Dec. 18, 1945. H. E. BESTE 2,391,082

TELEGRAPH CODE RECORDER

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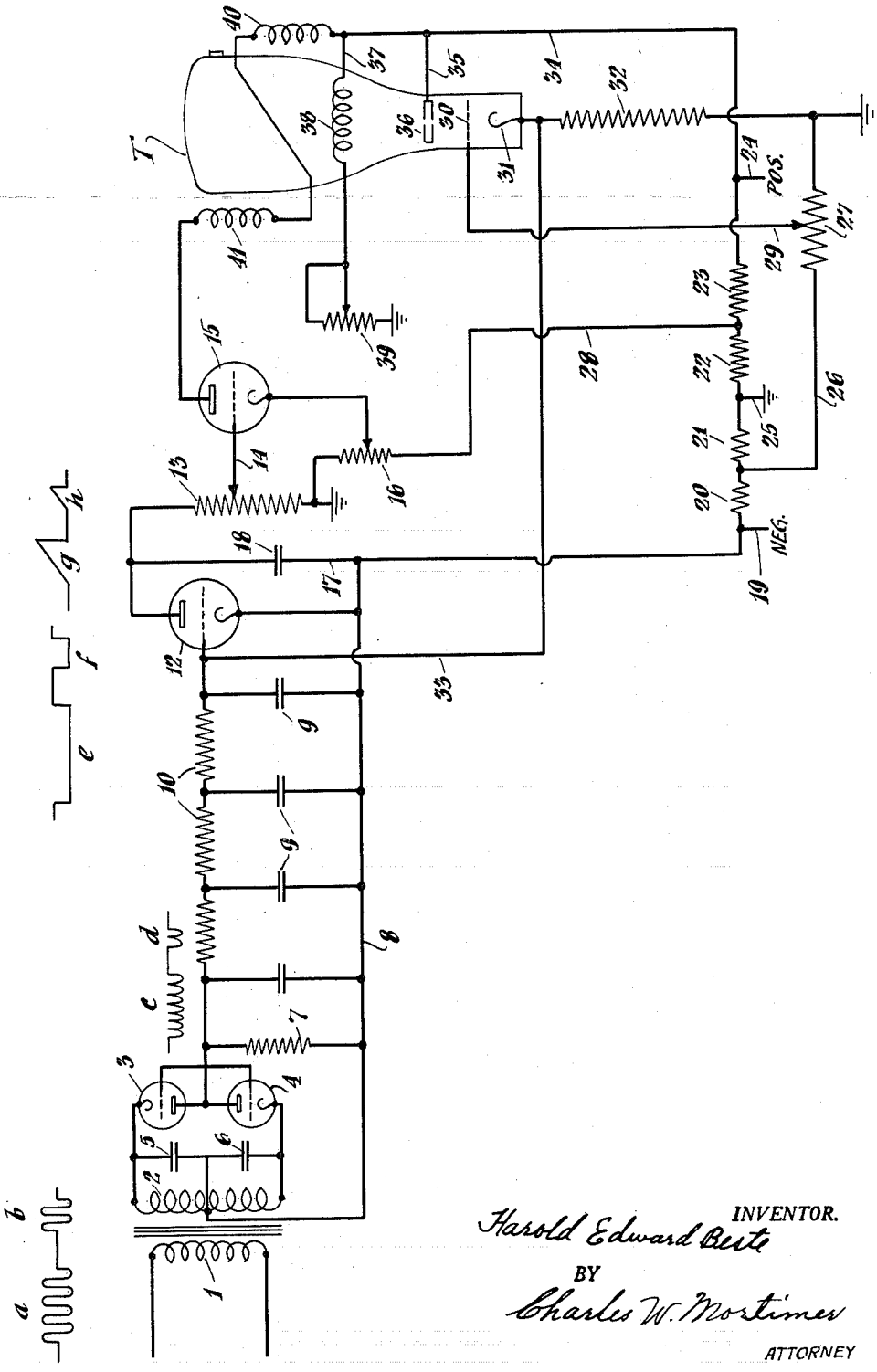

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TELEGRAPH CODE RECORDER

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5 Claims. (Cl. 178—88)

This invention relates to a device by means of which telegraph code signals are received in such a way that they can be observed visually. In carrying out the invention, received telegraph signals are caused to turn on and deflect the beam or ray of a cathode ray tube to different extents in accordance with the reception of dots and dashes so that traces of different lengths appear on the screen corresponding to the dots and dashes and can be easily observed and the message thereby read.

The received dot and dash signals which consist of high frequency oscillations are converted into direct current signals which deflect the beam and at the same time these dots and dashes are utilized to turn on the beam at the proper times so that the different signals can be read visibly and distinguished from each other. At the same time the danger of burning the screen of the cathode ray tube is obviated.

The invention may be understood from the description in connection with the accompanying drawing which is a diagram of connections showing an illustrative embodiment of the invention.

In the drawing, reference character 1 indicates the primary of a transformer to which the output of the usual telegraph code receiver, indicated at *a* and *b* as a dash and dot, respectively, is applied. The ends of the secondary 2, 2′ are connected to plates of triodes 3 and 4 and these secondaries are tuned by capacitors 5 and 6 to the frequency of the signals *a* and *b* which may, for example, be 5 kc. The center point of the secondaries 2, 2′ and a point between capacitors 5, 6 are connected to a source of negative potential, say —250 volts as indicated at 19.

The signals *a* and *b* produce negative direct current signals *c* and *d* which are the outputs of triodes 3 and 4. These signals are filtered by the RC filter 8, 9, 10, which has a short time constant, to remove the high frequency components and leave the negative polarity direct current signals *e*, *f* which are applied to the grid of triode 12. The plate of this triode is connected to ground through resistor 13 and its cathode is connected to the source of negative potential indicated at 19. A sliding contact 14 on resistor 13, one end of which is grounded, couples the plate of tube 12 to the grid of tube 15. The cathode of this tube 15 is connected by an adjustable contact to a potentiometer 16 one end of which is connected to a source of direct current and the other to ground. A capacitor 18 is connected between the plate and cathode of tube 12.

Resistors 20 and 21 in series are located between the negative source of potential 19 and ground 25. Resistors 22 and 23 in series are located between a positive source of potential 24 and ground 25. A lead 26 extends from a point between resistors 20 and 21 to one end of resistor 27, the other end of which is grounded. The lead 28 extends from a point between resistors 22 and 23 to one end of resistor 16.

A sliding contact on resistor 27 is connected by lead 29 to the control grid 30 of a cathode ray tube T. The cathode 31 of this tube is connected through resistor 32 to ground and by lead 33 to the grid of triode 12.

The positive potential applied at 24 is coupled by lead 34 and connector 35 to the anode 36 of tube T, and by connector 37 to the focussing coil 38 of this tube T which is in turn connected by an adjustable resistor 39 to ground. The deflection coils 40 and 41 for the beam of the cathode ray tube T are connected in series from lead 34 to the plate of tube 15.

The operation is as follows:

The signals consisting of dashes and dots made up of say 5 kc. frequency oscillations as indicated at *a* and *b* are applied to the primary 1 of the transformer. The output of the secondaries 2 and 2′ of this transformer is applied alternately to the plates of tubes 3 and 4 and appears as rectified direct current signals with negative polarity modulated by 5 kc. frequency as shown at *c*, *d*. This output is filtered by filter 8—10 to remove the high frequency components and yield the signals *e*, *f* which are applied to the grid of tube 12. The resistor 13 applies a positive voltage to the anode of tube 12 with respect to the negative voltage applied at 19 that is connected to its cathode, thus causing current to flow from ground through resistor 13 and tube 12 to the negative terminal 19 during the time no signal is applied to the primary 1 of this transformer. The capacitor 18 is not charged appreciably during this time because the internal resistance of tube 12 is small compared to the high resistance at 13 when it is drawing current and therefore there is only a small potential at the plate of tube 12.

When the negative D. C. signal *e*, *f* is fed to the grid of tube 12 it cuts off the current through this tube, whereupon the capacitor 18 charges and yields the so-called A-shaped signals *g*, *h* which are applied at the desired potential by the gain control 13, 14 to the grid of tube 15. This causes amplified pulses of current of A-shape to pass through the horizontal deflecting coils 40, 41 from source 24 so that the beam of the tube T is deflected comparatively slowly during the

interval of time represented by the sloping line at the left of the signals *g* and *h* and is returned almost instantly as represented by the very steep line at the right of these signals. This tube T has the inside surface of its face coated in the usual way with material which is rendered luminous wherever said beam strikes it.

The beam of the cathode ray tube T is decreased in intensity, except during the time when a signal is being applied to the grid of tube 12, as follows:

The lead 33 applies the rectangularly shaped signals *e*, *f* to the cathode 31 of tube T in negative polarity and the grid 30 of this tube is biased negatively a sufficient amount by adjustment of the contactor on resistor 27 to decrease the intensity of the beam of tube T when no signal is applied. When the negative signal *e*, *f* voltage is applied to the cathode 31 it biases this cathode 31 in a negative direction to such an extent as to form the beam which is accelerated by anode 36 and strikes the screen of the tube T simultaneously with the passing of current through the coils 40, 41. Since pulses of current corresponding to dashes and dots pass through the deflecting coils 40, 41 simultaneously with the longer and shorter intervals of time that the beam is turned on when the larger and smaller deflecting signals, respectively, are simultaneously applied to the coils, the signals are easily distinguished visually.

Provision may be made to rotate the tube T while the deflecting coils are kept stationary. The signals will then appear upon different locations on the screen surface of the tube. The tube can be rotated fast enough so that enough characters to make up several words within the arc can be observed. Any suitable sort of speed control such as a foot type can be used to alter the speed of rotation of the tube T.

What is claimed is:

1. A telegraph code receiver, comprising a cathode-ray tube having a deflection system and a surface upon which signals can be rendered visible, means to cause code signals of high frequency oscillations to become temporarily visible upon said surface at different times, said means comprising an amplifying circuit tuned to said oscillations and adjusted to yield rectangular signals, means to convert said rectangular signals into A-shaped signals corresponding in amplitude to the lengths of said rectangular signals, means to apply said A-shaped signals to said deflection system, means to cause said rectangular signals to turn on the ray of said cathode-ray tube for periods of time in accordance with the lengths of said rectangular signals, and means to produce relative rotation between said cathode-ray tube and its beam.

2. The code receiver of claim 1, in which means are provided to cause said A-shaped signals are caused to produce temporary visible indications on different parts of said cathode-ray tube surface.

3. The device of claim 1, in which said first named means comprises a transformer.

4. The device of claim 1, in which said first named means comprises a transformer and a high frequency filter to filter out said high frequency oscillations.

5. The device of claim 1, in which an amplifier is provided for said A-shaped signals.

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