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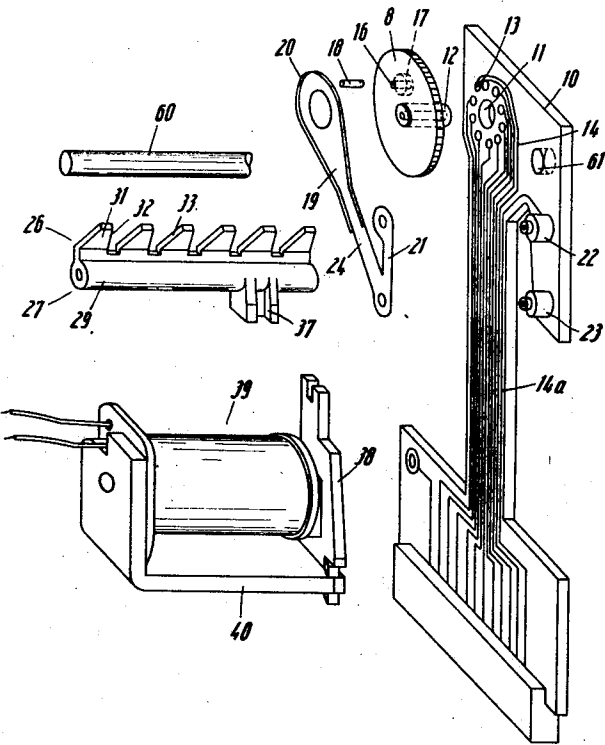
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[54] **MULTIDIGIT ROLLER COUNTING MECHANISM**  
**17 Claims, 5 Drawing Figs.**

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**335/138**  
[51] Int. Cl..... **G06m 1/28**  
[50] Field of Search..... **235/92;**  
**335/138, 139**

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**ABSTRACT:** Counter having digit wheels and a moveable contact for each digit wheel moveable in unison therewith over a bank of stationary contacts with spring means biasing each moveable contact toward its stationary contacts and with means for relieving the bias of said spring means upon the insertion of a value into the counter to eliminate frictional drag of the contacts on the digit wheels during indexing. The counter may include resetting means to reset the digit wheels to zero and the resetting means may also be coupled to the relieving means to free the digit wheels of frictional drag during resetting.



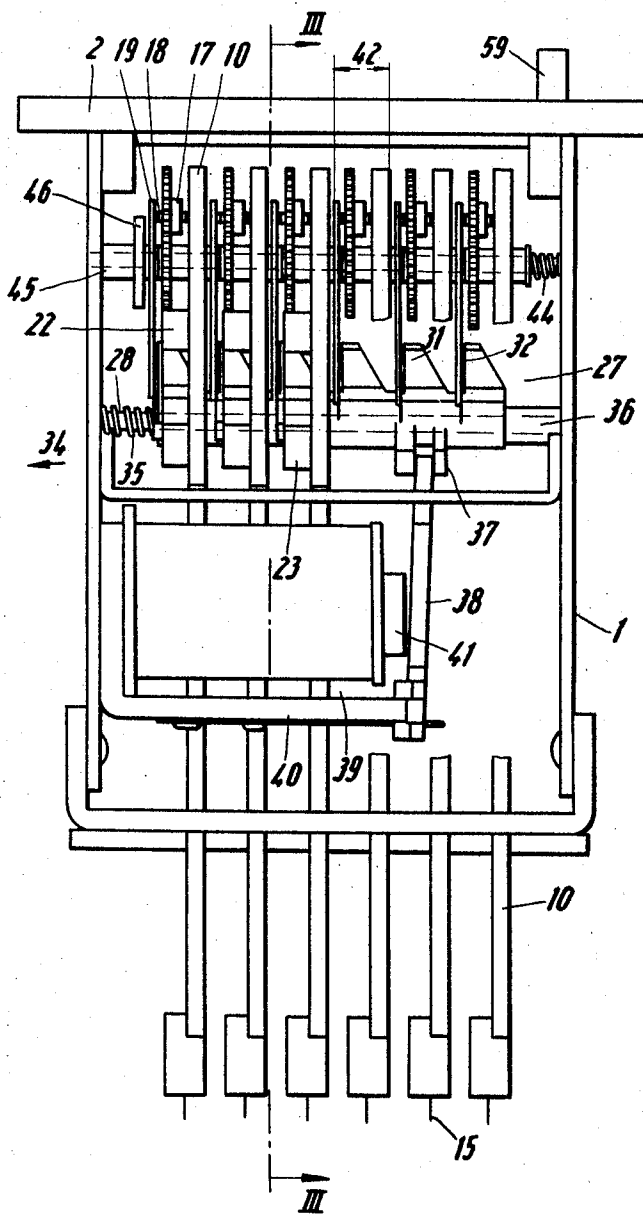


Fig. 1

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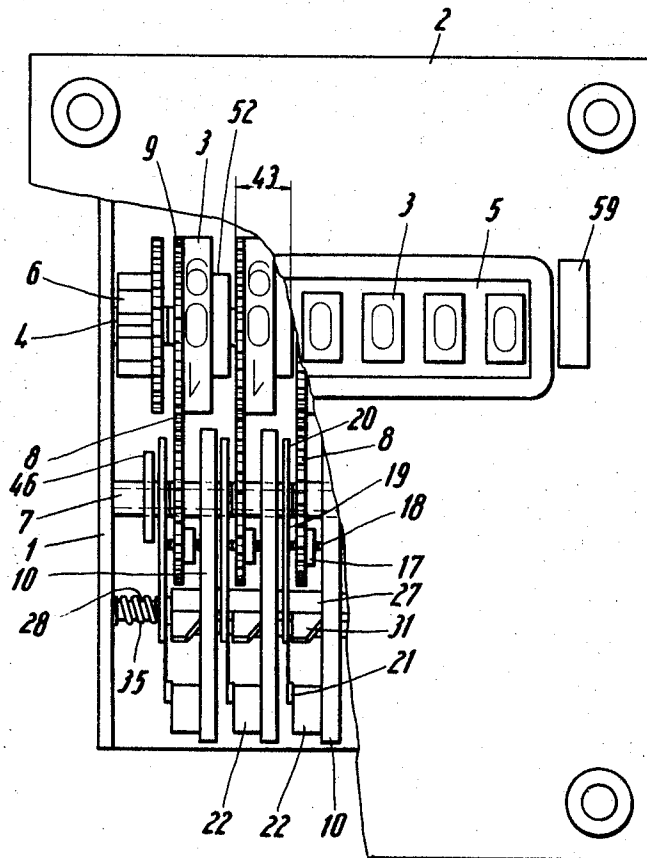


Fig. 2

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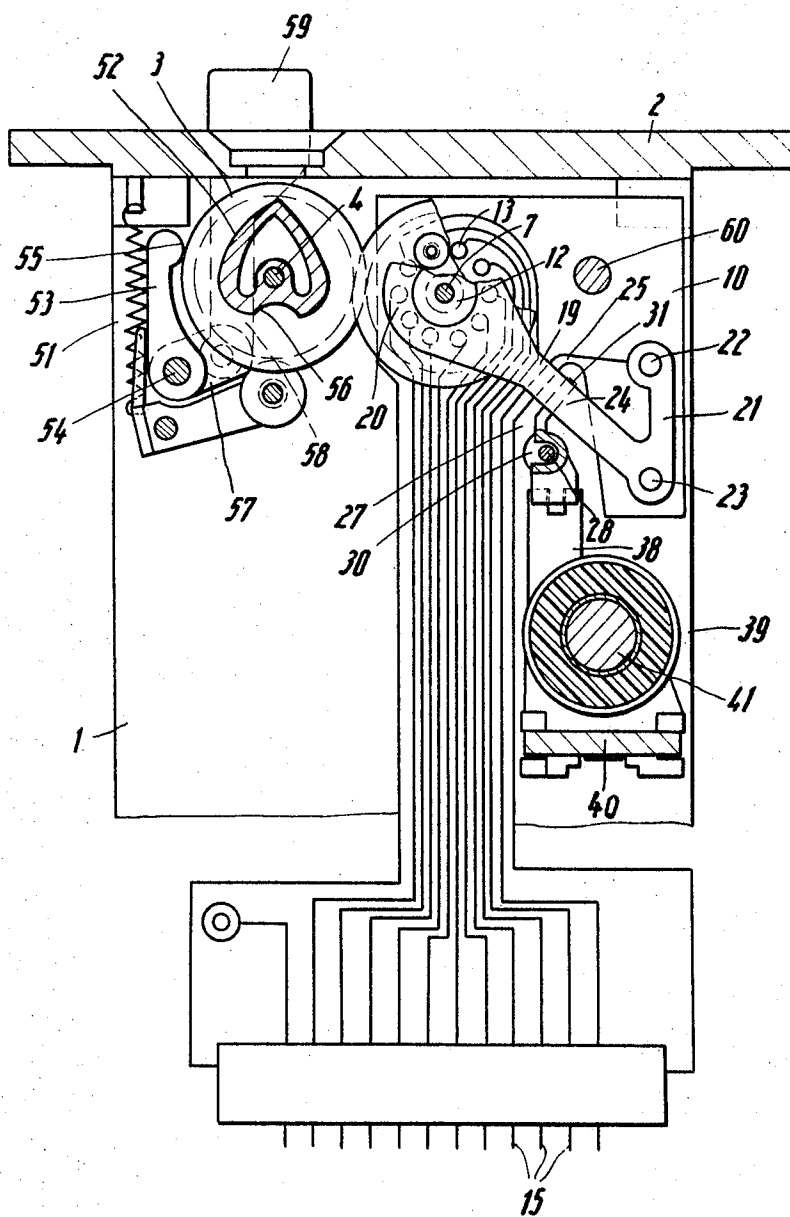


Fig. 3

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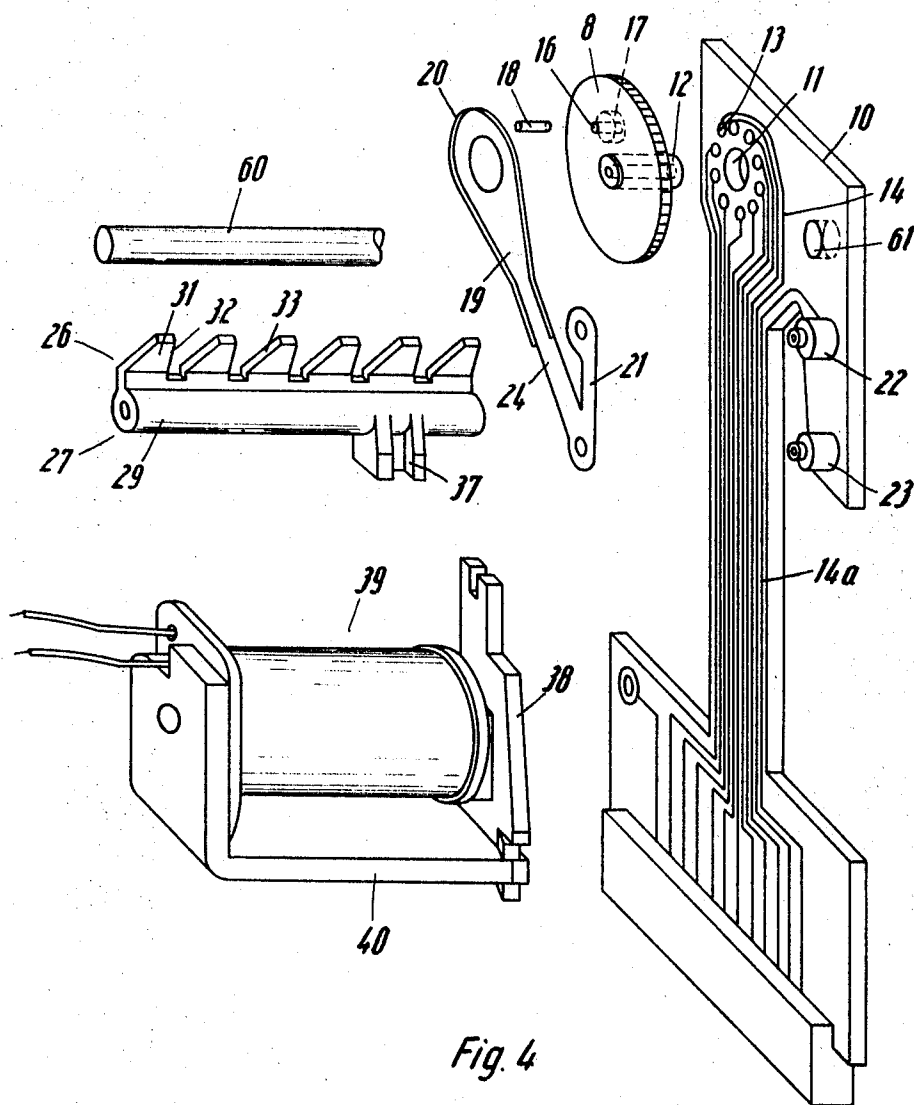


Fig. 4

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### MULTIDIGIT ROLLER COUNTING MECHANISM

The present invention relates to a multidigit roller counting mechanism, especially impulse counting mechanism, in which each roller is coupled to a rotating contact member and in which the counter contacts are designed as printed circuit and are located opposite to the path of rotation of the contact member, the printed circuit and the contact member resiliently arranged in the direction toward said printed circuit being axially displaceable relative to each other.

Roller counting mechanisms of this type are known according to which on the shaft of the counting roller and laterally offset there are the feeler contact areas arranged in a plane on a printed circuit and scanned by a pointerlike contact finger. The contact fingers are coupled with the respective number roller and under the influence of a spring press against the feeler contacts. This design has the drawback that during the rotation of each number roller a counteracting braking force occurs in view of the frictional contact with the feeler contacts and between the feeler contacts. This braking force adds up during the control of a plurality of rollers so that a relatively great power is required for driving the roller counting mechanism, and that, for instance, with an electromagnetic impulse counter a relatively strong driving system is necessary. When a plurality of rollers are controlled, an inclined position of the number indication may occur because the tooth play of the individual counting rollers adds up with the 10th control drives of such roller counting mechanisms. In view of this inclined position, especially the highest digit counting roller is displaced relative to its normal position by the maximum amount so that no safe contact of the electric feeling mechanism can be assured. For this reason, when manufacturing such roller counting mechanisms, especially narrow tolerances have to be applied. It is particularly disadvantageous that the contacts and in particular the reading contacts of the printed circuit which are formed by a thin layer, wear relatively rapidly in view of their being pressed against by the sliding counter contacts.

One-decade counters with feeler mechanism will during the transfer to the next higher decade require an additional contact which frequently is designed as additional feeler contact of the printed circuit and therefore is subjected to great and rapid wear.

With one-digit counters having feeler mechanisms, it has been tried after combining a plurality of counters of the same type to obtain an increased life span by interposing between each decade a transistor amplifier for purposes of reducing the contact load. In addition thereto, rather complicated constructions are involved, and the counters of this type have the drawback that they require considerable space. For resetting such group counting mechanisms, a particularly great number of elements is required because individual impulses have to be conveyed to the individual counting mechanisms and a further contact has to be provided which is adapted at the position zero to interrupt the current supply. Furthermore, the said counting mechanisms can be controlled in one direction only so that they are suitable only either as adding mechanisms or only as subtracting mechanisms.

U.S. Pat. No. 2,733,008 furthermore discloses a roller counting mechanism according to which contact springs with contacts arranged thereon are connected with gears. These gears mounted on a shaft are driven through the intervention of transmission gears which are likewise mounted on a shaft. The control plate located opposite each leaf spring is by means of bushings on shafts displaceable relative to the contact spring. In starting position, the control plates are out of contact with the contact springs. Through the intervention of a magnet and corresponding mechanical means, the contact plates are moved toward the contacts. While it is possible in this way to reduce the wear of the contact areas, the mechanical connections in the form of levers and pawls required for moving the control plates, do, however, not permit rapid successions so that this roller counting mechanism can be em-

ployed only where the control impulses succeed each other at relatively great intervals. Moreover, in view of the numerous levers and pawls and the correspondingly high mass action, a very great wear is unavoidable. A particular drawback of this arrangement consists in that the connections of the individual reading contact areas of the control plates have to be formed by flexible conduits because the control plates are movably journaled. Inasmuch as with each decade at least 11 flexible conduits have to be provided, the functioning of the counting mechanism is thus even further handicapped so that the possible control figures per time unit are still further reduced. Additionally, in view of the required flexible conduits, the advantage of printed control circuits cannot be fully taken advantage of with this type of roller counting mechanism.

It is an object of the present invention to provide a roller counting mechanism of the above-mentioned type which will be simple in construction and which will have a high shifting speed while the wear of the feeler contacts will be very low.

It is another object of this invention to provide a counting mechanism as set forth in the preceding paragraph which will require only a relatively low force for shifting the counting mechanism.

It is a further object of this invention to provide a counting mechanism as set forth above which will be characterized by small dimensions.

Still another object of this invention consists in the provision of a counting mechanism as set forth in the preceding paragraphs which will assure a precise working while not requiring any close tolerances.

It is also an object of this invention to provide a counting mechanism which can easily and in a simple manner be reset to its zero position and which can be designed as adding and also as subtracting mechanism. These and other objects and advantages of the invention will appear more clearly from the following specification in connection with the accompanying drawings, in which:

FIG. 1 illustrates a roller counting mechanism as seen from the bottom with opened housing.

FIG. 2 is a front view of the roller counting mechanism according to FIG. 1.

FIG. 3 represents a section taken along the line III-III of FIG. 1.

FIG. 4 is an explosive view of a reading section associated with a number roller.

FIG. 5 is a control circuit for the roller counting mechanism according to the invention.

The present invention concerns a multidigit roller counting mechanism, especially an impulse counting mechanism, in which each roller is coupled with a rotating contact member and in which counter contacts are provided in the form of a printed circuit and are located opposite to the circular path of the contact member while the printed circuit and the contact member resiliently arranged in the direction toward said printed circuit are relatively axially displaceable with regard to each other. The roller counting mechanism just mentioned is, in conformity with the present invention, characterized in that the contact member is arranged in rotating holding means and is displaceable parallel to the axis of rotation of said holding means. The invention is furthermore characterized in that a stationary spring presses the contact member against the counter contacts only when said holding means is at a standstill.

Such an arrangement makes it possible to relieve one, more or all contacts during the shifting of the counting mechanism and, more specifically, in such a way that the corresponding feeler areas are no longer exposed to the force of the pressing springs so that only a very slight wear of the feeler contacts and a very easy movement of the counting mechanism will be obtained. The relief mechanism may be designed, for instance, in such a way that only the respective spring is lifted off the respective associated contact. Generally, this suffices to prevent the disadvantageous wear and braking friction of heretofore known counting mechanisms. However, it is also

possible to lift the contacts themselves off their supporting surface on the feeler contact areas in which instance also the springs move back. This may be effected, for instance, by firmly connecting the contacts with the respective associated spring and by causing the contacts to be moved back with said spring when the latter is moved back. However, it is also possible so to design the relief device that it acts directly upon the contacts.

The relief device may be actuated mechanically or in any other suitable manner. It has proved particularly advantageous to drive the relief device by a magnet which is preferably arranged in the impulse circuit of the counting mechanism. When the counting mechanism receives a control impulse, the relief magnet is actuated simultaneously by said control impulse so that when advancing the counting mechanism, the contact or contacts are relieved in the manner described above. Immediately after carrying out the respective control step, also the relief magnet drops off so that the respective numerical value can immediately be felt. Thus, with the roller counting mechanism according to the invention, it is possible also to feel or scan the numerical value between control steps closely following each other with regard to time.

In certain instances it may be advantageous to design the relief magnet with a delayed dropoff action, for instance, by a parallelly arranged diode which additionally may be arranged in parallel with a condenser. This brings about that the contacts will be pressed safely against the feeler contact areas only when the respective counting step has been carried out and the counting mechanism has come to a standstill. This is required particularly with so-called half-step counters which are provided, for instance, in an anchor escapement drive because in such an instance, in view of the control impulse, only half a step of the counting mechanism is carried out, while the second half step of said counting mechanism is carried out when the impulse magnet drops off. Since the relief magnet, with corresponding synchronization of the impulse magnet, in this instance would drop off during the execution of the second half step, the delay is so selected that the relief magnet will drop off only after the completion of said second half step.

A particularly simple embodiment of the present invention is obtained when each contact is formed by a pin which is displaceable approximately axis-parallelly to the axis of the roller. That side of the pin which faces away from the printed circuit is engaged by a leaf spring which is preferably designed as an electrically conductive contact spring arranged parallel to the circuit and connected to at least one bushing or the like of the printed circuit, said bushing being connected to the feeler circuit. With this arrangement, the structure according to the present invention is also possible for use in connection with a roller counting mechanism of relatively small dimensions.

The roller counting mechanism according to the invention may furthermore be improved by connecting all of the leaf springs with a lifting-off part which is movable parallel to the direction of displacement of the contacts. Such a structure will yield a simple construction and will make it possible that all contacts can be relieved simultaneously.

According to a further feature of the invention, the lifting-off part is formed by a lifting-off comb which is displaceable on guiding means arranged parallel to the roller axis. Two prongs each of said lifting-off comb extend around a leaf spring between the connecting point thereof and the free end of said leaf spring so that when the lifting-off comb is displaced, the respective prongs about the associated leaf springs and take the same along in such a way that they are lifted off the contacts or lift the contacts off from the feeler contacts. The guiding means may be formed in a simple manner by a preferably cylindrical rod on which the lifting-off comb is guided, preferably by means of a sleeve which is partially open in the central area thereof. Expediently, the lifting-off part is toward its starting position spring-loaded, preferably by a pressure spring arranged around said guiding means. This will

assure that the leaf springs will with a corresponding design of the lifting-off comb not be contacted by the latter when in starting position.

The lifting-off comb which preferably consists of synthetic material, may in a simple manner be connected to the lifting-off and relief magnet by the lifting-off comb extending by means of a fork around the anchor of the lifting-off magnet which is located parallelly with regard to the displacement direction.

A particularly advantageous further development of the invention consists in that each contact is displaceably journaled on a gear meshing with a corresponding toothed portion of the number roller in a recess eccentrically located with regard to said gear. Furthermore, all gears are rotatably journaled on a common shaft located parallel with regard to the roller axis and arranged adjacent thereto. In this way the axially movable contacts are located behind the number rollers so that the extension of the roller counting mechanism in the direction of the roller axis can be selected very small. The width of the roller counting mechanism may be as small as with heretofore known roller counting mechanisms without feeler device when the width over the leaf spring up to the printed circuit of each feeler part corresponds approximately to the axial extension of the number roller.

For purposes of keeping the dimensions of the roller counting mechanism as small as possible, it is also advantageous to offset the guiding means for the lifting-off part behind the gear axis and preferably laterally of the roller axis.

In order to assure a precise location of the gears carrying the contacts, the said gears are in axial direction preferably spring-loaded against an abutment away from the respective associated circuit.

With the roller counting mechanism according to the present invention, it is possible without additional structural means to mount an additional pull magnet by means of which the number rollers through the intervention of zero adjusting levers and heart-shaped cams can be brought into zero or neutral position. Expediently, the zero positioning device is so coupled with the relief mechanism that when actuating the zero setting device, also the relief mechanism will be actuated. This may be effected for instance by connecting the relief magnet of the relief mechanism to the circuit for the pulling magnet of the zero setting mechanism.

The structure of the roller counting mechanism according to the invention also makes it possible to use the same as adding mechanism and also as subtracting mechanism in such a way that the roller counting mechanism may be used as differential counter. Each counting decade of the counting mechanism is connected with an 11-pole plug, and the counting mechanism may be employed as adding and/or subtracting counter, calculating counter, examining counter (Abfragezähler), preselector counter, number remote transmitting counter, program accumulator, time counting element, repeat counter, impulse counter, or the like, for printing mechanisms, punchcard machines, punchstrip machine, typewriters, or the like.

Referring now to the drawings in detail, the roller counting mechanism shown in FIGS. 1-4 comprises a housing 1 having rotatably journaled therein and, more specifically, behind the front plate 2, number rollers 3 which are rotatable about a shaft 4. The specifically illustrated embodiment represents a six-digit roller counting mechanism the number rollers 3 of which are located behind a window 5 of the front plate 2. At at least one end of the shaft 4 there is provided a control wheel in the form of a ratchet wheel 6 which is engaged by a pawl not shown which is actuated by impulse magnets (not shown). The said pawl is adapted to advance the ratchet wheel 6 in a manner known per se while advancing the adjacent number roller 3 by one counting step per each impulse.

Adjacent the roller shaft 4 and approximately equally spaced from the front plate 2, the housing 1 carries an additional shaft 7 which is parallel to the number roller shaft 4. The shaft 7 rotatably supports a plurality of gears 8 cor-

responding in number to the number of the number rollers 3. Each gear 8 meshes with a correspondingly geared section 9 of the adjacent or pertaining number roller 3. The transmission ratio between each roller 3 and the associated gear 8 is 1:1.

Each gear 8 has associated therewith a reading contact member in the form of a printed circuit 10. The printed circuits 10 are plane parallel to the gears 8 or number rollers 3 and extend between the gears 8 with the exception of the outermost printed circuit. Each printed circuit 10 has in conformity with FIG. 4 a bearing recess 11 for receiving a bushing 12 which is coaxially arranged with regard to the respective associated gear 8 and at least on that side which faces the printed circuit 10 protrudes beyond the gear 8. The shaft 7 extends through the bushings 12 of the gear 8 arranged adjacent to each other. Concentrically arranged about the bearing recess 11 of the printed circuit 10 and, therefore, concentrically uniformly distributed about the axis of rotation of the gears 8 are on each printed circuit 10, 10 feeler contact areas 13 each of which is connected to a printed conductor 14. The said conductors 14 are respectively connected to plugs 15 connected to the printed circuit 10 and protruding from the housing 1 of the counting mechanism. In each gear 8 and eccentrically arranged with regard to the axis of rotation thereof is a bore 16 which is approximately parallel to said axis of rotation. A bushing 17 is connected on that side of gear 8 which faces the printed circuit 10 and is coaxial to said bore 16. The bushing 17 forms an extension of the bore 16. A cylindrical contact pin 18 is displaceably mounted in the bore 16. The annular path of movement of said pin 18 overlaps with the feeler contact areas 13 of the printed circuit 10 so that by means of the contact pin 18 which is synchronously moved with the associated number roller 3 at a transmission ratio 1:1, the respective numerical value of the number roller 3 can be felt or scanned.

On that side of gear 8 which faces away from the printed circuit 10, the contact pin 18 which protrudes beyond said side is engaged by a contact leaf spring 19 the free end of which is approximately annularly shaped so that in each position of the gear 8 it can be pressed at the same pressure against the contact pin 18. That end 21 of the contact leaf spring 19 which faces away from the free end 20 is angle-shaped, said contact leaf spring 19 being adapted resiliently to press pin 18 against the printed circuit 10. The said end 21 which comprises two recesses is placed upon the printed circuit 10 and is held thereon, for instance, by riveting. One of the two bushings 22, 23, namely the bushing 22, which faces the front plate 2 is connected to a conductor 14a of the printed circuit 10 in such a way that the contact pin 18 through the intervention of the leaf spring 19 is located in the respective feeler circuit.

As will be seen from FIG. 3, the contact leaf springs 19 are so arranged that they protrude toward that side of the gear shaft 7 which faces away from the number rollers 3 and is inclined away from the front plate 2 toward the connecting end 21. The arm 24 located between the free approximately annular end 20 and the angle-shaped connecting end 21 of each contact leaf spring 19 passes, when seen in side view according to FIG. 3, past a cutout 25 of the respective printed circuit 10 while all cutouts 25 are in alignment with regard to each other in longitudinal direction of the gear shaft 7. The comb 26 of a lifting-off part 27 extends into said cutouts 25. The part 27 is displaceably guided on a rod-shaped guiding member 28 which is parallel to the gear axis 7. For purposes of guiding, the lifting-off part 27 carries a sleeve-like slide 29 which has an opening 30 located between the ends of said slide 29 and on that side thereof which faces away from the connecting ends 21 of the springs 19. In this way the slide 29 is guided only within the area of its two ends, and too great a friction between the slide 29 and the guiding rod 28 will be avoided. The lifting-off part 27 has a number of follower prongs 31 which corresponds in number to the number of the contact leaf spring 19. The surfaces 32 of said prongs 31 are respectively located parallel to the plane of the arm 24 of the pertaining contact leaf spring 19. The follower prongs 31

themselves are located perpendicularly with regard to the longitudinal direction of the arm 24 of the respective pertaining contact leaf spring 19 and to this end are cranked in the manner illustrated in the drawing. The surfaces 33 of prongs 31 which face away from the follower surfaces 32 are inclined. When the lifting-off comb 27 is counter to the direction of action of the spring force of leaf spring 19 displaced on guiding member 28 in the direction of the arrow 34 in conformity with FIG. 1, those follower surfaces 32 of the prongs 31 which previously were spaced from the leaf springs 19 engage the arms 24 of the leaf springs 19 and lift the same off the contact pins 18 so that the contact pins 18 are relieved and, if at all, engage the printed circuit 10 with an extremely low friction. In a direction counter to the direction of the relief movement, the lifting-off comb 27 is spring-loaded by a pressure spring 35 extending about the guiding member 28. The lifting-off comb 27, when in its starting position, rests against the end face of an abutment bushing 26 which is arranged on that side of the lifting-off comb 27 which is opposite the pressure spring 35 and which is arranged on the guiding member 28.

With the embodiment illustrated in FIGS. 1-4, the lifting-off comb has that side thereof which faces away from the follower prongs 31, and, more specifically, at the slide sleeve 29, provided with a fork 37 which extends around the plate-shaped armature 38 of a lifting-off magnet 39. The armature 38 is pivotally mounted on the yoke 40 of the lifting-off magnet 39. By means of a corresponding impulse, the core 41 attracts the armature 38 which is pivotable about a shaft perpendicular to the guiding means 8 of the lifting-off comb 27 in such a way that the comb 27 is displaced in the direction of the arrow 34 for relieving the contact pin 18. When the armature 38 drops off, the comb 27 will by means of a pressure spring 35 be returned to its starting position. As will be evident from FIG. 3, the lifting-off magnet 39 is arranged on that side of the contact leaf springs 19 in the housing 1 which is opposite to the front plate 2, the longitudinal axis of magnet 39 being parallel to the roller shaft 4.

Due to the fact that the feeler device is arranged parallel to the roller shaft 4 and adjacent thereto, it is possible to select the width 42 of each feeler device associated with a number roller 3, i.e. the width of the respective contact leaf spring 19 to the printed circuit 10 inclusively, in conformity with or equal to the axial extension 43 according to FIG. 2 of the respective number roller 3. In this way a particularly short extension of the counting mechanism in the direction of the shaft 4 is obtained.

As will be evident from FIG. 1, the gears 8 are spring-loaded by a pressure spring 44 extending around the shaft 7 and are urged against a bushing 45 located opposite to the pressure springs 44. The pressure springs 44 and the bushings 45 are so arranged that the gears are spring-urged away from the respective associated printed circuit 10.

The printed circuits 10 of each feeler member are so close to the contact leaf spring 19 of the adjacent feeler part that the contact spring cannot be overstressed during its relief movement but will abut against the adjacent printed circuit 10. For the contact leaf spring 19 located on one side and having no printed circuit adjacent thereto, there is provided an abutment collar 46 on gear shaft 7 by means of which the overstressing of said contact leaf spring during the relief movement will be prevented.

Referring now to the diagram of FIG. 5, the impulse magnet 47 which initiates the shifting steps of the counting mechanism and thereby releases the contact pins 18 is arranged in parallel to the lifting-off magnet 39 so that when the impulse magnet 47 attracts and thus when a shifting step is carried out, also the lifting-off magnet 39 attracts and relieves the contact pins 18 from the leaf springs 19 so that the contact pins 18 will only slightly with a minimum of friction engage the reading contact areas 13. The circuit of the lifting-off magnet 39 may also comprise a diode 48 and, if desired, a condenser 49 so that the lifting-off magnet 39 will be drop-delayed relative to the impulse magnet 47. Furthermore, a protective diode is provided for the impulse magnet 47.

As will be seen from FIG. 3, the roller counting mechanism according to the invention has a zero setting device 51 by means of which the number rollers 3 can be set to their zero position. According to the specific example shown in the drawing, to this end each number roller has its end face provided with a heart-shaped cam 52 which has respectively associated therewith a zero setting lever 53. All of the levers 53 are mounted on a shaft 54 which is parallel to the roller shaft 4 and is common to all levers 53 for shifting the same together.

When the zero setting levers 53 are moved toward the cam 52 of the number rollers 3, these number rollers are subjected to a torque until the end cam 55 of each lever 53 engages a corresponding recess 56 of the cam 52. In this position the zero mark of the respective number roller 3 is located within the area of the window 5. For purposes of actuating the zero levers 53, the latter are connected to an arm 57 having linked thereto a linkage 58 which at the front plate 2 adjacent the window 5 has a knob or the like 59. By pressing in the knob 59, the zero setting levers 53 are pivoted toward the cams 52 whereby the number rollers 3 are in the manner set forth above moved to their zero position.

The zero setting device 51 may in a manner not shown, for instance mechanically, be connected to the lifting-off member 27 in such a way that when actuating the zero setting device 51, the contact leaf springs 19 are so actuated that the contact pins 18 are relieved. When the zero setting levers 53 are connected to a pull magnet (not illustrated) so that by means of said pull magnet they can be pivoted toward the arms 52 of the rollers 3, the lifting-off magnet 39 is in conformity with the circuit of FIG. 5 preferably arranged in the circuit of the pull magnet in such a way that the lifting-off magnet 39 will automatically be actuated with the pull magnet. In this way it will be assured that when turning the number rollers to the zero position thereof, the contact pins 18 will be relieved.

As is illustrated in FIGS. 3 and 4, the printed circuits 10 have coaxially arranged cylindrical passages 61 through which a rod 60 extends which is fixedly connected to the housing thereby assuring that the feeler contact areas 13 of the printed circuits 10 will be precisely coaxial with the shaft 7.

It is, of course, to be understood that the present invention is, by no means, limited to the particular arrangement set forth in the drawings but also comprises any modifications within the scope of the appended claims.

What I claim is:

1. In a counter having digit wheels arranged in coaxial spaced relation and adapted for being indexed from position to position corresponding to values inserted into the counter, a stationary member for each digit wheel having spaced stationary contacts thereon corresponding to the indexed positions of the respective digit wheel, a moveable contact for each digit wheel moveable in unison therewith and adapted to move over the pertaining stationary member and engage a respective stationary contact thereof in each indexed position of the respective digit wheel, said moveable contacts being in the form of pins, spring means resiliently biasing each said moveable contact toward the respective stationary member to provide for pressure engagement of the moveable contact with a stationary contact in each indexed position of the respective digit wheel, said spring means being in the form of a leaf spring for each pin, relieving means operable upon the insertion of a value into said counter for relieving the bias on said moveable contact whereby the digit wheels will index free of frictional drag due to the pressure of said moveable contacts on the said stationary members and the stationary contacts carried thereby, said relieving means including an electromagnet operable when energized to relieve the bias on said pins, means for supplying energy to said electromagnet simultaneously with insertion of a value into said counter and for interrupting the said supply of energy at the end of said value insertion, and components in circuit with said electromagnet operable to delay the relaxing thereof upon the interruption of the supply of energy thereto.

2. In a counter having digit wheels arranged in coaxial spaced relation and adapted for being indexed from position

to position corresponding to values inserted into the counter, a stationary member for each digit wheel having spaced stationary contacts thereon corresponding to the indexed positions of the respective digit wheel, a moveable contact for each digit wheel moveable in unison therewith and adapted to move over the pertaining stationary member and engage a respective stationary contact thereof in each indexed position of the respective digit wheel, said moveable contacts being in the form of pins, spring means resiliently biasing each said moveable contact toward the respective stationary member to provide for pressure engagement of the moveable contact with a stationary contact in each indexed position of the respective digit wheel, said spring means being in the form of a leaf spring for each pin, said stationary members being in the form of printed circuit boards parallel to said digit wheels, relieving means operable upon the insertion of a value into said counter for relieving the bias on said moveable contact whereby the digit wheels will index free of frictional drag due to the pressure of said moveable contacts on the said stationary members and the stationary contacts carried thereby, said leaf springs being mounted on the pertaining stationary members and being conductive to complete a circuit from the respective pin to the circuit on the respective stationary member.

3. A counter according to claim 2 which includes a first gear fixed to each digit wheel, a second gear the same size as each first gear and meshing therewith, a shaft supporting said second gears in coaxial relation and for free relative rotation, said moveable contacts being carried by said second gears.

4. A counter according to claim 3 in which said relieving means comprises a reciprocable member and rodlike guiding means therefor, said guiding means being disposed in parallel spaced relation to said shaft.

5. A counter according to claim 3 in which said stationary contacts for each pin are arranged in the circular path of travel of the respective pin, and support means for each stationary member to hold the stationary contacts thereof in a position of concentricity with the respective second gears.

6. A counter according to claim 3 in which each leaf spring and the stationary member pertaining thereto is disposed within substantially the same axial limits as the respective digit wheel.

7. A counter according to claim 6 which includes spring means urging said second gears away from their respective stationary members and abutment means to stop said second gears in a predetermined position.

8. In a counter having digit wheels arranged in coaxial spaced relation and adapted for being indexed from position to position corresponding to values inserted into the counter, a stationary member for each digit wheel having spaced stationary contacts thereon corresponding to the indexed positions of the respective digit wheel, a moveable contact for each digit wheel moveable in unison therewith and adapted to move over the pertaining stationary member and engage a respective stationary contact thereof in each indexed position of the respective digit wheel, said moveable contacts being in the form of pins, spring means resiliently biasing each said moveable contact toward the respective stationary member to provide for pressure engagement of the moveable contact with a stationary contact in each indexed position of the respective digit wheel, said spring means being in the form of a leaf spring for each pin, relieving means operable upon the insertion of a value into said counter for relieving the bias on said moveable contact whereby the digit wheels will index free of frictional drag due to the pressure of said moveable contacts on the said stationary members and the stationary contacts carried thereby, said relieving means including an electromagnet operable when energized to relieve the bias on said pins, means for supplying energy to said electromagnet simultaneously with insertion of a value into said counter and for interrupting the said supply of energy at the end of said value insertion, and a lift member operated by said electromagnet and operable upon energization of said electromagnet to engage all of said leaf springs and move them in bias relieving direction.

9. A counter according to claim 8 in which said lift member is a comblike element having a finger overlying each leaf spring, guide means slidably supporting said comblike element for reciprocation at an angle to said leaf springs.

10. A counter according to claim 9 in which said guiding means is a rod and said comblike element has a sleeve-like portion reciprocally receiving said rod.

11. A counter according to claim 10 in which a spring is mounted on said rod and biases said comblike element toward a rest position wherein said leaf springs are released from said comblike element and bear on said pins.

12. A counter according to claim 11 in which said electromagnet has a moveable armature, and means connecting said armature with said comblike element.

13. In combination for a counter having digit wheels arranged in coaxial spaced relation and adapted for being indexed from position to position corresponding to values inserted successively and synchronously into the counter, a stationary member for each digit wheel having spaced stationary contacts thereon corresponding to the indexed positions of the respective digit wheel, a movable contact for each digit wheel movable in unison therewith and adapted to move over the pertaining stationary member and engage a respective stationary contact thereof in each indexed position of the respective digit wheel, spring means resiliently biasing each said movable contact toward the respective stationary member to provide for pressure engagement of the movable contact with a stationary contact in each indexed position of the respective digit wheel, relieving means operable upon the insertion of a value into said counter for relieving the bias on said movable contact whereby the digit wheels will index free of frictional drag due to the pressure of said movable contacts on the said stationary members and the stationary contacts carried thereby, and a first electromagnet energizable for inserting impulse values into said counter and said relieving means including a second electromagnet in parallel with said first electromagnet so as to be energized simultaneously therewith.

14. In combination for a counter having digit wheels arranged in coaxial spaced relation and adapted for being indexed from position to position corresponding to values inserted successively and synchronously into the counter, a stationary member for each digit wheel having spaced stationary contacts thereon corresponding to the indexed positions of the respective digit wheel, a movable contact for each digit wheel movable in unison therewith and adapted to move over the pertaining stationary member and engage a respective stationary contact thereof in each indexed position of the respec-

tive digit wheel, spring means resiliently biasing each said movable contact toward the respective stationary member to provide for pressure engagement of the movable contact with a stationary contact in each indexed position of the respective digit wheel, relieving means operable upon the insertion of a value into said counter for relieving the bias on said movable contact whereby the digit wheels will index free of frictional drag due to the pressure of said movable contacts on said stationary members and the stationary contacts carried thereby, resetting means for simultaneously setting all of said digit wheels to zero, means for actuating said relieving means simultaneously with said resetting means, said resetting means including a first electromagnet energizable for resetting said digit wheels to zero and said relieving means including a second electromagnet in parallel with said first electromagnet so as to be energized simultaneously therewith.

15. A multidigit roller counting mechanism with plural number roller means upon a common rotating axis adjacent to each other and coupled among each other by a decade drive mechanism, comprising, in combination: electrically energizable switching magnet means to which magnitudes to be counted are supplied in the form of electrical impulses each of which individually energizes said switching magnet means thereby to advance the counting mechanism by one counting step, plural contact-area-forming means each having corresponding contact members for number roller means provided therefor and synchronously rotatable relatively thereto, a fixed printed circuit means having at least 10 connections thereon forming a ring-shaped contact path for one of said contact members in juxtaposition to each other and insulated relative to each other with respect to said contact-area-forming means, spring means to urge contact engagement associated therewith, and lifting-off magnet means energizable by impulse simultaneously together with energizing of said switching magnet means and effective during each impulse to lift said contact members off from said contact-area-forming means against force of said spring means.

16. A counting mechanism further in combination according to claim 15, in which said switching magnet means and said lifting-off magnet means each have windings with respective ends of which two are connected electrically for parallel relation of said magnet means with respect to each other, and diode means connected between remaining winding ends of said magnet means.

17. A counting mechanism further in combination according to claim 16, in which a further diode is connected parallel to the winding of said lifting-off magnet means.

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