June 13, 1933. J. SERVANTON ET AL 1,913,905

CALL APPARATUS FOR AUTOMATIC TELEPHONES

Filed July 13, 1931

Fig.1

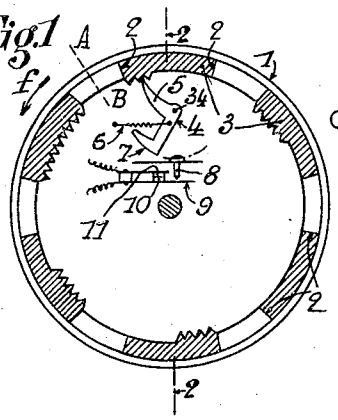


Fig.2

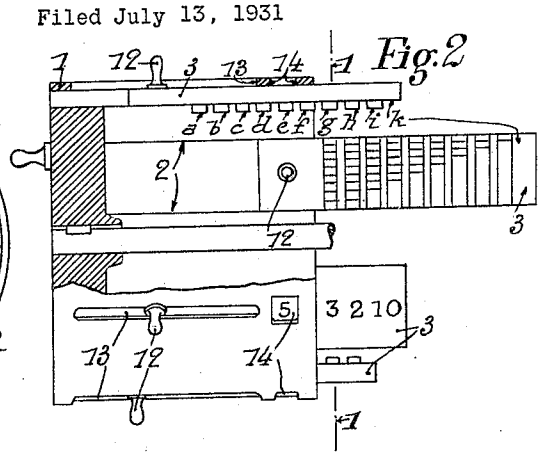


Fig.3

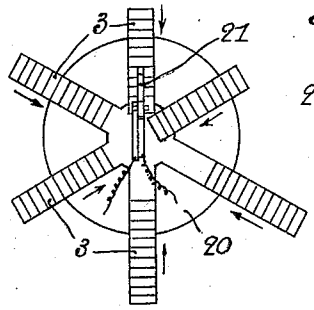


Fig.4

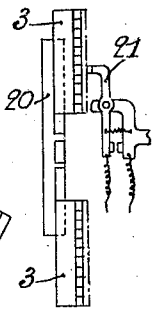


Fig.5

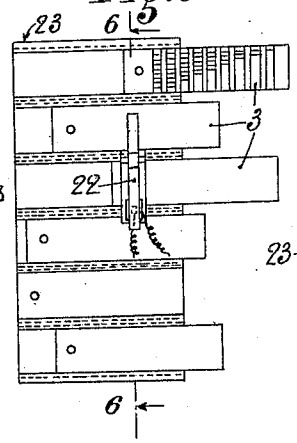


Fig.6

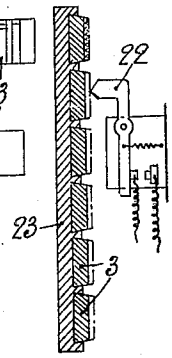


Fig.8

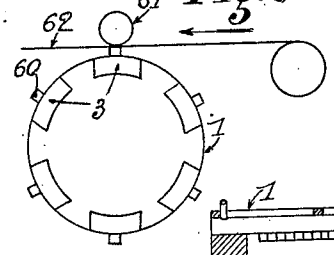


Fig.7

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UNITED STATES PATENT OFFICE

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CALL APPARATUS FOR AUTOMATIC TELEPHONES

Application filed July 13, 1931, Serial No. 550,518, and in France October 2, 1930.

The object of our invention is a call apparatus adapted to compose the call signal to be transmitted and to repeat it as many times as desired without it being necessary to compose it again.

The device according to our invention is of the type in which successive openings and closings of an electric contact are utilized for sending into the telephone line several series of impulses separated by intervals. Each series of impulses corresponds to a figure, or to a letter, the combination of said series of impulses forming the call number or word.

The device according to our invention essentially comprises a certain number of sliding bars, or similar organs (equal in number to the signs forming a call), each bar comprising a certain number of zones (for instance, ten zones corresponding to figures 0 to 9 inclusive), said zones being provided with 1, 2, 3, 4 . . . 9 teeth, projections, holes, or the like respectively, the tenth zone being smooth. An electric contact, adapted to move with respect to the bars cooperates with said projections, holes, etc., the relative displacement being such that said contact cooperates successively with selected zones of said bars respectively.

Preferred embodiments of our invention will be hereinafter described with reference to the accompanying drawing given merely by way of example and in which:

Fig. 1 is a transverse section of a numerating drum for an apparatus according to our invention, on the line 1—1 of Fig. 2;

Fig. 2 is an elevational view of the same drum, partly in section on the line 2—2 of Fig. 1, the breaking lever being supposed to be removed;

Fig. 3 is an elevational view of another embodiment of our invention;

Fig. 4 is a side view corresponding to Fig. 3;

Fig. 5 shows another embodiment of our invention;

Fig. 6 is a section on the line 6—6 of Fig. 5;

Fig. 7 is a diagrammatic view of a complete apparatus, fitted with the numerating drum shown in Figs. 1 and 2;

Fig. 8 is a diagrammatic view of the combination of said apparatus with a printing device.

In Figs. 1 and 2 the device comprises a drum 1, inside which have been provided slides 2, in which bars 3, having the form of portions of a cylinder, can slide. The number of bars corresponds to the number of signs (letters or figures) which go to form the call (6 for example). Each bar comprises ten transverse zones, *a*, *b*, *c* . . . *i*, *k*, extending in a direction parallel to the axis, each zone corresponding, for example, to figures 9, 8, 7, etc. . . . respectively. In each zone, the bar presents a line of teeth, projections, holes, or the like, corresponding in number to the figure which is represented by said zone. For example: zone *a*, corresponding to figure 9, has nine teeth; zone *b*, which corresponds to figure 8, has eight teeth, etc. The tenth zone *k*, corresponding to 0, is smooth, i. e., toothless.

Inside drum 1 is mounted on an oscillating break lever, the arm 5 of which is actuated by spring 6 and frictionally engages the internal face of drum 1 and of bars 3. The other extremity 7 of lever 4 is sector shaped. Along the path followed by said part 7, a finger 8 is mounted and cooperates with an elastic tongue 9. On the latter, a contact 10 is provided, which cooperates with a fixed contact 11. Both contacts are inserted in the circuit of the call line.

Each of the bars 3 is controlled through a button 12, which moves in a slot 13 provided in the drum. The figures, or letters, corresponding to each zone are inscribed on each bar, said figures, or letters, being visible through windows 14 of the drum.

The device operates as follows: When, as shown in the drawing, bars 3 are operated through button 12 so as to bring the figures, or letters, forming the call behind windows 14, the bars will be displaced so as to bring zones *a*, *b*, *c*, . . . etc. (comprising respectively a number of teeth corresponding to the figure that appears behind the windows) on the vertical plane 1—1 (Fig. 2), in which lever 4 operates. If drum 1, on the one hand, and lever 4 together with contact 10, 11, on the other hand, are caused to turn with re-

spect to each other, arm 5 of lever 4 will run along the inside of the drum and, each time it brushes past one of the teeth, it will switch the current off, at the same time producing a signal which, as already known, acts upon the selecting organs of the automatic central station. In the example shown, supposing arm 5 to have been placed, at the start, on the line AB (Fig. 1) and the drum to be turned in the direction of arrow *f*, the number indicated by the bars will be 350459.

It is evident that, under these conditions, it is possible to repeat the call as many times as desired without having to compose it anew (if, for instance, the line is not free at the time of the first call).

It should be well understood that our invention includes many other embodiments of our device.

For instance, as shown in Fig. 3, bars 3, instead of being disposed along the generatrices of the drum, could be placed along the radii of a disk 20, break lever 21 being being given a relative rotary motion as in the preceding embodiment.

As shown in Figs. 5 and 6, bars 3 could be disposed in the same plane, break lever 22 being then displaced, together with its contact, in parallel relation to plate 23 in which the bars slide.

In the above described embodiments of our invention, the break lever is made, preferably, of very strong material, such as fibre, for instance. The teeth of bars 3 could be replaced by small rollers to reduce the wear and tear. To the same ends, the electric contact, instead of being actuated by a break lever, could be operated by a small pinion engaging the teeth of bars 3. Whatever disposition may be adopted, the operation of the break device is independent of the wear on the teeth. However, for the sake of simplicity and economy, the contact might be established, as each tooth passes by, through an ordinary brush, each tooth being provided, for example, with a contact element of inoxidizable metal.

Fig. 7 is a diagrammatic view of a complete apparatus, provided with a numerating drum 1 of the type shown in Figs. 1 and 2. In this example, drum 1 is supported by a disk 30, secured to a shaft 31, which is itself supported by a frame 32, said disk 30 being provided with an operating handle 33. The axis 34 of break lever 4 and contacts 10, 11, are mounted on the extremity of a lever 35 which oscillates about a fixed axis 36, the oscillatory motion of said lever 35 being limited by two stops 37, 38. Lever 35 is drawn towards the lower stop 38 by a spring 39, while it is held against the upper stop 37 by a locking part 40 mounted on axis 40*b*, which engages projecting part 41 of lever 35 through the action of spring 40*a* and is moved out of its operating position upon coming in contact with stop 42 which is carried by shaft 31. A second stop 43, carried by shaft 31, cooperates with a stop 44 of lever 35 so as to limit the rotary movement of shaft 31. Said shaft 31 is provided with two pinions 45 and 46. Pinion 45 meshes with the teeth 47 of a cylinder 48 in which is fixed a spring (not shown), the other extremity of which is fastened to lever 35. Said cylinder 48 is also provided with teeth 49 meshing with a pinion 50 which is mounted on axis 51 of a speed governor 52. A ratchet wheel 53 of cylinder 48 cooperates with a pawl 54. When lever 35 is in contact with lower stop 38, teeth 47 are allowed to mesh with a pinion 55. This latter is keyed to a secondary shaft 56, to which is keyed a second pinion 57, which is constantly in mesh with pinion 46. A push button 58 serves to bring lever 35 into contact with its upper stop 37, against the action of spring 39. In the latter position, a finger 59, carried by lever 35, closes a contact 60 which is connected to the short circuit line of the telephone receivers, as already known.

This device operates as follows:

A call is made by turning drum 1 in an anticlockwise direction, thus displacing bars 3 as above disclosed. At that moment, oscillating lever 35 is resting on its lower stop 38 and pinion 45 is therefore disengaged from teeth 47 of cylinder 48. On the other hand, pinion 46 drives pinions 57 and 55 and said pinion 55 causes cylinder 48 to rotate in the opposite direction to that in which it would be driven by pinion 45. This rotary movement coincides with the tensioning of the spring contained in said cylinder 48. Pawl 54 is then brought into mesh with ratchet wheel 53 and prevents drum 1 from rotating in a backward direction.

When all the bars 3 have been brought to the desired position, the call may be transmitted by simply pressing push button 58. Lever 35 then pivots and lock 40 engages the projecting part 41 of said lever 35, thus holding the latter in contact with the upper stop 37. Break lever 4 comes into the position shown in Figs. 1 and 2, in mesh with the teeth of bars 3; on the other hand, ratchet wheel 53 is moved apart from pawl 54 and the spring causes cylinder 48 to rotate, thus rotating also shaft 31, through pinion 45, speed governor 52 regulating the rotary movement of said shaft 31.

Due to that reversing of the direction in which cylinder 48 is caused to rotate, shaft 31 always rotates in the same direction. This allows of composing the call without having to start from the last figure, or the last letter, as would have been the case had the shaft been actuated directly by the cylinder spring.

As soon as contact 10, 11 has been actuated by the last of bars 3, finger 42 releases lock 40, lever 35 drops back onto its lower stop 38 and all the organs of the device are in place,

ready for a new call. In order to repeat the call, it is sufficient to give one turn to drum 1 by means of handle 33 (i. e., until stops 43, 44 come in contact with each other), then press push button 58. Drum 1 then rotates in the same direction as before, repeating the same call signals.

Said device could be provided with a collar suitably connected to bars 3 so as to draw them back to zero through one single movement. Again, elastic stop members might be provided for holding bars 3 in the desired position.

It should be noted that, each time lever 35 is brought back to its working position, its finger 59 disconnects contact 60 from the short circuiting line of the telephone receivers.

Of course, the apparatus could be fitted with a device allowing it to be easily connected to the telephone system and thus to operate in connection with other apparatuses.

Fig. 8 is a diagrammatic view showing how a printing device may be combined with the apparatus according to our invention, so as to keep a record of each call. For instance, bars 3 could be provided with types 60 which would be used for printing upon a band of paper 62 passing under roller 61, said band being moved along by the action of the drum.

While we have disclosed what we deem to be preferred embodiments of our invention it should be well understood that we do not wish to be limited thereto as there might be changes made in the arrangement disposition and form of the parts without departing from the principle of our invention as comprehended within the scope of the appended claims.

What we claim is:

1. A call device for automatic telephone systems which comprises in combination, a movable support, a plurality of bars slidably mounted in said support, each bar being provided into a plurality of zones the surfaces of which are jagged according to a predetermined arrangement, an electric contact adapted to cooperate with said jagged surfaces, for controlling the electric circuits of the call system, means for slidably moving the bars in their support and means for moving the support with respect to said contact.

2. A call device for automatic telephone systems which comprises in combination, a rotary drum, a plurality of bars slidably mounted on the inner wall of said drum along the generatrices thereof, said bars being divided into a plurality of zones, a determined number of teeth on each zone, an electric contact adapted to cooperate with said teeth for controlling the electric circuits of the call system, means for slidably moving the bars in the drum so as to bring the desired zones in operative position with respect to the contact, and means for rotating the drum.

3. A call device for automatic telephone systems which comprises in combination, a movable support, a plurality of bars slidably mounted in said support each bar being divided into a plurality of zones, a determined number of teeth on each zone, a stationary electric contact for controlling the electric circuits of the call system, a break lever for controlling said contact adapted to cooperate with said teeth, means for slidably adjusting the bars with respect to their support so as to bring the desired zones thereof into operative position with respect to said lever, means for moving said lever into and out of contact with said teeth, and spring means for causing said support to move with respect to said lever.

4. A call device for automatic telephone systems which comprises in combination, a rotary drum, a plurality of bars slidably mounted in said support, each bar being divided into a plurality of zones, a determined number of teeth on each zone, a stationary contact for controlling the electric circuits of the call system, a break lever for controlling said contact adapted to cooperate with said teeth, means for slidably moving the bars with respect to their support so as to bring the desired zones into their operative position with respect to said lever, means for moving said lever into and out of contact with said teeth, and means for rotating the drum.

5. A call device for automatic telephone systems which comprises in combination, a movable rotary disk, a plurality of radial bars slidably mounted in said disk, each bar being divided into a plurality of zones, a determined number of teeth on each zone, a stationary electric contact for controlling the electric circuits of the call system, a break lever for controlling said contact adapted to cooperate with said teeth, means for slidably moving the bars in a radial direction with respect to said disk so as to bring the desired zones into their operative position with respect to said lever, and means for rotating said disk.

6. A call device for automatic telephone systems which comprises in combination, a movable plate, a plurality of parallel bars slidably mounted in said plate, each bar being divided into a plurality of zones, a determined number of teeth on each zone, a stationary electric contact for controlling the electric circuits of the call system, a break lever for controlling said contact adapted to cooperate with said teeth, means for slidably moving the bars with respect to said plate so as to bring the desired zones into their operative position with respect to said lever, and means for displacing said plate in its own plane.

7. A call device for automatic telephone systems which comprises in combination, a

movable support, a plurality of bars slidably mounted in said support, each bar being divided into ten zones, one of said zones being smooth, a determined number of teeth on each of the other zones, an electric contact for controlling the electric circuits of the call system, a break lever for controlling said contact adapted to cooperate with said teeth, means for slidably moving the bars with respect to their support so as to bring the desired zones into their operative position with respect to said lever.

8. A call device for automatic telephone systems comprising in combination, a rotary drum, a plurality of bars slidably mounted in said drum, each bar being divided into a plurality of zones, a determined number of teeth on each zone, a stationary electric contact for controlling the electric circuits of the call system, break lever for controlling said contact, a pivoting lever carrying said break lever and adapted to be moved into an operative position for which said break lever cooperates with said teeth, means for slidably moving the bars with respect to said drum, so as to bring the desired zones into their operative position with respect to said lever, a shaft integral with said drum, spring means for causing said shaft to rotate about its own axis, said spring means being connected to said shaft when said pivoting lever is in its operative position, a reversing gear interposed between said spring means and said shaft and adapted to be brought into its operative position by said pivoting lever when the latter is moved out of its operative position.

9. A call device according to claim 8, in which the spring means consist of a toothed spring barrel mounted on said pivoting lever, said device further comprising a pinion on said shaft, whereby the pivoting displacement of said lever may bring said toothed barrel in mesh either with said pinion or with said reversing gear.

10. A call device for automatic telephone systems according to claim 8, further comprising a spring for drawing said pivoting lever out of its operative position, locking means for maintaining said pivoting lever in its operative position and a stop on said shaft for releasing said locking means.

11. A call device for automatic telephone systems according to claim 8, further comprising a spring for drawing said pivoting lever out of its operative position, locking means for maintaining said pivoting lever in its operative position, a stop on said shaft for releasing said locking means, means for bringing back said locking means into its operative position against the action of the last mentioned spring, and a push button for operating said means.

12. A call device for automatic telephone systems according to claim 8 further comprising, a stop for limiting the rotary motion of said shaft about its own axis.

13. A call device for automatic telephone systems according to claim 8 further comprising, an electric contact for short circuiting the telephone receiver and means actuated by said pivoting lever for controlling said contact.

In testimony whereof we have signed our names to this specification.

JACQUES SERVANTON.
JEAN MARIE CONSAËL.