

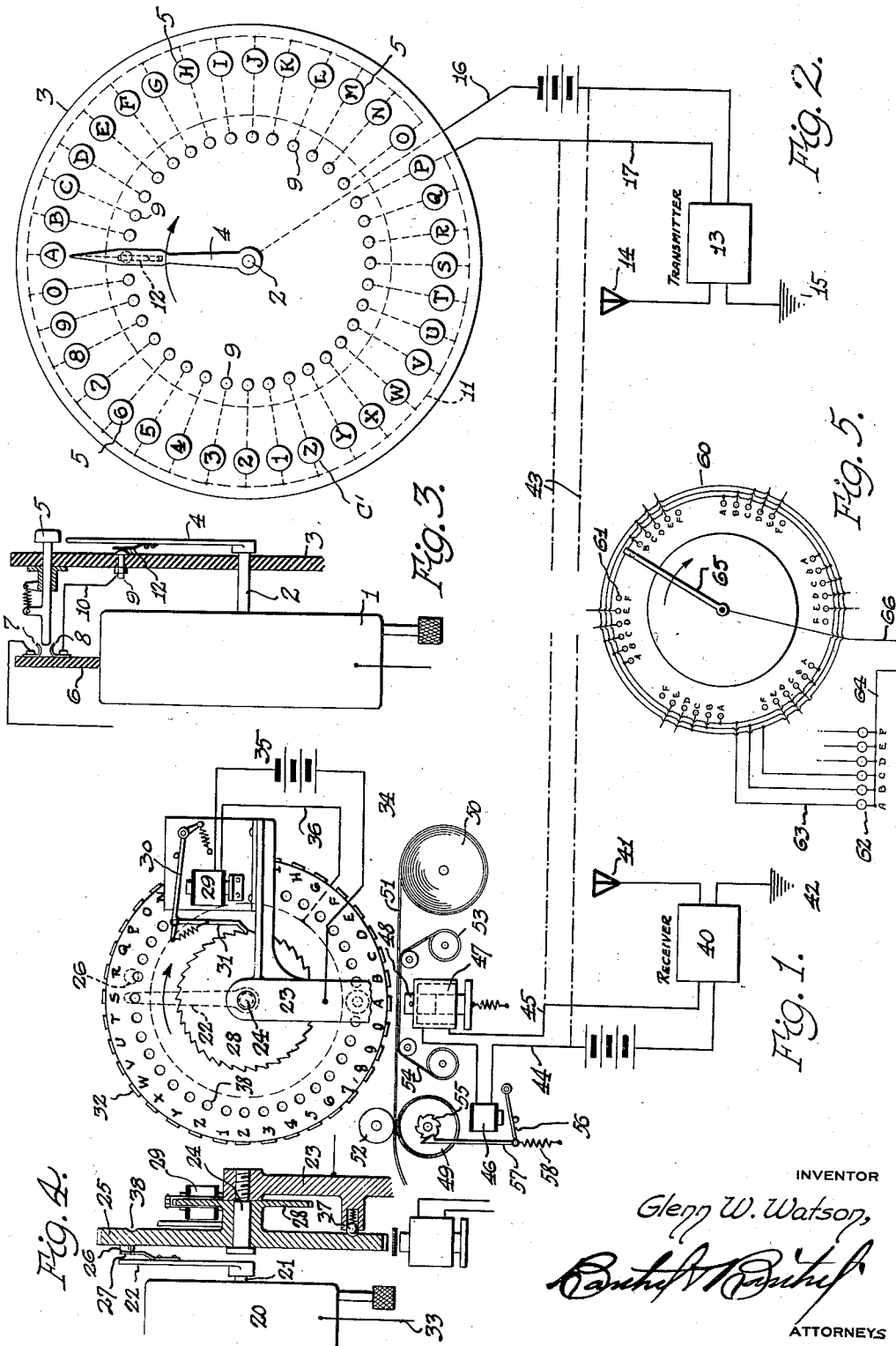
Feb. 23, 1932.

G. W. WATSON

1,847,030

SYSTEM OF COMMUNICATION

Filed Feb. 8, 1930



INVENTOR

Glenn W. Watson,

Barth A. Barth

ATTORNEYS

UNITED STATES PATENT OFFICE

GLENN W. WATSON, OF DETROIT, MICHIGAN, ASSIGNOR TO WATSONGRAPH CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE

SYSTEM OF COMMUNICATION

Application filed February 8, 1930. Serial No. 426,860.

The present invention pertains to a novel system of communication designed for the sending of messages by electrical impulses.

The principal object of the invention is to provide a system of this character which relies on the synchronization of parts of the transmitting and receiving apparatus rather than on the duration of the impulses. The present invention is entirely independent of the duration of impulses and is subject only to the operation of switches, by means of push buttons, corresponding to the characters to be transmitted.

In one embodiment of the invention, the sending apparatus consists of a pointer or arm rotating over a disk. The disk carries a series of switch elements, such as push buttons, associated with the characters necessary for transmitting intelligence. When a given character is to be sent, the push button corresponding thereto is operated when the pointer or arm is directed thereto.

At the receiving end there is provided a disk carrying impression members corresponding to those on the sending disk. These members pass a given point at the same average rate that the pointer travels, although means are provided for maintaining the disk stationary for intervals between comparatively rapid movements. A printing mechanism for cooperating with the impression members is controlled by a circuit responsive to the sending circuit, and the result is that the depression of a push button in line with the pointer causes a recording of the corresponding character by the printing mechanism.

If desired, the impression members may have a coded relation to the characters on the sending disk, in which case the recorded messages would be in code; or the impression members may maintain the above mentioned proper relation to the characters, in which case the message may be sent as well as received in code. These systems are obviously useful in time of war or otherwise for sending confidential messages.

The invention is fully disclosed by way of example in the following description and in the accompanying drawings, in which—

Figure 1 is an elevation of the receiving mechanism;

Fig. 2 is an elevation of the sending device;

Fig. 3 is a sectional view of the sending device;

Fig. 4 is a sectional view of the receiving device; and

Fig. 5 is an elevation of a modified construction.

Reference to these views will now be made by use of like characters which are employed to designate corresponding parts throughout.

The sending or transmitting apparatus comprises a driving device 1, preferably an electrical synchronized chronometer, from which extends a shaft 2. Concentric with the shaft is a panel 3 which is stationary in the illustrated construction where the shaft is vertical. A pointer 4 carried by the shaft passes over the panel or disk 3 near the forward face thereof.

The member 3 carries a series of push buttons 5 each bearing a different character, and in all carrying all the numerals and the letters of the alphabet as shown in Figure 2. Behind the disk 3 is a fixed panel 6 carrying pairs of spaced contacts 7 and 8 corresponding to and in line with the push buttons 5. Each push button when depressed closes the gap between the corresponding contacts 7 and 8.

The disk 3 also carries a series of studs or contacts 9 corresponding to the push buttons 5 and joined by conductors 10 to the corresponding switch contacts 8. The contacts 7 are connected to a common conductor 11. The back of the pointer 4 carries a spring contact 12 adapted to successively engage the contacts 9 in the rotative movement of the pointer.

Associated with the sending mechanism is a radio transmitter 13 connected to a conventional antenna 14 and grounded at 15 on the output side in the usual manner. One of the input terminals of the transmitter is joined by a conductor 16 to the pointer 4, for example through the chronometer mechanism and shaft 2 as shown in Figure 3, and the other input terminal is joined by a conductor

17 to the common conductor 11 which is connected to the studs 9.

In the operation of the device as thus far described, the transmitter circuit is closed 5 and an impulse delivered therefrom only when one of the push buttons 15 is depressed. To send an impulse which will result in the reproduction of a desired character at the receiving station, the push button representing this character is depressed manually 10 when the pointer 4 registers with it. All the transmitted impulses are alike, regardless of the push button operated and the position thereof, but the receiving apparatus is 15 co-ordinated with the sending apparatus to reproduce only the desired character when the sending apparatus is operated in the manner described.

The receiving apparatus also includes an 20 actuating member 20, preferably an electrically operated chronometer and timed exactly in its revolution with the sending chronometer having a rotatable shaft 21 with a pointer or arm 22 mounted thereon. Adjacent the member 20 is a fixed bracket 23 to 25 which is secured a stub shaft 24. On the shaft is rotatably mounted a disk 25 carrying a contact stud 26. The stud 26 is engageable by a spring contact 27 carried by the 30 arm 22. A ratchet 28 is formed integral with or secured to the disk 25, and on the bracket 23 is suitably supported a solenoid 29 for actuating the ratchet and disk under certain conditions. A lever 30 is mounted adjacent 35 the solenoid to be attracted when the latter is energized, and this lever carries a pawl 31 adapted to engage and drive the ratchet.

The chronometers 1 and 20 operate in synchronism and to this end may consist of 40 electrically or spring operated clocks controlled in any suitable manner. The disk 25 carries a series of characters corresponding to those on the push buttons 5, and on the periphery of the disk are mounted impression members 32, such as type, corresponding 45 to the characters. There is only one operative position for all the members 32 and the characters on the disk 25 are arranged somewhat differently than those on the disk 3 50 for this reason and also because in one case the disk is stationary and in the other case rotatable, although the relative position of the characters on each disk is the same. A circuit through the solenoid 29 is made whenever the stud 26 is engaged by the contact 27. 55 This circuit comprises a conductor 33 connected to the chronometer 20 and passes through the shaft 21 and pointer 22 to the contacts 27 and 26, through the disk 25 to the bracket 23, thence through a conductor 60 34 and battery 35 to one of the terminals of the solenoid, and finally from the other terminal of the solenoid through a conductor 36 which returns to the member 20 or the 65 conductor 33.

When the contact 27 engages the contact 26, the solenoid circuit is closed, whereupon the lever 30 is attracted and the pawl 31 turns the ratchet 28 and disk 25. This mechanism is so dimensioned that each stroke of 70 the pawl 31 advances the disk to the extent of the distance between adjacent characters. After different advances, the pointer 22 continues its uniform rotation, and when it again engages the contact 27, another movement of the ratchet and disk 25 is effected. 75 The average velocity of the disk is equal to that of the arm 22, but is intermittent rather than uniform. The bracket 23 carries a spring detent 37 adapted to engage in impressions 38 in the face of the disk and corresponding with the characters thereon. The detent holds the disk stationary between 80 movements and prevents it from overriding on any movement.

Associated with the disk 25 is a receiving apparatus 40 having an antenna 41 and grounded at 42 in the usual manner and tuned to receive impulses sent out from the aerial 14. This mode of communication between 90 stations may be replaced by telegraph wires 43 extending from the conductors 16 and 17 into another circuit at the receiving end. This circuit includes conductors 44 and 45 extending from the output terminals of the receiver 40 or from the wires 43, as the case may be. One of the conductors has an electro-magnet 46 in series therewith, and both 95 conductors are connected to the terminals of a solenoid 47 which has a plunger 48 adapted to be expelled when the solenoid is energized. The solenoid is directly beneath the position occupied by the lowermost type member 32.

At opposite sides of the solenoid 47 are a 105 roll 49 and a roll 50 of paper ribbon 51. The ribbon passes between the plunger 48 and the lowermost type member and is adapted to be delivered by the roller 49 and a superposed roller 52. Adjacent the electro-magnet 46 are rollers 53 which carry an inking ribbon 54, a portion of which is in engagement with the lower side of the ribbon 51 110 directly over the plunger 48. The shaft of the roller 49 carries a ratchet 55 rotatable with the roller 49. Beneath the electro-magnet 46 is pivoted an armature 56 which has one end articulated to a pawl 57 adapted to propel the ratchet 55 and roller 49. 115

The sending of impulses from the disk 3 120 has already been described, and it will be recalled that the impulse for sending a given character is transmitted when the pointer 4 is directed to the push button 5 bearing that character. At this moment the type member 32 bearing the same character is directly opposite the plunger 48, due to the synchronized condition of the arms 4 and 22. The reception of the impulse by the receiver 40 125 energizes the circuit comprised in the con-

ductors 44 and 45. The armature 56 is attracted by the magnet 46, but the pawl 57 rides idly over the ratchet 55 and has no effect on the roller 49 or ribbon 51. At the same time, the plunger 48 is ejected towards the opposite type member, whereupon the impression of that member is made on the ribbon 51. The striking end of the plunger 48 is of greater area than the character inscribed on any of the members 32, so that there is an overlapping of the plunger end with respect to the character. The result of this arrangement is the production of an impression on the ribbon 51 even though there be a slight imperfection in the synchronization. The energization of the circuit is only momentary, and when it is broken, a spring 58 pulls on the pawl 57, thereby turning the roller 49 and bringing a fresh area of ribbon in position over the plunger 48.

Figures 1 and 2 show the character A in position to be transmitted from the sending station and to be printed at the receiving station. Obviously, both stations should be brought into register with each other before sending, and this setting may be made by manual manipulation of the members 4 and 22 or of the chronometers 1 and 20.

It will be apparent that the reproduction of a signal on the ribbon 51 is independent of the duration of closing the sending circuit between any pair of contacts 7 and 8, or in fact all such intervals may be of equal duration insofar as can be estimated by the operator, so that the characteristics and difficulties of the conventional dot and dash systems are entirely absent in this device. The operation of the present device depends only on the fact that the characters on the disks 3 and 25 occupy like positions with relation to the arm 4 and plunger 48 respectively at all times, due to the synchronization of the actuating devices. The latter are timed in such a manner that the arm 4 will make a complete revolution in a few seconds, so that the operator will not be required to wait an unreasonable period between impulses. Only a few characters may be depressed at a time with the fingers and in their order on the disk, as depression must take place before contact is made with arm 4. More than one character may be depressed at a time and each must be released as soon as the arm 4 passes, having formed its contact and sent out an impulse.

In order to reduce the time interval between impulses without involving too great an angular velocity of the rotary arm, I have provided a different form of disk shown in Figure 5, in which the disk carries several groups of characters, each group containing the entire set. To avoid complication, only a few characters of each group are illustrated. In lieu of the common conductor 11 in Figure 3, there is provided a series of conductors 60 equal in number to the characters in a group.

The disk carries studs 61, similar to the contact studs 9, for all the characters in each group. All studs corresponding to like characters throughout the several groups are connected exclusively to a given conductor 60, so that each conductor represents a given character regardless of the group in which it is contained.

A bank of push button switches 62 is used for the sending of impulses, and these switches may be of the character already described in connection with Figure 3. Conductors 63 connect one terminal of each switch separately to the corresponding conductors 60, and the remaining switch terminals are joined into a common conductor 64 corresponding to the conductor 17 in Figure 2. An arm 65 is caused to turn over the disk and has a conductor 66 extending therefrom and corresponding to the conductor 16 in Figure 2. By the use of this apparatus, as many impulses per rotation of the arm 65 may be sent as there are groups on the disk, so that greater speed is possible without turning the arm at an excessive rate.

The invention is especially useful for sending messages through space without the use of any particular code, either within a building such as a bank, or over long distances as in sending weather reports or messages to airplanes, balloons, submarines, war vessels, police cruising cars, sheriff offices, camps in war time, and in transoceanic communication. The receiving of the message does not require an operator inasmuch as the message is automatically recorded.

For sending secret messages as in time of war or for commercial and diplomatic purposes, an arbitrary arrangement of the impression members may be made, but the relation of these members to those on the sending disk should be known to the person reading the message. In such case the message may be sent as usual but will appear meaningless if received by listeners-in. Approximately 125,000 different combinations may be made from the group of characters on the sending and receiving disks, it being only necessary for secrecy that sender and receiver have similar disks. Further secrecy may also be attained by special adjustment of the speed of sending and receiving chronometers. This eliminates the need of code unless desired. Another method is to maintain the relation between the impression members and the sending characters and to send the message in code, as a result of which it will be received in the same condition.

Although specific embodiments of the invention have been illustrated and described, it will be understood that various alterations in the details of construction may be made without departing from the scope of the invention, as indicated by the appended claims.

What I claim is:—

1. A system of communication comprising a sending disk, a series of operating members carried thereby, a series of contacts and characters associated with said members, a common contact adapted for selective engagement with the first named contacts and movable relatively to said disk, a radio transmission circuit having one side connected to said first named contacts and the other side to said common contact, said operating members being adapted to close said circuit on engagement of said common contact with each of the first named contacts and operation of the corresponding operating member, and receiving means for registering impressions of characters corresponding to said operating members on actuation of the latter, and synchronous propelling means for actuating the movable parts of said sending and receiving devices and having an energy source independent of said circuit.

2. A system of communication comprising a sending disk, a series of operating members carried thereby, a series of contacts and characters associated with said members, a common contact adapted for selective engagement with the first named contacts and movable relatively to said disk, a radio transmission circuit having one side connected to said first named contacts and the other side to said common contact, said operating members being adapted to close said circuit on engagement of said common contact with each of the first named contacts and operation of the corresponding operating member, a receiving disk having characters thereon corresponding to the characters on said sending disk, and means for bringing said characters into reading position on actuation of the corresponding operating members, and synchronous propelling means for actuating the movable parts of said sending and receiving devices and having an energy source independent of said circuit.

3. A system of communication comprising a sending disk, a series of operating members carried thereby, a series of contacts and characters associated with said members, a common contact adapted for selective engagement with the first named contacts and movable relatively to said disk, a radio transmission circuit having one side connected to said first named contacts and the other side to said common contact, said operating members being adapted to close said circuit on engagement of said common contact with each of the first named contacts and operation of the corresponding operating member, a receiving disk, impression members carried by said receiving disk and corresponding to the characters on said sending disk, a receiving circuit adapted to respond to said sending circuit, impression means operable by said receiving circuit and adapted to cooper-

ate with said impression members, and means for bringing said impression members into operative position in synchronism with the engagement of said common contact with the first named contacts, said means having an energy source independent of said circuit.

4. A system of communication comprising a sending disk, a series of operating members carried thereby, a series of contacts and characters associated with said members, a common contact adapted for selective engagement with the first named contacts and movable relatively to said disk, a radio transmission circuit having one side connected to said first named contacts and the other side to said common contact, said operating members being adapted to close said circuit on engagement of said common contact with each of the first named contacts and operation of the corresponding operating member, a receiving disk, impression members carried by said receiving disk and corresponding to the characters on said sending disk, a receiving circuit adapted to respond to said sending circuit, impression means operable by said receiving circuit and adapted to cooperate with said impression members, and synchronized means for bringing said impression members into operative position with relation to said impression means and for establishing relative movement between said common contact and series of contacts, said means having an energy source independent of said circuit.

5. A system of communication comprising a sending disk, a series of operating members carried thereby, a series of contacts and characters associated with said members, a common contact adapted for selective engagement with the first named contacts and movable relatively to said disk, a radio transmission circuit having one side connected to said first named contacts and the other side to said common contact, said operating members being adapted to close said circuit on engagement of said common contact with each of the first named contacts and operation of the corresponding operating member, a receiving disk, impression members carried by said receiving disk and corresponding to the characters on said sending disk, a receiving circuit adapted to respond to said sending circuit, impression means operable by said receiving circuit and adapted to cooperate with said impression members, a single contact carried by said receiving disk, a movable contact adapted to engage said single contact, a relay mechanism operable by engagement between said last named contacts to advance said receiving disk the distance between the successive impression members and to advance the single contact from the movable contact, and means for moving said movable contact in synchronism with the engagement of said common contact with said series of

contacts, said means having an energy and source independent of said circuit.

6. A system of communication comprising a sending disk, a series of operating members carried thereby, a series of contacts and characters associated with said members, a common contact movable over and engageable with said series of contacts, a radio transmission circuit having one side connected to said first named contacts and the other side to said common contact, said operating members being adapted to close said circuit on engagement of said common contact with each of the first named contacts and operation of the corresponding operating member, a receiving disk, impression members carried by said receiving disk and corresponding to the characters on said sending disk, a receiving circuit adapted to respond to said sending circuit, impression means operable by said receiving circuit and adapted to cooperate with said impression members, and means for bringing said impression members into operative position in synchronism with the engagement of said common contact with the first named contacts, said last named means having an energy source independent of said circuit.

7. A system of communication comprising a sending disk, a series of operating members carried thereby, a series of contacts and characters associated with said members, a common contact movable over and engageable with said series of contacts, a radio transmission circuit having one side connected to said first named contacts and the other side to said common contact, said operating members being adapted to close said circuit on engagement of said common contact with each of the first named contacts and operation of the corresponding operating member, a receiving disk, impression members carried by said receiving disk and corresponding to the characters on said sending disk, a receiving circuit adapted to respond to said sending circuit, impression means operable by said receiving circuit and adapted to cooperate with said impression members, and synchronized means for bringing said impression members into operative position with relation to said impression means and for moving said common contact over said series of contacts, said synchronized means having an energy source independent of said circuit.

8. A system of communication comprising a sending disk, a series of operating members carried thereby, a series of contacts and characters associated with said members, a common contact movable over and engageable with said series of contacts, a radio transmission circuit having one side connected to said first named contacts and the other side to said common contact, said operating members being adapted to close said circuit on engagement of said common contact with each of the first named contacts and operation of the

corresponding operating member, a receiving disk, impression members carried by said receiving disk and corresponding to the characters on said sending disk, a receiving circuit adapted to respond to said sending circuit, impression means operable by said receiving circuit and adapted to cooperate with said impression members, a single contact carried by said receiving disk, a movable contact adapted to engage said single contact, a relay mechanism operable by engagement between said last named contacts to advance said receiving disk the distance between the successive impression members and to advance the single contact from the movable contact, and means for moving said movable contact and common contact in synchronism with the engagement of said common contact with said series of contacts, said last named means having an energy source independent of said circuit.

In testimony whereof I affix my signature.
GLENN W. WATSON.