F. TRINKS.

CALCULATING MACHINE.

APPLICATION FILED JUNE 13, 1907.

975,180.

Patented Nov. 8, 1910.

8 SHEETS—SHEET 1.

Fig:1.

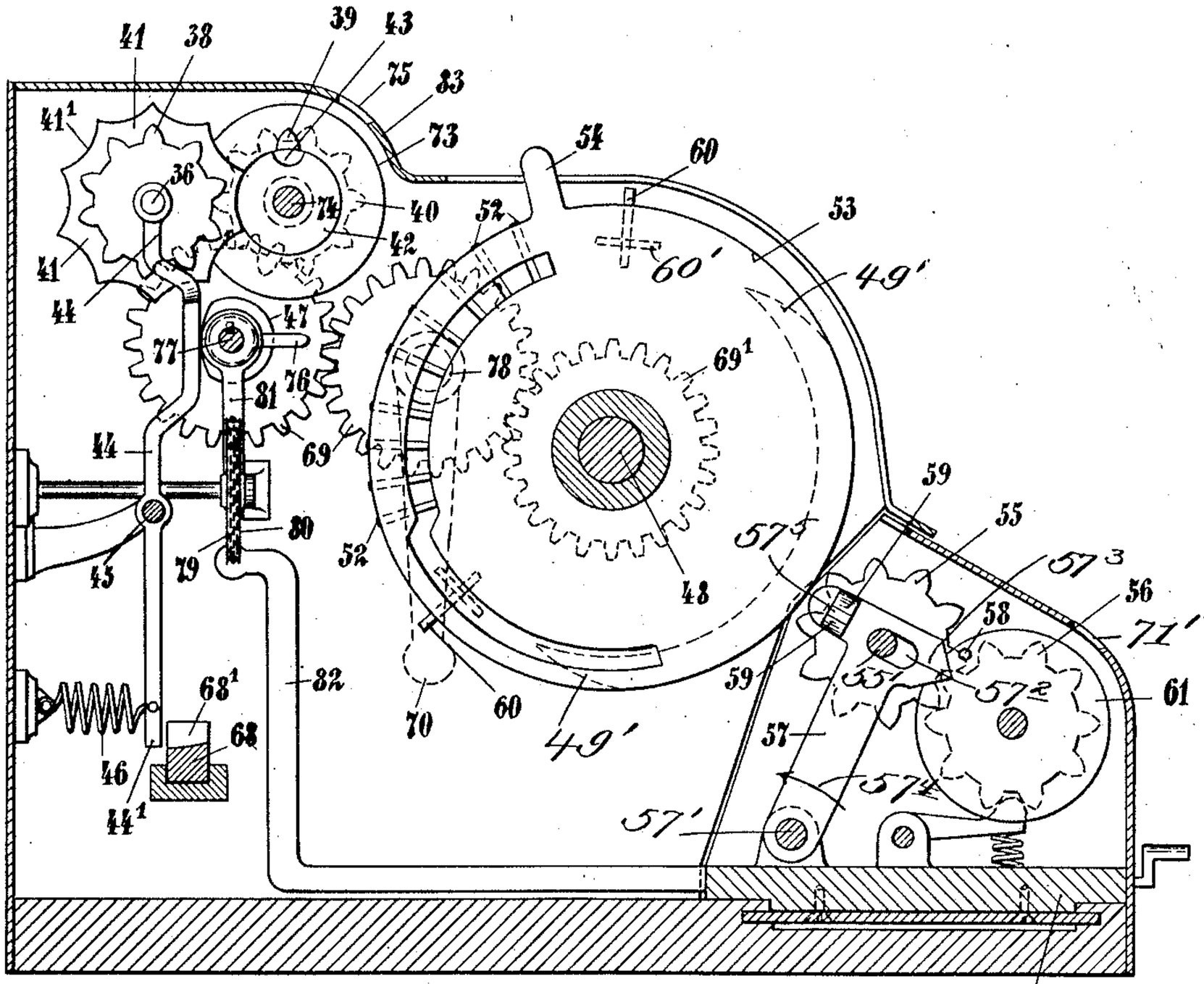
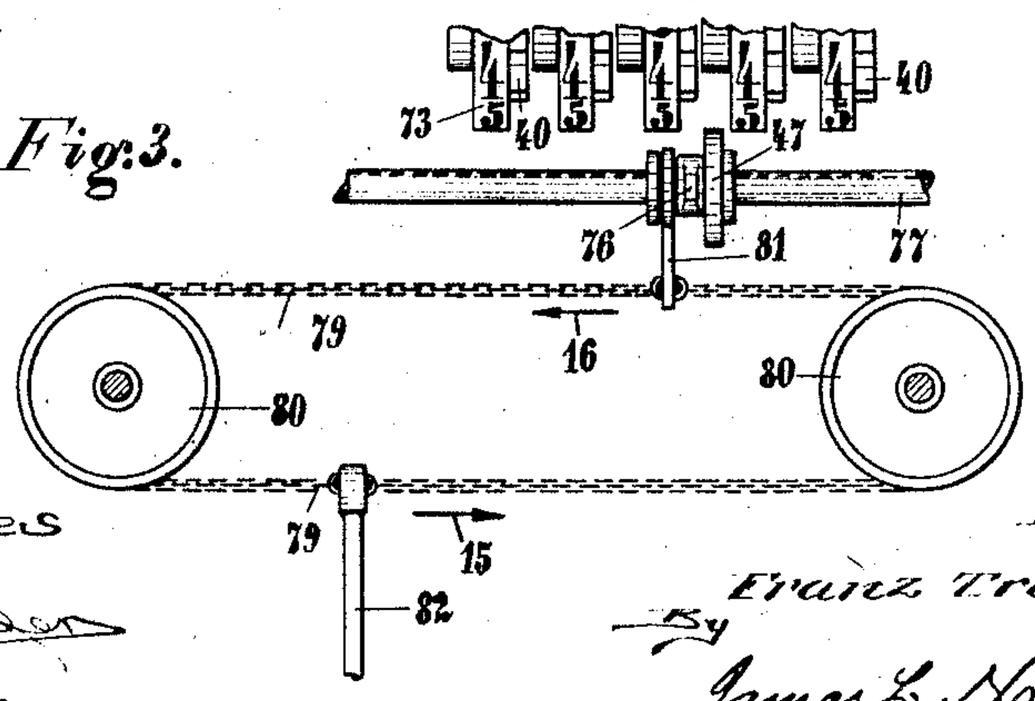


Fig:3.



Witnesses

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8 SHEETS—SHEET 2.

Fig. 1a.

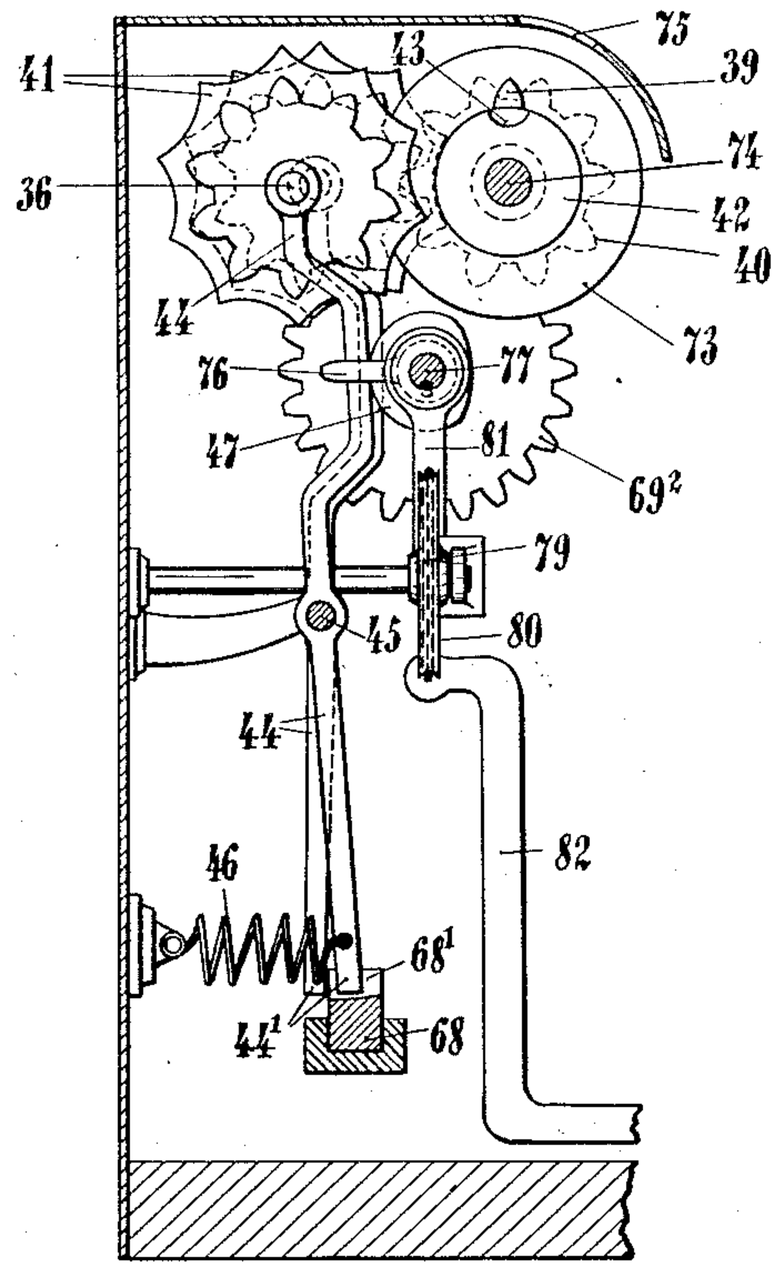
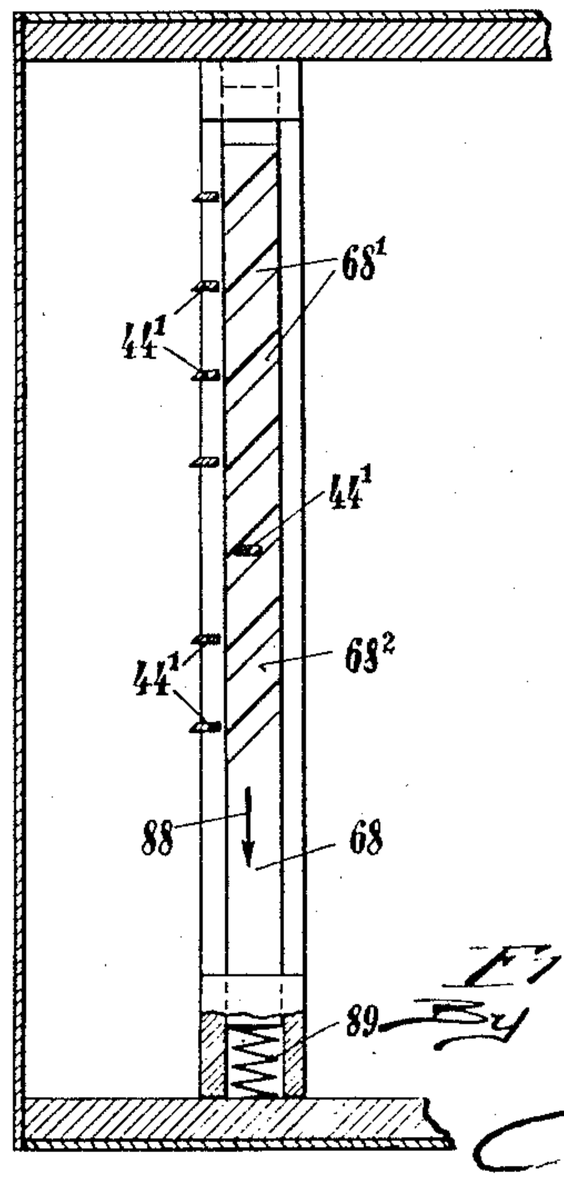


Fig. 1b.



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8 SHEETS—SHEET 3.

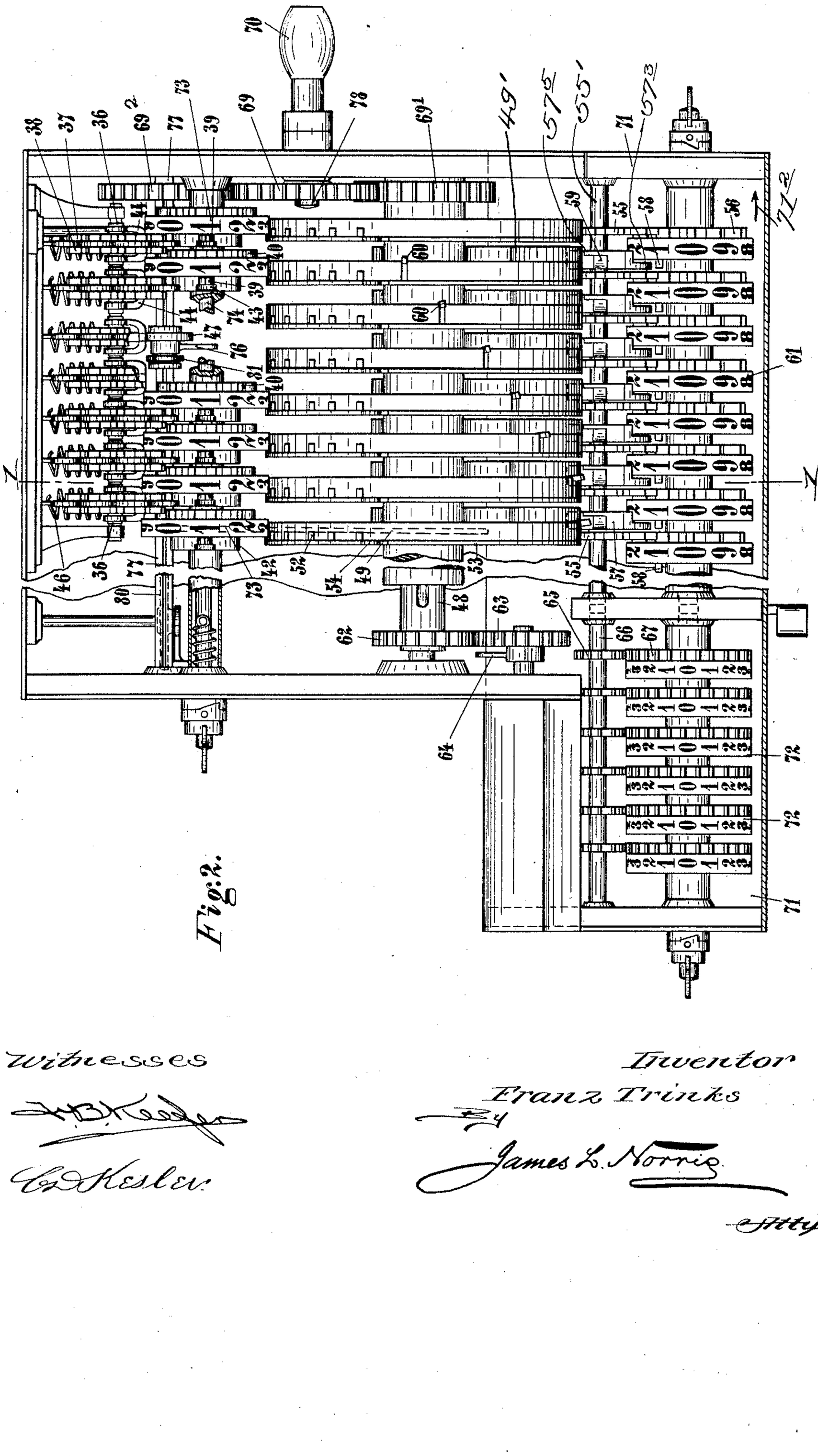

Fig. 2.

Witnesses

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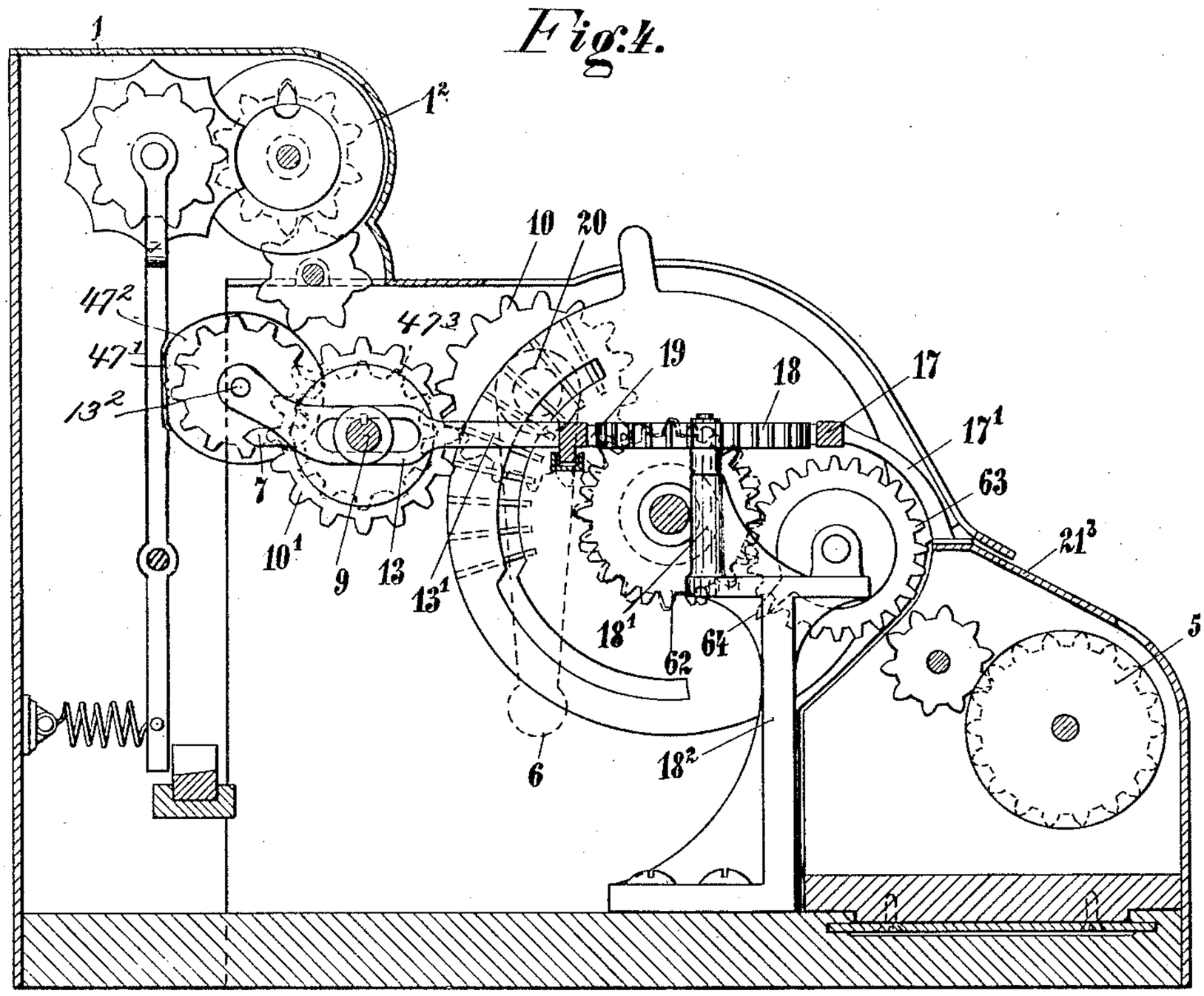
8 SHEETS—SHEET 4.

Fig. 4.



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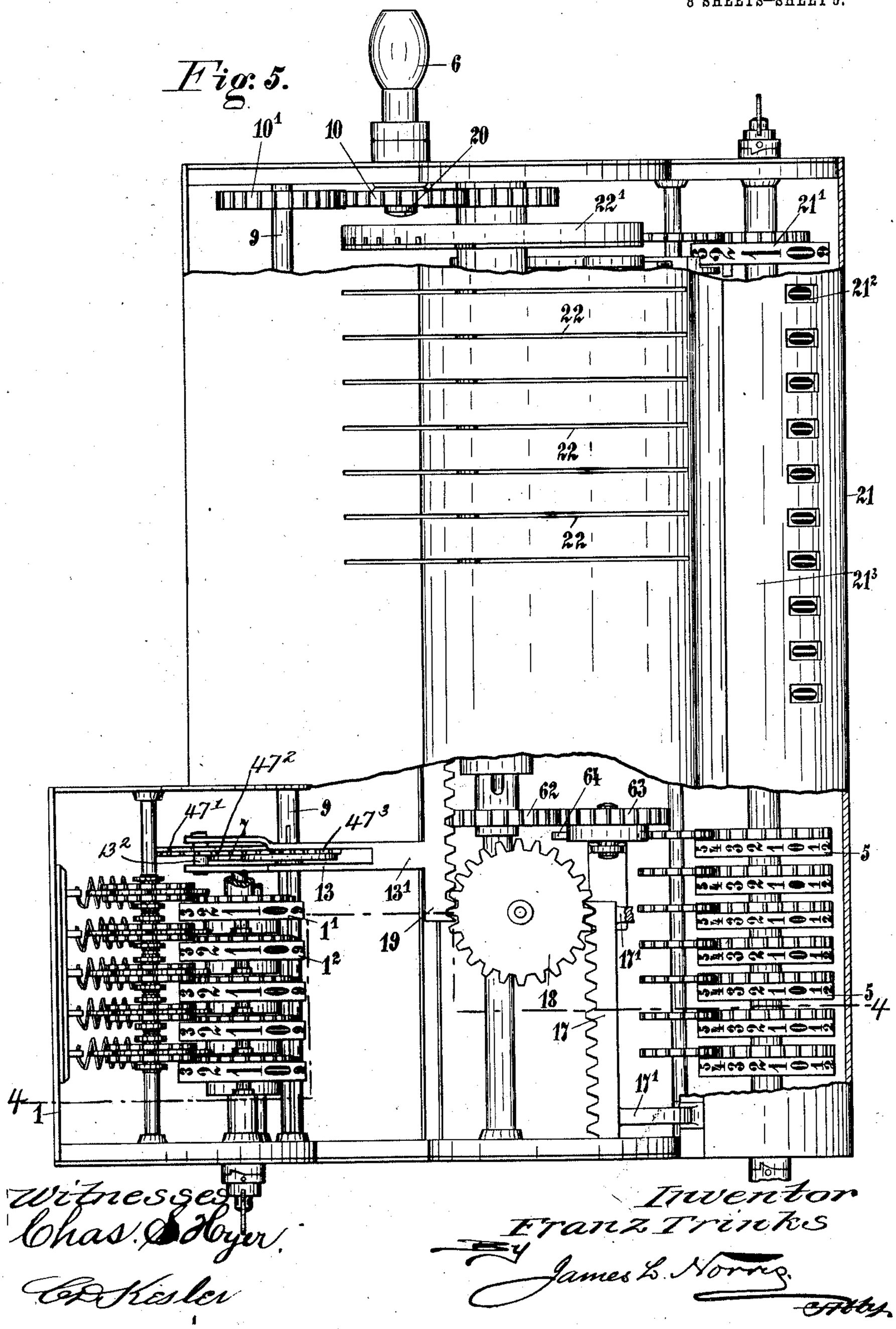
8 SHEETS—SHEET 5.

Fig: 5.



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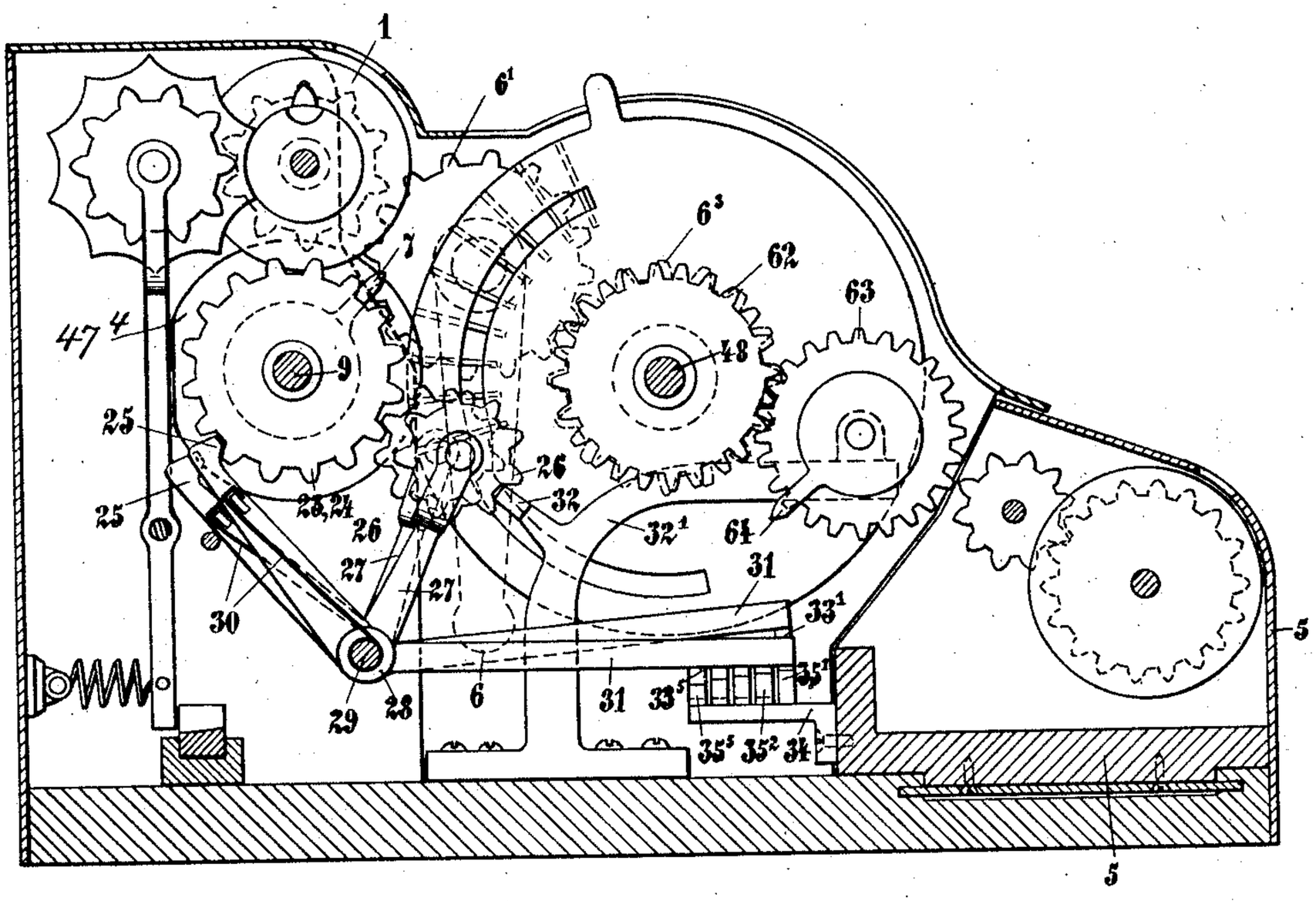
8 SHEETS—SHEET 6.

Fig. 6.



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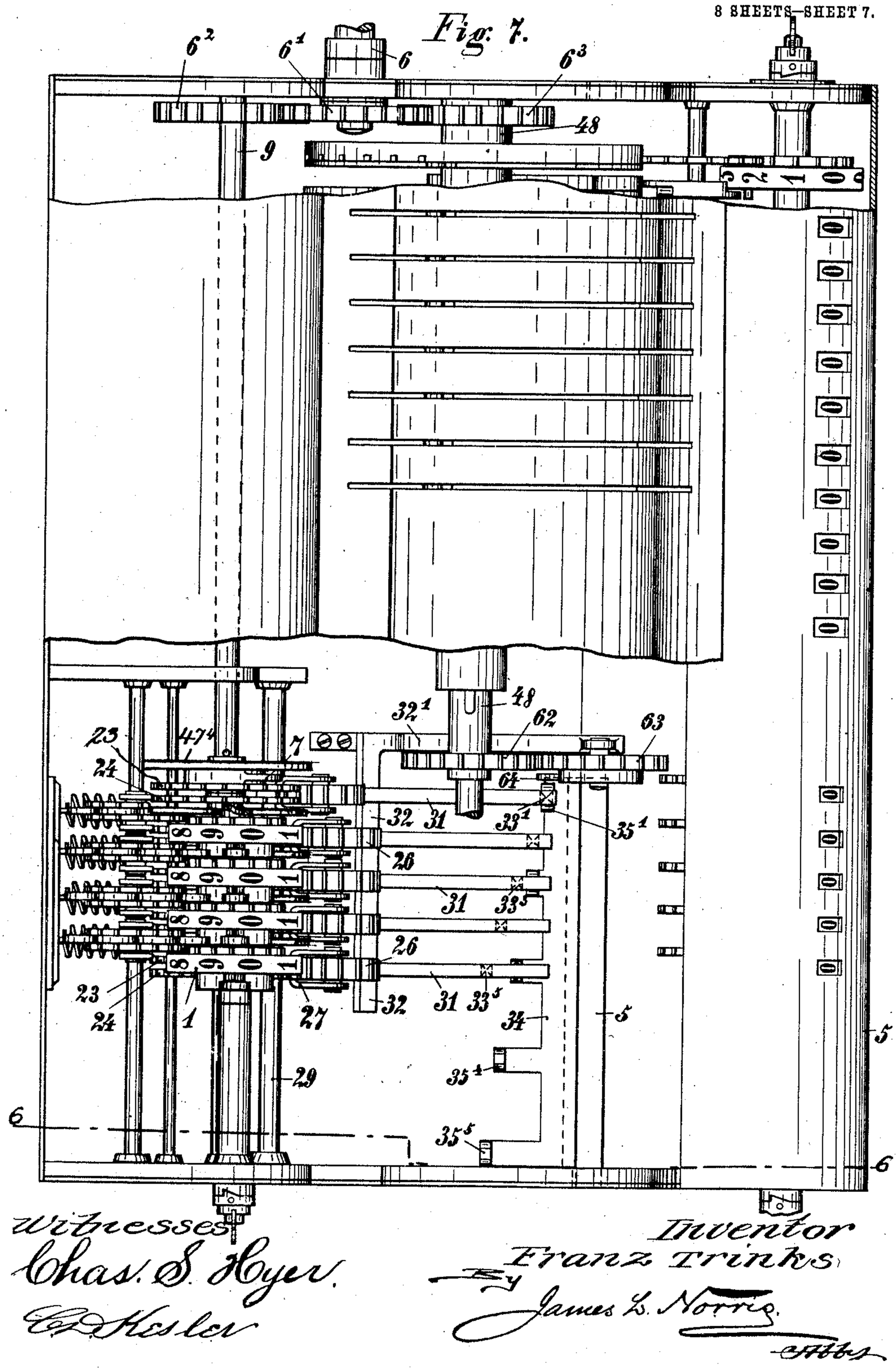
8 SHEETS—SHEET 7.

Fig. 7.



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8 SHEETS—SHEET 8.

Fig: 8.

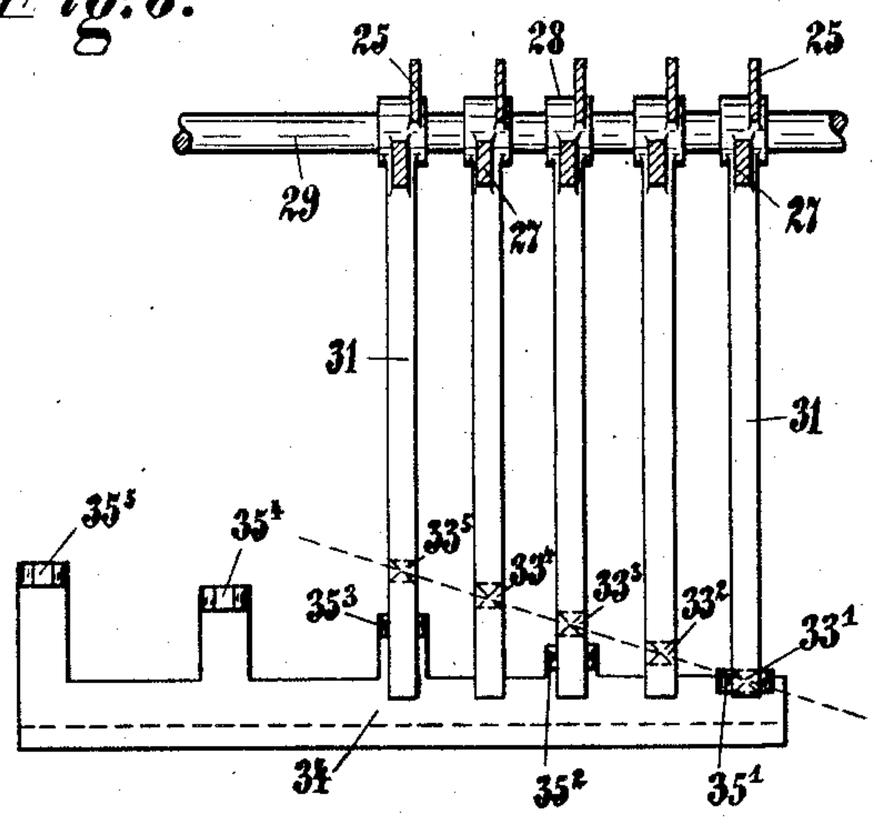


Fig: 9.

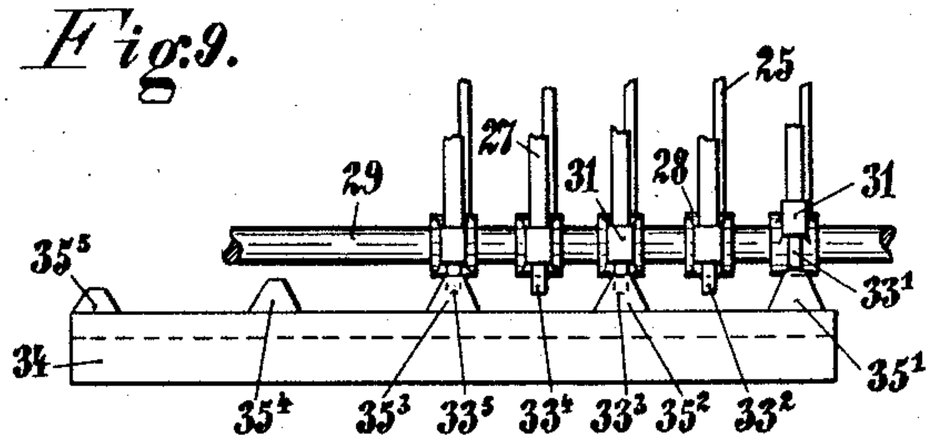
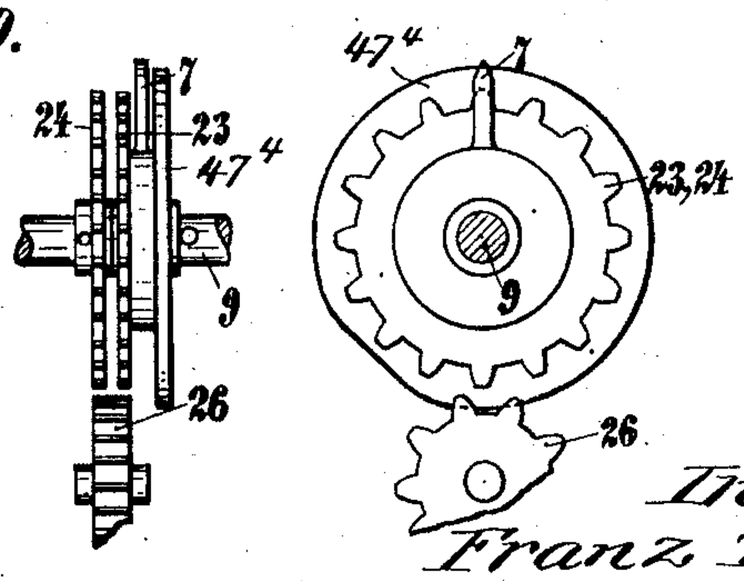


Fig: 10.



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UNITED STATES PATENT OFFICE.

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CALCULATING-MACHINE.

975,180. Specification of Letters Patent. Patented Nov. 8, 1910.

Application filed June 13, 1907. Serial No. 378,854.

To all whom it may concern:

Be it known that I, FRANZ TRINKS, engineer, subject of the Emperor of Germany, residing at Brunswick, Duchy of Brunswick, Empire of Germany, have invented certain new and useful Improvements in Calculating-Machines, of which the following is a specification.

This invention relates to calculating machines of that type embodying toothed adjusting wheels having radially movable teeth variable as to the number operatively projected and also provided with cam disks arranged on these wheels, and by the adjustment or rotation of the cam disks the teeth of the adjusting wheels are brought into and moved out of operating position, the rotation being effected by means of handles which project to the outside of the machine through slots in the casing or cover. The values adjusted on the toothed adjusting wheels are transmitted on the rotation of the main crank indirectly by means of intermediate wheels, to the figure-disks of the counting mechanism, which, for the purpose of making the direct action of the units toothed adjusting wheel on the intermediate wheel of the figure disks of higher value possible is disposed in parallel displaceable relation to the adjusting mechanism axis. In such calculating machines the counting mechanism indicating the crank revolutions is located on the carriage of the displaceable main registering mechanism connected thereto. In large machines, that is to say, those having a large number of numerical value places, this arrangement has the drawback of inconvenient elongation of the carriage, see for instance English patent to Willgodt Odhner No. 13,700 of 1890.

The present invention relates to improvements in calculating machines of the class described, and the object of the improvements is to provide a machine in which the lateral extension of the carriage of the displaceable main registering mechanism is decreased. To accomplish this object, the counting mechanism indicating the crank revolutions is not located on the carriage as in machines heretofore in use, but separated therefrom and preferably positioned in the upper part of the machine where its figures can be seen through peep-holes provided in the casing cover.

A further object of the present invention is to stationarily locate the counting mechanism for the crank revolutions. For this purpose the driving gear of the counting mechanism, which is operated by the machine crank, is moved simultaneously with the counting mechanism carriage of the main registering mechanism and in an opposite direction. The separate location of the counting mechanism indicating the crank revolutions and of the carriage of the displaceable main registering mechanism is particularly of advantage in large machines having a large number of numerical value places. Furthermore, it is desirable, under certain circumstances, to have two separate crank revolution counting mechanisms, in which case one may be disposed on the carriage as in ordinary machines of the class, and the other disposed as above stated.

For the purpose of illustrating the present invention, several forms are shown in the accompanying drawing, in which:—

Figure 1 is a vertical cross-section of a machine embodying the invention, taken on the line 1—1, Fig. 2, and showing the carriage of the main registering mechanism and the counting mechanism for indicating the crank revolutions. Fig. 1[a] is a cross-sectional view of a portion of the mechanism. Fig. 1[b] is a detail horizontal section of a part of the mechanism. Fig. 2 is a plan view of the construction shown in Fig. 1 with the casing or cover removed. Fig. 3 is a side elevation of a portion of the mechanism shown in Figs. 1 and 2. Fig. 4 is a vertical cross-section of a modification of the machine illustrated by Fig. 1, taken on the line 4—4, Fig. 5, and showing in addition to a revolutions counting mechanism similar to that illustrated by Figs. 1 and 2, the usual counting mechanism arranged on a carriage. Fig. 5 is a plan view of Fig. 4, partly in section. Fig. 6 is a vertical cross-section taken on the line 6—6 Fig. 7 and showing a further modification of the machine. Fig. 7 is a top, plan view of the machine shown by Fig. 6, part of the casing being removed. Fig. 8 is a top plan view of a portion of the mechanism used in the machine shown by Figs. 6 and 7, parts being illustrated in section. Fig. 9 is a side elevation of the mechanism shown by Fig. 8. Fig. 10 illustrates a side view and a front view of a part of the mechanism shown by Figs. 6 and 7.

Similar characters of reference are employed to indicate corresponding parts in the several views.

Referring particularly to the construction shown in Figs. 1 to 2, the numeral 49 designates a plurality of disks fixed upon a common shaft 48, the latter being rotated by means of intermediate gear wheels 69, 69^1 from the main crank 70 of the machine. Each of the disks 49, termed adjusting wheels, has nine radially displaceable teeth 52 and a well known form of cam disk 53, and by the rotation of said cam disk relatively to the adjusting wheel 49 with which it coöperates, the teeth 52 are brought into and out of operating position, the rotation being effected by means of a handle 54. The adjusting wheels 49 when rotated transmit their movement by means of gear wheels 55, 56 to the figure wheels 61 of the counting mechanism, the said counting mechanism being mounted on a carriage 71 displaceable parallel with relation to the axis 48, so that the said toothed adjusting wheels 49 may act directly on the wheels 55 and through the latter on the wheels 56 of the figure wheels 61 of higher value places. The counting mechanism, which is termed the main counting mechanism, is also provided with well known tens transferring mechanisms, always one tens transferring mechanism projecting between two adjacent counting disks 61.

Each tens transferring mechanism consists of a hammer-shaped lever 57 pivotal on an axis 57^1 and held in an upright position by the axis 55^1 of the wheels 55, which axis 55^1 enters a slot 57^2 of the lever 57. Each of the levers 57 normally stands at an outward incline with relation to its axis 57^1, the weight of the wheels 55 and the axis 55^1 being sufficient to maintain each lever 57 in this normal position, and the means for temporarily throwing each lever 57 inwardly from its normal position will now be described. The lever 57 generally projects with its head 57^3 into the path of a pin 58 rotating with the figure wheel 61 in such relation, that this pin 58 in its turn strikes against the head 57^3 and thereby pushes the lever 57 in the direction of the arrow 57^4. By this means the head 57^5 of the lever 57 is brought into the path of a tooth 60 rotating with the adjusting disk 49, so that the beveled face 59 of the head 57^5 comes into contact with the tooth 60, whereby this tooth is turned around its axis 60^1 and moved into the gearing of the adjacent wheel 55 (Fig. 2) for the next higher figure disk 61. In this way the tooth 60 moves the wheels 55, 56 and thereby the figure disk 61 one tooth (one figure value) forward, whereupon by further rotation the tooth 60 being influenced by a spring for disengagement is again moved laterally out of the plane of the wheel 55. On the further rotation but before finishing its full rotation the adjusting wheel 49 by its cam 49^1 strikes the head 57^5 and pushes the lever 57 back into its position of repose (Fig. 1). The next tens transferring operation takes place when the pin 58 again comes into contact with the head 57^3 of the lever 57, *i. e.* when it is observed through the peep-hole 71^1 that the figure "9" disappears and the figure 0 appears or vice versa. The transferring lever 57 of the tens transferring mechanism is revoluble on the axis 57^1, see Fig. 1, and is turned down by the pin 58 of the disk 61 to the left and then again to the right by engaging surfaces 49^1 or the cam means of the adjusting wheels 49 and lies closely beside the wheels 55, but does not operate to rotate the latter wheels. In both end positions the lever 57 is held by means of the friction arising from the contact between the said lever and the two shafts or axes 57^1 and 55^1, the latter closely entering a curved longitudinal bore of the lever 57. Two pivoted teeth 60, two cams 49^1 and two beveled faces 59 are provided to accommodate a right and left hand rotation of the machine crank 70. On the carriage 71 is also mounted co-axially with the main counting mechanism 61 a counting mechanism 72, see Fig. 2, the latter counting mechanism being termed the crank revolution counting mechanism, one counting disk of the latter mechanism being moved one tooth forwardly or backwardly if the crank 70 makes a full rotation. This latter operation is effected by means of a gear wheel 62 mounted on the shaft 48 and a second gear wheel 63 having a tooth 64 which engages one of the wheels 65 loosely mounted on a shaft 66 and in engagement with the gear wheels 67 of the counting disks 72.

According to the present invention, a second crank revolution counting mechanism 73 is laterally stationarily arranged on a shaft 74 mounted in the upper part of the machine where its figures may be seen through peep-holes 75 provided in the casing 83. To the driving gear of the second crank revolution counting mechanism 73 receiving its rotary motion from the crank 70 of the machine, a longitudinal displacement is simultaneously imparted by the movement of the carriage 71 of the main registering mechanism 61 and the first revolution counting mechanism 72, the said displacement being equal to that of the said carriage, but effected in an opposite direction. For this purpose, a cam wheel 76 is provided and longitudinally slidable on a shaft 77 arranged parallel to the shaft 74. From the shaft 77 rotation is imparted to the wheel 76 by means of a longitudinal groove provided in said shaft and a key carried by the latter wheel and sliding in the groove. The shaft 77 is rotated by the crank 70, a pair of spur gears 69 and 69^2 being respectively mounted on the shafts 78 and 77. Adjacent to the shaft 77 an endless

chain or band 79, see Fig. 3, is provided and passes over sprocket wheels 80, positioned as shown by Fig. 2, the upper portion of the said chain being connected to an arm 81 coöperating with and having a portion embracing a part of the cam wheel 76, the lower portion of the said chain engaging an arm 82 extending downwardly to and movable or displaceable with the carriage 71. By means of this positive connection between the carriage 71 and the axially displaceable cam wheel 76, the displacement of the registering mechanism to the right (arrow 15, Fig. 3), results in an equal displacement of the cam wheel 76 in the opposite direction through the intermediate action of the arm 82, the chain 79 and the arm 81, the upper portion of the chain moving in the direction of the arrow 16 (Fig. 3).

The main calculating mechanism embodying the disks 61 and driven by the adjusting mechanism, including the parts 49, 53, 54, 60, etc., has at least as many figure disks 61 as the adjusting mechanism has changeable driving wheels 49, but the said main calculating mechanism in practice is provided with more disks than there are driving wheels 49 embodied in the adjusting mechanism in order that the figure disks 61 farthest to the left which are not opposed by adjusting wheels can be driven by the latter wheels through the medium of the carriage 71 parallel to the shaft 48 and on which the said disks 61 are arranged. Shifting of the carriage 71 in the direction of the arrow 71^2 also has a further operation. If, for instance, the adjusting mechanism embodying the wheels 49 has been operated to show the number "325" and it is desired to multiply this number by 100, it would be necessary under ordinary operations of machines of this class to impart one hundred revolutions to the crank 70. In the present instance, to carry on this operation of multiplication the carriage 71 is shifted two values to the right or in the direction of arrow 72^2, Fig. 2, so that the adjusting wheel 49 farthest to the right acts upon the third lowest figure disk 61 and with the mechanism in this position it is only necessary to give a single revolution to the crank, the single teeth 64 and 76 of the cogs of the third lowest "hundreds" figure disks coöperating with the counting mechanism 72 or the counting mechanism 73.

The crank revolution counting mechanism 73 is also provided with tens transferring mechanisms so that it may be employed without difficulty in the so-called simplified multiplication or subtraction by which, for example, instead of 199×345, whose computation requires $9+9+1=19$ crank revolutions, the expression $200\times345-1\times345$ is calculated, for which purpose only $2+1=3$ crank revolutions (2 forward revolutions and 1 backward revolution) are necessary. The calculating operation is the following: After the value 345 has been adjusted, *i. e.* after bringing five teeth 52 of the first adjusting wheel 49, four teeth 52 of the second adjusting wheel 49 and three teeth 52 of the third adjusting wheel 49 into working position by turning the corresponding handles 54, the carriage 71 is moved two value places to the right (arrow 71^2, Fig. 2) and then the crank 70 is turned two times. By this means the teeth 52 of the above named three adjusting wheels 49 act by means of the gear wheels 55, 56 on the third, fourth and fifth figure disks 61 respectively so that the main registering mechanism indicates the number "69000". The two crank revolution counting mechanisms 72 and 73 show each the number "200". Then the carriage 71 is moved backwardly (to the left) into its initial position (Fig. 2) and one revolution is given to the crank in a direction opposite to that previously given thereto and whereby the above named three adjusting wheels 49 act on the first three figure disks 61 respectively in the subtracting sense. After this one subtracting crank revolution the main registering mechanism shows the number 68655 (69000—345) and the crank revolutions counting mechanism 73 by means of its well known tens transferring mechanisms shows the number 199 (200—1).

The counting mechanism 72 is employed for simple arithmetical computations, or simple addition and subtraction. In view of the fact that in these computations the revolutions of the crank to the right or to the left are counted in the same sequence, or 1, 2, 3, etc., the disks thereof must have two scales of figures, as shown by Fig. 2, running from an intermediate zero common to both scales.

Between two adjacent figure disks 73 is arranged a tens transferring mechanism, which is as follows: Groups of spur gears are loosely arranged on a shaft 36 parallel to the counting mechanism shaft 74, each of which groups consists of two spur gears 37 and 38 rigidly connected to each other. One of the gears 37 is operated by a cam 39 on the counting wheel 73 and the other gear 38 is in engagement with the teeth 40 on the next higher value counting wheel 73. Between both of the spur gears 37 and 38 of each group a Maltese cross disk 41 is inserted and rigidly connected therewith, this disk having a number of notches 41^1 corresponding to the number of the teeth of the spur gear 37, in which notches the hub 42 of the counting disk 73 engages, whereby the disk 41 and the spur gears 37 and 38 are secured against rotation. When the counting disk 73 moves from nine to zero, or vice versa, the cam 39 moves the gear 37 one tooth forward, whereby, through the inter-

mediate action of the gears 38 and 40, the counting disk 73 of the next higher value place is turned one graduation forward. The cross disk 41 permits this rotation, because its points projecting beyond the periphery of the hub can then enter a recess 43 of the counting wheel hub 42 adjacent thereto. The tens transferring mechanism described is simple and reliable in its operation.

In order to permit operation of any wheel 40 by the cam 76, it is necessary to provide means whereby the said wheel is temporarily unlocked from its Maltese cross disk 41. For this purpose the shaft 36 of the transfer mechanism is held between forked arms 44 which are adapted to rock on the shaft 45 and are acted upon by a spring 46 normally holding the transfer mechanism in engagement with the counting mechanism 73. If the shaft 77 be operated with the cam 76 in engagement with a wheel 40 other than the units wheel, an eccentric cam 47 connected with the rotating tooth 76 jams against the forked arm 44 and thereby forces the shaft 36 and therewith the gears 37 and 38 away from the counting mechanism spindle 74 to a necessary extent.

In order not to be compelled, in the arrangement hereinbefore described, to rely on the effectiveness of the springs 46 securing the position of the forks 44, a separate locking device is arranged in coöperative relation to the Maltese cross devices and which holds the latter in engaged position and only releases the same at the moment when disengaging position ensues or when such devices or device are or is rocked out of engagement. This separate locking device consists of a bar 68, Figs. 1, 1^a and 1^b, which bears against the free ends 44^1 of all the forked arms 44 and prevents any movement thereof. The bar 68 is provided with oblique notches 68^1 as shown in Fig. 1^b, which notches, when the crank 70 is in position of repose, lie opposite the free ends 44^1 of the arms 44, so that the end 44^1 which is swung out by the cam 47 can always enter the corresponding notch 68^1. After a given rotation of the crank 70, necessary for entirely swinging out an arm 44, the bar 68 is longitudinally displaced, see arrow 88, Fig. 1^b, by the swung out arm 44, the free end 44^1 of which strikes the oblique wall of its notch 68^1. The displacement of the bar 68 is effected to such an extent that its upper teeth 68^2, Fig. 1^b, come in front of the ends 44^1 of the arms 44 which have not been outwardly swung and whereby these arms are locked. A spring 89 presses the bar 68 back in its normal position, when the swung out arm 44 with its free end 44^1 leaves the notch 68^1, *i. e.*, when the disengaged Maltese cross device is again engaged. The arrangement just described, *i. e.*, the arrangement of the one crank revolution counting mechanism in the upper part of the machine above the adjusting mechanism, has the advantage over machines of ordinary construction in that the indications of the révolution registering mechanism 73 may be better ascertained if the separate rows of peep-holes and adjusting slots are located one above the other, than when two rows of peep-holes are arranged side by side in the same horizontal line.

In Figs. 4 and 5 a modification of the mechanism is shown and by means of which longitudinal displacement is imparted to the cam wheel 7. In this instance also the well known displaceable counting mechanism 5 for the revolution of the crank is separated from the undisplaceable counting mechanism 1. The latter mechanism is arranged in substantially the same manner as hereinbefore described, but the longitudinal displacement of the cam wheel 7 is differently effected. A rack bar 17 is connected by means of two arms 17^1 with the casing cover 21^3 of the main registering mechanism 21 (Fig. 5), the said rack bar 17 being positioned to displace a second rack bar 19 by means of an intermediate pinion 18 rotatably held on an arm 18^1 of an upright support 18^2, a fork 13 being connected by means of an arm 13^1 to the rack bar 19. The cam wheel 7 controlling the movement of the auxiliary registering mechanism 1 is displaceable on a shaft 9, but rotates with the latter. The shaft 9 is operated by means of spur gears 10, 10^1 respectively secured thereon and on the shaft 20 of the crank 6. The cam wheel 7 is longitudinally displaceable on the shaft 9 by the fork 13 as soon as a displacement of the registering mechanism 5, together with the second counting mechanism 21 is brought about, but is moved in a direction opposite to the movement of the said registering mechanism 5. If the last units counting wheel 21^1 of the main counting mechanism 21 is opposite the last units adjusting wheel 22^1 of the adjusting mechanism 22, the single cam wheel 7 stands opposite the units disk 1^1 of the revolution registering mechanism 1. If the counting mechanisms 21 and 5 be displaced to the extent of one numerical value so that the units wheel of the adjusting mechanism 22 acts on the tens wheel 21^2 of the main registering mechanism 21, the cam wheel 7 is also moved to the higher numerical value place and acts on the wheel 1^2 of the said registering mechanism 1.

In Figs. 6 to 10, inclusive, a further modification of the machine is shown, and therein the longitudinal displacement of the actuating cam wheel 7 is avoided. In this modified form of the machine a separate mechanism is provided for each of the numerical value places of the revolution registering mechanism 1, but this separate operating mechanism is not firmly coupled with the

common shaft 9. If the counting mechanism carriage 5 is in its starting position, the first cog wheel 26, see Figs. 6 and 7, is engaged by its saddle 35^1 moving along with the carriage and with the cog wheels 23, 24 coöperating with the said wheel 26. If the counting mechanism carriage 5 is shifted one value, then the second wheel 26 is cut out by its saddle 35^2, whereby the two cog wheels 23, 24 belonging to the "tens" disk 1, Fig. 7, are coupled. If the counting mechanism carriage is shifted from its position of rest to a position of two values, the third cog wheel 26 is cut out, etc. The cam wheels 7 for the separate numerical value places of the counting mechanism 1 are loosely fitted on the shaft 9 which is moved by the crank 6. The shaft 9 has spur gears 23 and 24, the latter gears 24 only being fastened to the shaft 9 and the spur gears 23 and operating cam wheels 7 being locked, so they cannot turn with the shaft 9 and the spur gears 24. The gears 23 are locked by pawls 25 engaging the same.

When it is desired to operate the devices or mechanism to designate numerical values through the actuation of the shaft 9, the pawl 25 is disengaged by the displacement of the carriage and the two spur gears 23 and 24 are coupled, a spur gear 26 of the width of both of the said spur gears 23 and 24 being swung into engagement with the latter spur gears, see Fig. 6. The gear 26 is mounted on an arm or inner fork 27, Figs. 6 and 7, which, with the before-mentioned pawl 25, is pivotally mounted on the spindle 29, said fork 27 and pawl 25 having a common hub 28. A spring 30 normally holds the elbow lever formed by the pawl 25 and arm 27 in such position as to disengage the wheel 26, or so that the said pawl is in engagement with the gear 23 and the gear 26 is thrown out of engagement with relation to the gears 23 and 24. The wheel 26 is swung into action, or into engagement with the gears 23 and 24 by the upward rotary movement of a horizontally extending lever 31 also connected to the hub 28 and which will be presently more fully described. A pawl 32, engaging the teeth of the said spur gear 26, locks the latter when it is disengaged or thrown away from the gears 23 and 24. This pawl 32, as shown, is in the form of a long horizontal bar which is connected with an upright support 32^1 and which engages all the gear wheels 26, see Fig. 7. In describing the foregoing coupling mechanism for bringing a cam wheel 7 corresponding to the position of the carriage 5 into action, reference has been made only to one set of gears 23 and 24, a single pawl 25, and a single spur gear 26, but it will be understood that these mechanisms will be duplicated in coöperation with the several cam wheels 7.

The lifting of the correct lever 31 corresponding to the numerical value place to which the carriage 5 is displaced may be accomplished in various ways. In the mechanism preferred, as shown in Figs. 7, 8 and 9, and particularly illustrated in Fig. 6, the levers 31 have projections 33^1, 33^2, 33^3, etc., the connecting line of which is inclined to the spindle 29, see Fig. 8, or, in other words, these projections are disposed at various points inwardly on the levers 31 in diagonal alinement. A bar 34 is connected to the carriage of the counting mechanism 5, so that when the carriage is displaced this bar 34 is also displaced parallel to the spindle 29, this bar 34 carrying saddles 35^1, 35^2, 35^3, etc., corresponding to the projections 33^1, 33^2, 33^3, etc., in such way that, on a given displacement of the carriage, the saddle corresponding to the particular numerical value desired to be indicated moves under the respective projection and lifts the lever 31, as shown in Fig. 6, thus swinging the corresponding spur gear 26 into action. The difference of the extent of lift of the several levers 31 caused by the varying distance of the projections 33^1, 33^2, etc., from the spindle 29, can be compensated for by making the saddles, or the projections, or both, of different heights. Instead of the spur gears 26 and the gears 23 and 24, any other suitable coupling mechanism may be provided. The crank revolution registering mechanism 1 may be provided with the same tens transferring mechanism as that shown in Figs. 1 and 2.

In Figs. 6 and 7 the rotation of the crank 6 is transmitted to the shaft 9 by means of spur gears 6^1, 6^2 and to the adjusting mechanism shaft 48 by means of the spur gears 6^1, 6^3. The gear wheel 62, fixed on the shaft 48, transmits in the same manner as in the arrangement shown in Figs. 1, 3, 4 and 5 the crank revolutions by means of the gear wheel 63 and the one-tooth wheel 64 to the crank revolution counting mechanism 5 which is arranged on the displaceable carriage. This construction is old and well known.

If the registering mechanism is also to be used for subtraction and division, the figure wheels may be provided with a double row of figures running in reverse directions and provided with means for hiding or covering the series of figures not actually in use. If the so-called short multiplication is to be employed, the figure wheels, may be provided with three different series of figures, with two of the series running in opposite directions from the common zero and with the third series having its numeral zero at one end adjacent to the numeral 9 of the adjacent series of figures and at the other end its numeral 9 common with the numeral 9 of the other series of figures. In this case two sets of peep-holes must be provided, one of which corresponds to the zero place be-

tween the two numerals 1 and the other to the zero place between the numerals 9 and 1. The first named serves for division operations, the last named for multiplication operations, both of the ordinary and abbreviated kind. It is also possible to do with one set of peep-holes for each registering disk if the disk of this registering mechanism be turned to one side or the other through 120°, according as it is desired to divide or multiply.

By the employment of two crank revolution counting mechanisms as indicated in my copending application Serial Number 406,442, filed December 14, 1907, the usefulness of the machine is materially increased in adding up the total price of different articles or materials varying in number. In pursuing this operation the two crank revolution counting mechanisms indicate at the end of such operation the value of seven tables, for instance, or the number "7." The one counting mechanism is then returned to zero position, and the value of nine barrels of some commodity, for instance, is then calculated, the operation of the latter counting mechanism in this particular calculation resulting in a display of the number "9." The other counting mechanism, which is provided with the tens transfer-devices, remains continuously active or is not returned to zero position and indicates the number "16" or the sum of the seven tables and nine barrels. The counting mechanism, which is without the tens transfer devices, is again operated to return the parts thereof to zero position and subsequently operated to give the value of either machines, for instance, and the counting mechanism with the transfer devices will then show the number "24" or the sum of the numbers "7," "9" and "8." The counting mechanism without the tens transfer devices, therefore, supervises, so to speak, during this particular calculation the number of objects at the time of the auxiliary calculations, while the counting mechanism with the tens transfer devices indicates the sum total of these objects, and the main counting mechanism indicates the aggregate cost.

What is claimed as new is:—

1. In a calculating machine, the combination with the main registering mechanism, its carriage, and an operating crank, of a counting mechanism comprising a plurality of counting elements indicating the crank revolutions, said counting mechanism being arranged separately from the main registering mechanism and its carriage, means to connect the crank with said counting mechanism elements, and means operated by the carriage to effect the connection between the crank and the proper counting element according to the position of said carriage.

2. In a calculating machine, the combination with the main registering mechanism, its carriage, and an operating crank, of a laterally stationary counting mechanism comprising a plurality of revolving counting elements indicating the crank revolutions, said counting mechanism being arranged separately from the main registering mechanism and its carriage and in the upper part of the machine above said registering mechanism, means to connect the crank with said counting elements, and means operated by the carriage mechanism to effect the connection between the crank and the proper counting element according to the position of said carriage.

3. In a calculating machine, the combination with the main registering mechanism, its carriage, and an operating crank, of a laterally stationary counting mechanism comprising a plurality of revolving counting elements indicating the crank revolutions, said counting mechanism being arranged separately from the main registering mechanism and its carriage and in the upper part of the machine above said registering mechanism, means to connect the crank with said counting elements, said means being slidable along the counting mechanism, and an operative connection between the carriage and said slidable connecting means and adapted to adjust the connecting means relatively to the counting elements so as to effect the connection between the crank and the proper counting element according to the position of said carriage.

4. In a calculating machine, the combination with the main registering mechanism, its carriage, and an operating crank, of a laterally stationary counting mechanism comprising a plurality of revolving counting elements indicating the crank revolutions, said counting mechanism being arranged separately from the main registering mechanism and its carriage and in the upper part of the machine above said registering mechanism, means to connect the crank with said counting elements, said means being slidable along said counting mechanism, and an operative connection between said carriage and the slidable connecting means and adapted to move the connecting means along the counting elements and to displace the same relatively to the counting elements so as to effect the connection between the crank and the proper counting element according to the position of said carriage.

5. In a calculating machine, the combination with the main registering mechanism, its carriage, and an operating crank, of a counting mechanism comprising a plurality of counting elements indicating the crank revolutions, said counting mechanism being arranged separately from the main registering mechanism and its carriage, means to connect the crank of the machine with said

counting mechanism elements, means operated by the carriage to effect the connection between the crank and the proper counting element according to the position of said carriage, tens transfer mechanism adapted to transmit the tens from one counting element to the next higher one, and automatic means to throw said tens transfer mechanism out of operation when its counting element is operated from the crank.

6. In a calculating machine, the combination with the main registering mechanism, its carriage, and an operating crank, of a counting mechanism comprising a plurality of counting elements indicating the crank revolutions, said counting mechanism being arranged separately from the main registering mechanism and its carriage, means to connect the crank with said counting mechanism elements, means operated by the carriage to effect the connection between the crank and the proper counting element according to the position of said carriage, tens transfer mechanism adapted to transmit the tens from the lower counting elements to the next higher ones, means to lock said transfer mechanism in operative position, means to unlock a part of said transfer mechanism when its counting element is operated from the crank, and automatic means to throw said unlocked tens transfer mechanism out of operation.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

FRANZ TRINKS.

Witnesses:
WILHELM LEMKE,
JULIUS SECKEL.