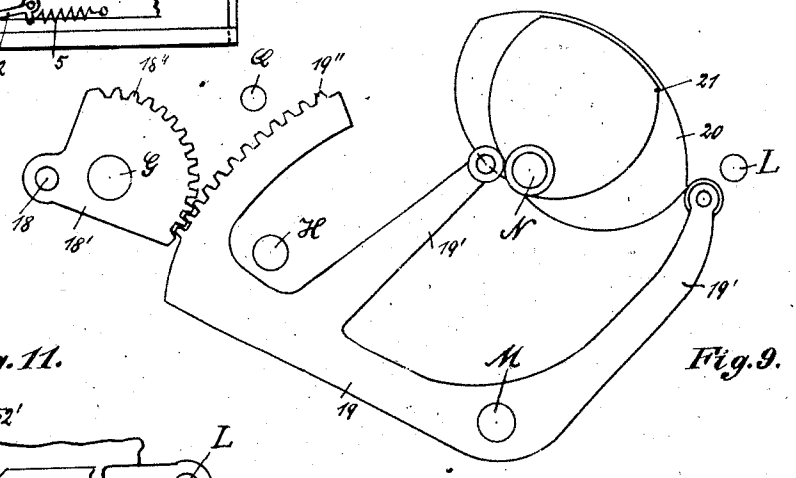
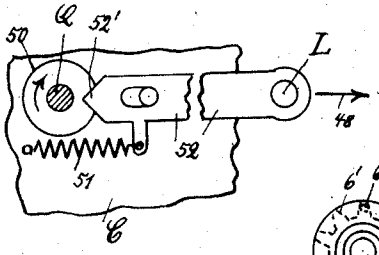


Fig. 11.

Fig. 9.



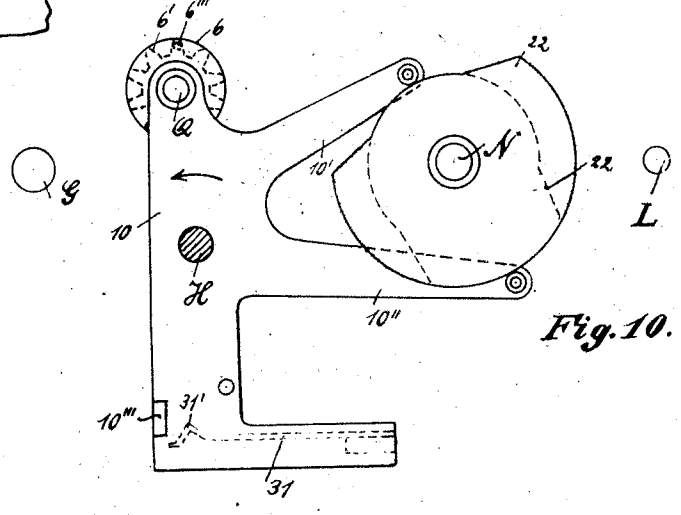


Fig. 10.

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Patented Dec. 4, 1928. 1,693,766

UNITED STATES PATENT OFFICE.

ALBERT SCHUBODE, OF BRUNSWICK, GERMANY, ASSIGNOR TO FIRMA HANNOVERA-KASSEN-GESELLSCHAFT M. B. H., OF PEINE, HANOVER, DEUTSCHLAND, GERMANY.

CALCULATING MACHINE.

Application filed February 7, 1925, Serial No. 7,638, and in Germany February 11, 1924. Renewed October 16, 1928.

My invention relates to new and useful improvements in calculating machines of the type described in my prior U. S. patent application filed Jan. 5, 1923, Ser. No. 610,934, and adapted for the first four rules of arithmetic—addition, subtraction, multiplication and division. In machines of this type a driving shaft is supported in suitable bearings of the frame and adapted to revolve in either direction in order to move, with the aid of appropriate interconnecting means, positioning or setting members engaging with the counting disks or wheels while moving either to or fro, the arrangement being such that the said positioning members may be moved either alternately from the set position into the zero position and back to the former or from the set position forward and back into the set position or starting point.

The object of my invention is to provide an improved device or mechanism for transferring the tens, with a view to thereby render a tens-transferring device simplifying the construction of such machines whereby they may be more economically manufactured, since the most essential parts of my improved transferring device and also those of the driving and positioning mechanism can be made by punching and do not require any subsequent finishing operation prior to assemblage. A further important advantage of my improved tens transferring device resides in that the same works positively throughout because the tens-shift gear teeth engage the gears of the counter-disk until the latter are again engaged by the adjusting or setting members so that the counter-disks cannot be shifted too far by overthrow. Furthermore the expenditure of power and the losses by wear and tear are minimized by my improved device or mechanism.

With the above recited and other objects in view, the invention resides in the novel construction set forth in the following specification, particularly pointed out in the appended claims and illustrated in the accompanying drawings, it being understood that the right is reserved to embodiments other than that actually illustrated herein to the full extent indicated by the general meaning of the terms in which the claims are expressed.

In the accompanying drawings forming a part of this specification I have shown, by way of example, an embodiment of the invention in connection, for simplicity's sake, with a calculating machine in which each value positioning member is arranged coaxially with the calculating member belonging to the former, it being understood that in the machine disclosed in the concurrent U. S. application Serial No. 610,934, above referred to, the two cooperating members are mounted on separate, parallel axes although the principle of operation is the same in both machines. In the drawings—

Figure 1 is a side view or elevation of the calculating machine with the new mechanism, the front wall of the casing being removed and the visible part of the latter shown in section, whilst the operating parts of the machine are illustrated in their positions of rest;

Figure 2 is a plan view thereof with the top portion of the casing mainly removed or broken off;

Figure 3 is a side view of the operating parts of the machine, comprising a simple element thereof, that is to say, a positioning or setting member with a calculating member mounted on the same shaft, a counting member and the new tens transfer device or means;

Figure 4 is a similar view showing the said operating parts after a one-third revolution in the case of an addition or a multiplication operation;

Figure 5 is another similar view illustrating the parts upon performance of a further one-third revolution;

Figure 6 is a front view or elevation of two value positioning members with the two cooperating calculating members and the automatic coupling device adapted to hold the said members coupled upon actuation of the crank-handle of the machine;

Figure 7 is an elevation and a plan of a coupling link for the two main levers of the new tens transfer device or means;

Figure 8 is a fragmentary elevation of the transfer lever of the new tens transferring device or means, showing the front end of the said lever;

Figure 9 is an elevation of the means for driving or actuating a two-armed member for reciprocating the value positioning members;

Figure 10 is an elevation of the device for automatically coupling the counting members with the value positioning members during the second one-third revolution of the crank-handle, and

Figure 11 is an elevation of the device employed in the machine for disengaging or throwing out the tens feeding members during the zero position of the counting work.

Parts which are repeated in the several figures bear the same reference characters in each case.

Referring to Figures 1 and 2, A is the base plate of the machine supporting the two vertical end walls B and C rigidly connected or integral therewith and interconnected by a number of parallel shafts or rods D, E, F, G, H, J, L, M, N and Q. Some of these shafts or rods are firmly attached to the vertical walls B and C for bracing purposes, such as F and G, whilst others are journalled therein to constitute actual rotary shafts as will be explained more in detail in the following description.

Mounted on the two stationary rods F and G are vertical plates O which are firmly connected together by means of bars O′ and a curved plate of sheet iron P having a number of parallel transverse slots P′ and forming a part of the top cover of the casing, the said plates O being free to slide on the supporting rods F and G together with the bars O′ and the curved plates P the whole structure O, O′, P thus forming a kind of a slidable frame or carriage in which the so-called positioning mechanism of the calculating machine is housed, that is to say, the mechanism for positioning or setting the numerical values to be introduced into a calculation. As will be seen in Figure 2 the said mechanism comprises five value places each including a disk 3 free to revolve on or about the stationary rod G and provided with a handle 4. One part of the periphery of the disk 3 is notched to provide ten gaps between the peripheral teeth 3^{xx} and on the opposite part of the periphery of the disk actuating teeth 3^{x} are provided. Further each disk is cut out to provide a segmental recess or slot 16, as will be more clearly seen in Figures 3 to 5, a stirrup 18 adapted to swing or oscillate about the stationary rod G, engaging in the recesses or slots 16 of all of the disks or value positioning members 3. The stirrup 18 is arranged to always move the same way and the segmental slots or recesses in the disk are dimensioned, as regards their sectorial length, to allow the stirrup 18 to swing, from the starting position of the disks 3 shown in Figure 3, without thereby causing the disks to move until the stirrup reaches the other end of the slot or slots. Fixed to the rod G adjacent to each disk 3 is an arm or lever 11 which is adapted to oscillate and provided with a pin or stud 11^{xx}, see Figure 6. The lower ends of the several arms 11 engage in a bar x having a number of cuts or slots one for each arm to engage in, and on moving this bar x lengthwise in one direction all of the arms 11 are displaced towards the disks 3 so that the pins 11^{xx} of the former will engage in a gap offered by the teeth 3^{xx} of the disks 3. The function of the slotted bar x is to shorten the effective length of the segmental slot or slots 16 in accordance with a value previously set in the co-operating disk or disks 3. The manner in which this is brought about will be explained hereinafter.

Supposing a calculation is to be performed with any certain value, say the number 67 for example, this value is to be set in the described positioning mechanism with the aid of the handles 4 by turning the first disk 3, by means of its handle, in the direction of the arrow 4′, shown in Figure 3 for seven tooth gaps and by turning the second disk 3 in the same way by six tooth gaps. Means such as scales may be provided on the curved plate or cover P for the purpose of controlling the described operation. By thus setting the value the end edges 16′ of the segmental recesses or slots 16 approach the stirrup 18 which still is in its starting position. If then the stirrup 18 is reciprocated about its axis after the disks 3 and the arms or levers 11 have previously been coupled with each other by means of the slotted bar x, all of the set disks 3 are moved by the said stirrup 18 alternately to zero position, as in Figure 1, and back into the set position owing to the fact that the stirrup alternately engages the edges 16′ of the segmental slots 16 of the set disks 3 and the arms 11. All of the disks 3 that are not set, remain of course in their normal or rest position, the stirrup 18 performing idle movements only within the segmental slots 16 of such disks. If now teeth 6′ of separate counting disks 6 are coupled or caused to engage with the teeth 3^{x} of the value positioning members 3, as long as the latter are reciprocated by stirrup 18, the set value, that is the number 67, will be transferred to the counting disks, either in the augmenting or additive sense—addition, multiplication—or in the reducing or subtractive sense—subtraction or division—dependent on whether the coupling or engagement occurs between the value positioning members 3, 3^{x} and the counting members 6, 6′ in the zero

setting operation or in the subsequent operation of re-setting the members 3.

The calculating machine is provided with means hereinafter to be described or with equivalent means for automatically coupling the members 3 and 11, reciprocating the stirrup 18 and also coupling the disks 3 with the counting disks 6, upon rotation of a main crank-handle 8, so that the operator has nothing to do except the little work of setting the value by means of the handles 4 and turning the handle 8 in the one or the other direction just as required in case of an augmenting or a reducing calculation.

The crank-handle 8 is attached to the main shaft N and the shaft N is journalled in suitable bearings of the walls B and C so as to be free to rotate in both directions. Upon rotation of the handle 8 the shaft N acts to lower, by means of a suitable cam or any equivalent intermediate member, a stirrup 1 supporting a bell-crank lever 2 controlled by a spring 5, as will be seen in Figure 6. The lever 2 is pivoted to the frame O, O′ and shaped and arranged to bear, with its depending arm, against the stirrup 1 and to engage with its upward extending arm with the slotted bar x. As soon as the stirrup 1 lowers, however, the lever 2 will, through the action of the spring 5 shift the bar into the coupling position. At the end of the rotation of the handle the stirrup 1 having gone back to its upper position, acts to return the slotted bar to its disconnecting position, shown in Figure 6, by means of the bell-crank lever 2. During the reciprocatory movement imparted to the setting members by the stirrup 18 the slots P′ of the curved plate or cover P act to maintain the members 3 and 11 in their coupled or engaged relationship. Consequently the members or disks 3 are automatically maintained, during the whole duration of rotating the handle 8, in coupled engagement with the co-operating members 11. Any appropriate locking means, such as for example spring pawls 7 shown in Figure 3, may be provided for locking the disks 3 in their position of rest.

The stirrup 18 comprises a rod supported by and connected at its two ends with two levers 18′ shaped to form each a toothed segment 18″ and adapted to rotate or oscillate about the stationary rod or shaft G. The segments 18″ mesh with corresponding toothed segments 19″ provided on levers 19 pivotally mounted on the stationary rod or shaft M and having each two arms 19′ fitted with antifriction rollers to engage two cams 20 and 21, respectively. These four cams are located in pairs at the two ends of the main shaft N and shaped to cause the stirrup 18, in case of turning the crank-handle for a calculating operation of additive character, that is in clockwise direction, to be moved forwards at the second one-third rotation of the handle and back again at the third one-third rotation, and in case of turning the crank-handle for a calculating operation of substractive character, that is in anti-clockwise direction, to be moved forwards at the first one-third rotation and be returned at the second one-third rotation of the handle. During the second one-third rotation of the handle, therefore, the driving stirrup 18 will be moved forwards, in case of revolving the handle in clockwise direction, and backwards in case of revolving the handle in anti-clockwise direction, so that if the positioning members or disks 3 are always coupled with the counting members 6 during this second one-third rotation, the counting members 6 will be driven or actuated the one time for addition and the other time for substraction. Referring to Figures 1, 2 and 10 I shall now go on to describe the specific means for automatically coupling the members 3 and 6.

All of the counting disks 6 are mounted for free rotation on a single shaft Q duly journalled in suitable bearings and provided, if desired or required, with a crank-handle 9 for the purpose of returning the disks 6 into their zero position. The shaft Q is supported by two levers 10 adapted to oscillate about a stationary rod or shaft H duly supported in suitable bearings of the walls B and C. The two levers 10 are rigidly connected together at a point remote from the shaft H, by any suitable means such as a bar 10‴ or the like, and the one lever 10 is provided with two lateral arms 10′ and 10″ forming a kind of a fork and provided with antifriction rollers engaging the peripheries of two cams 22 keyed to the main shaft N. The two cams 22 are shaped and adapted to cause the fork 10′, 10″ or the lever 10 to be oscillated to bring the teeth 6′ of the counting disks 6 in engagement with the teeth 3^x of the disks 3, if the main shaft is turned either in clockwise direction or in anticlockwise direction, for the second one-third rotation. In this way the set value is transferred, in a thoroughly automatic manner, from the positioning device or disks 3 to the counting device or disks 6, that is to say, at each revolution of the crank-handle 8, so that a single revolution means a calculation of addition or subtraction nature and a repeated revolution of the handle means a calculation by multiplication or division.

The rotations of the handle 8 are recorded by a counting mechanism 24, see Figures 1 and 2, including counting disks having each two series of figures from 0 to 9 in numerical sequence, for clockwise and anticlockwise rotation, either in juxtaposition or the one within the other one or in succession. The said counting disks are mounted on a shaft D and adapted to revolve freely thereabout. The shaft D is provided at the one end projecting beyond the wall C, with a small crank-

handle indicated at 25 in Figure 1, or the like for returning the whole set of disks into the zero or starting position.

The counting mechanism further comprises a ring with a pawl or single tooth 26, keyed to the shaft E supported in suitable bearings of the two walls B and C. Upon rotation of the shaft E the pawl or tooth 26 acts in the manner of a ratchet pawl to stepwise transfer the counting disks, rotation being imparted to the shaft E by the main shaft N through the agency of a link 30, see Figure 2, guided by a stationary pin 29 and connecting the two cranks 27 and 28 at the outer ends of the shafts E and N, respectively.

Obviously the positioning mechanism comprising the parts 3 and 11 on the one hand, and the counting device (6) on the other hand must be arranged to be displaceable with relation to each other in order to enable the said mechanism to immediately act upon counting disks 6 of higher values. As hereinbefore explained the positioning mechanism is adapted to be shifted owing to the frame O, O' P being displaceable lengthwise on the supporting shafts or rods F and G. The ring with the tooth 26 is connected with the said frame or carriage O, O' P in order to cause the former to partake in the lengthwise movements of the latter denoted by an arrow R in Figure 2. The connecting means provided for the purpose consists, in the embodiment shown, of a peripheral groove 26'' cut in the ring carrying the tooth 26 and adapted to be engaged by a plate 0. The displacement of the mechanism 3, 11 may be performed by hand or by means of any suitable, known means and the counting disks 24 may be secured or arrested, just as the counting disks 6, in their proper positions by means of resilient checking members of any suitable, conventional shape and arrangement.

An essential feature of a calculating machine of the described type resides in that, during the second one-third rotation of the crank-handle both in clockwise direction and in anticlockwise direction, the counting member 6 must engage the positioning and calculating member 3, 11 to receive a value from the latter and that in the last one-third rotation the parts must be out of engagement in order that the counting member shall be free for the transferring by tens. My invention includes the discovery that it is possible and of practical value to utilize the movement required in any case for disconnecting the counting members 6 from the members 3, 11, at the same time for coupling or connecting the counting members 6 with the tens transferring means which operate to bring in the tens values during the last one-third rotation of the crank-handle. Inversely the movement required for disconnecting the counting members 6 from the tens transferring means is or may be utilized for coupling or connecting the counting members with the members 3, 11 so that the tens transferring means need not be returned into their position of rest except during the second one-third rotation of the next revolution of the crank-handle where the counting members are coupled or connected with the members 3. A construction embodying this idea affords the advantageous possibility of employing tens transferring means which are or may be supported so as to be immovable with respect to their operative position, and adapted to be assembled or mounted in place in a ready and simple manner without requiring any manual finish. Another feature of my invention lies in the particular construction and arrangement of the tens transferring means themselves, especially inasmuch as a positive tens transferring operation will be ensured thereby without any liability of feeding the counting members excessively or beyond the desired positions or limits. A further important feature of my invention resides in so constructing and arranging the parts that the tens transferring means will be efficient and reliable in operation both in case of clockwise and in case of anticlockwise rotation of the crank-handle or the main shaft, that is to say for calculations of additive character and for calculations of subtractive nature, since calculating machines of the kind disclosed in my prior application Serial No. 610,934 or of any similar type are greatly improved thereby in constructional, economical and practical regards.

Referring to the embodiment illustrated in the drawings my improved tens transferring means or mechanism is constructed and operates as follows.

As regards the construction and arrangement of the mechanism hammer-shaped controlling levers 23 are mounted on the shaft H free to rotate thereabout. As will be clearly seen in Figures 1 and 3, the levers 23 occupy a place in the path of the cams 6''' provided in the usual manner on the counting disks, and are retained and secured in their two end positions by means of springs 31. Each lever 23 has a hole for the reception of a pin or pivot 32 of a crank or link 33, see Figures 1 to 5 and 7, having a second pin or gudgeon 34 projecting from the opposite side thereof approximately midway between the two ends of the said arm or link 33, and engaging in a longitudinal slot 35' of a transferring lever 35 mounted on the shaft L free to rotate thereabout and adapted to occupy any one of the three positions determined by three notches co-operating with a resilient locking pawl or spring 45. The inner end of the lever 35 is shaped to form a plurality of teeth and in the embodiment shown four teeth 36, see Figure 8, are provided. The teeth 36 are situated in the same plane as the teeth 6' of

the counting disk 6 of the next higher order intended and adapted to co-operate with the former, the arrangement being such that by oscillating the disks 6 about the shaft H the teeth 6′ will be disengaged from the teeth 3× and, at the same time, the teeth 6′ will be caused to engage the teeth 36 of the lever 35 and vice versa. This engagement, see Figure 5, always exists at the last one-third rotation of the crank-handle 8. Keyed to the driving shaft N and in the vertical plane of the two arms of the lever 35 is a controlling disk 46 which is provided with lifting pins 37, 39 and 42 and with two transferring pins 43 and 44, the pins 37, 39 and 42 lying in different vertical planes, whilst the pins 43 and 44 are located in the same vertical plane. The purpose of these cam-like acting lifting and feeding pins will be apparent from the following description of the operation of the tens transferring mechanism.

In the normal or rest position of the crank-lever 8 or shaft N all of the movable parts of the machine occupy the positions shown in Figures 1, 3, 9 and 10 if no operation of transferring the tens had been performed by the last preceding rotation of the crank-handle.

Supposing the counting member 6 passes, at any calculating operation (engagement between members 6 and 3 as shown in Figure 4), that is to say during the second one-third rotation of the main shaft N, beyond the tens limit, for example of a value "4" is to be added by the positioning member 3, 3× to a value "8" of the counting disk 6, the cam 6‴ of the counting disk 6, acts to turn the controlling lever 23 over into the position shown in Figure 5 and at the same time the arm or link 33 pivotally connected to the lever as above described, operates to lift the transferring lever 35 by means of its pivot 34 engaging and moving in the slot 35′ of the lever 35, so that the latter will be moved from the position shown in Figure 4 to the position depicted in Figure 5. The free end of the link 33 is thereby brought into the path of the pins 43 and 44 of the disk 46. Now at the last one-third rotation of the shaft N when the counting member 6 has been disengaged from the teeth 3×, through the agency of the coupling mechanism shown in Figure 10, in order to engage with the teeth 36 of the lever 35, that is to say, when the member 6 has been moved from the position shown in Figure 4 to that illustrated in Figure 5, the pin 43 or 44, that is to say, in case of a rotation of the shaft N for an addition purpose, the pin 44 will strike the end of the link 33 thereby lifting the link 33, as shown in Figure 5, and causing the pin 34 of the latter to raise the lever 35 of the next higher value section so that the lever 35 will transfer its counting member 6 for the length of one tooth and thereby perform the tens transmission. Upon such transmission which must be effected successively from the one counting disk 6 to the next counting disk 6 in the usual manner known to persons versed in the art, the lever 35 finally remains in the position shown in Figure 5, even during the rest position of the main shaft N or crank-handle 8, while the lever 23 by contact with the lifting cam following the action of the tens-transferring drive tooth is forced back during the last third of the rotation into its normal position as shown in Fig. 3. The slot 35′ in the lever 35 is of such length that it permits such shifting movement and does not prevent a further movement of the lever 23 which movement is thereby affected that this lever in the coupling between the parts 3× and 6× in which the part 10 swings forward is entrained by the part 10 by means of the spring 31.

The lever 35 is returned into the intermediate position or position of rest shown in Figures 1 and 3 and requiring a previous disengagement of the counting members 6 in order to maintain the tens transfer, during the second one-third portion of the next rotation of the crank-handle, because both in calculations of additive nature and in calculations of subtractive nature the counting members 6 are disengaged, as hereinbefore explained, from the members 35 during the second one-third rotation of the shaft N. In any case the counting member 6 must co-operate, during the second one-third rotation of the main shaft N, with the calculating and positioning members 3, 11, so that during this co-operating period the transferring levers 35 can be returned from the position shown in Figure 5 to that illustrated in Figures 1, 3 and 4.

In the embodiment shown in the drawings a cam or pin 39 is provided for the purpose, the said cam or pin 39 acting to strike the lower arm of the lever 35 and move the same from the position in Figure 5 to the position shown in Figures 1, 3 and 4. As soon as the latter has been forced into its zero position, the link 33 will return to the position as illustrated in Figures 3 and 4.

In case of subtractive calculations where the lever 23 struck by the cam 6‴ of the counting disk 6, acts to likewise return the link 33 towards the right hand side, the transferring pin 43 of the disk 46 actuates the link 33, in order to turn and move downwards the transferring lever 35, whilst for the purpose of returning the same to the intermediate position shown in Figures 1, 3 and 4 a lifting pin or cam 42 is provided and adapted to lift the upper arm of the lever 35 and thereby turn the latter about its pivot L. This return movement likewise occurs during the second one-third rotation of the next following revolution of the crank-handle of the main shaft N, if the counting member is disconnected from the transferring lever 35, 36.

In case that the two arms of the transfer-

ring lever 35 are so shaped, dimensioned and arranged as to cause the one or the other arm, just as the case may be, to come in contact with the peripheral face of the disk 46 upon the displacement or rotation of the lever 35 into the raised or the lowered position, respectively, the new tens transferring mechanism will operate in a perfectly positive manner and excessive movements beyond the required limits cannot occur. For the like purpose or alternatively, for instance, abutments may be provided on the transferring lever 35 for limiting the extent of movement of the coupling link 33, see Figure 5. The construction and arrangement of the transferring lever 35 in the manner illustrated, so that the actuating disk 46, as regards the two engaging points of the lifting pins or cams 39 and 42, is enclosed by the lever for half its circumference and a line passing through the two pins will go approximately through the axis of the shaft N and intersect the line connecting the axes of the two shafts N and L approximately at right angles, however, this is particularly advantageous on account of the smooth and jerk-free actuation or drive of the transferring levers 35 ensured thereby.

It goes without saying that I wish it to be understood that the engagement between the transferring levers and the counting members 6 may just as well be brought about by way of an axial displacement of either the levers or the counting members instead of employing lateral displacement for the purpose as hereinbefore described and shown.

As it is imperative to disengage the counting members 6 from the transferring teeth 36 of the levers 35 during the zero position of the former, I arrange the levers so as to be displaceable bodily or as a unit; for example, I mount the shaft L so as to be displaceable in the direction of the arrow 48 shown in Figures 3 to 5 by means of a cam or the like, adapted to be moved through the agency of a toothed segment employed for rotating the zero positioning shaft Q. In the shown embodiment the shaft L is supported by two arms 49, see Figures 1 and 3 to 5, mounted on a rod or shaft J, so as to be free to oscillate. Keyed to the said shaft Q is a disk 50, see Figure 11, having a peripheral notch for the reception of the nose 52′ of a sliding latch or dog 52 mounted on the shaft L and adapted to be held in engagement with the recess or notch of the disk 50 by means of a strong coiled spring 51, as clearly shown in Figure 11. During the rotation of the zero positioning shaft Q by the actuation of the crank-handle 9 the sliding dog 52 acts to displace the shaft L in the direction of the arrow 48, see Figures 3 to 5 and 11, whereby the counting members are disengaged from the transferring levers 35, 36.

The controlling levers 23 and the tens transferring levers 35 may be made from sheet iron by a punching operation and do not require any supplemental manual finish. The links 33 and the controlling disks 46 constituting the drive for the tens transferring mechanism may be made by casting under pressure.

I have not attempted to explain all of the minute details of the construction of the machine, for it will be understood by those to whom this specification is addressed, that the parts will necessarily be of the proper size, dimensions and relationship, and will be properly mounted and supported according to the tenets of machine construction; nor have I attempted to illustrate the parts in their exact sizes and dimensions as many of the parts are conventionally shown.

It seems unnecessary to reiterate the operation of the machine, for the operation of the several parts has been described in detail. Nor does it seem necessary to burden this specification with an exposition of the advantages which my invention possesses, for they will be apparent to those versed in the art to which this invention relates.

Though I have described with great particularity of detail a single specific embodiment of my invention only, yet it is not to be understood therefrom that the invention is limited to the particular embodiment disclosed. Various modifications in detail and in the arrangement and combination of the parts may be made by those skilled in the art without departure from the invention. I therefore wish it to be understood that I do not limit myself to the construction herein shown and described, but hold myself at liberty to make such departures therefrom as fairly fall within the spirit and scope of my invention.

What I claim is:

1. In a calculating machine, a tens transfer including a counting disc, a control lever adapted to be displaced by the counting disc on exceeding the tens transfer shift limit, a rotatable member, drive pins carried by said member, an oscillating lever pivotally connected with the control lever and moved thereby into the paths of the pins, said pins acting to tilt the oscillating lever in one or the other direction, and transfer means coacting with the oscillating lever to effect the tens transfer movement of the counting disc of the next higher value.

2. A calculating machine as claimed in claim 1, characterized by the provision of means on the rotatable member for returning said control lever and the means coacting with the oscillating lever to initial position.

3. In a calculating machine as claimed in claim 1 characterized in that said oscillating lever is provided medially with a laterally projecting pin engaging said transfer means,

the end of the oscillating lever opposite the control lever being movable into the path of and engageable by said pins.

4. A calculating machine as claimed in claim 1 characterized in that the transfer means is constituted by a two-armed lever partially embracing the rotatable member and movable in either direction, the movement of the shift lever in either direction being limited by engaging thereof with the rotatable member.

In testimony whereof I have affixed my signature.

ALBERT SCHUBODE.