No. 756,777. PATENTED APR. 5, 1904.

# A. CARLISS.

## ELECTRICAL ANNUNCIATOR.

APPLICATION FILED OCT. 5, 1901.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

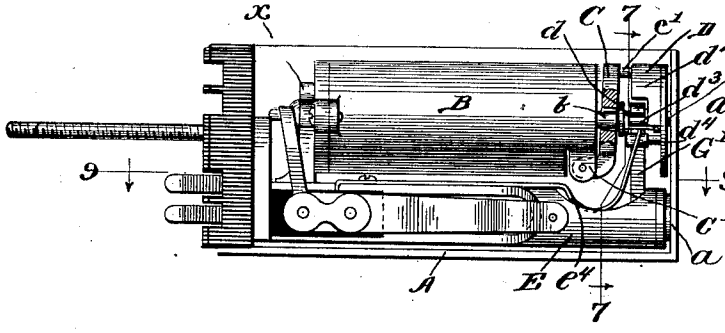



Fig. 2.

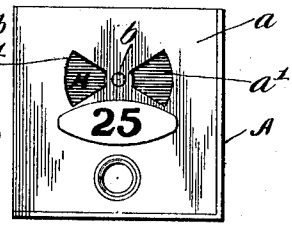



Fig. 3.

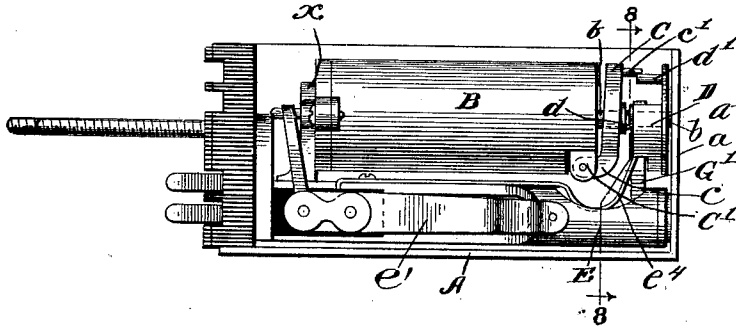



Fig. 4.

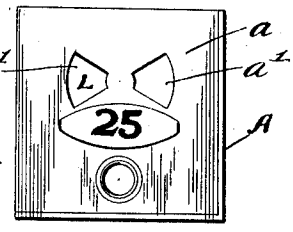
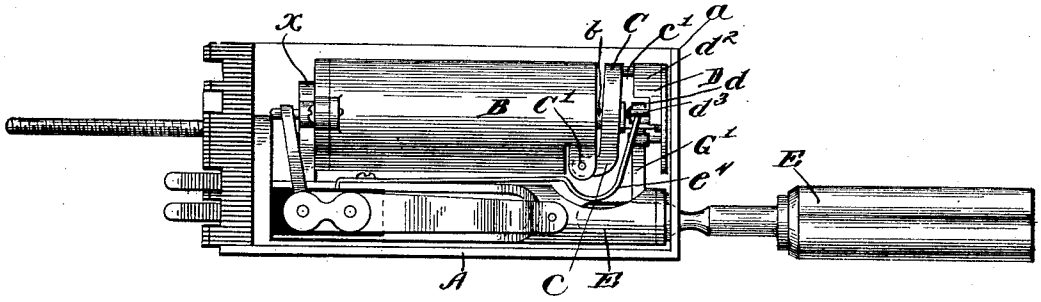



Fig. 5.




Witnesses

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No. 756,777. PATENTED APR. 5, 1904.

A. CARLISS.

ELECTRICAL ANNUNCIATOR.

APPLICATION FILED OCT. 5, 1901.

NO MODEL. 2 SHEETS—SHEET 2.

Fig. 6.

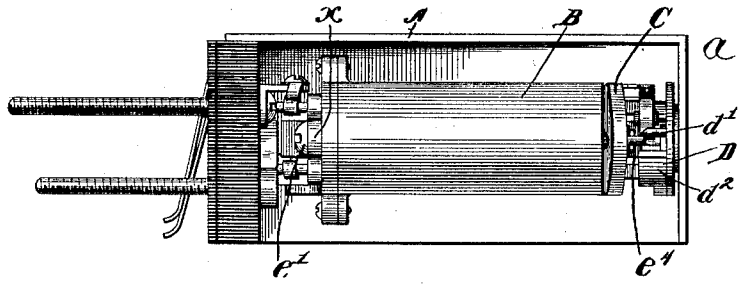



Fig. 7.

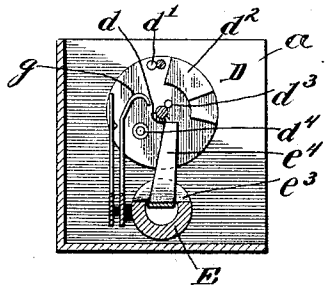



Fig. 8.

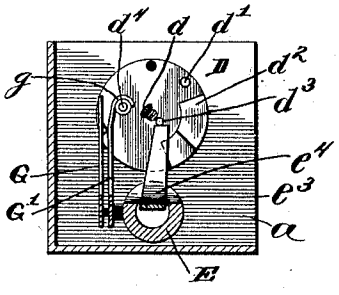



Fig. 9.

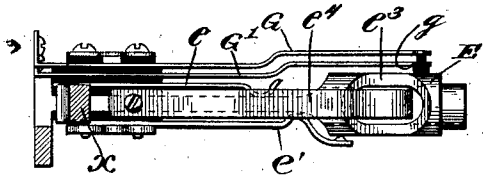
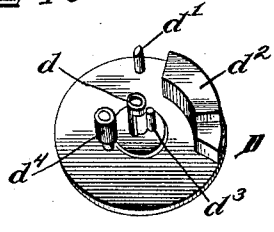



Fig. 10.




Witnesses

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No. 756,777. Patented April 5, 1904.

# UNITED STATES PATENT OFFICE.

ALBERT CARLISS, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE AMERICAN ELECTRIC TELEPHONE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF NEW JERSEY.

## ELECTRICAL ANNUNCIATOR.

SPECIFICATION forming part of Letters Patent No. 756,777, dated April 5, 1904.

Application filed October 5, 1901. Serial No. 77,648. (No model.)

*To all whom it may concern:*

Be it known that I, ALBERT CARLISS, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Electrical Annunciators, of which the following is a specification.

My invention relates to annunciators designed more particularly for use in connection with telephone-circuits. Annunciators of this character and for this purpose are commonly known as "telephone-drops."

The form of annunciator or telephone-drop to which my invention more particularly relates consists of an electromagnet having its armature adapted and arranged to release the shutter or drop, so as to signal a call, and comprising a spring-jack so constructed and arranged that the insertion of the plug will operate to restore the shutter or drop to its normal position.

The objects of my invention are to provide an annunciator of simple and efficient construction, to provide a construction in which there are no projecting parts or portions which will tend to interfere with the movements of the telephone operator, to provide a construction tending to reduce to a minimum the friction which the armature of the magnet will be compelled to overcome in releasing the drop or shutter, to provide a construction and arrangement tending to render a device of this character unusually sensitive, to reduce the extent of play or movement necessary on the part of the restoring-spring in restoring the drop or shutter to its normal position, to provide a construction and arrangement whereby a rotary drop or shutter can be effectively employed for operating the night-alarm, and to provide certain details and features of construction tending to increase the general efficiency and to render a device of this character serviceable and thoroughly reliable.

To the foregoing and other useful ends the drop or shutter of my improved annunciator is preferably in the form of a rotary plate or member arranged directly in front of the magnet-armature. The front wall of the mounting or casing for the annunciator is preferably provided with one or more openings adapted to expose the surface of the said rotary drop or shutter. This rotary drop or shutter is preferably weighted, so as to partially turn or rotate when released by the armature. With this construction and arrangement the opening or openings in the front wall of the annunciator casing or mounting are, as stated, adapted to expose the front or forward surface of the rotary drop or shutter. In this way the shutter or drop is adapted to turn and display either numbers or differently-colored surfaces, so as to signal a call. Preferably the shutter or drop is weighted in such manner that in its normal position its contact with the armature is very slight, and in this way the friction which the armature overcomes in releasing the drop or shutter is reduced to a minimum. Furthermore, the restoring-spring is arranged to engage the drop or shutter at a point quite close to the latter's axis. With this arrangement only a very slight movement is necessary on the part of the spring in rotating and restoring the drop or shutter to its normal position. It will be understood that this restoring-spring is preferably actuated by the plug when the latter is inserted in the spring-jack. With the rotary drop or shutter thus arranged back of the forward or front wall of the casing it will be readily seen that the front of the casing will be free from all parts or portions which would tend to interfere with the movements of the operator—that is to say, the front of the casing will be smooth and free from projections. As a matter of further improvement the electromagnet is preferably mounted upon and constructed so as to be rigid with the sleeve of the spring-jack. In this way the construction is improved and simplified, the sleeve of the spring-jack serving not only to perform its usual function, but also to provide a strong and rigid support for the electromagnet. Preferably the armature is pivoted to the under side or forward end of the electromagnet-casing. It is also preferable to have the shutter or drop and the magnet axially alined

and to have the front wall of the casing and the forward end of the magnet-core connected by a stud or cylindric pin, thereby not only providing a support for the forward end of the magnet, but also providing an arbor upon which the drop or shutter can rotate.

The nature and advantages of my invention, together with other novel features and matters of improvement, will, however, hereinafter more fully appear.

In the accompanying drawings, Figure 1 is a side elevation of an annunciator constructed in accordance with my invention. Fig. 2 is a front elevation of the structure shown in Fig. 1. In these two views the shutter or drop is shown in its set or normal position. Figs. 3 and 4 are views similar to Figs. 1 and 2, the shutter or drop in this case, however, being shown in its released position. Fig. 5 is a view similar to Fig. 1, showing the plug inserted in the spring-jack and illustrating the manner in which the plug raises the restoring-spring which engages and restores the drop or shutter to its normal or set position. Fig. 6 is a plan of the device or structure shown in Fig. 1. Fig. 7 is a transverse section on the line 7 7 in Fig. 1. Fig. 8 is a transverse section on line 8 8 in Fig. 3. Fig. 9 is a horizontal section on line 9 9 in Fig. 1. Fig. 10 is a perspective of the rotary drop or shutter.

As thus illustrated, my invention comprises a suitable casing or mounting A, adapted to provide a support or mounting for the various parts or members of which the annunciator and spring-jack are composed.

While for the broader purposes of my invention the annunciator herein described is applicable to various kinds of electrical apparatus, I have in the present embodiment of my invention shown and described the annunciator in connection with a telephone spring-jack. It will be readily understood, however, that the annunciator comprising the electromagnet B and the hinged armature C and the rotary shutter or drop D can be employed in various other electrical circuits wherein it may be desired to effect a visual signal.

The electromagnet B may be of any suitable or approved form, but is preferably mounted upon or supported by the sleeve E of the spring-jack. This may be accomplished by providing the rear end of the sleeve with an upwardly-projecting arm X, to which the rear end of the magnet-core can be secured by the screw $e'$. The forward end of the magnet is preferably supported or connected with the front wall $a$ of the mounting by means of a cylindric pin or stud $b$. In this way the device is self-contained, the entire construction being such that the jack, magnet, and other parts can be removed intact. The armature C is preferably and desirably pivoted or hinged to the under side of the forward end of the electromagnet-casing. For this purpose the forward end portion of the electromagnet-casing is preferably formed with ears $c'$, between which the downwardly and rearwardly projecting portion $c$ of the armature is pivoted. In order to permit free back-and-forth play or movement on the part of the armature, the center portion of the latter is preferably recessed or cut away to provide an opening through which the pin or stud $b$ extends, as shown in Figs. 1 and 2.

The rotary drop or shutter D is, it will be observed, preferably in the form of a plate or disk arranged flatwise against the inner surface of the front wall $a$. (See Fig. 10.) This drop or shutter is mounted for rotation upon the pin or stud $b$ and for this purpose is preferably provided with a sleeve or hub $d$. The wall $a$ is provided with a couple of openings $a'$, adapted to expose the surface of the drop or shutter D. The shutter thus mounted for rotation is, it will be observed, axially alined with the electromagnet B. The upper portion of the armature C is preferably provided with a pin $c'$, adapted to engage the end of the pin $d'$ on the drop or shutter D. As previously stated, the shutter is shown in its set or normal condition in Figs. 1 and 2 and also in Figs. 5, 6, and 7. In these views it will be observed the pin $c'$ engages the pin $d'$ in such manner as to prevent the weight $d^2$ on the shutter from rotating the latter about its axis. When the electromagnet is energized, the armature C draws away from the shutter, thereby disengaging the pin $c'$ from the pin $d'$, so as to release the shutter or drop and allow it to rotate into the position shown in Figs. 3 and 4. It is this rotation of the drop or shutter which effects the desired signal. For this purpose the outer surface of the shutter or drop can be provided with a number, or it can be differently colored, so as to present one appearance when the shutter is in its set or normal position and a noticeably-different appearance when the drop or shutter is in the position shown in Figs. 3 and 4. For example, the front of the wall $a$ can be blackened, and the surface of the shutter which is exposed when the latter is in its normal or set position can be likewise blackened. The balance of the shutter-surface can be white or some other contrasting shade. In this way the shutter when released will rotate and present through the openings $a'$ a surface so different in color or shade from the front of the casing or mounting as to instantly attract the attention of the telephone operator. It will be readily understood, however, that various devices or arrangements can be adopted for thus utilizing the rotation of the shutter to effect a visual signal. The weight $d^2$ of the shutter is preferably arranged at a point where it will cause as little pressure as possible of the pin $d'$ upon the pin $c'$. In this way the armature has very little friction to overcome in drawing away from the shutter. In other words, the con-

tact between the two pins $d'$ and $c'$ is so slight, owing to the fact that the weight is normally practically over the center of the disk, that there is practically no frictional resistance offered to the movement of the armature. In this way the annunciator is rendered unusually sensitive.

The spring-jack is provided with the usual tip and shunt springs $e$ and $e'$, adapted to cooperate in the usual well-known manner with the telephone-plug F. The upper portion of the jack-sleeve is cut away at $e^3$ to permit contact being made between the restoring-spring $e^4$ and the plug F. When the shutter is released, as shown in Fig. 8, for example, the upper end of said restoring-spring $e^4$ engages the shutter-pin $d^3$. In this position the shutter is in condition to be rotated or restored to its set or normal position by an upward movement on the part of the restoring-spring $e^4$. This upward movement occurs practically as soon as the operator starts to insert the plug F in the sleeve of the spring-jack. This is shown in Fig. 5, wherein it will be seen that the end of the plug has crowded or lifted the spring upward to an extent to rotate and return the shutter to the position shown in Fig. 1. At this juncture it will be seen that the movement necessary on the part of the restoring-spring to restore the shutter to its normal position is very slight. This is due to the fact that the pin $d^3$ is arranged very close to the center or axis of the shutter, so that, as stated, only a very slight movement is necessary on the part of the restoring-spring to give the shutter the requisite amount of shift to bring it back into its normal or set position. It will be readily understood that the plug F can be of any known or approved form and also that the spring-jack, as far as its contacts, &c., for establishing electrical connection in the various telephone-circuits are concerned, can be of any known or approved form. For telephone-work, however, the association of the jack with the electromagnet, armature, and shutter in the manner shown and described is a desirable and advantageous one. The jack can be secured to the rear end of the mounting in any suitable or desired manner.

The principle of my improved annunciator affords convenient and ready application of the contact-pieces for closing the night-signal, which latter is a device well known in telephone practice. In order that the release of the shutter or drop may operate a night-signal, the springs or contact-pieces for closing the night-signal circuit can be suitably arranged and secured to one side of the spring-jack and can have their upper portions arranged in position to be brought together by a pin or stud $d^4$, projecting from the back of the shutter. These night-signal springs or contact-pieces G and G' can be arranged sufficiently close together to enable them to make contact with very slight relative movement. The night-signal spring or contact-piece G' can have its upper end portion provided with a deflected or bent end portion $g$, adapted to engage the pin or stud $d^4$ on the shutter. When the shutter drops or rotates as a result of a call, the pin or stud $d^4$ moves upward and engaging the bent or deflected portion $g$ causes the night-signal spring G' to contact with the other spring G. This will be readily understood by referring to Figs. 7 and 8, wherein it will be seen that when the shutter is in its normal or set position the two night-signal springs or contact-pieces are apart, but that when the shutter is released the pin or stud $d^4$ crowds the spring G' into contact with the spring G. At this juncture it will be also seen that the hooked upper end portion of the spring G' serves as a stop for limiting the rotary movement of the shutter. This rotary movement of the shutter is also limited by reason of the pin $d^3$ coming in contact with the upper end of the restoring-spring $e^4$. In this way the rotary shutter or drop can be employed to not only perform its natural function of effecting a visual signal, but can also be employed for operating the night-signal, which, as stated, is a device well known in telephone practice and which of course can be of any suitable or approved form. Thus it will be seen that by my invention I provide a simple and efficient construction of annunciator which renders the casing or mounting front free from all objectionable projections. For this reason with my improved construction the front of the structure or supporting member of my annunciator will be smooth and free from all projections which might tend in any way to interfere with the movements of the operator.

I claim as my invention—

1. An annunciator comprising an electromagnet, a swinging armature mounted in front of the forward end of said magnet, a weighted disk pivoted immediately in front of said armature, the axis of the armature being at right angles to the axis of the said disk, the armature being adapted to release the disk when the magnet is energized, a base-plate adapted to support the said magnet-armature and disk, and a front plate mounted on said base-plate in front of said disk and provided with an opening to expose a portion of the face of said disk.

2. In a combined drop and jack, the combination of an electromagnet, a swinging armature mounted in front of the forward end of said magnet, a weighted disk pivoted in front of said armature, the armature being adapted to release the disk when the magnet is energized, a front plate mounted in front of said disk and provided with an opening to expose a portion of the face of said disk, a spring-jack provided with a restoring-spring provided with a forward upturned end adapted to rise between the armature and disk and engage a projection on the back of the latter,

and a base-plate adapted to support all of said parts.

3. An annunciator comprising an electromagnet, a swinging armature mounted in front of said magnet, a pivot-pin mounted in the core of said magnet and extending through an opening in said armature, a rotary disk mounted on said pin in front of said armature, the armature being adapted to release the disk when the magnet is energized, a base-plate supporting said parts, and a front plate mounted on said base-plate in front of said disk, said front plate being apertured to expose a portion of the face of said rotary disk.

4. An annunciator comprising an electromagnet, a pivot-pin mounted in the forward end of the core of said magnet, a swinging armature mounted in front of said magnet, a rotary disk mounted on said pin in front of said armature, the armature being adapted to release the disk and allow the latter to rotate when the magnet is energized, and a front plate arranged in front of said disk and provided with an aperture at each side of the axis or pivotal point of said disk.

5. An annunciator comprising an electromagnet, a swinging armature mounted in front of said magnet, a pivot-pin mounted in the core of said magnet and extending through an opening in said armature, a rotary disk mounted on said pin in front of said armature, the disk and magnet being axially alined, and a front plate mounted in front of said disk and provided with one or more apertures adapted to expose a portion of the face of the disk.

6. An annunciator comprising an electromagnet provided with a tubular shell, a vibratory armature mounted in front of said magnet and pivoted at its bottom to ears formed on the end of said shell, a pivot-pin mounted in the core of said magnet and extending through an opening in said armature, a weighted disk mounted for rotation upon said pin in front of said armature, the armature being adapted to release the disk when the magnet is energized, and a front plate provided with one or more apertures adapted to expose a portion of the face of said disk.

7. An annunciator comprising an electromagnet, a pivoted armature mounted in front of the forward end of said magnet, an apertured front plate, a pivot-pin connecting the core of said magnet with said front plate and extending through an opening in said armature, a rotary disk mounted on said pin between said armature and plate, and a base-plate upon which all said parts are supported.

8. An annunciator comprising an electromagnet, a pivoted armature mounted in front of the forward end of said magnet, a rotary disk mounted in front of said armature, an apertured front plate mounted in front of said disk, a pair of upwardly-projecting night-bell springs arranged between the disk and armature, a pin on the back of said disk adapted to move one of said springs into contact with the other, and a base-plate upon which all of said parts are supported.

9. In a combined drop and jack, the combination of an electromagnet, a swinging armature mounted in front of the forward end of said magnet, a weighted disk pivoted immediately in front of said armature, the axis about which said armature swings being at right angles to the axis of said disk, the armature being adapted to release the disk when the magnet is energized, a base-plate adapted to support the said magnet, armature and disk, a jack arranged below the magnet and provided with means for automatically restoring the drop when a plug is thrust into the jack, and a front plate mounted on said base-plate in front of said disk and provided with an opening to expose a portion of the face of said disk.

10. In a combined drop and jack, the combination of an electromagnet, a swinging armature mounted in front of said magnet, a pivot-pin mounted in the core of said magnet and extending through an opening in said armature, a rotary disk mounted on said pin in front of said armature, the armature being adapted to release the disk when the magnet is energized, a base-plate supporting said parts, a jack arranged below the magnet and provided with means for automatically restoring the drop when a plug is thrust into the jack, and a front plate mounted on said base-plate in front of said disk, said front plate being apertured to expose a portion of the face of said rotary disk.

11. In a combined drop and jack, the combination of an electromagnet, a pivot-pin mounted in the forward end of the core of said magnet, a swinging armature mounted in front of said magnet, a rotary disk mounted on said pin in front of said armature, the armature being adapted to release the disk and allow the latter to rotate when the magnet is energized, a jack arranged below the magnet and provided with means for automatically restoring the drop when a plug is thrust into the jack, and a front plate arranged in front of said disk and provided with an aperture at each side of the axis or pivotal point of said disk.

12. In a combined drop and jack, the combination of an electromagnet, a pivot-pin mounted in the forward end of the core of said magnet, a swinging armature mounted in front of said magnet, a rotary disk mounted on said pin in front of said armature, the armature being adapted to release the disk and allow the latter to rotate when the magnet is energized, a jack arranged below the magnet and provided with means for automatically restoring the drop when a plug is thrust into the jack, and a front plate arranged in front of said disk and provided with an aperture at each side of the axis or pivotal point of said disk.

13. In a combined drop and jack, the combination of an electromagnet, a swinging armature mounted in front of said magnet, a pivot-pin mounted in the core of said magnet and extending through an opening in said armature, a rotary disk mounted on said pin in front of said armature, the disk and magnet being axially alined, a jack arranged below the magnet and provided with means for automatically restoring the drop when a plug is thrust into the jack, and a front plate mounted in front of said disk and provided with one or more apertures adapted to expose a portion of the face of the disk.

14. In a combined drop and jack, the combination of an electromagnet provided with a tubular shell, a vibratory armature mounted in front of said magnet and pivoted at its bottom to ears formed on the end of said shell, a pivot-pin mounted in the core of said magnet and extending through an opening in said armature, a weighted disk mounted for rotation upon said pin in front of said armature, the armature being adapted to release the disk when the magnet is energized, a jack arranged below the magnet and provided with means for automatically restoring the drop when a plug is thrust into the jack, and a front plate provided with one or more apertures adapted to expose a portion of the face of said disk.

15. In a combined drop and jack, the combination of an electromagnet, a pivoted armature mounted in front of the forward end of said magnet, an apertured front plate, a pivot-pin connecting the core of said magnet with said front plate and extending through an opening in said armature, a rotary disk mounted on said pin between said armature and plate, a jack arranged below the magnet and provided with means for automatically restoring the drop when a plug is thrust into the jack, and a base-plate upon which all said parts are supported.

16. In a combined drop and jack, the combination of an electromagnet, a pivoted armature mounted in front of the forward end of said magnet, a rotary disk mounted in front of said armature, an apertured front plate mounted in front of said disk, a pair of upwardly-projecting night-bell springs arranged between the disk and armature, a pin on the back of said disk adapted to move one of said springs into contact with the other, a jack arranged below the magnet and provided with means for automatically restoring the drop when a plug is thrust into the jack, and a base-plate upon which all of said parts are supported.

Signed by me at Chicago, Cook county, Illinois, this 1st day of October, 1901.

ALBERT CARLISS.

Witnesses:
CHAS. C. BULKLEY,
HARRY P. BAUMGARTNER.