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PHOTO-TELEGRAPH OR FACSIMILE RECEIVERS

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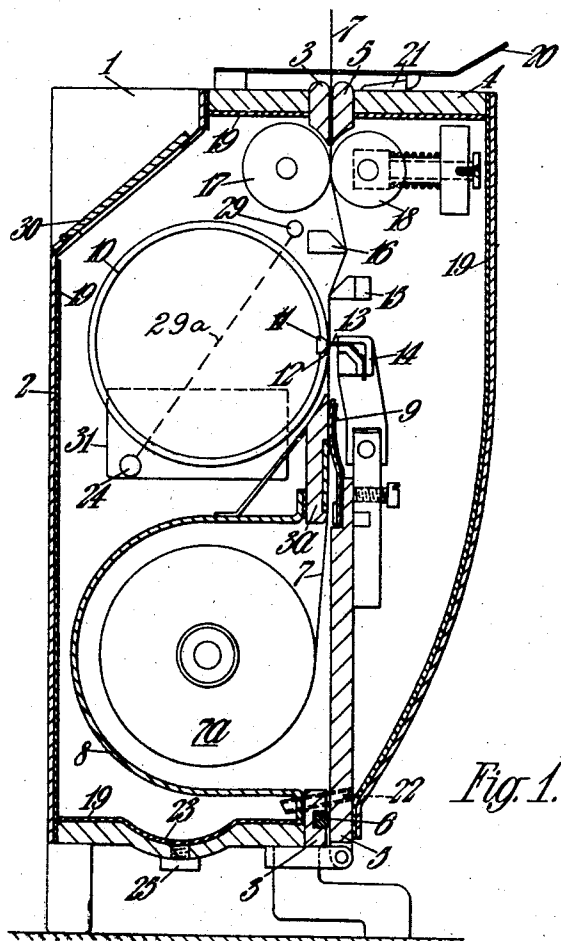


Fig. 1.

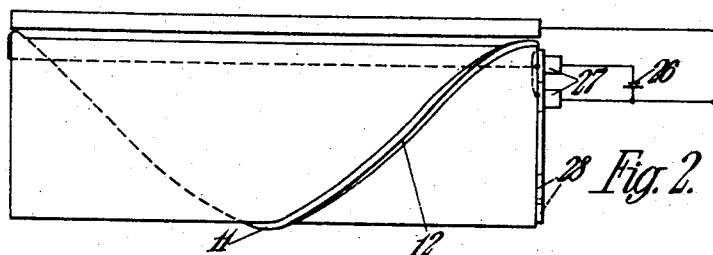


Fig. 2.

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PHOTO-TELEGRAPH OR FACSIMILE RECEIVERS

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This invention relates to photo-telegraph or facsimile receivers employing an electro-chemical system of recording and more particularly to such receivers in which the recording paper is used in a moist condition.

In some types of receiver of the class referred to the recording paper is passed through an impregnating bath immediately prior to recording and means must be provided to ensure that the moisture content of the paper is at its correct level when the paper reaches the recording mechanism. The present invention is more particularly concerned with the type of receiver in which the paper is impregnated and the moisture content is brought to its correct level at the time of manufacture. The paper is then sealed into moisture-proof containers for despatch and storage prior to use.

Well known types of such receiver include a rotating helical contact on one side of the paper co-operating with a linear electrode on the other side of the paper. At each revolution of the helix a point of electric contact between the electrodes (through the recording paper) passes across the paper to provide a scanning line. The paper is moved forward either continuously or step by step so that the whole surface is scanned and a varying voltage derived from received signals is applied between the electrodes to give a marking of varying optical density according to the received signals.

In order to obtain a satisfactory record, especially at high recording speeds, it is necessary to control the moisture content of the recording paper within very close limits. If the paper is too dry its electrical resistance rises and the marking is faint and lacking in detail, whilst if it is too damp the record may contain blots and streaks and in addition there is a general loss of detail due to spreading of the dark compound which forms the markings through the fibres of the paper. It is, therefore, essential that the roll of paper being used in the receiver is kept in such a manner that there can be no loss of moisture either during storage or in transit between the roll and the recording mechanism. It is equally important that there should be no gain in moisture by the paper.

Facsimile receivers are known in which the roll of paper is stored in a substantially closed and airtight container, the recording mechanism being more or less open to atmosphere. The atmosphere inside the closed container absorbs moisture from the roll until the atmospheric moisture content is at or near saturation point. Thereafter the paper suffers no loss of moisture whilst inside the container, but although shielding arrangements between the container and the recording mechanism are often included, the paper loses a certain amount of moisture in transit. To avoid this loss of moisture other receivers are known in which the stock roll of paper and the recording mechanism are both enclosed in the container. The atmosphere within this container absorbs moisture from the paper until it is at or near saturation point and thereafter no further loss of moisture occurs. A small amount of heat is generated during the recording process and this raises the atmospheric temperature inside the container to

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a level slightly above the ambient temperature outside the box. Due to heat losses by radiation the temperature of the walls of the box is slightly lower than that of the internal atmosphere and condensation takes place upon the walls. The condensed water may collect in drops which are liable to fall on to the paper. Furthermore, a certain amount of moisture is condensed upon the rotating helix and this may also be deposited on the paper. Wherever the moisture content of the paper is increased locally a blot or streak occurs which spoils the recording.

Other types of facsimile recorder are known in which a heater running at a relatively high temperature is employed to dry and/or intensify the recording. If such a high temperature heater is employed in a closed box with the stock roll of paper the problems above referred to are greatly increased. Due to its higher temperature the atmosphere inside the container can absorb a larger amount of moisture before it reaches saturation point, so that there is a greater initial loss of moisture by the paper prior to recording. Furthermore, the temperature inside the box will be considerably higher than the outside ambient temperature, because a heater of relatively higher power is necessary. Consequently there is considerable radiation of heat from the walls of the container and a correspondingly large amount of condensation occurs.

The object of the present invention is to overcome these difficulties inherent in known machines. It recognizes that in order to prevent drying of the paper prior to recording the atmosphere inside the container must be maintained at or near saturation point. In order to prevent the deposition of moisture on the recording helix and other rotating parts, the helix, and optionally other rotating parts, are maintained at a temperature very slightly above that of the atmospheric temperature inside the container by means of a low-power heater or heaters. It also recognises that condensation upon the walls of the container is bound to occur and to prevent condensed water from getting into contact with the paper the walls of the container are lined with a porous material which has in some degree heat insulating properties, thus reducing radiation from the walls of the container and at the same time preventing the formation of drops of water, since condensed water is held in the pores of the lining. The lining is so arranged that due to capillary action and gravitation condensed water is conducted to other parts of the container where it may re-evaporate to maintain the high humidity inside the container, or be deposited in a suitable receptacle in the bottom of the receiver.

The invention will be further described with reference to the accompanying drawings in which:

Figure 1 is a vertical section of a receiver according to the invention.

Figure 2 is a diagrammatic view of a modification.

Referring to the drawing, a photo-telegraph receiver is built within a framework 1 and includes a compartment 2 containing the stock roll of paper and the recording mechanism. The open face of compartment 2 carries frame 3 having a flat top.

The compartment is closed by hinged lid 4 having a frame 5 of corresponding shape to frame 3. A resilient seal 6 between frame 3 and frame 5 seals the container except for a narrow gap through which recording paper 7 issues from the receiver. A labyrinth roller or resilient lips could be provided at the slot if desired. Compartment 2 includes a sub-compartment 8 containing the stock roll of paper 7a and this is separately closed by the portion 3a of frame 3 and sealing strip 9 which consists of a strip of springy metal lined with a suitable soft material, for example, rubber or a plastic.

Drum 10 is provided with helical support 11 which carries electrode wire 12. The general arrangement of drum 10, helical support 11 and electrode wire 12 may be in ac-

cordance with the known art, and the assembly is rotated by means of a synchronous motor and gears (not shown) synchronously with the scanning drum of the photo-telegraph transmitter.

Parallel to the axis of helix drum assembly 10, 11, 12, is linear electrode 13, carried in hinged frame 14 and pressed into contact with electrode wire 12, for example, by spring pressure. The strip of recording paper 7 is unwound from stock roll 7a and passes between portion 3a of frame 3 and flexible seal 9 then between wire electrode 12 and linear electrode 13. Two guide bars (or rollers) 15 and 16 may be included, guide bar 15 being positioned so that paper strip 7, moves in a straight line from portion 3a of frame 3, between electrodes 12 and 13 to guide bar 15. Guide bar 16 is offset in order to apply an initial tension to paper strip 7 when lid 4 is closed. From guide bar 16 paper strip 7 passes between driving roll 17 and spring-pressure roll 18. Driving roll 17 is driven in conjunction with helix assembly 10, 11, 12, to feed paper strip 7 through the receiver at the desired speed. Lid 4 is held in the closed position by two spring latches 20 engaging projections 21.

Driving arrangements to the electrodes and paper feed may be made through glands or fittings of known type.

The inside lid, walls and base of the closed compartment are lined with a porous or absorbent material 19 such as, for example, the porous plastic sheet known under the trade name "Porvic." The absorbent lining serves two purposes in that it has in some degree heat insulating properties and any moisture condensed upon it is absorbed. Moisture so absorbed is conducted through the porous lining and may be re-evaporated at points where the humidity is lower. Surplus moisture gravitates through the porous lining and collects in trough 23 formed in the base of the closed compartment. Surplus moisture collecting in the lower part of lid 4 is conveyed by pipe 22 into trough 23 from which it may be re-evaporated or drawn off by opening plug 25.

In order to prevent condensation of moisture on the helical support 11 or wire electrode 12 a heater 24 is placed below helix drum assembly 10, 11, 12; this raises the temperature of the said assembly to a level slightly above that of the compartment as a whole. In the alternative construction shown in Figure 2 heater 24 is omitted and helical support 11 is heated by the passage through it of an electric current from battery 26 over brushes 27 and slip rings 28, the heating current being independent of the signal current. Alternatively the helical support 11 is made of an insulating material and a heating current independent of the signal current is passed through electrode wire 12.

Heaters may be placed at other points within the closed compartment, for example beneath driving roll 17. It will, however, be understood that the best position for heaters depends on the detail design of the mechanism and the shape of the closed compartment. A thermostat is included, for example at 29 having a connection 29a, arranged to switch off heater 24 or a suitable connection to switch off the heating current through helical support 11 or helix wire 12 when a predetermined maximum temperature is reached.

Where a receiver according to the invention is being used in relatively moist atmospheric conditions heater 24

or its equivalent may be switched off. Shutters 30 and 31 may be partly or fully opened, according to the prevailing degree of humidity, to permit a current of air to circulate around helix assembly 10, 11, 12, in order to prevent condensation without allowing excessive evaporation of moisture from the recording paper.

The receiver shown in the drawing is intended for operation in a vertical position, that is, with paper strip 7 travelling in a vertical direction. It will be understood that such a receiver may also be arranged for horizontal operation whilst still incorporating all the features and advantages of the invention.

We claim:

1. A photo-telegraph or facsimile receiver comprising a holder for a stock roll of recording paper, a recording mechanism having rotating parts, guide means for passing a strip of paper from the roll to the recording mechanism, means for driving the strip through the recording mechanism, a compartment for enclosing the stock roll and holder therefor, the strip of paper in transit from the roll to the recording mechanism and the recording mechanism itself, sealing means for the compartment so as substantially to prevent air entering or leaving the compartment means for applying a small amount of local heat to the rotating parts of the recording mechanism in order to prevent condensation upon them or dry off condensed moisture, a chemically inert moisture-absorbing lining to the compartment which is heat-insulated and porous so that moisture condensed upon the walls cannot form drops and means for conducting the moisture to a location in the receiver where it will do no harm or from which it may be re-evaporated in order to maintain the necessary high humidity of the atmosphere inside the compartment.
2. A photo-telegraph or facsimile receiver as claimed in claim 1, in which the lining is made of porous plastic sheet.
3. A photo-telegraph or facsimile receiver as claimed in claim 1, in which the heating means comprises a heater located in close proximity to the rotating parts of the recording mechanism.
4. A photo-telegraph or facsimile receiver as claimed in claim 1, in which the heating means comprises means for connecting an electric current to pass through a helical electrode of the recording mechanism.
5. A photo-telegraph or facsimile receiver as claimed in claim 1, in which the heating means comprises means for connecting an electric current to pass through a helical electrode of the recording mechanism mounted on an insulating support.
6. A photo-telegraph or facsimile receiver as claimed in claim 1, in which a thermostat is provided within the compartment together with means connecting it to the heating means to control the heating means to provide a predetermined maximum temperature of the recording mechanism.

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