

Nov. 17, 1931.

M. A. NOSS

1,832,237

RADIO TELEGRAPH SYSTEM

Filed June 7, 1928

3 Sheets-Sheet 1

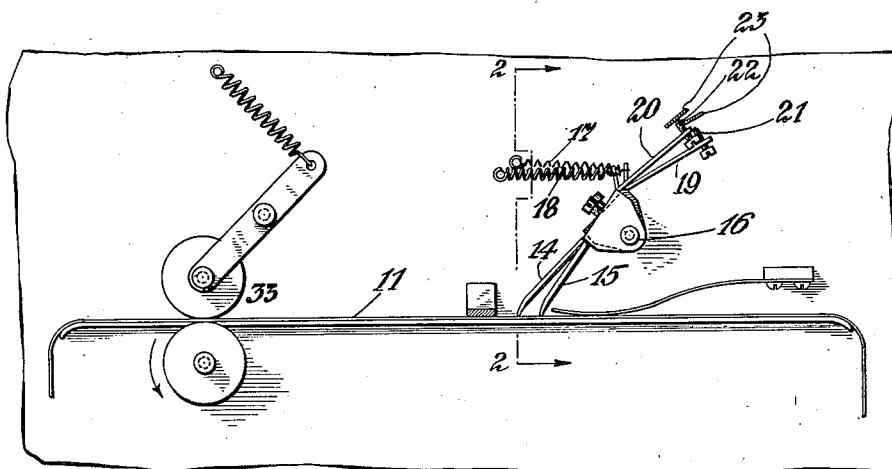


Fig. 1

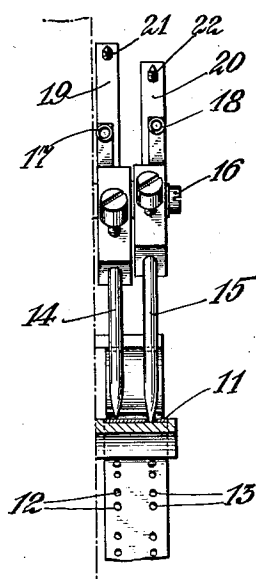


Fig. 2

INVENTOR

MARSENA A. NOSS

BY

BY
Massey, Fenwick & Lawrence
ATTORNEYS

ATTORNEYS

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M. A. NOSS

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3 Sheets-Sheet 2

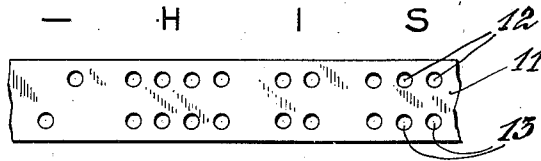


Fig. 3

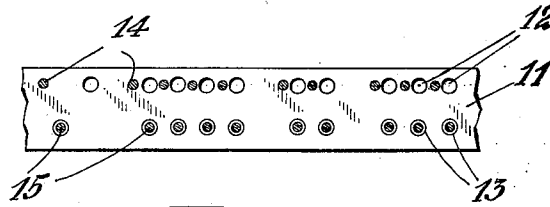


Fig. 4

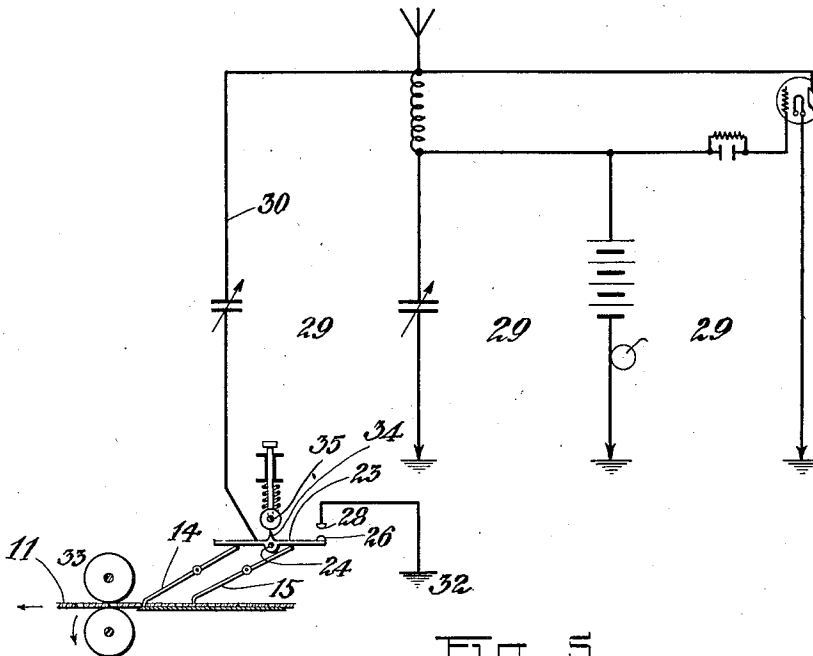


Fig. 5

INVENTOR
MARSENA A. NOSS
BY
Mason, Fenwick & Lawrence
ATTORNEYS

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M. A. NOSS

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3 Sheets-Sheet 3

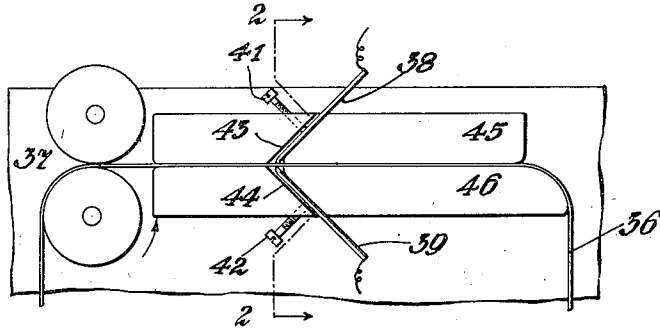


Fig. 6

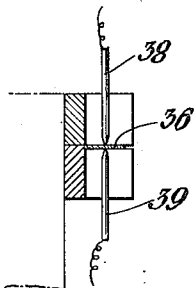


Fig. 7

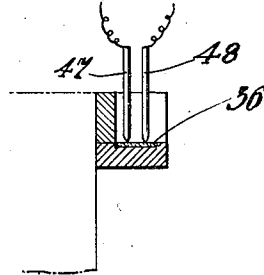


Fig. 9

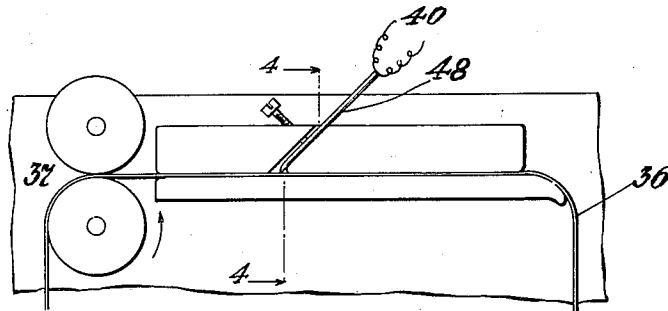


Fig. 8

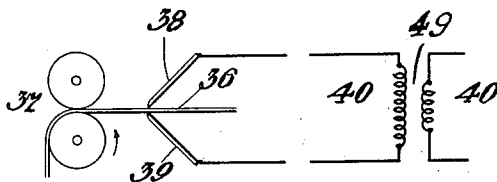


Fig. 10

INVENTOR
MARSENA A. NOSS

BY

Massou, Fenwick & Lawrence
ATTORNEYS

UNITED STATES PATENT OFFICE

MARSENA A. NOSS, OF NEW YORK, N. Y.

RADIO TELEGRAPH SYSTEM

Application filed June 7, 1928. Serial No. 283,592.

This application is a continuation in part of prior applications, Serial No. 531,547, filed January 15th, 1922; and Serial No. 130,319, filed November 19th, 1926.

5 My invention relates to means for transmitting and recording radio signals particularly, although some of the means may be used also for transmitting and recording signals by wire.

10 My improved radio transmitting apparatus in its present preferred total embodiment, comprises a rapidly moving tape perforated in two parallel rows, a pair of movable transmitting fingers arranged to engage the res-
15 pective rows of perforations and be actuated thereby in alternation, a movable electric switch lever to be vibrated oppositely by said tape-actuated fingers, a fixed switch contact which is alternately opened and closed by
20 the switch lever, novel detent means to restrain momentarily the switch lever in its open and closed positions, and a radio transmitting apparatus in circuit with and preferably modulated by the vibrating switch
25 lever so that a rapid succession of radio impulses is transmitted, grouped, and spaced according to the perforations in the tape, which is preferably perforated in accord with the Morse code.

30 My improved apparatus for recording such radio signals comprises in its present preferred embodiment a rapidly moving, recording tape sensitized by chemical treatment so as to be darkened and discolored by the pas-
35 sage of electricity thereto from a conducting pen in contact therewith, such a pen and a radio-receiving apparatus in circuit with the pen so that as the radio impulses, in the Morse code for example, are trans-
40 mitted from the apparatus described, and the sensitized recording tape is rapidly moved in harmony with the transmitting tape, the electric impulses passing to the tape from the recording pen will darken or discolor the
45 tape and form thereon a succession of dots and dashes corresponding to the novel signals transmitted.

In order that my invention in all its various features may be fully understood, I shall first
50 describe in detail the mode in which I at

present prefer to carry the invention into practice, and then particularly point out the various features of the invention in the claims.

Reference is to be had to the accompanying 55 drawings forming part of this application for patent in which like parts are designated by the same numbers in all the figures.

Figure 1 is a side elevation of a radio transmitting apparatus arranged in accord 60 with my invention.

Figure 2 is a cross sectional view of the same on the line 2—2, Figure 1.

Figure 3 represents a portion of the sig- 65 nal transmitting tape.

Figure 4 shows the said portion of tape with the tips of the transmitting fingers thereon and therein.

Figure 5 is a diagrammatic view of the transmitting circuit. 70

Figure 6 is a side view of a radio signal recording apparatus arranged in accord with my invention.

Figure 7 is a cross sectional view of the same on the line 7—7, Figure 6. 75

Figure 8 is a side elevation of a modified form of my recording apparatus.

Figure 9 is a cross sectional view of the same on the line 9—9, Figure 8.

Figure 10 is a diagrammatic view of the form of recording apparatus in Figures 6 80 and 7.

Referring first to Figures 1, 2, 3, 4, and 5, number 11 designates the movable perforated recording tape, which is perforated, by the 85 usual means, with two longitudinal rows 12 and 13 of perforations, to be engaged respectively by a pair of transmitting fingers 14 and 15, which are pivoted at 16 and the tips of which are pressed continuously 90 against the tape by springs 17 and 18. The tip of the spring depressed finger 15, as here shown, enters the perforations 13, in succession, as the tip of the finger 14 is sustained 95 by the blank spaces between the perforations 12, and vice versa. The fingers 14 and 15 have upper arms 19 and 20 respectively, carrying adjustable bearings 21 and 22 respectively, which alternately engage the opposite arms of a switch contact lever 23 pivoted at 24 as 100

best indicated diagrammatically in Figure 5. One arm of the switch lever 23, carries an electric contact 26 which engages an electric contact 28 fixed in the radio transmitting circuit 29.

In this example of my invention, the movable lever contact 26 is connected to a current modulating circuit 30, connected to the radio transmitting circuit 29, and the fixed contact 28 is grounded at 32.

The arrangement, adjustment, and electric connections are such that as the perforated tape 11 is rapidly moved by the feeding mechanism 33, shown in Figure 1, the fingers 14 and 15 will be alternately raised and depressed by and according to the grouping and spacing of the two rows of perforations on the tape, the switch formed by the contacts 26 and 28 will be opened and closed, the radio-modulating circuit broken and closed and radio impulses thus transmitted of a grouping and spacing corresponding to the grouping and spacing of the tape perforations, which are produced in the usual way to accord with the code message to be transmitted.

To restrain the switch lever 23 in its open and closed positions, I employ, instead of the usual polarized relay, detent means shown diagrammatically in Figure 5, consisting in this example, of a tooth 34 fixed to the switch lever 23, and engaging a spring-pressed disk-bearing 35 mounted to turn on its axis, so that as the switch lever is swung, for example, to open the contacts 26 and 28, the tooth 34 will swing against the pressure on the bearing 35, past the line of its axis and be held in that position to keep the radio modulating circuit momentarily open until the switch lever is swung to close said contacts, when the tooth 34 will in like manner pass and be restrained on the opposite side of the center line, to keep the radio-modulating circuit closed.

To record the radio impulses thus transmitted I now prefer to employ the recording apparatus shown in Figures 6, 7, 8, 9, and 10.

The specific recording apparatus shown in Figures 6 and 7, consists of a recording tape 36, sensitized by a chemical, such as cyanide of potassium, so as to become darkened or discolored by the passage of electricity thereto from a conducting pen in contact therewith; a mechanism 37 for moving the tape rapidly in harmony with the perforated transmitting tape 11; one or more pens 38 and 39 whose points are held adjustably in contact with the moving sensitized tape, and a radio receiving circuit 40, indicated in Figure 10, electrically connected to the pens 38 and 39.

In Figures 6 and 7, the pens 38 and 39 are held and adjusted by means of set screws 41

and 42, in pen channels 43, 44, preferably inclined in the upper and lower tape guides 45 and 46, so that the points of the pens will meet on opposite sides of the tape and as the radio impulses of a grouping and spacing corresponding to the message transmitted are received on the radio receiving circuit 40, they will pass through both pens and the intervening tape, and there will be produced on opposite sides of the moving tape a series of black or darkened dots and dashes corresponding to the message transmitted, which can thus be easily read. Owing to the high frequency of the electric oscillators or alternations, each close group of impulses will produce a continuous dot or dash, so that by properly grouping and spacing the perforations on the transmitting tape dashes and dots making the proper message will be recorded.

In the form of recording apparatus shown in Figures 8 and 9, the two pens 47 and 48 are arranged abreast of each other on the upper side of the tape, so that a double line of dots and dashes conveying the message will be produced, one of which will serve as a check upon the other in case of any imperfections in either line.

I find that although in this latter example of my apparatus, the impulses do not pass vertically through the sensitized tape, but across the same, correct and distinct signals are recorded, as in the first example, only in the line of motion.

In order to produce a distinct record on the tape, I prefer to raise the amperage of the radio reception signals by interposing a step-down transformer 49 between the radio circuit and the electric pens.

It is evident that many changes may be made in the specific forms of transmitting and recording apparatus here shown, and that any suitable forms of radio transmission and receiving circuits may be used in connection therewith without departing from the boundaries of my invention as defined by the following claims.

It will be seen from the foregoing that the arrangement of the record tape, the two rows of perforations and the peculiarly related positions of the fingers 14 and 15 with their respective rows of perforations 12 and 13, causes the finger 15 to throw on the switch when it drops into one of the perforations, and the finger 14 to throw off the switch when it subsequently drops into the companion perforation in the row 12, the perforations of the rows being arranged in pairs for this purpose. In order to get the time interval necessary to record over long lines, the finger 15 is "led" over the finger 14 as shown in Figure 1. At the same time the companion pairs of perforations must be spaced in lateral relation to the tape to give the dot and

dash duration of impulse as best shown in Figure 3.

I claim as my invention:

1. In a printing telegraph system, the combination with a receiving unit of a sending unit comprising a movable perforated sending tape having two rows of perforations arranged in signal pairs, two movable fingers engaging the perforations of the respective rows for alternate operation, electrical contacts and connections and a movable switch arranged for operation in reverse directions by the respective fingers.

2. In a printing telegraph system, the combination with a receiving unit of a sending unit comprising a movable perforated sending tape having two rows of perforations arranged in signal pairs, two movable fingers engaging the perforations of the respective rows for alternate operation for a single signal, electrical contacts and connections, a movable switch arranged for operation in reverse directions by the respective fingers and frictional holding means for retaining the switch in its thrown positions.

3. In a printing telegraph system, the combination with a receiving unit of a sending unit comprising a movable perforated sending tape having two rows of perforations arranged in signal pairs, two movable fingers arranged to consecutively engage their particular pair of perforations to give an alternate operation, electrical contacts and connections and a movable switch arranged for operation in reverse directions by the respective fingers.

4. In a printing telegraph system, the combination with a receiving unit, of a sending unit comprising a movable perforated sending tape having two rows of perforations arranged in signal pairs, two pivoted fingers arranged to successively engage the respective pair of perforations of a single signal, electrical contacts and connections, a pivoted switch arranged for operation in reverse directions by the respective fingers and means for yieldingly holding the switch in shifted positions.

In testimony whereof I affix my signature.

MARSEN A. NOSS.