May 5, 1936. H. L. SPAUNBURG 2,040,026

COUNTER

Filed April 9, 1931 2 Sheets-Sheet 1

Fig. 1.

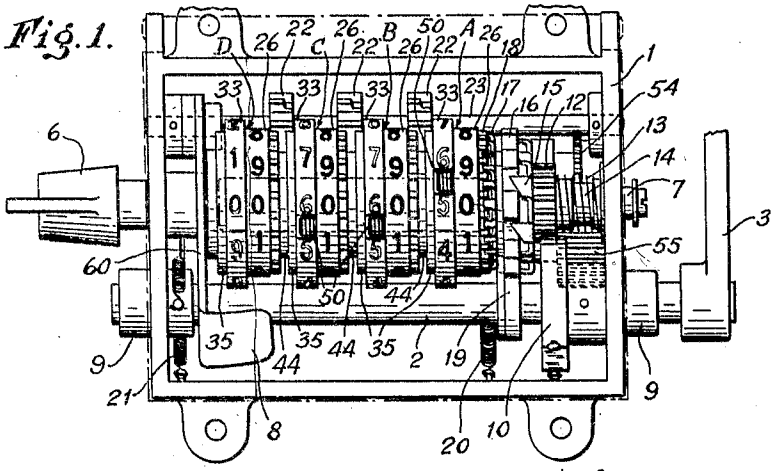


Fig. 2.

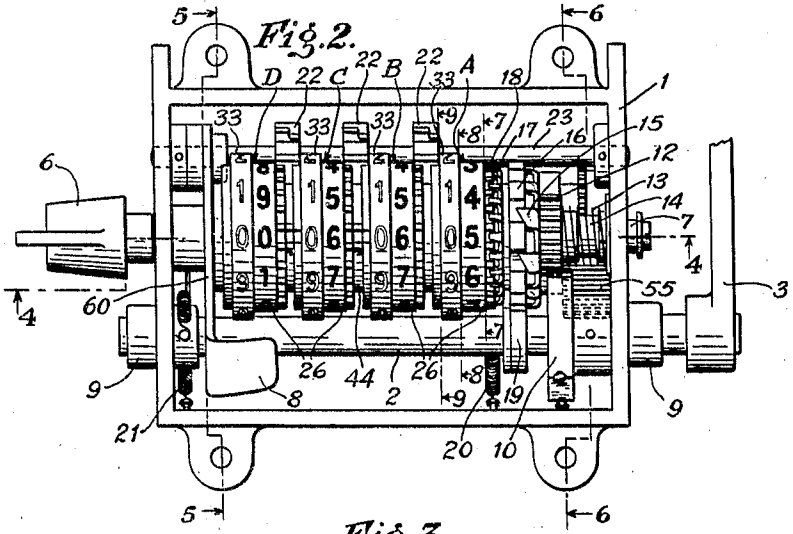
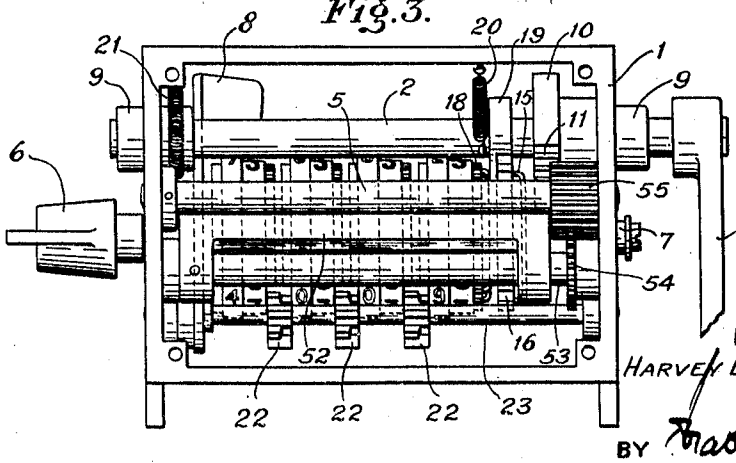


Fig. 3.



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May 5, 1936. H. L. SPAUNBURG 2,040,026

COUNTER

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Fig. 4.

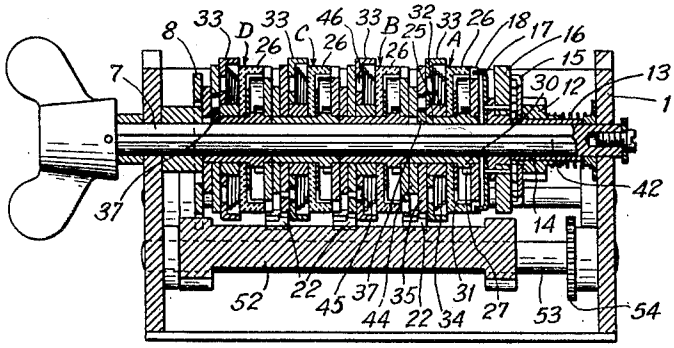


Fig. 5.

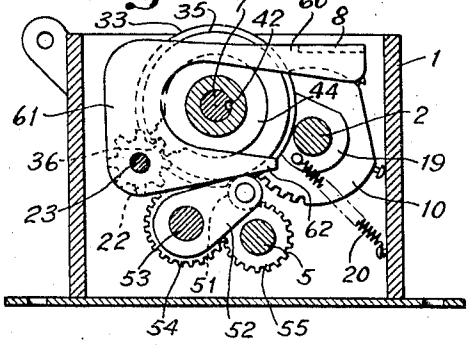


Fig. 6.

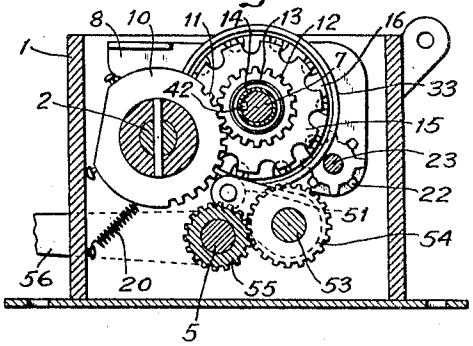


Fig. 8.

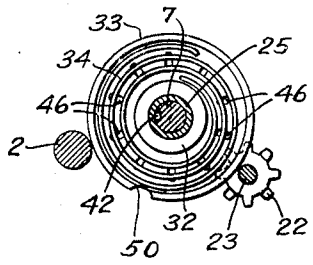


Fig. 7.

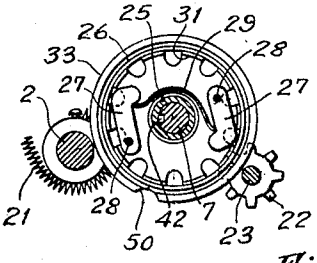


Fig. 9.

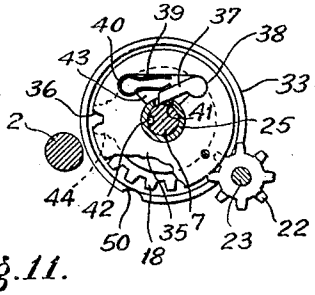


Fig. 10.

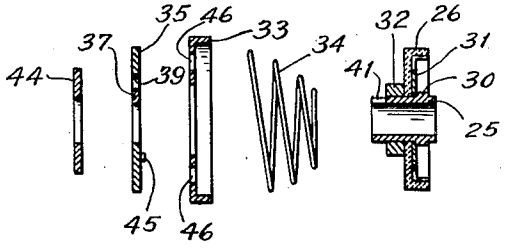
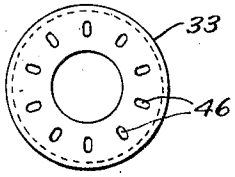


Fig. 11.



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Patented May 5, 1936 2,040,026

UNITED STATES PATENT OFFICE

2,040,026

COUNTER

Harvey L. Spaunburg, Bristol, Conn., assignor to Veeder-Root Incorporated, a corporation of Connecticut

Application April 9, 1931, Serial No. 528,819

21 Claims. (Cl. 235—132)

My invention relates to counters.

It has among its objects to provide an improved counter of the type adapted to count a predetermined number of times and, upon resetting, again count up to that total. A further object of my invention is to provide such an improved counter having improved adjustable predetermining dial means whereby the counter may be set with facility to count any predetermined number of times, and further provided with improved co-operating controlling and resetting mechanisms and improved means for facilitating the setting operation. These and other objects and advantages of my improved construction will, however, hereinafter more fully appear.

In the accompanying drawings I have shown for purposes of illustration one embodiment which my invention may assume in practice.

In these drawings,—

Figure 1 is a plan view of a counter constructed in accordance with my improvement and having its dials in starting position, the cover being shown in dotted lines and the connections to the operating shafts being broken away to facilitate illustration;

Fig. 2 is a view similar to Figure 1, but with the cover omitted and the counter dials in the position which they would occupy upon the completion of the count required by Figure 1;

Fig. 3 is a bottom plan view of the constructions shown in Figure 1;

Fig. 4 is a longitudinal sectional view on line 4—4 of Fig. 2;

Fig. 5 is a transverse sectional view on line 5—5 of Fig. 2;

Fig. 6 is a transverse sectional view on line 6—6 of Fig. 2;

Fig. 7 is a transverse sectional view on line 7—7 of Fig. 2;

Fig. 8 is a transverse sectional view on line 8—8 of Fig. 2;

Fig. 9 is a transverse sectional view on line 9—9 of Fig. 2;

Fig. 10 is a separated vertical sectional view of the component parts of one of the counter units; and

Fig. 11 is a side elevation of the predetermining ring.

In this illustrative construction I have shown a counter mounted in a usual casing 1 and adapted to be operated through an operating shaft 2 by any suitable means, as, for example, a lever 3. Herein, the movement of the shaft 2 causes a series of counting mechanisms, or dial units, A, B, C and D, previously set in a relationship designating a predetermined number, to count the operations of the lever 3 and shaft 2 until the predetermined number of operations has been counted, and then permit the automatic operation of a controlling shaft 5 which in a well known manner controls a signal or the operation of the machine. Herein, the several dial units are also reset by a resetting member or wing nut 6 fixed to and rotating with an axially disposed resetting shaft 7, and the operation of setting is further facilitated by the depression of a releasing member 8 operatively connected as hereinafter described.

Considering the arrangement and connections generally, it will be noted that the shaft 7 extends axially through all the units, or counting mechanisms, A, B, C and D, and parallel to the shafts 2 and 5 previously mentioned, with the shaft 2 in front of the dials and the shaft 5 below the latter. Moreover, it will be noted that operating connections are provided between the shaft 2 and the unit A in such manner that the latter is moved through successive fractions of complete revolutions as the lever 3 is oscillated about the axis of the shaft 2, while the rotation of the unit A is transmitted to the other units B, C and D through usual transfer mechanism whereby the units to the left of unit A are successively operated to carry in a well known manner.

Referring more in detail to the operative connections for actuating the unit A and the other units from the latter, it will be noted that the shaft 2 is journaled in suitable bearings 9 formed on the casing, and that in addition to the lever 3 which is outside the casing, the shaft has well known ratchet type operative connections between the same and the unit A. More particularly, it will be noted that these connections include a usual toothed disc 10 fixed to the shaft and having a toothed sector 11 engaging with the teeth of a rotatable and reciprocable gear 12, which in turn is normally forced in one direction by a coiled spring 13 and carried on a spacing sleeve 14. The gear 12 herein also has usual ratchet teeth 15 of a well known construction fixed thereto and adapted to co-operate with the usual side apertures in a ratchet wheel 16, while the latter, in turn, carries a toothed member 17 forming a clutch member co-operating with a continuously toothed member or gear 18 forming a part of the dial unit A and normally rotatable with the rest thereof. Moreover, it will be noted that a pawl 19 is provided on the shaft 2 to engage with the edges of the teeth of the member 16 and that this pawl is connected with a coiled

spring 20 which in turn has its opposite end connected to the casing below the shaft 2. Here attention is also directed to the fact that a second coiled spring 21 is provided at the opposite end of the shaft 2 and has one end connected to the top of the shaft while the other is extended around under the shaft and connected to the front wall of the casing 1 near the top of the latter at a point above the shaft. With this mechanism it will be evident that upon reverse movements of the member 3, the shaft 2 will be moved in such manner as to actuate the ratchet wheel 16 through members 10, 12 and 15, and thereby cause rotation of the unit A with the member 16 and relative to the shaft 7. Further, it will be evident that through the provision of usual transfer pinions 22 disposed between the units A and B, the units B and C, and C and D, the several units will carry in a well known manner, the pinions herein being mounted on a usual shaft 23 suitably journaled in the casing 1 below and at one side of the shaft 7.

Referring more particularly to my improved counter units, it will be understood that each of the same is of identical construction, and that accordingly a description of one will suffice for all. In Figures 4 and 7 to 11 inclusive it will be noted that unit A comprises in addition to the gear 18 previously mentioned, a bushing 25 on which the gear 18 is rotatable and which extends therefrom axially through the rest of the unit between the elements thereof and the shaft 7 on which the bushing is normally freely rotatable. Moreover, it will be noted that next the gear 18 is disposed the counting or number wheel 26 which in turn houses within the same the usual driving pawls 27 pivoted at 28 on the gear and connected by a usual spring 29, and which wheel 26 however also forms a part of the predetermining mechanism, as hereinafter described. It will also be observed that the bushing 25 is provided with a flange 30 near its right hand end and that a usual peripherally notched ratchet wheel 31, co-operating with the pawls and rotatable with the wheel 26, is provided in the number wheel 26 between this flange and the number wheel. As shown, a collar 32 is also fixed on the sleeve against the opposite side of the number wheel in such manner as to form a unitary construction. Herein, it will also be noted that a co-operating predetermining number wheel 33 of slightly larger diameter than the wheel 26 is journaled for rotation on the left hand end of this collar 32, while a conically coiled spring 34, herein having four coils, is housed between the number wheels 33 and 26 and normally acts to force the number wheel 33 to the left. As shown herein a locking disc 35 is also provided to the left of this number wheel 33 and the collar 32, which in turn is provided with a single peripheral aperture 36. This locking disc 35 herein carries within the same a pawl 37 seated at one end in a suitable bearing 38 and having its opposite end acted upon by a suitable spring or clip 39 of U-shape and carried in a corresponding oppositely located bearing 40, in such manner that the pointed working end of the pawl 37 is normally projected downward through a longitudinal slot 41 in the left hand end of the sleeve 25 and ready to engage with one wall of a longitudinal groove or keyway 42 provided in the shaft 7 upon rotation of the latter in one direction and as hereinafter described, to effect resetting. Both the pawl and spring are readily removable from the side of the locking disc through a V-shaped side aperture 43 therein connecting the bearing apertures 38 and 40 and the axial bore for the shaft. Here it will also be noted that a two-toothed driver or carrying member or gear 44 is provided on the sleeve 25 outside of and in registry with its co-operating locking disc 35 so that both will co-operate with the first transfer gear 22 in a well known manner. It will also be understood that the members 44, 35, 32, 26 and 31 are staked or otherwise suitably connected to the bushing 25 for rotation therewith. Here attention is also particularly directed to the fact that the locking disc 35 herein has a laterally projecting pin 45 near its periphery projecting laterally toward the predetermining number wheel 33 and having an end or head receivable in any one of ten corresponding but elongated and radially disposed apertures 46 in that member 33 each opposite a number on the periphery of that member.

From the above, it will be evident that through the interconnection of the pin 45 with any aperture 46 and the action of the coiled spring 34, all of the elements of each unit, beginning with the gear 18 and extending through the carrying gear 44, will normally rotate as a unit, while through the pawl and ratchet connection 27, 31 all parts of each unit are also rotatable relative to the gear 18. It will also be evident that it is possible to change the adjustment of the member 33 at will by first simply moving the same to the right to disengage the aperture 46 from the pin 45 and then rotating the member 33 bodily about the collar 32 in such manner as to bring the desired number thereon into exposed position at the top of the unit. There, upon release of the member 33, the spring 34 will force the parts together, the pin 45 then entering into the selected aperture 46. It will also be evident that as the members 33 on the several units are each independently adjustable in the same manner, it is made possible for the predetermined number for which the mechanism is to be set to be varied at will.

Operatively associated with this mechanism is controlling mechanism operative when the predetermined number has been reached. More particularly, it will be noted that each of the predetermining wheels 33 is provided with an opening or notch in its periphery herein indicated at 50, the notches 50 in each wheel being disposed in the same position and between the numbers 5 and 6 on the periphery of the number wheel so that all the notches will be in alignment when the several number wheels 33 are in zero position, i. e. with the zeros on the several wheels 33 in alignment. Co-operating with these notches 50 is a series of rolls 51 carried on a swinging roll carrying member 52 which is, in turn, mounted on a supporting shaft 53 suitably journaled in the casing 1 parallel to the controlling shaft 5 and herein having a gear 54 meshing with a smaller gear 55 on the controlling shaft 5. As a result of this construction, it will be evident that when the shaft 5 is provided with the usual weight or spring connection, herein illustrated in the form of a weight 56, the shaft 5 will normally be held against rotation through its gearing connection with the shaft 53, so long as the rollers ride over the unnotched portion of the number wheels 33. When, however, the notches 50 therein come into alignment, the rollers 51 will drop into the aligned notches and the shaft 5 will be automatically operated in a well known manner to operate a signal or shut down the machine, as is usual in such devices.

Operatively associated with the mechanism so

far described, is the resetting mechanism. This, herein, is automatically operative upon rotation of the wing nut 6 to move both the predetermining number wheels 33, 26 relative to the gears 18 in passing from the positions which they will occupy at the completion of the predetermined count and shown in Figure 2, to the positions which they occupied when beginning the count and shown in Figure 1. More particularly, it will be noted that, as the shaft 7 is rotated by the wing nut 6, the various pawls 37 will drop into the keyway 42 in the shaft as soon as a predetermined relation is present between the shaft and number wheels 26. Thus, for example, as shown in Figure 2, with the first left hand number wheel 26 at zero, its pawl 37 will herein engage the keyway 42, and immediately upon rotation of the wing nut 6 and shaft 7, the unit D will commence to rotate with it and continue alone until unit D comes into alignment with any of the other units, whereupon that additional unit or units will begin to rotate therewith, and the picking up or resetting operation will thus continue in a well known manner until all of the units are rotated into the starting position shown in Figure 1, which is the zero position of the number wheels 26. Further, it will be evident that, since the predetermining wheels 33 are held by the pins 45 in definite angular relation to the wheels 26, these wheels 33 will be rotated with the wheels 26, and accordingly be returned to their initial position shown in Fig. 1, wherein it will be noted that these wheels 33 again indicate the predetermined number for which the mechanism is set.

Operatively associated with the mechanism described is also improved means for facilitating setting of the number wheels 33. This mechanism herein includes the releasing member 8 which is conveniently located at the front of the left hand end of the counter so as to be readily depressible by one hand while the other is used to adjust the wheels 33. Herein, the member 8 is provided with a portion 60 extending transversely above the shaft 7, with a portion 61 extending downwardly from the portion 60 in back of the shaft, and which is journaled at its lower end on the shaft 23, and with a portion 62 extending forwardly from the lower end of the portion 61 beneath the shaft 7 and above the member 52. Thus, upon depression of the member 8, its portion 62 will depress the member 52 and the rollers 51 carried thereon. As a result of this construction, it will be observed that the number wheels 33 are released by the disengagement of the rollers 51 in their notches 50 and are accordingly freely movable from one position of adjustment to another. It will also be evident that while the interlocking of the rollers in the notches in any of the members 33 is prevented so long as the member 8 is depressed, the latter, upon release, will be automatically elevated and release the member 52, all as a result of the automatic action of the weighted control shaft 5.

In the operation of my improved construction, assuming that it is desired, for example, to set the parts for 665 operations, the parts are adjusted to the positions shown in Figure 1. There it will be noted that the usual number wheels 26 of all the units A, B, C and D are in zero position, while the predetermining number wheels of C, B and A respectively expose the numerals 6, 6, 5 respectively, and the wheel 33 of unit D shows a zero. In this particular starting position it will be noted that the notches 50 of the members 33 of the units A, B and C occupy the position shown, wherein they are not in alignment, although they of course would be in alignment if the predetermined number desired was 666. Upon continued operations of the lever 3, the unit A will be operated in a well known manner and will in turn, through the first transfer pinion 22, have its revolutions carried to the unit B while the revolutions of the unit B will be carried to the unit C. As this continues, the wheels 26 of the units A, B and C will add until their total is 665, while the number wheels 33, though not subtracting uniformly at all stages, since the carrying mechanism for the wheels 26 will not permit uniform operation, will nevertheless all tend to subtract and will all indicate zero when the predetermined number is shown by the working wheels 26. When the wheels 33 all thus indicate zero, their notches 50 will then be aligned and the rollers 51 will then drop into the same in such manner as to enable operation of the controlling shaft 5 and the consequent operation of a signal or shutting down the machine as may be desired. When, however, the operator wishes to resume counting, it is only necessary for him to turn the wing nut 6 in such manner as to rotate the shaft 7 and thereby pick up the several units in such manner as to reset the mechanism to again count up to the predetermined number 665, the several wheels being returned to their original position indicated in Figure 1. If, on the other hand, the operator desires to change the predetermined number, this is readily accomplished by simply pushing each desired number wheel 33 over to the right to effect disengagement from its pin 45 and then rotating it and releasing it in its new position desired, whereupon it is automatically re-connected to operate with the rest of the dial units on which it is mounted, the adjustments of the members 33 being facilitated, if desired, by the depression of the member 8. Obviously, when the lever 3 is again started, the mechanism will count up to the new predetermined number and operate a signal or shut down the machine when the new predetermined number is indicated on the dials 26, and the dials 33 are in zero position, all as previously described.

As a result of my improved construction, it will be noted that it is possible to adjust the predetermining members 33 relative to the transfer elements on each unit including the gears 18, when these gears are in mesh with their transfer pinions, while the members 26 other than that on unit A, are similarly freely adjustable relative to the gears 18 and move with the predetermining members 33 relative to these gears during resetting and while the gears 18 remain in mesh with their transfer pinions all in such manner as to insure accuracy. Attention is also directed to the facility with which the members 33 may be adjusted, and to the further fact that during setting the members 33 and 26 may be moved together by rotating the members 33, the members 26 then turning therewith until the latter members reach the desired positions, while the members 33 may thereafter be disengaged from the locking discs and moved independently relative thereto and to the gears 18 and members 26 into the desired positions. It will also be noted that the movement of the members 33 longitudinally of their units to disengage the same from their locking discs, and the necessary registration of the apertures 46 and pins 45, also tends to minimize improper setting

since the members 33 cannot be forced back by the spring from any non-registering position, and it is thus evident from the face of the units that one or more of the members 33 is not in proper position. It will also be evident that while the adjustment of these members 33 and 25 is possible without depressing the member 8, the depression of the latter will facilitate adjustment by throwing the rollers out of engagement with the notches in the members 33. Moreover, the predetermining number wheel is adjustable relative to the counting number wheel and the parts of the carrying mechanism on the unit at any time after the predetermined count has been reached, prior to the operation of the resetting mechanism and while the same remains in the position occupied at the completion of the predetermined count. Further, it will be noted that the member 8 can be depressed to release the rollers from engagement with the predetermining members without disconnecting the driving and driven gears of the several counter units from their transfer pinions, and without actuating the resetting mechanism.

It will also be noted that the predetermining number wheel is located intermediate, and completely occupies the space between, the counting number wheel and the locking disc of its unit and has a driving connection with said locking disc while being adjustable relative thereto. It will also be noted that the numbers on the predetermining number wheels progress in the opposite direction from the direction of those on the counting number wheels, thus enabling adjustment of the predetermining number wheels to set up thereon, with one integer in each number on separate units A, B, C and D, in such manner as to provide a direct reading number equal to the count desired, while a like but reversed arrangement is produced on the counting number wheels following each count. Further, with the counting number wheels reset to zeros prior to a counting operation, and with a direct reading number representing the predetermined count set up on the predetermining wheels, it will be evident that upon completion of the count, the zeros on the several counting wheels will appear on the predetermining wheels, and the direct reading number of the count will appear on the counting wheels. These and other advantages of my improved construction will, however, be clearly apparent to those skilled in the art.

In the use of my improved mechanism, it will be evident that various other standard forms of drive for the first dial unit A may be substituted for that shown without in any way affecting the operation of the mechanism. Further, it will be evident that the mechanism may be used with control shafts 5 of either the spring or weight operated type, and also that the movement of this control shaft may be utilized in any well known manner to operate a signal or shut down the machine as may be desired. In practice, it will also be understood that the two sets of number wheels 26 and 33 may be, and preferably are, made of contrasting materials in order to minimize confusion, the wheels 26, for example, in a preferred construction being provided with enamel'ed faces, while the wheels 33 are of polished metal, although obviously various other contrasting arrangements may be used. Also it will be understood that in certain forms the numbers may be left off one or both of the wheels 26 and 33 while the same will still be counting and predetermining members respectively.

While I have in this application specifically described one embodiment which my invention may assume in practice, it will be understood that the same is shown for purposes of illustration, and that the invention may be modified and embodied in various other forms without departing from its spirit or the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent is:—

1. In a counting device having a plurality of counting mechanisms and carrying mechanism therebetween, predetermining mechanism co-operating with said counting mechanisms having on each of the latter a plurality of counting members one included in said counting mechanism and the other comprising a predetermining member and each adjustable relative to a part of said carrying mechanism on said counting mechanism while said carrying mechanism is in mesh.

2. In a counting device having a plurality of counting mechanisms and carrying mechanism therebetween, predetermining mechanism operative after a predetermined count having on each counting mechanism a member comprising a counting member included in said counting mechanism and adjustable relative to a part of the carrying mechanism on said counting mechanism and a co-operating predetermining member adjustable relative to said first mentioned member.

3. In a counting device having a plurality of resettable counting mechanisms each having carrying members on opposite ends thereof, and transfer pinions connected to adjacent members on adjacent mechanisms, predetermining mechanism operative after a predetermined count having on each counting mechanism an adjustable predetermining member adjustable relative to both of the carrying members on said counting mechanism, and a co-operating counting member included in said counting mechanism and adjustable with said predetermining member relative to one of said carrying members on said counting mechanism during resetting.

4. In a counting device having a plurality of counting mechanisms and carrying mechanism therebetween, predetermining mechanism co-operating with said counting mechanisms having on each of the latter a plurality of dial member one included in said counting mechanism and t other comprising a predetermining member r adjustable jointly relative to said carrying m anism while the latter is in mesh and one ad able relative to the other.

5. In a counting device having a plurality of counting mechanisms and carrying mechanism therebetween, predetermining mechanism co-operating with said counting mechanisms having on each of the latter a plurality of counting members one included in said counting mechanism and each adjustable relative to a part of said carrying mechanism on said counting mechanism while said carrying mechanism is in mesh, and mechanism for resetting said members while said carrying mechanism is in mesh and adjusting both members together relative to said part.

6. In a counting device having a plurality of operatively connected counting mechanisms each having resetting mechanism and a rotatable driving gear and a transfer pinion meshing therewith, predetermining mechanism co-operating with said counting mechanisms having on each of the latter a rotatable wheel included in said

counting mechanism and a dial member comprising a predetermining member and one adjustable relative to the other and both adjustable relative to the rotatable gear of that counting mechanism during operation of said resetting mechanism and while said gear is in mesh with its transfer pinion.

7. In a counting device having a plurality of operatively connected counting mechanisms each having a rotatable gear and a transfer pinion meshing therewith, predetermining mechanism co-operating with said counting mechanisms having on each of the latter a plurality of dial members one included in said counting mechanism and one constituting a predetermining member and one adjustable relative to another and both adjustable relative to the rotatable gear of that counting mechanism while said gear is in mesh with its transfer pinion, and mechanism for resetting said dial members while said gears and pinions are in mesh.

8. In a counter, a shaft, a plurality of counting mechanisms thereon each rotatable relative to said shaft and having a number wheel, means for rotating one of said counting mechanisms relative to said shaft, carrying mechanism between the several counting mechanisms, and predetermining mechanism including an adjustable predetermining wheel in each counting mechanism between the number wheel thereof and the number wheel of the counting mechanism of next higher order.

9. In a counter, a reset shaft, a plurality of counting mechanisms thereon each rotatable relative to said shaft and having cooperating resetting mechanism, a counting wheel, and driving and driven carrying gears, transfer pinions connecting adjacent carrying gears of adjacent counting mechanisms, each of said counting mechanisms also having an adjustable driving connection between its counting wheel and its driving gear permitting adjustment of said counting wheel during resetting while said transfer pinions remain in mesh with said carrying gears, and a predetermining number wheel on each counting mechanism coaxial with the counting wheel thereof and having means operative by gripping the periphery of said predetermining wheel for adjusting said predetermining wheel into a plurality of angular operative positions relative to said counting wheel.

10. In a counter, a shaft, a plurality of counting mechanisms each rotatable bodily relative to the shaft and each comprising a gear at one end of the counting mechanism rotatable relative to the latter and to both a locking disc and a co-operating carrying gear fixed to the opposite end of said mechanism, a number wheel fixed to said mechanism having a driving connection with said first mentioned gear, and an adjustable predetermining wheel having an adjustable connection to said locking disc, means for rotating one of said counting mechanisms, transfer pinions between said counting mechanisms and co-operating predetermining mechanism co-operating with said predetermining wheels.

11. A counter having a plurality of counting mechanisms each including transfer elements thereon, a counting wheel having adjustable operative connections and adjustable relative to certain of said transfer elements, and a predetermining number wheel having adjustable operative connections and adjustable relative to all of said elements and said counting wheel, co-operating transfer mechanism meshing with said transfer elements on said counting mechanisms during adjustment of both of said wheels, and co-operating predetermining mechanism co-operating with said predetermining number wheels.

12. A counter having a plurality of counting mechanisms each including transfer elements thereon, a counting number wheel having adjustable operative connections and adjustable relative to certain of said transfer elements, and a predetermining number wheel having adjustable operative connections and adjustable relative to all of said elements and said counting number wheel, co-operating transfer mechanism meshing with said transfer elements on said counting mechanisms during adjustment of both of said wheels, co-operating predetermining mechanism controlled by said predetermining number wheels, and means for resetting both sets of number wheels in one operation while adjusting the same together relative to certain of said transfer elements.

13. A counter having a plurality of counting mechanisms each including transfer elements thereon, a counting number wheel, and a predetermining number wheel, the predetermining number wheels of the several mechanisms being numbered and adjustable to set up thereon a direct reading number equal to the count desired, resetting mechanism operative to reset said counting number wheels to zero prior to a counting operation, cooperating transfer mechanism meshing with said transfer elements on said counting mechanisms during resetting of both of said sets of number wheels, and cooperating predetermining mechanism cooperating with said predetermining number wheels, the direct reading number set up on said predetermining number wheels representing the desired count and the zeros indicated on said counting number wheels at the beginning of the count being reversed upon completion of the predetermined count.

14. A counter having a plurality of counting mechanisms, transfer mechanism therebetween, predetermining number wheels adjustable on said counting mechanisms while said transfer mechanism is in mesh to set up thereon a direct reading number equal to the desired count, co-operating predetermining mechanism co-operating with said predetermining number wheels after a predetermined count, and means for resetting said counting mechanisms after said count operative while said transfer mechanism is in mesh and resetting said predetermining wheels in the positions of adjustment occupied thereby prior to the beginning of the count.

15. A counter having a plurality of counting mechanisms. each having a counting number wheel, transfer mechanism therebetween including transfer elements on said counting mechanisms, predetermining number wheels adjustable on said counting mechanisms while said transfer mechanism is in mesh, co-operating predetermining mechanism co-operating with said predetermining number wheels after a predetermined count, and means for resetting said counting mechanisms after said count operative while said transfer mechanism is in mesh and resetting said predetermining wheels in the positions of adjustment occupied thereby prior to the beginning of the count, both said counting number wheels and said predetermining number wheels having adjustable operative connections and being adjustable together relative to transfer elements on said counting mechanisms during resetting.

16. In a predetermined counter, mechanism op-

erative after a predetermined count including a plurality of coaxially disposed counting mechanisms each having transfer elements thereon rotatable together during counting and relatively rotatable during resetting, a counting wheel, and a predetermining wheel co-operating with said mechanism, each predetermining wheel being rotatable relative to both transfer elements during setting and both counting and predetermining wheels on each counting mechanism being rotatable relative to one transfer element thereon during resetting, co-operating transfer mechanism, and rotatable resetting means for resetting both sets of wheels and having a resetting member extending through said wheels.

17. In a counting mechanism, a gear on one end thereof, a co-operating carrying gear and locking disc at the opposite end thereof, a counting wheel between said gears having adjustable operative connections to said first mentioned gear including a ratchet mechanism and rotatable with said first mentioned gear during counting and independently adjustable relative thereto, and a predetermining member between said ratchet mechanism and said cooperating gear rotatable during counting with said gears and counting wheel and having an adjustable operative connection operative from the periphery of said predetermining member for enabling adjustment of the latter relative to said counting wheel.

18. In a counting mechanism, a gear on one end thereof, a co-operating carrying gear and locking disc at the opposite end thereof, a number wheel between said gears rotatable with said first mentioned gear during counting and independently adjustable relative thereo, and a predetermining member between said number wheel and said co-operating gear rotatable during counting with said gears and number wheel and adjustable with said number wheel relative to said first mentioned gear and also independently adjustable relative to said number wheel and both of said gears.

19. In a counting mechanism, a bushing, a gear rotatable on one end thereof, a carrying gear fixed on the other end thereof, a co-operating locking disc adjacent said carrying gear and likewise fixed to said bushing, and a plurality of coaxial number wheels, one located adjacent and having a driving connection with and adjustable relative to said disc and the other fixed to said bushing and driven by said first mentioned gear and adjustable relative thereto.

20. In a counting mechanism, a bushing, a gear rotatable on one end thereof, a carrying gear fixed on the other end thereof, a co-operating locking disc adjacent said carrying gear and likewise fixed to said bushing, a plurality of coaxial number wheels between said first mentioned gear and disc both normally rotatable with the latter, releasable driving connections between one of said wheels and said disc for connecting said wheel to the latter in a plurality of angular positions, and driving pawl connections between the other wheel and said first mentioned gear normally driving said other wheel with said first mentioned gear while permitting adjustment into a plurality of angular positions.

21. In a counting device having a plurality of counting mechanisms and transfer mechanism therebetween operatively connecting adjacent counting mechanisms, a predetermining member for each counting mechanism provided with a notch therein and adjustable relative to each counting mechanism while the latter is locked against rotation by said transfer mechanism, a controlling member, and means disposable in the several notches upon alignment thereof and thereupon actuating said controlling member and adapted to remain in said notches after operation of said controlling member, a casing enclosing said last mentioned means and said counting mechanisms and having closed sides and an open top, and means disposed within said casing and having an actuating portion in and accessible through said open top and operative while said counting mechanisms remain connected by said transfer mechanism for releasing said first mentioned means at will when the same remain in said notches as aforesaid to free said predetermining members for adjustment to vary the predetermined count.

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