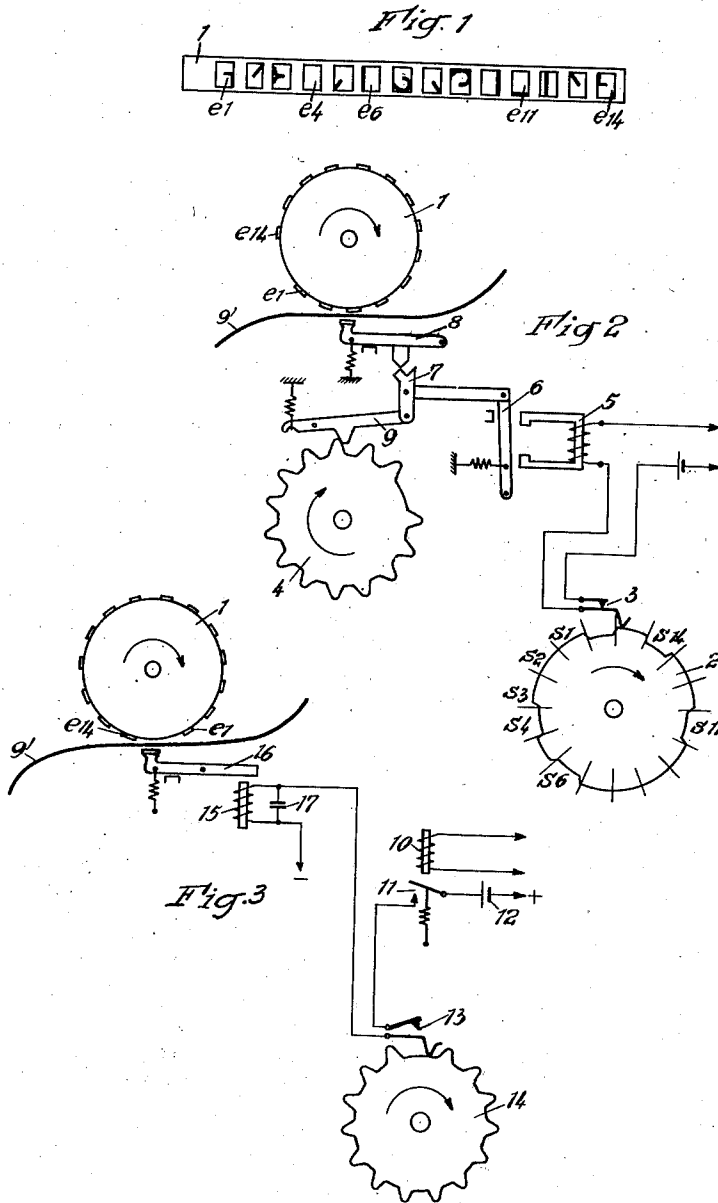


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PRINTING TELEGRAPH RECEIVER

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## PRINTING TELEGRAPH RECEIVER

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This invention relates to printing telegraph apparatus, and is particularly concerned with a printing telegraph receiver of the type termed "monogram printer", wherein the individual signs or characters are built up or formed by a plurality of sign or character elements in accordance with predetermined series of impulses.

Teletypewriters in start-stop systems operate normally with the five-current-step alphabet and print one letter or character according to a given impulse combination. Such devices are extremely costly in production but furnish a transmission speed of from seven to eight signs per second.

Other so-called "facsimile-telegraph" devices are known wherein a message is reproduced by combining electrical impulses upon a paper tape in the form of dots. Such devices are particularly adapted for wireless transmission which is especially subject to disturbances. A great number of impulses are used for each sign or character, necessitating a transmitting path capable of furnishing high transmission speed. This latter requirement cannot be met in the case of normal communication lines which are provided according to international agreements for a transmission speed of 50 Baud.

An advantage of the previously noted "monogram printers", wherein the signs or characters are built up of individual characteristic sign elements, resides in the fact that fewer impulses are required to be transmitted for each sign. They are considerably cheaper in production than normal teletypewriter machines, thereby under certain operating conditions compensating for the disadvantage of lower transmission speed.

A great drawback of known monogram printers of the general type intimated above resides in the need for providing a special receiver magnet for every sign element required for building up the signs or characters; the armature of each magnet functioning as a printer bar.

According to the instant invention, the resulting disadvantages are avoided and a considerable simplification of such devices is obtained by arranging the sign or character elements, required for the building-up or forming of the printed signs, upon the periphery of a type wheel or drum which is suitably synchronously controlled with a sender device. The sign elements which are required for the printing of a given sign or character are successively printed, upon rotation of the type wheel, on a suitable ribbon or tape within the same sign range or field thereof. The printing of the individual sign elements is caused by a

printing bar or hammer which is controlled by an intermediate actuating means from a cam wheel rotating synchronously with the type wheel, depending upon impulses corresponding to the transmitted sign or character. The intermediate actuating means or link controlling the printer bar is actuated during the reception of a sign or character by a cam wheel according to the number of individual sign elements provided upon the type wheel. It is, for example, possible to form all letters and signs or figures with only fourteen sign elements.

The intermediate actuating member which operates the printer bar or hammer is, in one embodiment of the invention, operatively governed by the armature of the receiver magnet, depending on whether it is energized or deenergized, for the purpose of selecting the individual sign elements. It is particularly advantageous to connect the receiver magnet in a resting current circuit so that the printer bar is only actuated upon the release of the armature. The contacting operating surfaces of the intermediate actuating member and the printer bar are wedge-shaped in such a manner that a selecting period of only very short duration is required for the selection of a sign element.

According to another object of the invention, the receiver operates with the sender in start-stop operation, the printing of a given sign taking place within one revolution of the type wheel. A start impulse initiates the rotation of the type wheel, whereupon the printer bar is thrust against the printer tape or ribbon, provided between the bar and the type wheel, at each sign element required for forming the sign to be printed. The cam wheel controlling the actuation of the printer bar is likewise operatively released by the start impulse and is stopped again, together with the type wheel, by a stop impulse at the conclusion of one revolution. It is possible, due to the indirect control of the printer bar, to use a receiver magnet system of relatively low magnetic strength; and it is likewise possible to operate the system with sufficient certainty and accuracy in spite of impulse distortions that may occur in the transmission lines.

The above noted objects and other objects and features will be brought out in the course of the following detailed description rendered with reference to the accompanying drawing, wherein:

Fig. 1 illustrates the development of a type wheel, showing the characteristic sign elements provided thereon;

Fig. 2 shows a diagrammatic representation of a receiver according to the present invention; and

Fig. 3 indicates another embodiment of the invention.

The type wheel 1, shown in Fig. 1 peripherally developed, carries the sign elements required for forming or building up all signs or characters. Only fourteen sign elements  $e1-e14$  are required in the present case for building up all signs, including letters and figures.

The sender arrangement for such telegraph receivers consists essentially of individual cam disks 2 for sending out the series of impulses required for the selection of the individual sign elements. The sender cam disk 2 in the case of a start-stop synchronization transmits initially, upon starting its rotation, a start impulse by opening the contact 3. The type wheel 1 and the cam wheel 4 at the receiving end are thereupon released for one revolution. The means for releasing the type wheel 1 and the cam wheel 4 are not shown in detail, in order to avoid unnecessarily encumbering the drawing. The intermediate member or link 7 is moved through the lever 9 up and down under the control of the cam wheel 4 and operatively engages the printer bar or lever 8, depending on whether or not the armature 6 of magnet 5 is in actuated position, thereby causing the printer bar to thrust the printer tape against the type wheel 1 to print that sign element on the tape which is at the corresponding moment positioned in front thereof or aligned therewith.

In the case of the resting current circuit for the receiver magnet 5 the printer bar 8 is actuated and thrust against the paper tape 9' only upon the receipt of no-current impulses. The armature 6 of the receiver magnet 5 remains actuated during spacer impulses (current steps), and the intermediate link 7 passes the lower end of the printer bar 8 upon operation of lever 9. Accordingly, no printing of a sign element will take place during spacer periods.

The cam wheel 4 is provided with cams corresponding in number to the number of sign elements on the type wheels—in the present case, fourteen cams. The individual cam disks of the sender are subdivided accordingly.

The operation may be explained in connection with this embodiment by describing the sending and receiving of the letter E. The sender cam disk 2, as noted previously, after sending the start impulse, closes the contact 3 by means of the cam portion  $s1$  to  $s3$ , thereby energizing the receiving magnet 5 and preventing actuation of the printer bar 8 by moving armature 6 and link 7 into actuated position. Cam portion  $s4$  of the cam disk 2 thereupon causes separation of contact 3, deenergizing magnet 5 and releasing armature 6. The printer bar 8 is now thrust against the type wheel 1 by the corresponding cam of wheel 4 actuating link members 9 and 7, causing the printing of the sign element  $e4$  which represents the upper horizontal line of the letter E. The sign elements  $e6$ ,  $e11$ , and  $e14$  are then successively printed on the same sign range or field of the paper tape 9' under control of cam portions  $s6$ ,  $s11$ , and  $s14$ , thereby causing the building-up or forming of the letter E during one revolution of the type wheel 1 and cam disk 2. The paper tape is then advanced by one space to the next receiving position.

In Fig. 3 is illustrated an embodiment of the invention wherein the operation is essentially

electrical. The contact 11 is operated by the receiver magnet 10 responsive to the receipt of the transmitted signs from the sender, thereby connecting the battery 12 to contact 13. Contact 13 is closed by the operation of the cam disk 14 in accordance with the number of individual sign elements. Depending on whether or not the battery 12 is connected at that time by contact 11, the printer magnet 15 will be energized and will cause the printing of a sign element by actuation of the printer bar 16. The cam disk 14 is shaped so that the contact 13 is closed only for short intervals corresponding to the middle portions of the received impulses. Connected in parallel with the printer magnet 15 is a condenser 17, in order to assure the actuation of the printer bar 16 with sufficient safety even during the short impulse duration.

It is understood that specific embodiments have been shown and described above in order to guide others in carrying out the invention in practice. Changes are possible within the scope and spirit of the appended claims wherein is defined what is considered new and desired to have protected by Letters Patent of the United States.

I claim:

1. A printing telegraph receiver wherein complete individual signs are formed of a plurality of fractional sign elements under the control of predetermined impulse series, comprising a rotatable type wheel, a plurality of characteristic sign elements disposed peripherally on said type wheel each element representing a fraction of a complete sign to be printed, a printing tape, a rotatable wheel having peripheral teeth corresponding in number to the number of fractional sign elements on said type wheel and rotatable therewith, printing means controlled by said rotatable toothed wheel, and impulse controlled means for additionally and selectively governing the actuation of said printing means during each revolution of said type wheel and said toothed wheel to print on said tape within the identical printing space thereof a plurality of said fractional sign elements to form within said space a predetermined complete sign.

2. The device defined in claim 1, wherein said printing means comprises a printer bar and an actuating member for engaging said bar to cause the selective printing operation thereof, the contacting surfaces of said printer bar and said actuating member being wedge-shaped to effect very short contacting duration for the printing of predetermined fractional sign elements.

3. In a printing telegraph system, the combination with a type wheel and printing means, of operating means which attempts to actuate said printing means to print all the characters on said wheel in succession upon a single rotation thereof, a line circuit, and means controlled over said line circuit for rendering said operating means ineffective in respect of any desired number of said characters.

4. In a printing telegraph system, a rotatable type wheel having a plurality of characters, a cam having actuating surfaces equal in number to said characters, said cam being rotatable with said wheel, printing means adapted to be controlled by said cam, a line circuit and magnet controlled thereover as each cam actuating surface comes to operative position, and means controlled by said magnet for determining in the case of each said actuating surface whether the said printing means responds or not.

5. In a printing telegraph system, a rotatable

type wheel having a plurality of different characters, a tape, a printer bar for pressing said tape against said wheel, actuating means for the printer bar operated as each character on said wheel passes the printer bar, a line circuit, and means controlled over said line circuit each time the actuating means is operated for determining if such actuation is effective to operate said printer bar.

6. In a printing telegraph system, the combination, with a type wheel and printing means, of a reciprocating member, means for operating said member as many times during each rotation of said wheel as there are characters on the wheel, means whereby said member may actuate

said printing means, a line circuit, and mechanism controlled over said line circuit for rendering said last means effective or ineffective upon each operation of said member.

7. In a printing telegraph system, a type wheel having a plurality of partial or incomplete characters thereon, said incomplete characters being adapted for use in different combinations to build up complete characters, and printing means cooperating with said wheel and controlled from a distant point for printing any desired combination of said incomplete characters during a single rotation of said wheel and thereby produce a desired complete printed character.

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