Aug. 3, 1926. 1,594,749

V. J. ODHNER

DEVICE FOR INDICATING THE NUMBER OF REVOLUTIONS OF ROTATING MACHINE ELEMENTS

Filed July 3, 1922 2 Sheets-Sheet 1

Fig. 1.

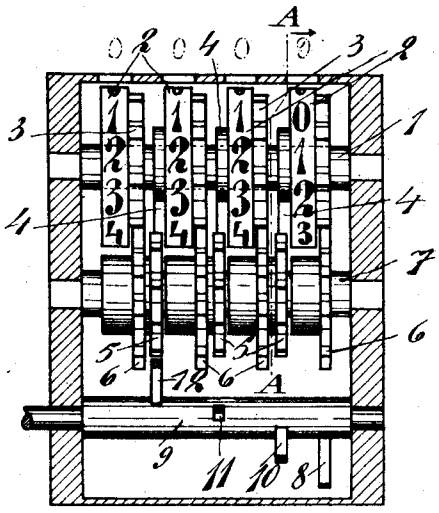


Fig. 2.

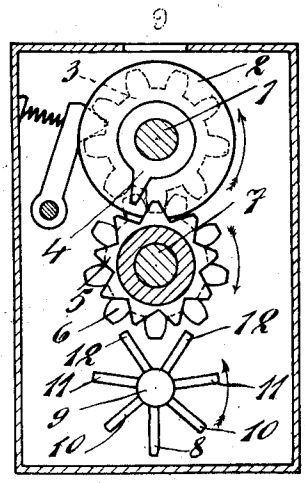
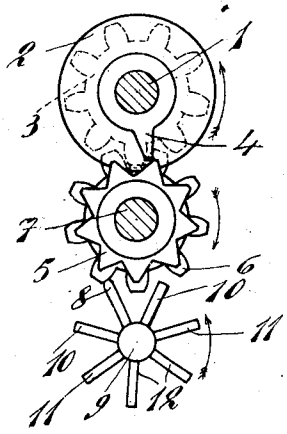


Fig. 3.



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Fig. 4.

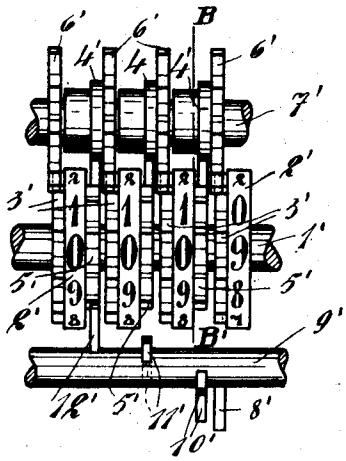


Fig. 5.

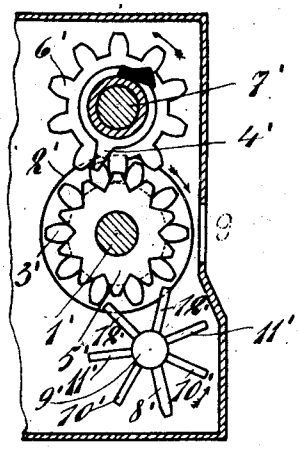


Fig. 6.

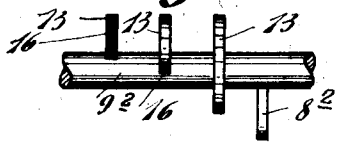


Fig. 7.

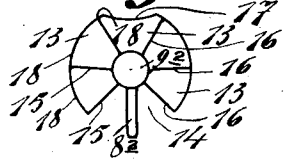


Fig. 8.

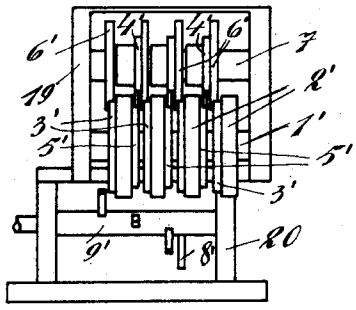
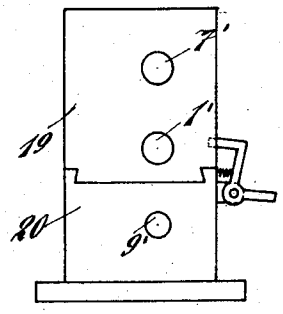


Fig. 9.



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UNITED STATES PATENT OFFICE.

VALENTIN JAKOB ODHNER, OF STOCKHOLM, SWEDEN.

DEVICE FOR INDICATING THE NUMBER OF REVOLUTIONS OF ROTATING MACHINE ELEMENTS.

Application filed July 3, 1922, Serial No. 572,571, and in Sweden July 15, 1921.

In ordinary calculating devices provided with indicating discs for indicating the number of revolutions of rotating machine elements, for example shafts or the like, the movement transferred from the rotating element to one of the indicating discs is as known transmitted to other indicating discs of higher value by means of a device located at the side of the discs, said device generally consisting of a pin or the like rigidly connected with the respective indicating disc, said pin when the indicating disc in question is turned from 0 to 9 or from 9 to 0, engaging and turning a gear wheel connected with the indicating disc of nearest higher value, so that the latter disc is shifted one step and so on. Said device for transmitting the movement is however less satisfactory especially when calculating operations are carried out with a great number of indicating discs which are kept in their fixed positions by means of spring-actuated pawls, as the shifting of the indicating discs effected through said arrangement is done simultaneously and with increased velocity from one disc to the next one, on account of which a relatively great force is required for effecting the shifting operation.

The object of the present invention is to remove said disadvantage and to render a successive shifting of the indicating discs possible whereby power is saved. According to the present invention a member which cooperates with the indicating discs and which is arranged in such a way as to take over and independently carry out the transmission of the movement (which is started in the known way) from one indicating disc to another of higher value is connected with or made integral with above mentioned member which transmits the movement of the shaft or the like.

A calculating device according to the present invention is shown in the accompanying drawings. Fig. 1 is a front-view of the device and Fig. 2 is a part sectional view on the line A—A in Fig. 1. Fig. 3 is a similar view as Fig. 2 showing the parts in another position. Fig. 4 is a front-view of a modified arrangement of the indicating discs with associated parts. Fig. 5 is a part sectional view of the device on the line B—B in Fig. 4. Figs. 6 and 7 show a modification of one of the parts of the device. Figs. 8 and 9 are diagrammatic views of the device as applied to a calculating machine.

The calculating device consists of a number of indicating discs 2, rotatably mounted on a shaft 1, only four of said indicating discs being shown in the drawing. A gear wheel 3 is as usual rigidly connected with each one of the indicating discs, a spring-actuated pawl, Figure 2, engaging said gear wheel in the known way. According to Figs. 1–3 each indicating disc is furthermore provided with a projection or the like 4, which is adapted to cooperate with a rotatable, toothed wheel 5 or the like when the indicating disc is turned from 0 to 9 or from 9 to 0, said toothed wheel being made integral with a gear wheel 6, which engages the gear wheel 3 of the adjacent indicating disc. The toothed wheels 5 and corresponding gear wheels 6 are mounted on a shaft 7 parallel with the shaft 1. One of the gear wheels 6 cooperates as usually with a member 8 formed as an arm or the like which is connected with the rotating shaft and which transmits the movement of the latter.

Said arm is mounted on a rotatable shaft 9, which by means of a gearing, not shown in the drawings, is connected with the shaft or the like, the revolutions of which are to be counted. The shaft is provided with a number of spirally mounted projections 10, 11, 12 which in their proper turns cooperate with the toothed wheels of the indicating discs of higher value and which according to the drawings consist of radial teeth or arms. As shown in Fig. 2 said teeth are mounted two by two on the shaft 9 so that one of the teeth is brought into operation when the shaft is rotating in the one direction and the other tooth operates when the shaft is rotating in opposite direction.

When the movement of the rotating shaft by means of the gearing is transferred to the shaft 9 the arm 8 engages and turns the gear wheel 6 and thereby the units-indicating disc 2 one step for each revolution of the shaft 9. According to the position

shown in Figs. 1 and 2 the shaft 9 has made nine revolutions so that the figure 9 is visible in the opening at the units-indicating disc. At the continued rotation of the shaft 9 the projection 4 engages the toothed wheel 5 and turns the latter and thus the tens-indicating disc about half a step, at which the toothed wheel is brought into engaging position for the tooth 10 which is nearest to the arm 8 (Fig. 3) and which takes over the transmission of the movement started by the pin and turns the toothed wheel and the indicating disc in question the remaining part of the step, so that the figure 1 will be visible in the opening at the tens-indicating disc, and the figure 0 in the opening at the units-indicating disc. After the toothed wheel 5 which at this time will be located again in the engaging position shown in Fig. 2 for the projection 4 on the units-indicating disc has been turned in the above described way eight more steps by said projection and the tooth 10 so that the figure 9 will be visible in the opening at the tens-indicating disc, the projection on the latter will engage the next toothed wheel and turn the latter about half a step into engaging position for the tooth 11 which thereupon turns the wheel with the hundreds-indicating disc the remaining part of the step and so on. When the projection 4 during the turning of the shaft 9 in the opposite direction turns the toothed wheel 5 in the same way about half a step said wheel will be brought into engaging position for the other tooth 10 which turns the wheel and corresponding indicating disc the remaining part of the step and so on. The teeth 10, 11, 12 have such a length as to pass respective toothed wheel 5 without hindrance when the shaft 9 is turned, except when said wheel in the above described way has been brought into engaging position for respective tooth on the shaft 9 by the projection 4 cooperating with the wheel 5. When the shaft 9 occupies the normal position shown in Fig. 2 the toothed wheels 5 can be turned without hindrance by the teeth 10, 11, 12 and the projections 4 when the indicating discs are returned to the zero-position.

According to Figs. 4 and 5 the shaft 1′ supporting the indicating discs 2′ is located nearest to the shaft 9′, so that the arm 8′ cooperates directly with the gear wheel 3′ of the units-indicating disc. In this case the toothed wheels 5′ are fixedly connected with the indicating discs and the projection 4′ cooperating with respective toothed wheel is made integral with the gear wheel 6′ on the shaft 7′. When the arm 8′ by means of the gear wheel 3′ turns the units-indicating disc from 9 to 0 (or in opposite direction from 0 to 9) the projection 4′ engages the toothed wheel 5′ of the tens-indicating disc and turns said wheel about half a step into engaging position for the tooth 10′ which thereupon turns the toothed wheel and the indicating disc the remaining part of the step and so on. The shaft 9′ is also provided with teeth 11′ and 12′.

According to the embodiment shown in Figs. 6 and 7 a disc 13 is substituted for each pair of teeth 10, 11, 12 on the shaft 9, which disc is provided with a recess 14 extending from its periphery, the two limiting surfaces 15, 16 of said recess constituting stops cooperating with the toothed wheel 5 of respective indicating disc, the mutual distance and position on the shaft 9^2 of the said stops corresponding to those of the teeth. Each one of the discs 13 is furthermore provided with another recess 17, which in the shown, inactive position of the roll is located at respective toothed wheel 5, so that the latter can be turned without hindrance when the indicating discs are returned to the zero-position. After the toothed wheel is moved into engaging position for the disc 13 by means of the projection 4 in the above described way the stop 15 (or 16) turns the toothed wheel the rest of the step started by means of said projection. The peripheric edge 18 of the disc prevents the toothed wheel from being turned any more than to the desired position.

Figs. 8 and 9 are schematic views of the device as applied to a calculating machine, the frame member 19 which supports the shafts 1′ and 7′ being movable step by step relatively to the member 20 which supports the shaft 9′ in such a way that the arm 8′ can cooperate with the gear wheels 3′ of the tens-, hundreds-, etc., indicating discs during the calculating operations.

When the indicating discs are returned to the zero-position which is done in the ordinary way no movement can be transferred from indicating discs of higher value to indicating discs of lower value.

It is to be understood that the device can be modified in several respects without departing from the scope of the invention.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:—

A transfer mechanism for the revolutions counters for the pin wheels in calculating machines of the pin wheel and cam disc type, having a plurality of rotatable numeral wheels, the motion being transferred from the pin wheels to one of them by a member connected with the pin wheels and partaking in the motion of same, the motion being then transferred to the numeral wheels of higher value by a rotatable element provided with projections fast therewith and cooperating with said numeral wheels and acting in both directions of movement of the said rotatable element and adapted to take

up and finish the transfer movement already initiated from one numeral wheel to another of higher value, characterized by the member connected with the pin wheels and partaking in the motion of same being so connected with the transfer motion transmitting element provided with the projections, that this element partakes in the rotation of the member transferring the motion from the pin wheels.

In witness whereof, I have hereunto signed my name.

VALENTIN JAKOB ODHNER.