

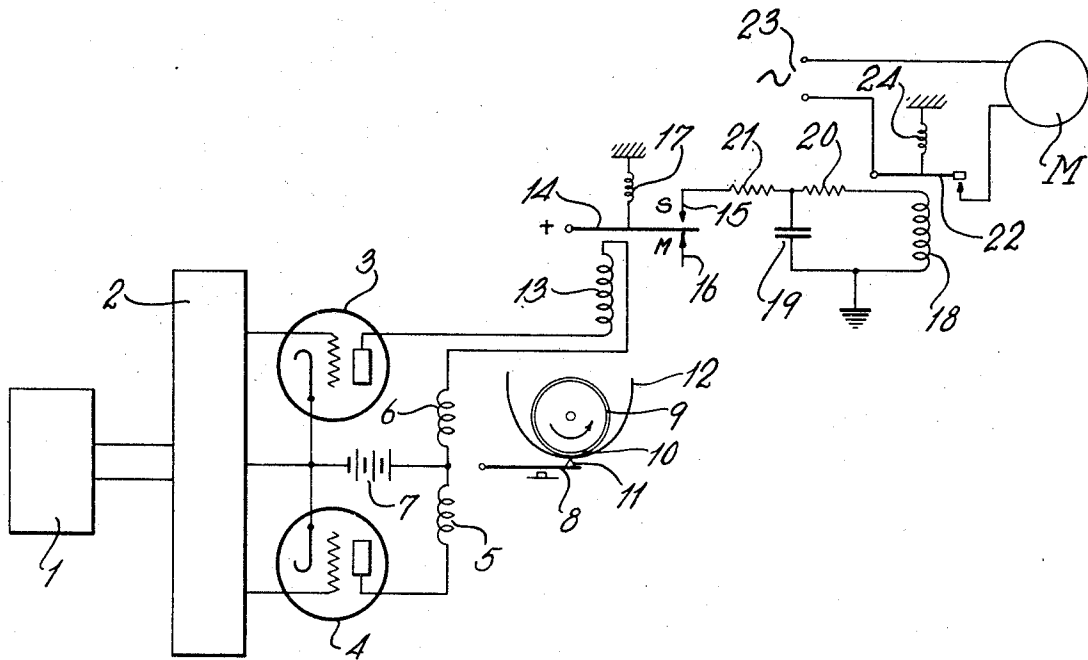
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A. G. COOLEY

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TELEFACSIMILE SYSTEM

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AUSTIN G. COOLEY

INVENTOR

BY *John J. Hogan*

ATTORNEY

UNITED STATES PATENT OFFICE

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TELEFACSIMILE SYSTEM

Austin G. Cooley, New York, N. Y., assignor to
Times Telephoto Equipment Inc., New York,
N. Y., a corporation of New York

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6 Claims. (Cl. 178—7.3)

This invention relates to telefacsimile systems and more especially to such systems of the tape-recording type.

A principal object of the invention is to provide means for automatically controlling a facsimile receiving machine so that its driving mechanism only operates while facsimile signals are being received.

A feature of the invention relates to a telefacsimile receiving system of the tape-recording type wherein the space and mark signal conditions control the operation or non-operation of the tape driving motor.

A further feature relates to a novel and simple automatic motor control circuit arrangement for telefacsimile recording systems.

Other features and advantages not specifically enumerated will be apparent after a consideration of the following detailed descriptions and the appended claims.

While the invention is concerned primarily with the control of a facsimile receiving machine, only those parts of a telefacsimile system will be referred to as are necessary to an understanding of the inventive concept. Accordingly in the drawing, the block 1 designates schematically any well-known form of telefacsimile signal transmitter, whereby the intelligence to be transmitted is converted into two signal conditions, e. g., marking and spacing. For this purpose, device 1 may be a facsimile or telegraph transmitter which controls the production of signal current of two different levels, the lower level representing for example marking, and the upper level representing for example spacing or vice versa. Device 1 may include a facsimile scanning mechanism of any known construction such for example as a scanning drum around which is formed the printed matter to be transmitted, and as a result of which the white areas are translated into an audio frequency carrier, for example one of 1800 C. P. S., and the black areas are translated into an 1800 C. P. S. carrier of a different amplitude. For a detailed description of such mechanism, reference may be had to my Patent No. 1,719,392 or No. 2,015,742. It will be understood of course that any other well-known facsimile transmitter may be used for generating the two signal conditions of different relative amplitudes. Furthermore, the invention is not necessarily limited to the transmission of signals of different amplitudes but may employ a transmitter of the off and on type, that is where spacing signals for example are represented by cur-

rent flow and marking signals are represented by absence of current.

At the receiving end of the signalling channel L, the signals are passed through a suitable detector and amplifier 2 and preferably they are converted into D. C. signals which are impressed upon a pair of grid-controlled tubes 3, 4. Tubes 3 and 4 are so connected that for weak signals or no signals, corresponding to a mark condition, the tube 3 passes plate current while the tube 4 is biased to substantial plate current cutoff. On the other hand, when a strong signal corresponding to spacing, is received, the tube 4 becomes plate conductive while the tube 3 becomes biased to substantial plate current cutoff. In other words, the tube 3 passes current under control of a received mark signal while the tube 4 passes current in response to a received space signal. The plate circuits of the tubes 3 and 4 are connected in balanced relation through two operating windings 5 and 6 and through the plate supply battery 7. Associated with the windings 5 and 6 is an armature or bar 8 mounted for swinging movement and adapted to be actuated in one direction or another depending upon which of the windings 5, 6, is energized. The member 8 cooperates with any well-known form of facsimile recorder represented schematically by the drum rotating 9. Merely by way of example, drum 9 may have around its periphery in helical form a rib or knife edge 10 and the member 8 may carry a knife edged bar 11 which extends substantially parallel to the axis of drum 9, a suitable movable recording web or tape 12 being positioned between bar 11 and the knife edge 10. When the member 8 is in spacing position, the bar 11 is clear of the recording paper 12. When a marking signal is received, bar 11 is moved to engage the recording paper whereupon a suitable mark is made thereon. For this purpose the recording can be effected by means of an inked ribbon or carbon transfer paper positioned between the bar 11 and the recording web 12; or, if desired, the rib 10 can be inked by a suitable inking roller as described in application Serial No. 418,172, filed November 7, 1941, thus avoiding the use of a separate inked ribbon or carbon paper. For a detailed description of one preferred form of control circuit for the tubes 3 and 4, reference may be had to application Serial No. 397,513, filed June 11, 1941.

It will be understood of course that the motor M which drives the drum 9 may also control the feeding of the tape 12. However, it is highly desirable that the tape and scanning drum 9 be

inert when no facsimile signals are being received, and that the motor be started automatically into operation and be maintained in operation under control of the received facsimile signals. For this purpose, there is connected in series with the windings 6 a relay winding 13 which controls its pivoted armature 14. Armature 14 is provided with two contacts 15, 16. When tube 3 is passing plate current, the armature 14 is maintained against its contact 16. This condition is maintained so long as no signals are being received since as above pointed out the tube 3 passes plate current only during the no signal or mark condition. On the other hand, when spacing signals are received, the armature 14 is held against the contact 15 by a suitable spring 17. The armature 14 is connected to a positive terminal of a suitable D. C. potential supply, the negative end of which may be grounded. Consequently, when the armature 14 is in engagement with contact 15, a current flows through the winding 18 of a motor control relay. Connected in circuit with the winding 18 is a condenser 19 and discharge control resistor 20. A charge control resistor 21 is also connected between contact 15 and winding 18, and, if desired, resistors 20, 21, may be variable. The relay winding 18 controls an armature 22 so that when the winding 18 is energized it closes the circuit from the A. C. supply source 23 to the motor M. Consequently, as long as strong or space signals are being received, the winding 18 remains energized and the motor M continues to operate to feed the tape 13. If however, the line L should cease to transmit signals for a predetermined length of time, the armature 14 breaks the circuit with contact 15 and winding 18 starts to deenergize. This winding does not immediately deenergize because of the charge on condenser 19. After the said predetermined interval however, the winding 18 is sufficiently deenergized so that the armature 22 is retracted by its spring 24 to break the motor circuit. Consequently, the tape 12 is fed in synchronism with the transmitting tape only as long as facsimile signals are being transmitted.

In order to start the receiving motor under control of the transmitting station, all that is necessary is to transmit for said predetermined interval a space signal which causes the armature 14 to close the circuit of relay 18. This usually happens automatically when a printed tape is used at the transmitter because when the tape is scanned transversely of its width there is in most cases a white margin between the printing and the edge of the tape. The scanning and transmission of this margin supplies the necessary signal condition to start motor M. Motor M once started is maintained in operation thereafter by the continued receipt of space signals even though alternated by intervening mark signals because of the relatively slow time constant of the discharging circuit of condenser 19. Thus the motor M remains in operation during the receipt of facsimile signals. Upon the cessation of facsimile transmission from transmitter 1, the winding 18 starts to deenergize and after a predetermined interval it causes the motor circuit to be opened.

Various changes and modifications may be made herein without departing from the spirit and scope of the invention.

What I claim is:

1. In a telefacsimile transmission and receiving system, a facsimile transmitter for transmit-

ting space and mark signals corresponding respectively to two different shade values of elemental areas of a subject matter to be transmitted, a facsimile receiver having a recording web and a recording mechanism therefor, a motor for feeding said web and operating said mechanism, and means to control the starting and stopping of said motor, the last-mentioned means including a relay for opening and closing the motor circuit, the winding of said relay being energized as long as facsimile signals are being received, means comprising an electrostatic storing device whereby said winding is automatically deenergized a predetermined interval after the cessation of said facsimile signals.

2. A facsimile system according to claim 1 in which the relay is connected in circuit with said electrostatic storing device which consists of a condenser and timing resistor whereby the winding is maintained energized during the reception of space and mark signals.

3. In a telefacsimile transmitting and receiving system, a facsimile transmitter for transmitting two kinds of signals, e. g., space and mark signals corresponding respectively to two different shade values of elemental areas of a subject matter to be transmitted, a facsimile receiver having a recording web and recording mechanism including a motor for feeding said web and operating said mechanism, control circuits for said mechanism including a pair of grid-controlled tubes one of which is normally conductive and the other normally substantially non-conductive, said tubes remaining in that condition as long as one of said kind of signals is being received, e. g., a marking signal, means responsive to the reception of the other kind of signal, e. g., spacing, for reversing the conductivity state of said tubes, a relay for controlling the circuit of said motor, said relay being energized when said other kind of signal, e. g., spacing is being received, and means to maintain said relay energized for a predetermined time interval after the cessation of receipt of said other kind of signal, e. g., spacing.

4. In a telefacsimile transmitting and receiving system, a facsimile transmitter having means to generate a facsimile signal current of large amplitude corresponding to one range of shade of the subject matter being scanned, e. g., white, and generating a small amplitude facsimile signal current corresponding to a different range of shade of said subject matter, e. g., black, a facsimile receiver having a recording tape and recording mechanism responsive to said signals to reproduce said black and white shades on said tape, a motor for operating said mechanism and feeding said tape, a pair of grid-controlled tubes selectively responsive to said black and white signals, a relay controlled by the output current of the one of said tubes means whereby said relay is selectively responsive to the reception of white signals for a predetermined interval to start said motor automatically and responsive to the cessation of white signals for a predetermined interval to stop said motor automatically.

5. A telefacsimile transmitting and receiving system according to claim 4 in which the said relay has its winding connected to said tubes in circuit with a storing condenser and an adjustable resistance whereby said relay is maintained energized during the normal transmission of alternate black and white signals.

6. In a telefacsimile transmitting and receiving system, a facsimile transmitter for transmitting space and mark signals corresponding re-

spectively to two different shade values of elemental areas of a subject matter to be transmitted, a facsimile receiver having a signal receiving circuit and having a recording web and a recording mechanism therefor, a motor for feeding said web, and means to automatically start the motor in operation upon the receipt of signals and to automatically stop the motor a predetermined time interval after the cessation of signals, the last-mentioned means including a relay for open-

5 ing and closing the motor circuit, a condenser connected in circuit with said relay said condenser being charged by one class of received signal, e. g., spacing, and maintaining said relay energized for a predetermined time interval after the cessation of said space signals, said condenser being connected to said signal receiving circuit so as to be charged by the spacing signals.

AUSTIN G. COOLEY.