W. SCHÜRMANN.

COUNTER.

APPLICATION FILED APR. 30, 1912.

1,091,771. Patented Mar. 31, 1914.

Fig. 1.

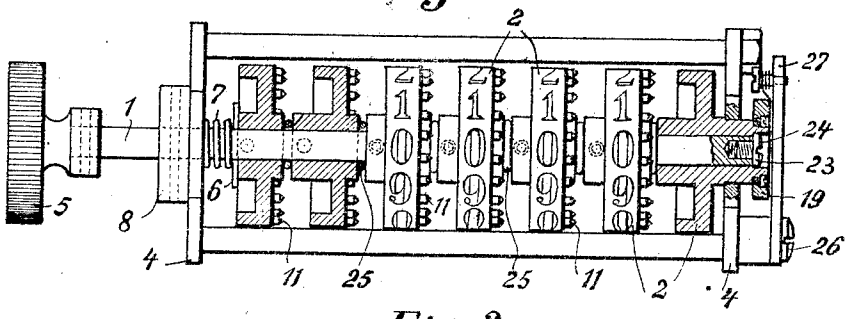


Fig. 3.

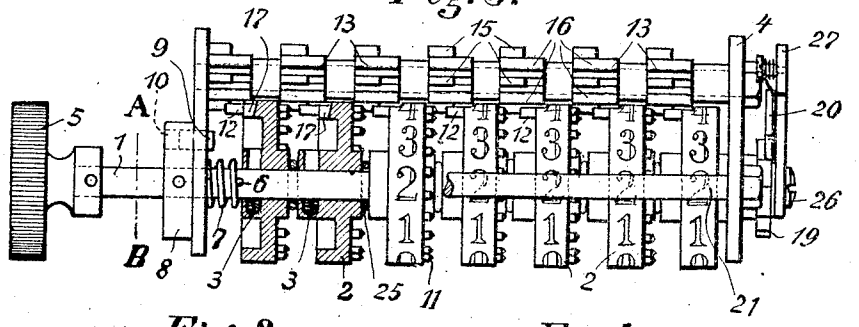


Fig. 2.

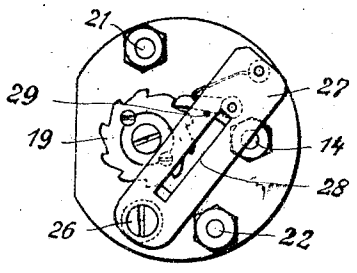


Fig. 4.

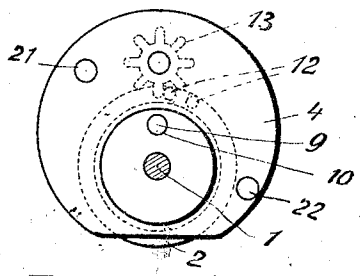


Fig. 5.

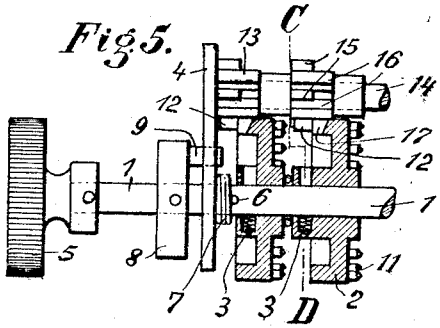
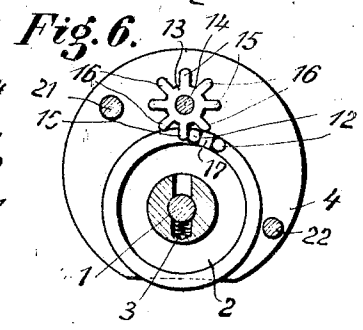


Fig. 6.



Witnesses:
Katherine Koch
Daniel Holmgren

Inventor:
Walter Schürmann
by his attorneys
Briesen & Dumpe

UNITED STATES PATENT OFFICE.

WALTER SCHÜRMANN, OF DUSSELDORF, GERMANY.

COUNTER.

1,091,771. Specification of Letters Patent. Patented Mar. 31, 1914.

Application filed April 30, 1912. Serial No. 694,28[illegible]

To all whom it may concern:

Be it known that I, WALTER SCHÜRMANN, a citizen of the Empire of Germany, residing at Dusseldorf, in the Empire of Germany, have invented a new and useful Counter, of which the following is a specification.

My invention consists of a simple counter comprising a shaft turnable and longitudinally shiftable in a casing, a series of numeral wheels loose on the shaft and adapted to be taken along with the latter by friction and to be stopped while permitting the shaft to turn and means for feeding the several numeral wheels one after the other in the proper order. By longitudinally shifting and then turning the shaft, all the numeral wheels are returned to their "0" position. In other words the counter can be "canceled" in a simple manner.

I will now proceed to describe my invention with reference to the accompanying drawing, in which—

Figure 1 is an elevation of the counter, the mantle of the casing being removed and parts shown in section, Fig. 2 is an end view of the same, when looked at from the right in Fig. 1, Fig. 3 is a plan view of the same, a part being broken away and other parts shown in section, Fig. 4 is a vertical section through the line A—B in Fig. 3, Fig. 5 is the left part of Fig. 3, in which the shaft is shifted to the left, and Fig. 6 is a vertical section through the broken line C—D in Fig. 5.

Similar characters of reference refer to similar parts throughout the several views.

Two end plates 4, 4 are connected together by means of three rods 14, 21, 22 and are covered with a suitable cylindrical mantle (not shown), all these parts forming the casing of the counter. In this casing a shaft 1 is mounted to turn and to longitudinally move. Several, here seven, independent numeral wheels 2, 2 having their numerals 0 to 9 on the periphery are mounted loosely on the shaft 1 and should be so arranged, that they can be taken along with the shaft 1 during its rotation by friction. In the present case this is effected in the manner, that each numeral wheel 2 has in its nave a hole in which a helical spring 3 is disposed, that bears against the shaft 1. The extreme right numeral wheel 2 in Fig. 1 serving as a units-wheel is on its right side provided with a nave extension, which turns in the right end plate 4 and is rigidly connected with a ratchet wheel 19 (Fig. 2) having ten teeth. A disk 23 is fastened on the right end face of the shaft 1 by means of a screw 24 and is made to bear against an inner shoulder in the said nave extension of the units-wheel. Rings 25, 25 surrounding the shaft 1 are inserted between the several numeral wheels 2, 2 and a cross pin 6 fastened in the shaft 1 is made to bear against the extreme left numeral wheel 2 in Figs. 1 and 3, so that in this manner the several numeral wheels 2, 2 are prevented from longitudinal motion on the shaft 1. Where so preferred, however, the rings 25, 25 may be omitted and the several numeral wheels 2, 2 may be made to touch one another with their naves. The said mantle of the casing should be provided with a known longitudinal slot or with a series of openings, through which the numerals on the several numeral wheels 2, 2 can appear one after the other. A helical spring 7 surrounding the shaft 1 and bearing on the one hand against the left end plate 4 in Figs. 1 and 3 and on the other hand against the cross pin 6 tends to return the shaft 1 with the several numeral wheels 2, 2 to the normal position shown. A disk 8 is fastened on the shaft 1 on the left side of the left end plate 4 in Figs. 1 and 3 and limits the longitudinal motion of the shaft 1. The disk 8 has a hole 10 (Figs. 3 and 4), in which a pin 9 fastened in the end plate 4 can engage. A suitable knob 5 is rigidly connected with the left end of the shaft 1 and can be seized with the fingers for pulling the rod 1 with the numeral wheels 2, 2 to the left against the pressure of the spring 7. Fastened on the right end plate 4 is a pin 26, on which a lever 27 is mounted to rock. The turn of the lever 27 may be limited by the said mantle, and the lever 27 is to be connected in any known manner with some reciprocating part, the number of strokes of which is to be counted by the instrument. For example the lever 27 may be provided with a slot 28, in which some pin (not shown) can be adjusted for pivotally connecting the reciprocating part with the lever 27. A spring-pressed pawl 20 is disposed on the inner side of the lever 27 and is adapted to normally engage the ratchet wheel 19. When the shaft 1 by means of the knob 5 is pulled to the left in Figs. 1 and 3 so as to bring the disk 8 out of engagement with the pin 9, also the

ratchet wheel 19 will come out of engagement with the pawl 20, so that it is possible to turn the shaft 1 with the ratchet wheel 19, until after the completion of one revolution the pin 9 again engages in the hole 10 of the disk 8 and in consequence of this the shaft 1 is permitted to return to its normal position under the action of the helical spring 7. Preferably the lever 27 is on its inner side provided with a pin 29 for so limiting the turn of the pawl 20 as to enable the latter to reëngage in the respective tooth space of the ratchet wheel 19 during the rocking motion of the lever 27, while the shaft 1 is being returned to its initial position.

Each numeral wheel 2 has on the right side in Figs. 1 and 3 ten pointed pins 11, 11 distributed along the periphery and on the left side two pins 12 (Fig. 6) at a small distance from one another and a notch 17 (Fig. 5) registering with the space between the two pins 12. Loose on the rod 14 are pinions 13, 13, the number of which is equal to that of the numeral wheels 2, 2. The pinions 13, 13 are in contact with one another and with the end plates 4, 4 and are thus prevented from longitudinal motion. Each pinion 13 has long teeth 16 and short teeth 15, which alternate with one another, as is clearly shown. For the normal position of the shaft 1 shown in Figs. 1 and 3 all the teeth of each pinion 13 can mesh one after the other with the pins 11 of the numeral wheel 2 on the left side, so that on any numeral wheel 2 completing one revolution its two pins 12, 12 will engage the teeth 15, 16 of the pinion 13 (Fig. 6) and thereby turn the next higher numeral wheel 2 one numeral forward, the long tooth 16 engaging in the notch 17 of the lower numeral wheel, after which the two long teeth 16 in contact with the periphery of the lower numeral wheel 2 will prevent the pinion 13 and thereby the next higher numeral wheel 2 from moving.

When for "canceling" the counter the knob 5 is pulled to the left in Figs. 1 and 3 and then turned, the pins 11, 11 of all the numeral wheels 2, 2 will be thereby brought out of engagement with the corresponding pinions 13, 13 (see Fig. 5), so that the numeral wheels 2, 2 can be taken along with the shaft 1 by friction by means of the helical springs 3, 3, but the pinions 13 are prevented from turning as their teeth 12 ride over the rims of said wheels. It will thus be evident, that on any numeral wheel 2 reaching its "0" position it will be prevented from further turning, so that it turns on the shaft 1 and by simply turning the knob 5 once all the numeral wheels 2, 2 can be returned to their "0" position. On the shaft 1 being again released by the pin 9 the pins 11 of all numeral wheels 2, 2 can again engage in the corresponding pinions 13, 13. Of course the pin 9 requires to be so disposed on the end plate 4 as to insure the correct reëngagement of the numeral wheels 2, 2 by means of their pins 11, 11 in the pinions 13, 13.

Obviously the hole 10 of the disk 8 may be provided in the end plate 4 and the pin 9 may be fastened in the disk 8, while the effect will be the same as before.

The counter is operated as follows: After the rocking lever 27 has been pivotally connected in the described manner with the reciprocating part, the number of strokes of which is to be counted, the knob 5 is at the proper moment pulled to the left in Figs. 1 and 3 and turned for "canceling" the counter, whereupon by the pin 9 the shaft 1 is released, so that under the action of the helical spring 7 it returns to its normal position shown and the pins 11, 11 of all the numeral wheels 2, 2 reëngage the pinions 13, 13. Thereby the counter is started. The extreme right numeral wheel 2 serving as "units-wheel" or wheel of lower order is fed one numeral forward for each stroke of the lever 27 and the several numerals appear one after the other in the slot or opening in the cover (not shown) as usual. When the units-wheel completes one revolution, it feeds the tens-wheel or wheel of higher order one numeral forward by means of the pins 12, 12 and the corresponding pinion 13. Then tens-wheel in turn on completing the revolution feeds the hundreds-wheel the numeral forward, and so on.

I claim:

1. In a machine of the character described, a shaft, a numeral wheel of lower order and a numeral wheel of higher order mounted on said shaft and adapted to participate in its movement by frictional contact, a pair of pins and an intermediate notch formed at one face of the numeral wheel of lower order, a plurality of pins formed at the opposed face of the numeral wheel of higher order, a ten-carrying pinion rotatably and non-slidably mounted in proximity to both of said numeral wheels, said pinion being provided with alternating short and long teeth, the short teeth being adapted to simultaneously engage the pins of both of said numeral wheels, while the long teeth normally engage the rim of the numeral wheel of lower order and are adapted to engage the notch of said last named wheel, and means for firstly axially moving the shaft whereby the pins of the numeral wheel of higher order are withdrawn from the path of the pinion-teeth, while the pinion is prevented from rotation by the engagement between its long teeth and the rim of the wheel of lower order, and for secondly rotating the shaft thereby taking both of the numeral wheels along.

2. In a machine of the character described,

a shaft, a plurality of numeral wheels carried thereby and adapted to participate in its movement by frictional contact, a pair of pins formed at one face of each of said numeral wheels, a plurality of ten-carrying pinions, each pinion being adapted to operatively connect two adjacent numeral wheels, and means for firstly axially moving and secondly rotating the shaft, the rotary movement of each numeral wheel being checked by the engagement of one of its pair of pins with one of the teeth of the coöperating pinion.

WALTER SCHÜRMANN. [L. S.]

Witnesses:
HELEN NUFER,
ALBERT NUFER.