

May 29, 1923.

1,456,602

W. KAISLING

CALLING DEVICE.

Original Filed Jan. 17, 1920 2 Sheets-Sheet 1

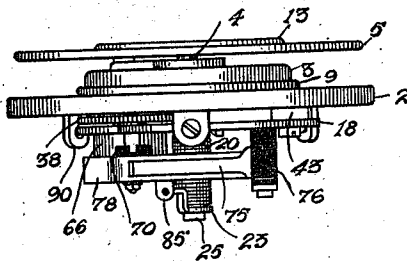


Fig. 4.

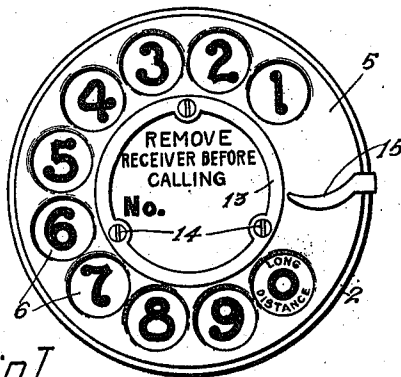


Fig. 1.

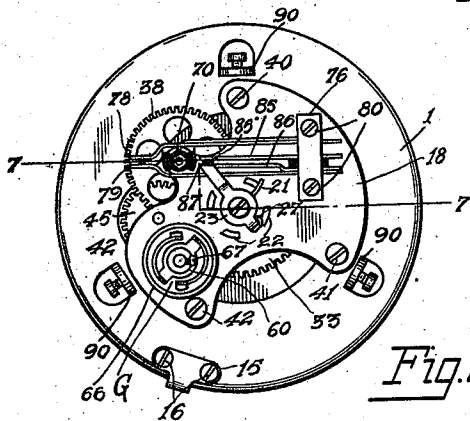


Fig. 2.

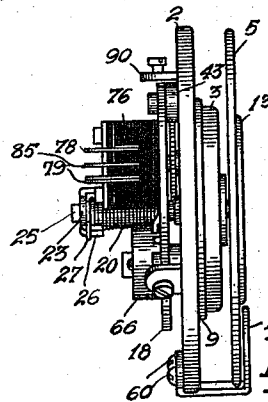


Fig. 3.

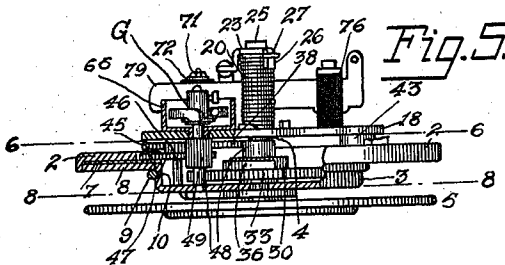


Fig. 5.

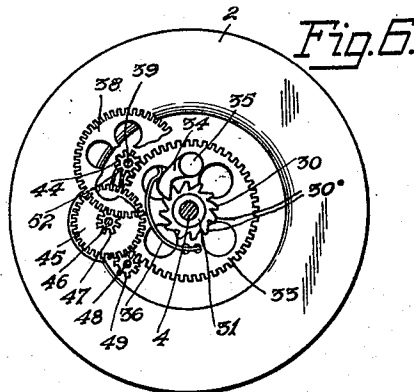


Fig. 6.

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May 29, 1923.

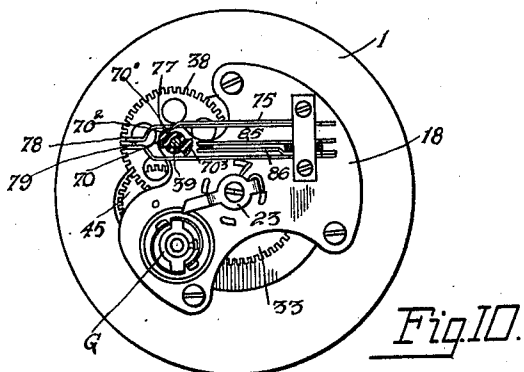
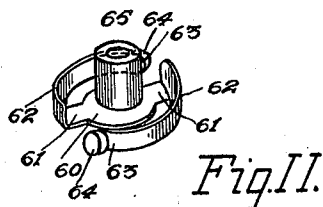
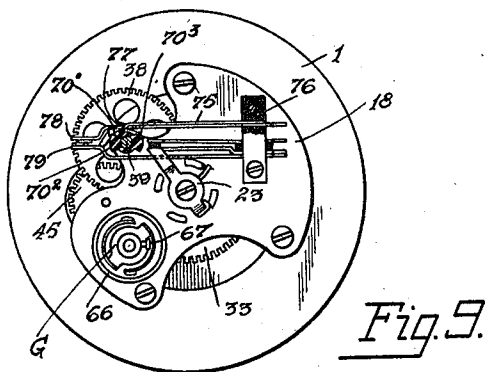
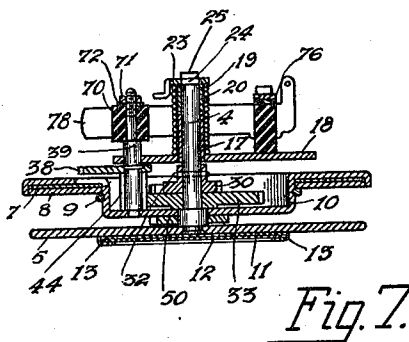
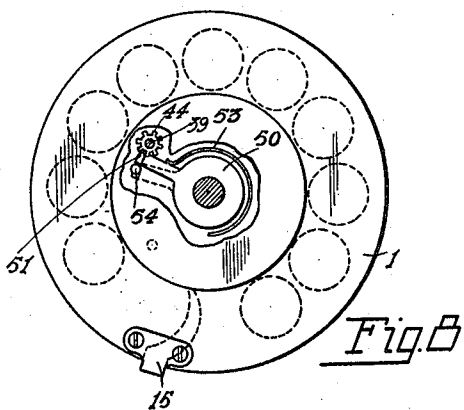
1,456,602

W. KAISLING

CALLING DEVICE

Original Filed Jan. 17, 1920

2 Sheets-Sheet 2



Inventor:
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Patented May 29, 1923.

1,456,602

UNITED STATES PATENT OFFICE.

WILLIAM KAISLING, OF CHICAGO, ILLINOIS, ASSIGNOR TO KELLOGG SWITCHBOARD AND SUPPLY COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

CALLING DEVICE.

Application filed January 17, 1920, Serial No. 352,001. Renewed November 23, 1922.

To all whom it may concern:

Be it known that I, WILLIAM KAISLING, a citizen of the United States, and residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Calling Devices, of which the following is a specification.

My invention relates to calling devices and has to do more particularly with calling devices such as are commonly used in telephone substations for controlling automatic switches which are located at the central office by directive impulses to extend a connection from a calling substation to a called substation through the agency of the said switches.

My invention is particularly adapted to operate in conjunction with the so-called metallic or two-wire type of automatic circuits in which the circuit of the line is interrupted a number of times, determined by the adjustment of the calling device. The principal object of my invention is to provide a device of the character above described which will be certain and efficient in operation, simple in construction and economical to manufacture.

A feature of my invention is the provision of positive means whereby, upon the setting movement of the dial, the contact operation, which interrupts the impulse springs, is prevented from rotating forward and separating the said impulse springs. Other features of my invention relate to the governor, to the ratchet mechanism which connects the setting member or dial to the impulse controlling means and to the construction and operation of the contact springs and contact operator. The above and other features and advantages herein described will be better understood upon reference to the following detailed description taken in connection with the accompanying drawings, and the scope of the invention will be particularly pointed out in the appended claims.

Referring now more particularly to the accompanying drawings, in which I illustrate the calling device in the several views and in which like reference characters indicate like parts, and in which—

Fig. 1 is a face view of the calling device;
Fig. 2 is a rear view of Fig. 1;
Fig. 3 is a right side view of Fig. 2;
Fig. 4 is a top view of Fig. 2;

Fig. 5 is a bottom view of Fig. 2 with certain parts broken away;

Fig. 6 is a sectional view along the line 6—6 of Fig. 5;

Fig. 7 is a sectional view along the line 7—7 of Fig. 2;

Fig. 8 is a sectional view along the line 8—8 of Fig. 5;

Fig. 9 is a plan view of the device showing the latch mechanism when the device is at normal;

Fig. 10 is a view similar to Fig. 9 but showing the apparatus in an actuated position; and

Fig. 11 is a perspective view of the governor.

Referring now more in detail to my invention as illustrated in the accompanying drawings, it comprises a main mounting plate 1 having a flanged portion 2 and a forwardly extending cup portion 3. A main shaft 4 extends through the bearing of the cup-shaped portion 3; the said shaft 4 having a finger hold actuating member 5 fastened to it in any suitable manner, it being preferably staked to the forward end of the shaft 4. The finger hold actuating member 5 is provided with a plurality of openings or finger holds 6, preferably ten in number. A number indicating disk 7 is placed with its indicating numerals below the actuating member 5 and rests upon the flange 2, the number of said numerals corresponding with the number of finger holds 6. The indicating disk 7 has a protective disk 8 of transparent material, such as glass, placed in front of it so as to protect the indicating disk. The members 7 and 8 are held in place upon the flanged portion 2 by means of a split ring 9, the ring fitting into a groove cut in the periphery of the forwardly extending cup-shaped member 3, the ring 9, when resting in its place in the groove 10, securely holding the members 7 and 8 in place upon the flanged portion 2.

The ten openings which form the finger holds 6 are numbered 1, 2, 3, etc., to 0. The calling device is adapted to transmit from 1 to 10 impulses, the said numerals upon the indicating disk 7 indicating the number of impulses its corresponding finger hold is adapted to transmit through the agency of the set of impulse springs. The actuating member 5 is provided with a card 11 and a transparent protecting disk 12, the said

card 11 and protective disk 12 being held in place by means of a clamping ring 13 which is fastened to the actuating member 5 in any suitable manner, as by means of the screws 14, which have screw-threaded engagement with the actuating member 5. The card 11 contains instructions relative to the operation of the device. A stationary finger stop 15 is mounted upon the flanged portion 2 of the mounting plate 1 by means of screws 16. When the finger hold actuating member 5 is advanced in a clockwise direction, the advancing finger of the operator engages the stationary finger stop 15 and arrests the forward movement of the actuating member.

Referring now more particularly to the operating mechanism the main shaft 4 extends through a suitable bearing sleeve 17 in which it rotates, the said bearing 17 being secured to the bridge plate 18 in any suitable manner. A sleeve 19 is provided which is of a size to receive the shaft 4, the said sleeve when in place resting against the bearing 17. A spiral motor spring 20 is coiled around the bearing 17 and sleeve 19. One end 21 of the spring engages one of a plurality of lugs 22, which lugs 22 are preferably integrally formed with the bridge plate 18 by means of a shearing and forming operation. The spring 20 restores the finger hold actuating member 5 to its normal position after the same has been advanced and then released. An arm 23 is provided which has a square orifice which fits over the square portion 24 of the shaft 4 and is held in place by means of a screw 25, which has screw-threaded engagement with the shaft 4. The arm 23 operates the so-called shunt springs and also serves to retain the motor spring 20 in place. The arm 23 is provided with a downward angular extension 26, which extension 26 forms a securing means for the end 27 of the motor spring 20, the said end 27 being hook-shaped so as to permit its being hooked over the extension 26. To secure the proper tension of the motor spring 20, the end 21 of the spring 20 is moved in a clockwise direction over the lugs 22 until the proper adjustment or tension is secured; the end 21 of the spring 20 is then placed so that it engages one of the plurality of lugs 22, to thus hold the spring 20 under its normal tension and also hold the finger hold actuating member 5 in its normal position. Positioned beneath the bridge plate 18 on the main shaft 4 is a ratchet 30 which is provided with a collar 31 through which the said shaft 4 extends. The ratchet 30 is fastened to the shaft 4 by means of a pin 32 which passes through a transverse orifice in the shaft 4. Positioned directly beneath the ratchet 30 and rotatably mounted upon the shaft 4 is a gear wheel 33, the said gear wheel 33 being loosely mounted upon the said shaft 4. A pawl 34 is pivotally secured

to the face of the gear wheel 33 by means of the pivot pin 35 and engages one of the plurality of teeth of the ratchet 30, the said pawl 34 being held in engagement with the tooth of the ratchet 30 by means of a leaf spring 36. The spring 36 has one end secured to the gear wheel 33 in any suitable manner, its other or free end engaging pawl 34, pressing it into engagement with the ratchet 30.

A gear wheel 38 is suitably secured to a shaft 39, which shaft 39 is journaled in the mounting plate 1 and in the bridge plate 18, the bridge plate 18 being fastened to the mounting plate 1 by means of screws 40, 41 and 42, which screws pass through spacing washers 43, which washers are placed between the bridge plate 18 and mounting plate 1, the said screws having screw-threaded engagement with the mounting plate 1. A pinion 44 formed integrally with the shaft 39 meshes with the gear 33. A gear wheel 45 is suitably secured to a shaft 46, which shaft 46 is journaled at its opposite ends in the mounting plate 1 and bridge plate 18. A pinion 47 formed integrally with the shaft 46 meshes with the gear 38. Shaft 48 of the governor mechanism G is provided with a pinion 49 integrally formed with the said shaft 48 and meshes with the gear wheel 45. The governor mechanism G is adapted to retard the return movement of the finger hold actuating member 5 to a predetermined speed, as will be more fully hereinafter described.

To retain the finger hold member 5 in its normal position against the tension of the motor spring 20, I provide an arm 50 loosely mounted upon the main shaft 4 between the mounting plate 1 and finger hold actuating member 5. The arm 50 is provided with an angular extension 51, which projects through a suitable opening 52 in the cup-shaped portion 3 of the mounting plate 1. A leaf spring 53 is provided and has one end secured to the mounting plate 1 and its free end engaging the arm 50. A pin 54 is secured to the inner face of the finger hold actuating member 5 and when the said member 5 is in its normal position, the pin 54 engages the arm 50, turning the said arm about shaft 4, forcing the extension 51 which protrudes through the cup portion 3 of the mounting plate 1 into engagement with the pinion 44, against the tension of the leaf spring 53. The tension of the said spring 53 is overcome by the tension of the motor spring 20. Should the member 5 be advanced in a clockwise direction, the pin 54 moves with the member 5 away from arm 50, allowing the leaf spring 53 to move the nose of the angular extension 51 out of engagement with the pinion 44. When the member 5 restores to normal, the pin 54 again forces the nose of the extension 51 into en-

gagement with the pinion 44, thus arresting the movement of the member 5. The nose of the extension 51 engaging the pinion 44 prevents an overrun operation of the impulse mechanism.

The governor mechanism G comprises a shaft 48 which has a pinion 49 formed integrally therewith, as hereinbefore mentioned, the said pinion meshing with the gear wheel 45 upon shaft 46. A pinion 47 integrally formed with the shaft 46 meshes with the gear wheel 38 which is carried upon the shaft 39. The pinion 44 which is integrally formed with the shaft 39 meshes with the gear wheel 33 which is loosely mounted upon the main shaft 4. The train of gearing thus outlined connects the governor mechanism G with the main shaft 4. The governor proper comprises a plate 60 of thin, flexible material formed into diametrically, oppositely disposed arms 61, which arms 61 are provided with angular extensions 62. The free ends 63 of the arms 62 are provided with weighted members 64. The plate 60 is suitably secured to a collar 65, which collar is provided with an orifice of a size to receive the shaft 48. The governor as a whole is slipped over the shaft 48 into a cup-shaped member 66, which member 66 is rigidly secured to the bridge plate 18 in any suitable manner, and forms a containing member for the said governor mechanism G. The member 60 and collar 65 as a whole are held in position upon the shaft 48 by means of a set screw 67.

The governor mechanism G is operatively associated with the train of gearing before mentioned and when the finger hold actuating member 5 is rotated in a clockwise direction to set the calling device to transmit a certain number of impulses, the gear 33, which is loosely mounted upon the shaft 4, remains stationary while the shaft 4 and ratchet 30 are operated in a clockwise direction so that the pawl 34, which is pivoted upon the gear wheel 33, rides over the teeth of the ratchet until the pawl rests in the desired tooth of the ratchet 30. Upon the return movement of the finger hold actuating member 5 with the shaft 4 and ratchet 30, the pawl 34 engages a tooth of the ratchet wheel 30, causing the gear 33 to be rotated with it, and through the medium of the train of gearing the motion is transmitted to the governor mechanism G. The weighted free ends 63 of extensions 62 are moved outward against the normal tension of the semi-circular members 62, due to centrifugal force and the weights 64 are forced against the inner periphery of the cup-shaped member 66, thus retarding the return movement of the device to a predetermined speed.

In order to operate the impulse springs of the device, I preferably provide an interrupter or cam member 70 of insulating

material mounted upon the shaft 39 and held in place thereon by means of a nut 71, which has screw-threaded engagement with the threaded portion of the shaft 39, and a suitable washer 72 is placed between the nut 71 and the interrupter cam 70. The cam 70 is positioned between the interrupter contacts, that is, the axis of rotation of the cam is between the interrupter contacts, so that when the cam is in its normal position, its wing members extend parallel to the interrupter contacts but free from engagement therewith, permitting the contacts carried by the interrupter springs to engage each other. When the cam member is rotated its wings engage the interrupter springs to open their contacts. The ratchet 30 hereinbefore described has twelve teeth 30'. When the member 5 is moved in a clockwise direction, the pawl 34 engages the successive teeth 30' of the ratchet in its advance movement. To prevent the interrupter 70 from opening the interrupter springs, I provide a spring latch 75 secured to the impulse spring support 76. The cam 70 is provided with wings 70² and 70³. The latch 75 is provided with an angular nose 77 which engages the cam member 70, and on the setting operation of the device, a partial rotation of the cam 70 brings a shoulder 70' of the wing 70² or 70³ into engagement with the nose 77 of the latch 75, arresting the forward movement of the interrupter cam. When the member 5 starts its return movement in a clockwise direction, the said pawl 34 remains in engagement with the ratchet 30, thus operating the ratchet 30, the loosely mounted gear 33, the train of gearing connected thereto and interrupter 70.

The normally closed interrupter or impulse springs 78 and 79 are actuated according to the number of impulses to be transmitted by the cam member 70. The impulse springs 78 and 79 are so spaced that the cam member 70 normally rests between the springs 78 and 79, with the wings 70² and 70³ extending parallel to the interrupter springs. The free ends of the springs are formed as shown in Fig. 2 and are provided with contact points. The nose 77 of the latch 75 passes through a suitable orifice in the spring 78, permitting the said latch to engage the cam member 70. The springs 78 and 79 are insulatively secured to the support 76 which is secured to the bridge plate 18 by means of screws 80. The support 76 also holds the shunt springs in position.

When the actuating member 5 is rotated in a clockwise direction, the ratchet 30 moves with the shaft 4, the pawl 34 rides over the teeth 30' of the ratchet 30, due to the gear wheel 33 being loosely mounted upon the shaft 4, but on the return movement, the pawl 34 engages a tooth 30' of the ratchet corresponding to the number of impulses to be sent. The gear wheel 33 is then rotated

in a counter-clockwise direction, due to the motor spring 20 thereby transmitting power to the pinion 44 which meshes with gear 33, thus rotating the shaft 39 upon which the cam member 70 is secured, bringing about the opening and closing of the impulse contacts 78 and 79 a predetermined number of times.

I have found that excellent results can be obtained by forming the interrupter mechanism in the manner just described. This is due to the fact that each opening of the interrupter springs for each impulse of the series is for the same duration or period of time. The devices of the prior art have been found somewhat objectionable for use in two-wire systems, owing to the fact that their interrupter mechanism was provided with a plurality of interrupters for separating the interrupter springs, and as the different interrupters vary somewhat in their shape or size, the impulses transmitted were not of the same duration. Even though the different interrupters of the interrupter device might have been substantially the same shape or size when the device was first made, they wore differently as the device was used, thus causing the device to transmit impulses of different durations. With my device, which is provided with only one interrupter, the impulses are always of the same duration.

I provide, as hereinbefore mentioned, shunt springs by which the subscribers' apparatus may be short-circuited while the impulses are being transmitted. The shunt springs comprise a pair of normally open contact springs 85 and 86, the spring 85 being conductively connected with the impulse spring 78. The springs 85 and 86 are also mounted upon the support 76. When the calling device is at normal, the arm 23 secured to the shaft 4 engages an insulation buffer 87 mounted upon the extension 85' of the spring 85, and holds the shunt springs normally disengaged. When the member 5 is moved off normal the shaft 4 is rotated and the arm 23 moving therewith disengages the buffer 87, allowing the shunt springs 85 and 86 to close and remain in such position until the arm 23 again engages buffer 87, upon the completion of the return movement of the member 5.

Lugs 90 are provided, which are integrally formed with the plate 1 by means of a shearing and forming operation, the said lugs forming a means for fastening the dial to a telephone instrument or other device.

I will now describe briefly the operation of the device. Let us assume that the operator wishes to effect four operations of the impulse contacts 78 and 79, that is, to transmit four impulses, the finger of the operator will be inserted into a finger hold 6 above the number 4 on the indicating disk, and the

member 5 is rotated in a clockwise direction until the finger of the operator engages the stationary stop 15. The rotation of the member 5 also causes the rotation of the shaft 4 and the ratchet 30. The member 5, when started upon its forward movement, causes the pin 54 to disengage arm 50 and the spring 53 moves the said arm 50, allowing the nose or extension 51 to disengage pinion 44. A slight movement, as already described, of the mechanism is brought about, but is arrested when the nose 77 of the latch spring 75 engages a shoulder 70' of the cam member 70. The gear 33 is loosely mounted upon the shaft 4 and, therefore, upon this forward movement the said gear 33 remains normal and as the pawl 34 is pivoted to the gear 33 it rides over the teeth 30' of the said ratchet 30. As the shaft 4 leaves normal upon its forward rotation, the arm 23 carried thereby disengages the rubber buffer 87 of the shunt spring 86, allowing the shunt springs 85 and 86 to close their contacts to short-circuit the substation apparatus. The adjustment of the member 5 winds up the motor spring 20 so that when the finger of the operator is removed from the finger hold 6 of the actuating member 5, the spring 20 restores the shaft 4, ratchet 30 and arm 23 to normal. The pawl 34 now engages a tooth 30' of the ratchet 30 and the ratchet 30 carries the gear 33 with it, and motion is transmitted to the governor mechanism G through the agency of the train of gearing, thus permitting the restoration of the calling device at a predetermined speed. Motion is also transmitted to the shaft 39 to bring about the rotation of the cam member 70, causing the contact springs 78 and 79 to be interrupted four times to transmit the four impulses to the central office to operate the central office switches. Upon the return to normal of the device, the pin 54 again engages arm 50, forcing the extension 51 into engagement with a tooth of the pinion 44, thereby immediately arresting further rotation of the impulse cam 70. The arm 23 again engages the rubber buffer 87 mounted upon the spring 86, thus interrupting the shunt springs 85 and 86. The device is now at normal and is again ready to be adjusted to effect the transmission of another set of impulses.

In illustrating my invention I have shown a specific form of apparatus, but I do not wish to be limited to the exact structure as shown, as many modifications and changes may readily suggest themselves to those skilled in the art, and therefore I aim to cover all such changes and modifications as come within the spirit and scope of the appended claims.

What I claim as new and desire to secure by United States Letters Patent, is:

1. A device of the character described in-

cluding a pair of interrupter contacts, an interrupter provided with a pair of wings normally resting between a pair of interrupter springs to which said interrupter contacts are connected, means for rotating said interrupter whereby the wings of said interrupter engage said springs to disengage said interrupter contacts, and a line circuit controlled by said interrupter contacts.

2. A device of the character described including a pair of parallel interrupter springs normally in engagement at their free extremities, an interrupter extending between said springs provided with a pair of wings lying normally in a plane parallel to the planes of said interrupter springs, means for rotating said interrupter whereby one of said wings engages one of said springs and the other of said wings engages the other of said springs to cause the one spring to disengage the other spring.

3. A device of the character described including a pair of parallel interrupter springs firmly secured to a mounting plate at their one end, the free extremities of said springs being shaped to contact with each other, a gear train, an interrupter extending between said springs operatively associated with said gear train, a pair of wings for said interrupter, and means for rotating the same through the agency of said gear train whereby one of said wings engages one of said springs, and the other of said wings engages the other of said springs to open contact between said springs.

4. A device of the character described including a pair of interrupter springs secured to a mounting plate, said springs extending parallel to each other and having their free extremities shaped to contact with each other, a gear train supported by said mounting plate, an interrupter device extending between said springs and provided with a pair of wings so arranged that when said interrupter device is rotated through the agency of said gear train one wing engages one of said springs and the other wing engages the other of said springs to open contact between said springs.

5. A device of the character described including a pair of interrupter springs, a mounting plate, means for securing said interrupter springs to said mounting plate, a gear train supported by said mounting plate, an interrupter device operatively associated with said gear train and provided with a pair of wings adapted to be rotated between said interrupter springs, one of said wings adapted to engage one spring and the other of said wings adapted to engage the other of said springs to separate the same when said interrupter is rotated by said gear train.

6. A device of the character described including a mounting plate, a pair of parallel

interrupter springs secured to said mounting plate having their free extremities shaped to contact with each other, an interrupter device normally resting between said springs but permitting the same to contact with each other, and a setting member including a gear train, said setting member when advanced and then released causing rotation of said interrupter device through the agency of said gear train whereby the contact between said springs is alternately opened and closed.

7. A device of the character described including a mounting plate, a pair of interrupter springs secured thereto extending parallel to each other and having their free extremities shaped to contact with each other, a gear train secured to said mounting plate, an interrupter device operatively associated with said gear train and normally resting between said springs, a pair of integrally formed wings for said interrupter device whereby when the same is rotated by said gear train said wings alternately engage the interrupter springs to open and close contact.

8. A device of the character described including a mounting plate, a pair of interrupter springs secured thereto extending parallel to each other and having their free extremities shaped to contact with each other, an interrupter device normally extending between said springs, a pair of integrally formed wings for said interrupter device whereby when the same is rotated said wings alternately engage the interrupter springs to open and close said contact, and mechanism for preventing the rotation of said interrupter device in one direction.

9. A device of the character described including a mounting plate, a pair of interrupter springs secured thereto, an interrupter device for opening and closing the contact between said interrupter springs, and pawl mechanism for preventing the rotation of said interrupter device in one direction.

10. An interrupter device of the character described including a pair of interrupter springs, an interrupter device provided with a pair of wings adapted to rotate between said springs to open and close contact therebetween, and a spring pawl adapted to cooperate with the wings of said interrupter device to prevent rotation of said device in one direction.

11. A device of the character described including a mounting plate, a pair of interrupter springs secured to said mounting plate, an interrupter device provided with a pair of wings adapted to rotate between said springs to open and close contact between said springs, and a pawl adapted to cooper-

ate with the wings of said interrupter device to prevent rotation thereof in one direction.

12. A device of the character described including a mounting plate, a pair of interrupter contacts secured to said mounting plate, an interrupter device provided with a pair of wings adapted to open and close contact between said interrupter contacts, and a pawl adapted to cooperate with the wings of said interrupter device to prevent rotation thereof in one direction.

13. A device of the character described including a pair of interrupter springs, an interrupter provided with a pair of wings adapted to be rotated to open and close contact between said interrupter springs, and a third spring extending through an orifice in one of said interrupter springs for cooperation with the wings of said interrupter to prevent rotation of said interrupter in one direction.

14. A device of the character described including a pair of interrupter springs lying in parallel planes and in contact with each other, an interrupter normally resting between said springs, a gear train associated with said interrupters, a setting member for controlling said gear train, and a motor spring associated with said gear train to cause rotation of said interrupter in a plane at right angles to the planes of said springs to cause the one spring to disengage the other spring.

15. A device of the character described including a mounting plate, a gear train mounted thereon, impulse mechanism operatively associated with said gear train at an intermediate point, an interrupter member for said impulse mechanism, a rotatable setting member for controlling said gear train, and a spring secured to said mounting plate and engaging said interrupter member to prevent an operative movement of said impulse mechanism upon the forward rotation of said setting member.

16. A device of the character described including a mounting plate, a gear train mounted thereon, a shaft and pinion integrally formed and positioned at an intermediate point in said gear train, a pair of impulse springs supported by said mounting plate, a cam secured to said shaft and positioned between said impulse springs, a rotatable setting member loosely connected to said gear train, and a spring secured to said mounting plate and engaging said cam to prevent movement of said cam member upon the forward movement of said rotatable setting member.

17. A device of the character described including a mounting plate, a gear train secured thereto, impulse mechanism operatively associated with said gear train at an intermediate point including a shaft and

pinion integrally formed, a pair of normally closed impulse springs secured to said mounting plate, a cam secured to said shaft and positioned between said impulse springs, and wings for said cam normally extending parallel to said interrupter springs and adapted to engage said impulse springs to open said impulse springs.

18. A device of the character described including a mounting plate, a pair of spring members extending parallel to each other and secured to said mounting plate, said spring members having their one end arranged so that they are normally in contactual engagement with each other, a rotatable member disposed between said spring members and adapted when rotated to engage said spring members to open the contactual engagement between said spring members and then to disengage said spring members to permit the reestablishment of the contactual engagement between said spring members.

19. A device of the character described including a mounting plate, a pair of spring members secured to said mounting plate and parallel to each other, said springs normally in contactual engagement at one end, a rotatable member disposed between said spring members, a gear train associated with and adapted to rotate said rotatable member, to cause said rotatable member to engage said spring members to open the contactual engagement between said spring members and then to disengage said spring members to permit said spring members to assume their contactual engagement.

20. A device of the character described including a mounting plate, a pair of spring members secured at their one end to said mounting plate, the free ends of said spring members being normally in contactual engagement with each other, a rotatable member positioned between said spring members and having a pair of wings integrally formed therewith and adapted to engage said spring members when rotated to open the contact between said spring members and also to disengage said spring members to permit the closure of the contact between said spring members, a spring-driven gear train for rotating said rotatable member, and frictional means for regulating the speed of said gear train.

21. A device of the character described including a mounting plate, a pair of contact springs normally in contactual engagement with each other, said contact springs secured to said mounting plate and parallel to each other, a member disposed between said contact springs, a cup-shaped member, a spring-driven gear train positioned in said cup-shaped member and retained in position by said mounting plate, said gear train adapted when operated to rotate said first

member to cause the same to engage and disengage said contact springs to open and close the contactual engagement of said contact springs, and friction means for controlling the speed of said gear train.

22. A device of the character described including a mounting plate provided with openings, contact springs secured thereto, said springs having contactual engagement with each other, a cup-shaped member, a gear train positioned in said cup-shaped member, shafts for said gear train extending through the openings in said mounting plate, said mounting plate being secured to said cup-shaped member whereby said gear train is retained in its mounted position, a helical spring engaging one of said shafts for driving said gear train, a non-conducting member secured to another of said shafts between and in operative relation with said contact springs, said non-conducting member adapted to be operated by said gear train to cause the same to engage and disengage said contact springs to open and close the contact engagement of said contact springs.

23. A device of the character described including a cup-shaped member, a mounting plate secured to said cup-shaped member, a gear train secured between said member and said plate, normally closed impulse springs secured to said mounting plate, a non-conducting member connected to said gear train and adapted to be operated and controlled by said gear train, said non-conducting member operatively associated with said impulse springs and adapted when operated to engage said impulse springs to open said normally closed impulse springs and then to disengage said impulse springs to permit said impulse springs to close.

24. A device of the character described including a cup-shaped member, a mounting plate secured to said cup-shaped member, a gear train secured between said member and said plate, shafts for said gear train extending through said mounting plate, a coil spring operatively associated with one of said shafts for operating said gear train, means for adjusting the tension of said coil spring, normally closed impulse springs secured to said mounting plate, a cam secured to another of said shafts and positioned between said impulse springs, said cam having integrally formed extensions normally extending parallel to said impulse springs and adapted to be operated by said gear train to engage said impulse springs to open said impulse springs, and means for regulating the speed of said gear train.

25. A device of the character described including a mounting plate, a pair of normally closed impulse springs secured to said mounting plate, a rotatable member dis-

posed between said impulse springs and normally disengaging said impulse springs, means for rotating said rotatable member to cause the same to engage and disengage said impulse springs to open and close said impulse springs, and a spring member secured to said plate for engaging said rotatable member to prevent effectively revertible rotation of said rotatable member.

26. A device of the character described including a mounting plate, a gear train mounted thereon, a shaft and pinion integrally formed and positioned at an intermediate point in said gear train, a pair of impulse springs supported by said mounting plate, a cam secured to said shaft and positioned between said impulse springs, a rotatable setting member loosely connected to said gear train, a spring secured to said mounting plate and engaging said cam to prevent movement of said cam member upon the forward movement of said rotatable setting member, another pair of springs mounted on said mounting plate, a member operatively associated with said setting member and adapted to normally engage one of said last pair of springs to prevent contactual engagement of said last pair of springs with each other, said last member adapted to disengage said one of said last pair of springs to permit said last pair of springs to engage each other when said setting member is moved out of its normal position.

27. A device of the character described including a mounting plate, a cup-shaped member, a gear train secured between said plate and member, a pair of impulse springs supported by said mounting plate, a cam member operatively associated with said gear train and disposed between said impulse springs, said gear train adapted to operate said cam member to cause the same to engage and disengage said impulse springs to open and close said impulse springs, and means integrally formed with said cup-shaped member for securing said device as a unit to any suitable supporting member.

28. A device of the character described including a mounting plate, a pair of impulse springs mounted thereon, a cam member rotatably disposed between said impulse springs and normally disengaging said impulse springs, said cam member when rotated adapted to engage and disengage said impulse springs to open and close said impulse springs, and means for causing said cam member to be rotated at a constant rate of speed.

Signed by me at Chicago, in the county of Cook and State of Illinois, this 13th day of January, 1920.

WILLIAM KAISLING.