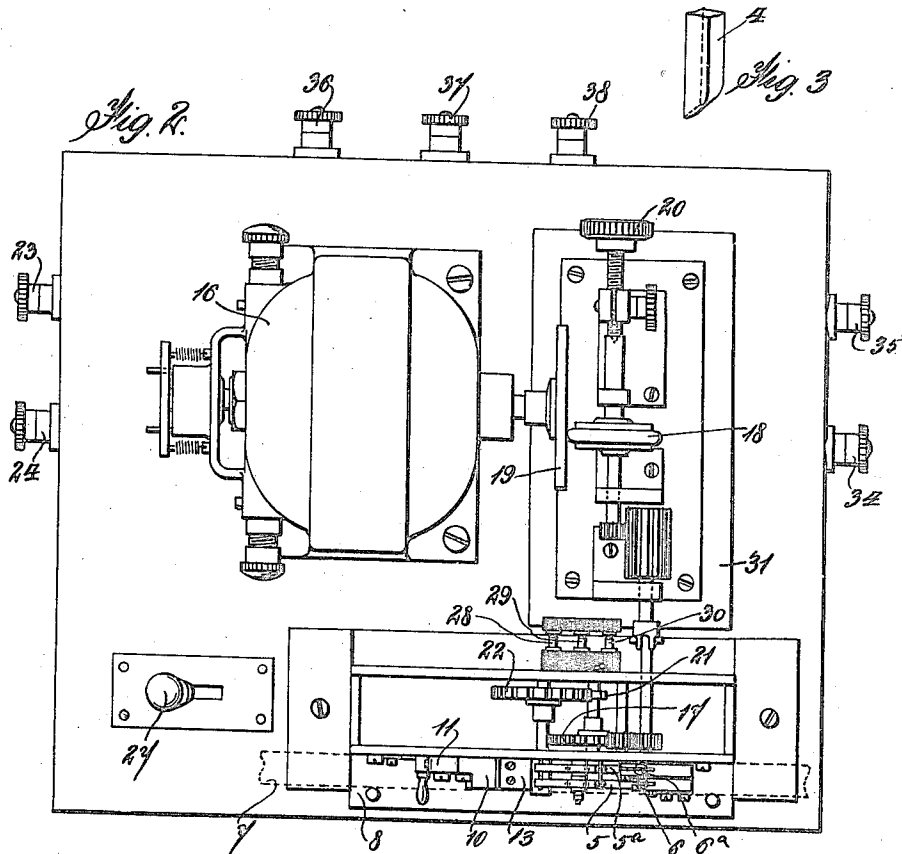
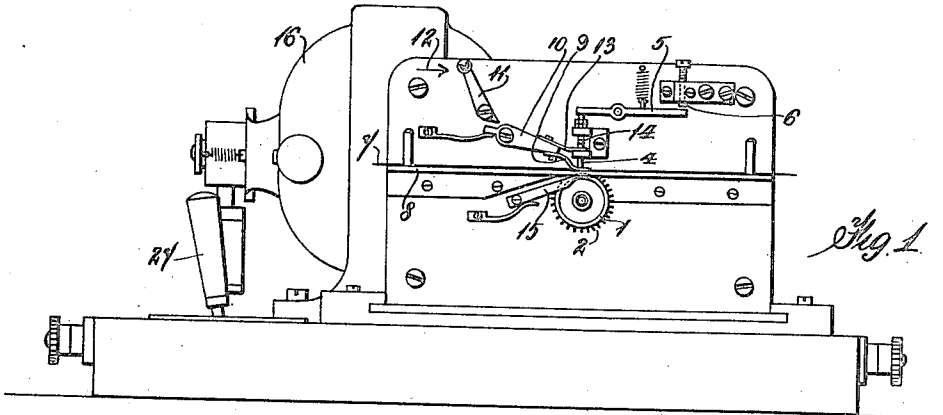


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APPLICATION FILED JUNE 7, 1915.

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Patented Jan. 15, 1918.
3 SHEETS—SHEET 1.

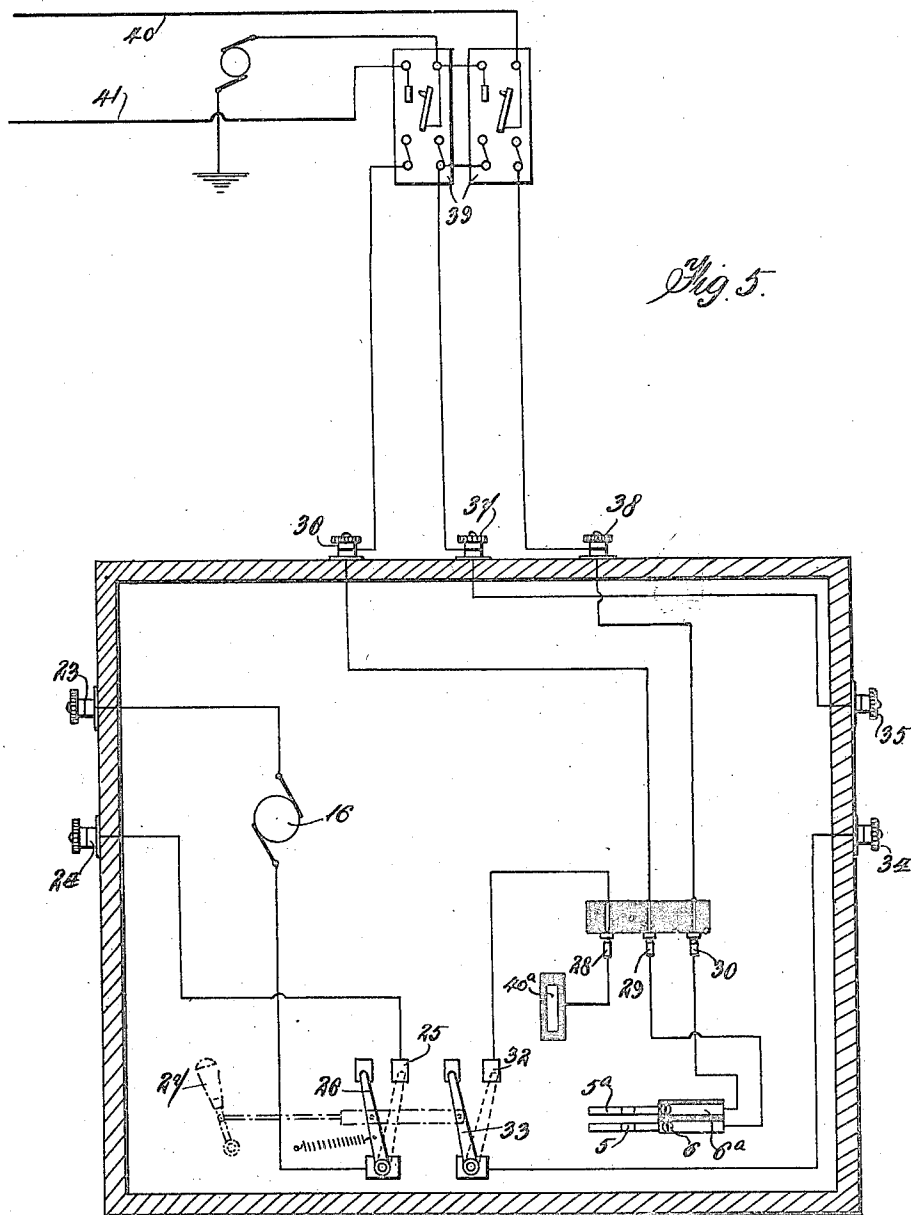


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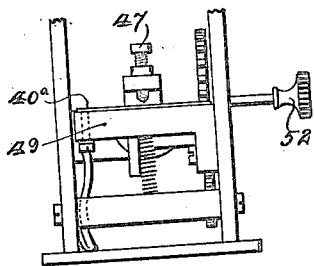


Fig. 8.

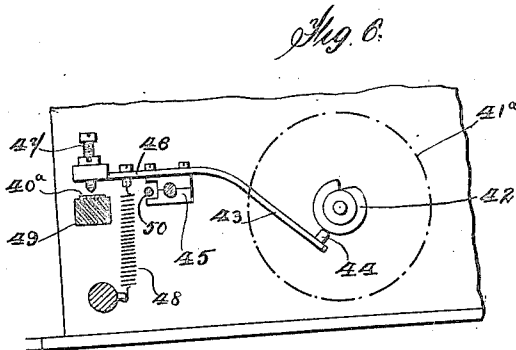


Fig. 6.



Fig. 9.



Fig. 10.

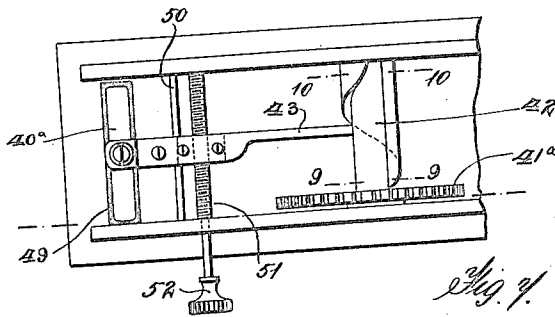


Fig. 7.

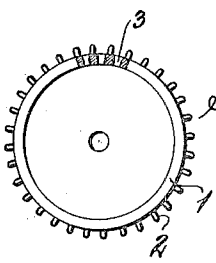


Fig. 4.

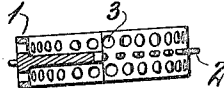


Fig. 4a.

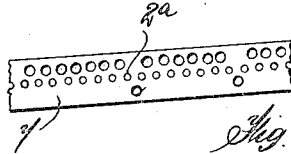


Fig. 11.

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UNITED STATES PATENT OFFICE.

HENRY KINGSFORD HARRIS, OF WESTMINSTER, LONDON, ENGLAND.

TAPE-TRANSMITTING APPARATUS FOR TRANSMITTING ELECTRICAL IMPULSES.

1,253,818.

Specification of Letters Patent.

Patented Jan. 15, 1918.

Application filed June 7, 1915. Serial No. 32,630.

To all whom it may concern:

Be it known that I, HENRY KINGSFORD HARRIS, a subject of the King of Great Britain and Ireland, residing at 96 Victoria street, Westminster, in the county of London, England, have invented certain new and useful Improvements in Tape-Transmitting Apparatus for Transmitting Electrical Impulses; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to tape transmitting apparatus by means of which electrical impulses can be transmitted in any desired sequence over one or more lines and refers more particularly to an improved constructional form of device of the foregoing description, which, while being applicable for transmitting electrical impulses generally is especially suitable for transmitting such impulses for the purpose of operating electrical devices for making public announcements, exhibiting advertisements and for other analogous purposes.

The characteristic features of the said invention will now be more fully described with reference to the accompanying drawings and ascertained by the claims.

In the drawings:—

Figure 1 shows front elevation of the device;

Figure 2 shows plan;

Fig. 3 shows a detail;

Figs. 4 and 4^a show side elevation and plan of another detail;

Fig. 5 is a diagrammatical view;

Fig. 6 shows in front elevation and part section an addition to the mechanism shown at Figs. 1 and 2.

Fig. 7 shows plan of same;

Fig. 8 shows side elevation.

Figs. 9 and 10 show section of a detail on line 9, 9, 10, 10, respectively, Fig. 7.

Fig. 11 shows a portion of a perforated tape for use in connection with this device.

The same letters of reference are employed to denote the same parts in all the views:—

Referring to Figs. 1 to 5 1 is a roller provided centrally on its periphery with projecting pins 2 so shaped and arranged as to engage with the rows of feeding perforations 2^a. The roller 1 has also upon its surface a number of rows of holes 3 coming at

such a position that they are immediately beneath pins 4, as will be seen clearly from Figs. 4 and 4^a. These pins 4 are contact making pins and may be arranged side by side to any number according to the method of perforating the tape employed.

As will be seen from Fig. 2, two pins are employed in the case under consideration. These pins are slightly pressed downward by means of a spring and their upper ends normally hold one end of a rocking device upward, so that the other end of the said rocking device is out of contact with the contact making screw 6. 7 is a perforated tape, shown in plan at Fig. 11, which is fed forward upon a face plate 8. When a perforation is brought into position beneath one of the pins 4 it drops through the same and comes into the hole in the roller 1. This action further allows the rocking piece 5 associated with the pin to make a contact with its particular contact 6, and sends an impulse to the line which is provided with a source of power. 9 is a spring normally coming upon the surface of the tape between the perforations and so arranged as to press the tape into contact with the roller 1. One end of this spring is attached to a lever 10 pivoted to the casing. 11 is a lever one end of which comes into contact with the notched end of the lever 10 and the other end of which is provided with a handle. When the handle is pulled in the direction of the arrow 12, the spring 9 which constitutes a pressing foot is raised from the surface of the tape. 13 is another spring which is capable of engaging with the pins or collars 14 upon the pins 4, and it will be seen that when the handle of the lever 11 is rocked over both the pressing foot 9 and the row of pins 4 are raised free of the tape.

In order to free the tape from the feeding pins 2 another spring controlled plate 15 is provided coming beneath the tape and when pressure of the foot 9 is taken off the spring device 15 lifts the tape clear of the pins 2.

The tape is fed forward through the machine by the electric motor 16 which drives the wheel 17 through the reducing gear shown. This reducing gear comprises a device for varying the speed of the drive which consists in a friction disk 18 which engages with the plate 19 carried by the motor spindle at any desired radius from the center thereof, so that the proportionate rotation of

these two disks can be varied. 20 is a screw head connected to the shaft of the friction disk 18 and by turning the screw head 20 the position of the disk 18 with respect to the plate 19 can be varied. The axle of the wheel 17 is provided with a pinion or cam 21, having one tooth, which tooth, once every revolution meshes with the teeth of the wheel 22, and causes this to move around through the distance of one tooth, and consequently causes the pins 2 to feed forward the tape 7 one division, as the wheel 22 is fixed upon the axle of the roller 1.

This machine as will be understood, if provided with more pins, brushes or other contact-making devices is adapted for use with tapes having any desired number of rows of perforations as well as for tapes with one or two rows of perforations, it being simply necessary to disconnect the circuits of the pins not actually being employed. A form of pin which I prefer to use is illustrated in the detail shown at Fig. 3, which shows the lower portion of the pin. It will be seen that the pin is somewhat squared in cross section, and presents a rounded contour to the advancing tape, so that the edges of the holes in the wheel which are slightly smaller than the perforations, catch behind the rounded portion and raise the pin easily without any fear of the same tearing the tape, thus enabling the same tape to be repeatedly used.

Referring to the diagram of connections shown at Fig. 5, the lower portions of which connections are preferably arranged within the base of the apparatus shown at Figs. 1 and 2, 23 and 24 are two terminals on the side of the casing. A conductor leads from the first of these terminals to one brush of the motor 16. The conductor passes from the terminal 24 to a contact 25, the other brush of the motor is connected to a pivoted conducting arm 26. 27 is an operating handle, also see Figs. 1 and 2, connected to a slide and when the handle is pushed over to the right the pivoted and spring-controlled conducting arm 26 makes contact with the contact plate 25; thus if a suitable source of power is connected to the terminals 23 and 24 when the handle 27 is pushed over the motor is started.

The casing carrying the gearing driving the roller 1 is preferably fitted on to a sliding base and provided at the back with three spring plunger contacts 28, 29 and 30.

These are insulated from the metal casing and come into forced contact with other contacts carried by the insulated base 31, see Fig. 2. The contact 30 is connected to one of the contact making devices 6, and the contact 29 to the other contact device 6^a. The contact 28 is connected to a conducting plate 22. 33 is a pivoted conducting arm also controlled from the handle 27 which is con-

nected to a terminal 34, and it should be mentioned that when the arm 27 is pushed over to bring the motor into circuit, the conducting plate 33 makes contact with the contact plate 32.

35 is another terminal, the terminals 34 and 35 being connected to a source of power which may be weak or strong according to whether the system is to be worked by relays or by direct transmission.

The back of the apparatus is provided with three other terminals 36, 37, 38 all being connected at the exterior of the apparatus with suitable relays and switches 39, and then to the lines 40 and 41, a suitable source of power being located in the circuits.

It will be seen that on the interior of the casing the terminal 36 is connected to the contact 29, the terminal 38 to the contact 30, while the terminal 37 is connected to the terminal 35.

When the arm 33 is in contact with the plate 32 and the perforated tape causes the contact making arm 5 to come into connection with the contact 6, a suitable impulse is sent to the line while when the contact piece 5^a comes into contact with the piece 6^a a suitable contact is sent to the other line.

Where no device for regulating the time of the impulse is provided the contact 28 is connected with the metallic casing of the instrument, but where such a device is furnished the contact is in connection with a portion thereof, lettered in this case 40^a, which is insulated from the metal casing.

A device for varying the duration of the time of contact and the interval between, is shown at Figs. 6 to 10. This mechanism is intended to be located at the left-hand bottom corner of the casing shown at Figs. 1 and 2. In these figures 41^a is a gear wheel intended to mesh with the gear wheel 17, and of similar size to the said gear wheel so that every time the tape moves through one tooth the wheel 41 is rotated through one revolution. The spindle of the gear wheel carries an insulated cam roller 42 of the peculiar shape shown. 43 is an arm provided with a projection 44 kept pressed against the surface of the cam roller. The arm 43 is attached to a traveling nut 45 and extended back into another arm 46 provided with a contact-making screw 47. 48 is a tension spring for keeping the arm 46 pulled normally downward. 49 is a block of insulating material carrying the conducting plate 40^a, suitably connected as previously explained to the contact 28. 49 is a bar forming a stop for limiting the rocking action of the contact arm 47.

50 is a rod for guiding the nut 45.

When the projection 44 is on the lower surface of the cam roller the contact screw

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47 makes electrical contact with the plate 40^a, while when the said projection is on the higher surface of the cam these parts are out of contact.

5 The nut 45 is mounted upon a screw 51 located between the side plates of the casing and capable of being rotated by a head 52. When the head 52 is rotated the nut 45 is caused to travel and take with it the 10 arms 43 and 46. Owing to the peculiar formation of the cam 42 it will be seen that when the arm 43 is at one end of the cam the period during which the projection 44 is on the upper surface thereof is the maximum, that is to say the time during which 15 the electrical contact is made is reduced to a minimum, while when the arm is at the other end of the cam the time during which the projection is on the upper surface is a minimum, thus giving the maximum electrical contact, and between these two extremes 20 any desired intermediate setting may be made.

Errors in punching the tape may be automatically eliminated by providing an extra 25 contact-making brush passing over an obliterating perforation, which operates a cut-out at the right time, thus preventing the faulty place in the tape spoiling the indication. 30

What I claim as my invention and desire to secure by Letters Patent of the United States of America is:—

1. In an apparatus for transmitting impulses, a rotatable member over which a 35 perforated tape is adapted to pass, means for causing an electrical contact to be made each time a perforation of the tape passes between the said means and rotatable member, gearing for intermittently operating 40 the rotatable member, and means to actuate the gearing so that it will operate at different speeds.

2. In apparatus for transmitting impulses, a rotatable member over which a 45 perforated tape is adapted to pass, means for making electrical contact each time a perforation of the tape passes between said means and rotatable member, means to drive 50 the rotatable member, and means for regulating the duration of time of contact, said means comprising a variable cam, a contact member having a portion thereof engaging the cam, a support for the contact member, 55 and means to move the support longitudinally of the cam.

3. In apparatus for transmitting impulses, a rotatable member over which a 60 perforated tape is adapted to pass, means for causing an electrical contact to be made each time a perforation of the tape passes between the said means and rotatable member, a shaft to drive the rotatable member, a gear carried by the shaft and adapted to 65 turn the shaft, a second shaft, a single

toothed element carried by the second named shaft to engage said gear and advance the gear a step upon a complete revolution of said single toothed element, a 70 second gear secured to the second named shaft to drive it, means to rotate the second named gear, means for regulating the duration of time of contact including a variable cam and a contact member engaging therewith and adapted to be adjusted with 75 relation thereto, and a gear for driving the variable cam and having substantially the same diameter as the second named gear and engaging therewith to be driven thereby. 80

4. In apparatus for transmitting impulses, a rotatable drum provided upon its periphery with recesses, a spring pressed contact member disposed near the drum, a control pin arranged adjacent to the drum 85 and engaging the contact member and having a lateral extension, a pivoted lever arranged near the drum, a pressing foot carried by the pivoted lever and adapted to contact with a perforated tape passing over 90 the drum, an elevating member carried by the pivoted lever to engage with the lateral extension of the control pin to shift the same away from the drum, and means to swing the pivoted lever upon its pivot. 95

5. In an apparatus for transmitting impulses, a drum having openings and feed pins on its periphery and over which a perforated tape passes with its feed perforations engaging the feed pins of the drum, 100 a control pin above the drum and tape and adapted to pass through the other perforations of the tape into the openings of the drum, a pivoted and spring pressed contact member engaged by the control pin and normally held against movement in one direction 105 by said control pin, and means for intermittently rotating said drum.

6. In an apparatus for transmitting electrical impulses, a rotatable member over 110 which a perforated tape passes, means for causing an electrical contact to be made each time a perforation of the tape passes between the said means and rotatable member, and gearing for intermittently operating 115 the rotatable member.

7. In an apparatus for transmitting electrical impulses, a rotatable part over which a perforated tape passes, means for causing electrical contact to be made each time a 120 perforation of the tape passes between the said means and rotatable part, and means for intermittently rotating said part, said means comprising a gear wheel on the shaft of the rotatable part and a pinion having 125 a single tooth meshing with said gear, and a motor operating the pinion.

8. In an apparatus for transmitting impulses, a rotatable member over which a perforated tape passes, means causing an 130

electrical contact to be made each time a perforation of the tape passes between the said means and the rotatable member, gearing for intermittently operating the rotatable member, and means for regulating the duration of time of contact.

9. In an apparatus for transmitting impulses, a rotatable member over which a perforated tape passes, means for making electrical contact each time a perforation of the tape passes between the said means and rotatable member, means for operating the rotatable member, and means for regulating the duration of time of contact, said means comprising a variable cam and an adjustable contact having a member engaging the cam.

10. In an apparatus for transmitting impulses, a rotatable member over which a perforated tape passes, means for making electrical contact each time a perforation of the tape passes between the said means and rotatable member, and means for regulating the duration of time of contact, said

means comprising a variable cam, a contact member having a portion engaging the cam, a nut upon which the contact member is mounted, and a screw upon which the nut is mounted.

11. In apparatus for transmitting impulses, a rotatable drum provided upon its periphery with recesses, a movable contact member disposed near the drum, a control pin arranged between the drum and contact member to normally oppose the movement of the contact member in one direction, a pressing foot arranged near the drum to contact with a perforated tape passing over the same, and means for substantially simultaneously moving the control pin and pressing foot away from the drum.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY KINGSFORD HARRIS.

Witnesses:

A. E. VIDAL,
L. SIMMONDS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."