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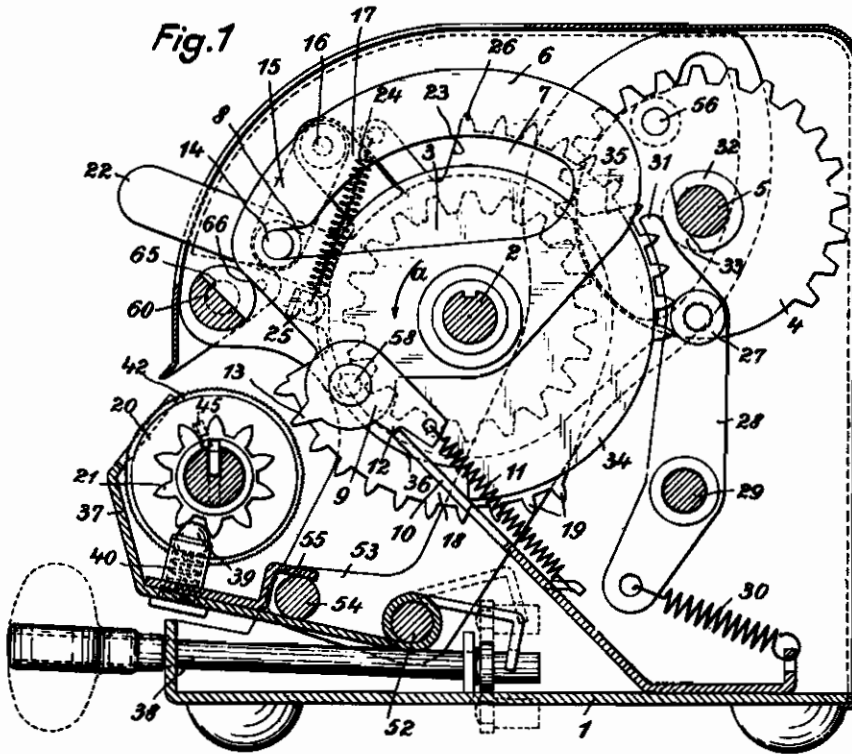
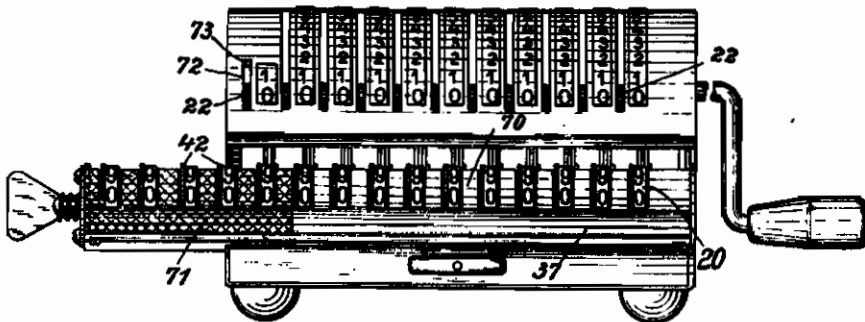


Fig. 7

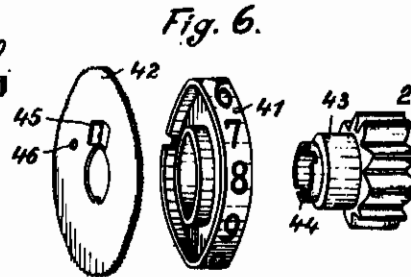
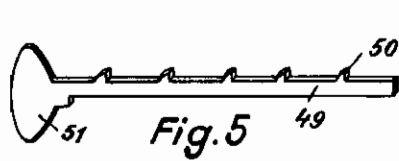
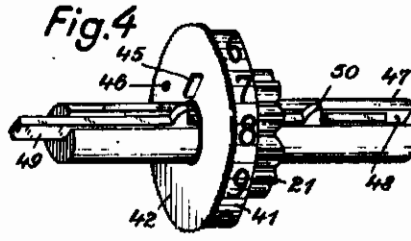
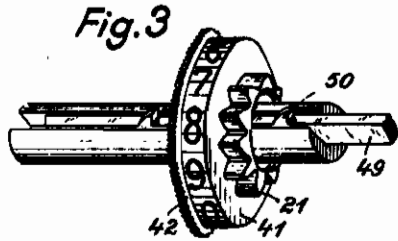
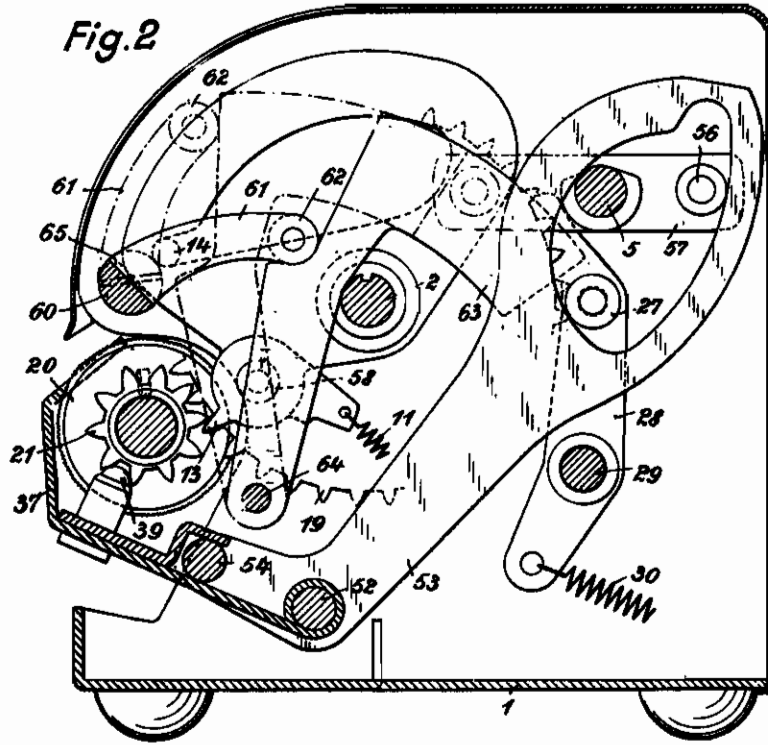


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# ALIEN PROPERTY CUSTODIAN

## CALCULATING MACHINE

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This invention relates to a calculating machine in which the operating or driving position of catch pawls is adjusted by setting members for the purpose of determining the coupling distance for the driving members of the counting mechanism.

According to the present invention, the catch pawls, contrary to the arrangement of known machines, are jointed with the driven part of the coupling provided between the driving shaft and the members driving the counting mechanism, so that said catch pawls take part in the operation of the members driving the counting mechanism, striking against stops at the end. By the above described feature the construction of the machine is simplified considerably, moreover, contrary to known machines, special catch pawls for checking the kinetic energy of the gears of the counting mechanism can be omitted.

In order to make possible multiple addition or subtraction with one-time adjustment of the setting members, the driving members of the counting mechanism carrying the catch pawls, according to the present invention, are connected resiliently with the setting members so that the springs, which during the calculation are loaded or contracted depending upon the coupling distance, will bring back the driving members into the pre-set position after completion of the addition or subtraction. It is also worth mentioning that with this kind of calculating machines the subtraction is carried out by complementary counting mechanism. Advantageously the curved guide may be formed by a slot having a hook-shaped bend at the end and being provided in a plate which can be moved around the driving shaft and is equipped with an adjusting lever. The tens position can be effected with this type of calculating machine simply by moving the curved guide by one counting unit in the direction of driving by the tens shifting means. Means must, of course, be provided in this case to effect the return of the curved guide into its original position. It is essential to lock this movable curved guide in its various positions as soon as during operation of the machine the curved guide should tend to move about owing to the influence of the spring. Consequently, according to the present invention, the catch lever which engages the curved guide path is automatically locked by the crank shaft in its locking position.

Moreover, according to the present invention, the revolution counting mechanism and the result counting mechanism form a common counting mechanism, being connected by tens shift.

The shifting means for the revolving counting mechanism can be disconnected so that either each revolution can be counted by the revolution counting mechanism, as usual, or by disconnection of its shifting means the revolution counting mechanism can be used for enhancing the capacity of the result counting mechanism in the case of higher values. In this way the scope of adaptation for this machine is considerably enlarged. A conventional calculating place can be provided for operating the revolution counting mechanism, whose setting member, however, can only be set on "0" or "1".

The separation of the counting mechanism into result counting mechanism and revolution counting mechanism can be marked, for instance, by painting the housing of latter in a different color.

The invention will be better understood by reference to the following detailed description in connection with the accompanying drawing showing by way of example and purely schematically some embodiments of the invention and in which:

Fig. 1 is a sectional view of a calculating machine having the invention applied thereto.

Fig. 2 is another sectional view of the calculating machine in order to better illustrate the parts provided on the ends.

Figs. 3 and 4 show different views of a number roller with the shaft of the counting mechanism.

Fig. 5 is a perspective view, showing a detail.

Fig. 6 is a perspective view showing the single parts of the number roller.

Fig. 7 is a front elevation of the calculating machine according to Fig. 1.

Similar reference numerals denote similar parts in the different figures.

Referring now to the drawings in greater detail, the main driving shaft 2 is mounted to revolve in the two side walls of the machine housing 1. A gear 3 which is in mesh with a gear 4 is rigidly mounted at one end of the driving shaft 2. Only a part of the periphery of the gear 4 is provided with teeth, the empty space skipping over the teeth of the gear 3.

Mounted beside the gear 4 is a disc which engages with a second disc rigidly mounted on shaft 2 and designed like one arm of a Maltese gear. In this way the shaft 2 is prevented from turning when the teeth of gear 4 do not mesh with the gear 3. The gear 4 is mounted on the shaft 5, at one end of which the crank is connected for revolving the shaft 5.

The members belonging to the single calculat-

ing places are mounted on shaft 2. Each calculating place consists of a disc 6 having a slot 7, for controlling the size of movement. This slot 7 has a recess 8 at its front end, the function of which will be described later. The discs 6 are mounted to turn freely on shaft 2 and are kept in their position by a pawl 9 which moves against a locking bar 10. The pawl 9 is impelled by a spring 11 which tends to move the pawl with the disc 6 in direction of the arrow *a*. This action of the spring is impeded, however, by the pawl 9 moving with its shoulder 12 against the stop bar 10. The pawl 9 has also a lug 13 projecting into the path of the tens shifting lugs of the correspondingly lower place, as will be described later.

A pin 14 which is fastened at 15 to an arm 17 of a calculating member 18 by means of a guide 15, projects into the guide slot 7. The member 18 is provided with teeth 19 which mesh with the gears 21 mounted beside the number rollers 20, thereby moving the latter. Setting of the calculating members 18 is done by means of the setting lever 22 rigidly mounted on a disc 23 which by the spring 24 is positively connected with the calculating member 18. Consequently, the member 18 is moved in the setting direction only by the spring 24 and the disc 23, whilst in the zero position the setting lever 22 strikes directly against a curve or bend 25 of the member 18 projecting into its path-way, thereby positively forcing this member into zero position. The disc 23 is also provided at its rear part with teeth 26 which correspond to the teeth 18 of the calculating member 18 and cooperate with a stop roller 27 for arresting the disc in the pre-set position. The stop roller 27 is fastened to a lever 28 which is mounted to move around a shaft 29. A spring 30 engaging at the lever 28 is constantly tending to move the lever anti-clockwise and thereby to engage the roller 27 with the teeth 26.

One end 31 of the lever 28 extending beyond the roller 27 cooperates with the crank shaft 5, or with a bushing 32 mounted on same, and on one side is provided with an abutment 33. This abutment in the rest position of the crank shaft 5 and also of the crank, not shown, is arranged opposite the end of the lever 31, and thus makes possible the escape of the lever 28 when setting the discs 23 as well as the driving discs 18. As soon as the crank shaft revolves, however, the whole periphery of the bushing 32 strikes against the end 31 of the lever 18, gripping it tightly. It follows that moving of the setting lever 22 during the operation of the machine is positively avoided.

Mounted on the shaft 2 between the disc 6 controlling the size of movement and the calculating member 18 is a driving disc formed with a lug 35 extending to the upper edge of the guide slot 7. This lug 35 engages the pin 14 and takes it along since, owing to the upper edge of the guide slot 7 and the edge 36 bordering the guide slot towards below, it cannot escape the disc 34. The pin 14 is moved along until it reaches the recess 8, where the lug 35 passes by it so that the pin 14 and also the member 18 cannot be further taken along with the lug 35. In this manner the member 18 is carried along always by a fixed amount that can be predetermined by setting of the lever 22. (Setting member 22 remains in its position and spring 24 is loaded).

The counting mechanism 37 consisting of the number rollers 20 and the gears 21 is mounted to slide transversely to the setting discs (decade

slide) by means of the switching device 38, which is known and need not therefore be dealt with in detail. The number rollers are held in their respective positions by balls 39 which are pressed against the gear 21 by a spring 40. Each number roller is composed of a disc ring 41 carrying the numbers and a knurled disc 42, both of which are mounted on a hub 43 of the gear 21 and are fixedly secured thereto by bending the edge 44 of the hub 43. Each disc 42 has a lug 45 for the purpose of tens shifting and zero shifting. Moreover, the knurled disc has a mark 46 to facilitate correct assembling of the various parts. The number rollers consisting of the parts 21, 41, 42, are mounted on a shaft 47 having a slot 48. A rod 49 is mounted to slide in the slot 48 but is kept in its position of rest by a spring, not shown. The lugs 50 which are provided on the rod 49 for each of the number rollers can engage the lugs 45. By turning the handle 41 fastened to the rod 49, and withal the shaft 47, the number rollers are brought into zero position.

The number rollers are first arranged on the rod 48 and then, together with this rod 48, are mounted on the shaft 47. This proves advantageous in that the lugs 50 and the rod 48 can consist of one and the same piece.

In order to bring into mesh the gears 21 of the counting mechanism with the teeth 19 of the driving discs 18, the counting slide 37 is swingably mounted on a shaft 52 which at both ends of the machine is provided with an angle lever 53.

A rod 54 is mounted between the forward extensions of the angle levers 53 and engaged by a lug 55 of the slide 37 so that the slide can be swung independent of its position. The levers 53 with their opposite ends extends into the path of the crank pinions 56, mounted on the crank shaft 5. One of these crank pinions is mounted on the gear 4 and the other one on a lever 57 attached to the shaft 5.

A result counting mechanism 70 as well as a revolution counting mechanism 71 have been provided in the slide 37. Both of these are constructed to form one unit so that in any case they can be used jointly as result counting mechanism when figuring with large values. For this purpose the calculating place 72 which serves to drive the revolution counting mechanism, is set on "0". This calculating place does not differ from any of the others with the exception that the slot 73 which guides the setting lever 22, is only long enough to be set on "0" or "1". If the setting lever 22 of this calculating place is set on "1", provided that the carriage of the calculating mechanism is in normal position, the value "1" is transferred into the revolution counting mechanism with each turn of the crank which is thus registered and counted. If, however, the revolution counting mechanism shall not be used as such but the whole unit shall be used as result counting mechanism, the setting lever 22 of this calculating place is set on "0", thus preventing the transfer of any value from this calculating place.

The revolution counting mechanism has been painted in a different colour from the result counting mechanism in order to see at a glance which calculating places belong to the former and which to the latter.

The manner of operation of the device is as follows:

The value to be multiplied is introduced into the machine by setting the levers 22. Care must be taken that the counting mechanism slide is in

its correct position, and then the crank, not shown, is turned. As soon as the shaft 5 starts revolving, the setting levers 22 are locked by the stop lever 27, 28 which is prevented from escaping by the sleeve 32. After the teeth of the gear 4 are in mesh with the gear 3, the latter together with the shaft 2 is moved in the direction of the arrow *a*. Thereby the driving discs 34, which are rigidly mounted on the shaft 2, are carried along and in their turn engage the pins 14 of the set driving discs carrying them along until their escape into the recess 8 of their respective discs 6. The driving discs 18 are correspondingly set. Previously the crank pinions 56 have engaged the levers 53 moving them until the gears 21 will mesh with the teeth 19 so that the movement of the driving discs 18 has been transferred to the number roller. As soon as a number roller has thus been switched from "9" to "0," the tends switching lug 45, which is mounted on the number roller, will engage the lug 13 of the pawl 9 and turn it around its pinion 50 until its shoulder 12 is moved out of contact with the stop bar 10. Consequently, the disc 8 is moved by one switching step by the action of the spring 11 so that the distance of the pin 14 of the next higher place from the recess 8 is increased by one switching step and thus the respective number roller is correspondingly moved on. A bar 60 has been provided on the front side of the machine with a lever 61 at one end, for the purpose of setting the discs 6 back by one step (one tooth). A roller 62 is mounted on the end of the lever 61 for co-

operation with a lever 63 which in its position of rest assumes the position indicated by the full line in Fig. 2 and by means of a pin 64 is swingably mounted on one side wall of the machine housing. This lever 63 is moved from the position indicated by the full line in Fig. 2 into the position shown by the dash and dot line, by the crank pinion 56 which operates the lever 53 of the one side, and in this changed position the lever 63 moves the bar 60 by means of the roller 62 in such a way that the bar 60 with its bevelled part 65 engages the edge 66 of the disc 8 which has been set for carrying out a tens shift, returning same to its position shown in Fig. 1. In this position the lug 12 of the pawl 9 again catches behind the stop bar 10, whereby the disc 6 is arrested.

The method and apparatus of the present invention have been described in detail with reference to specific embodiments. It is to be understood, however, that the invention is not limited by such specific reference but is broader in scope and capable of other embodiments than those specifically described and illustrated in the drawing.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

RUDOLF MARTIN.  
OTTO MEUTER.