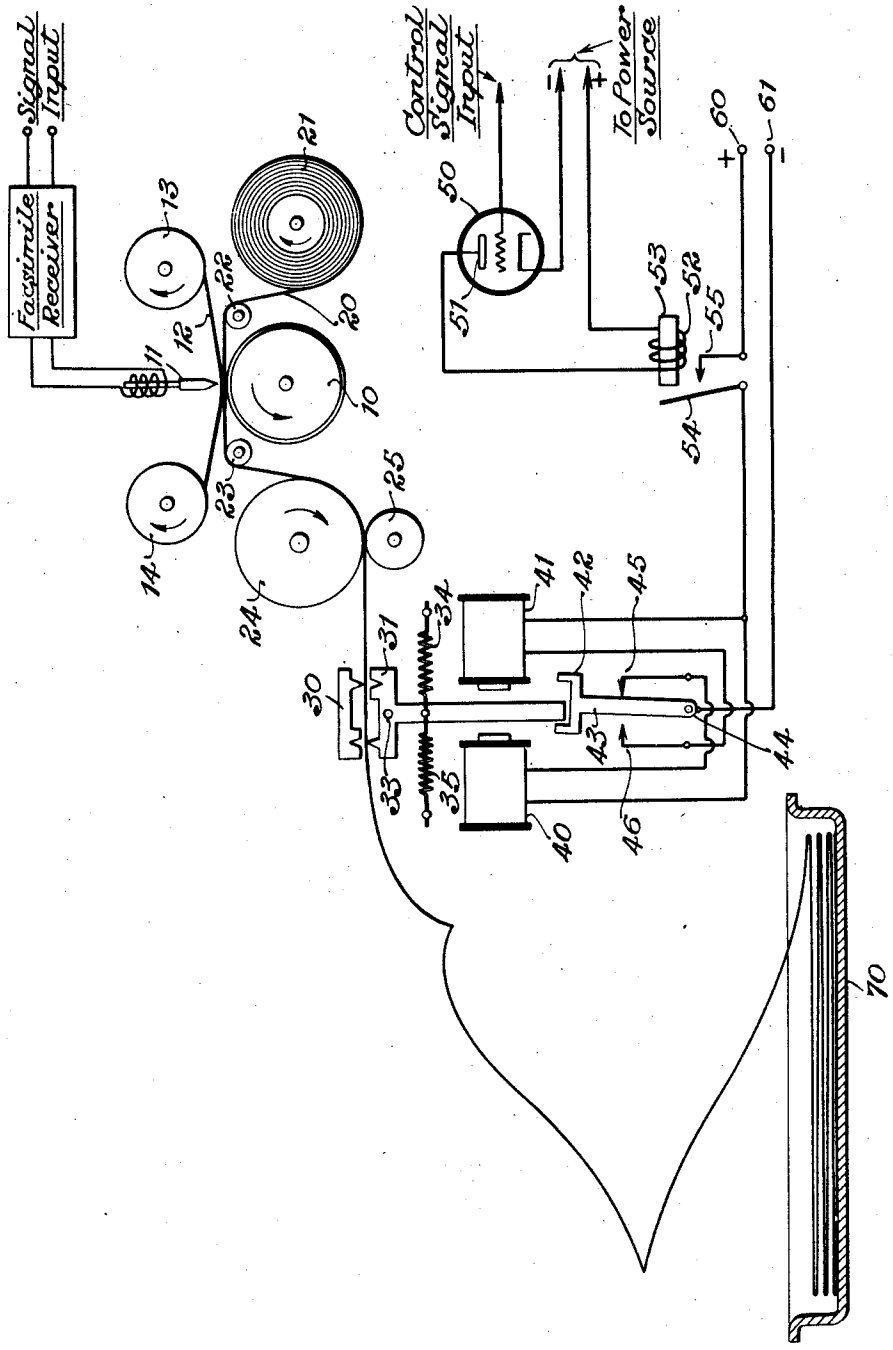
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MATERIAL CREASING AND INDENTING APPARATUS

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MATERIAL CREASING AND INDENTING APPARATUS

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My invention, in general, relates to apparatus for folding materials into given lengths, and more particularly to such apparatus as used in conjunction with facsimile receivers and reproducers.

In modern facsimile recorders such as exemplified by Patent No. Reissue 20,152, issued October, 1936, the intelligence or design which is recorded is recorded on a plane faced material such as paper or the like, such material usually being in the form of a roll, and which is used in accordance with the demands of the machine. The intelligence, however, is usually recorded in "frames" or pages. For several reasons it is undesirable to wind up the material which has been recorded into a roll. Since present day facsimile machines have been adapted to the receipt of "home newspapers," it is quite common for a receiver of such programs to desire to read the paper in the manner to which he is accustomed, viz., as separate sheets. A roll type of paper is not adapted for this purpose, and accordingly is not highly satisfactory. Accordingly, it is one of the objects of my invention to provide an apparatus in which the roll type of recording will be avoided.

Previously known devices have, in the past, avoided the above outlined difficulty by cutting the material on which the intelligence is recorded into sheets, and these sheets have been stacked in a container. Such a cutting structure, for instance, is exemplified in Patent No. 2,182,871, issued December 12, 1939. These devices, while desirable from an operative standpoint in a number of facsimile arrangements, have the disadvantage that they are somewhat complex and are not readily adaptable for small types of home receivers. Accordingly, it is another of the objects of my invention to provide a device which will be simple and which will avoid the complexities of the cutting and stacking apparatus.

One of the ways in which the two above outlined disadvantageous features may be avoided is by folding the paper or other recording material into sheet or page lengths. This has the advantage that the apparatus is not particularly complex and, further, that the stacking feature for the pages is more easily accomplished since, in the previously known stacking devices in which the paper was fed along two diverging guide members, the paper had a tendency to collect a static charge and cling to the guide members, rather than passing along smoothly and easily.

Accordingly, among the objects of my invention are:

1. To provide an apparatus in which the roll type of recording will be avoided.

2. To provide a device which will be simple and which will avoid the complexities of the cutting and stacking apparatus.

My invention in general consists in providing at least a pair of coacting members for causing a folding indentation in the paper or other recording material, and the coacting devices are actuated by a special signal which is transmitted at the end of the scanning of each page of material which is transmitted. The members coact to alternately cause the indentation to be in opposite directions, thereby allowing the sheets to be folded back on each other.

My invention will best be understood by reference to the drawing, in which the single figure shows one embodiment thereof.

Referring to the figure of the drawing, there is shown a recording drum member 10 illustrative of one of the methods of recording facsimiles such as illustrated in United States Patent No. Reissue 20,152 issued October, 1936, the drum having a helix mounted on the periphery thereof which co-operates with a presser bar member shown schematically at 11. Since these elements are well known per se and generally of themselves do not form the particular basis of this invention, they are illustrated herein only schematically. Passing between the presser bar and the periphery of the drum is carbon paper 12 which unwinds from a roll 13 and the used carbon paper is wound up on a roll 14. Also passing between the presser bar and the drum is the material 20 on which the facsimile is to be recorded, and this material in general usually comprises paper having opposing planar faces. This paper is fed from a roll 21 and passes over roller 22 and thence between the presser bar and the drum bearing the helix, and thence across the roller 23, and from this point between feed rollers 24 and 25.

In this illustration there is positioned next to the feed rollers 24 and 25, although not necessarily maintained at this particular position, a crimping or braking mechanism comprising elements 30 and 31. Each of these elements comprises a member having a cross-section which is substantially L shaped, and the lower part of the L in each instance contains a female section and the upper part of the L contains a male section, these two plates being positioned so as to be mutually co-operative between the male and female sections thereof. The lower L shaped member has connected thereto a lever arm 32

which is pivoted at point 33. This lever arm extends downwardly and two balanced spring members 34 and 35 are provided so as to hold the arm in a balanced position, that is to say, a substantially upright position in this illustration. Positioned one on either side of the lever arm are two magnet members 40 and 41, and the lower end of the lever arm is maintained normally between the two sides of a U shaped member 42, the latter having connected thereto a lever arm 43 which is pivoted at the point 44. Positioned on either side of the lever arm connected to the U shaped member are switch contacts 45 and 46.

A thermionic tube 50 is provided having anode 51, cathode and at least one control electrode. The anode is connected through the winding 52 surrounding a magnetic member 53, the latter having positioned adjacent thereto a pivoted switch arm 54 which may be actuated by the magnet and switch contact 55. A power source is provided and for purposes of simplicity is not shown in this drawing. However, the terminals 60 and 61 thereof are indicated.

The electrical connection from the source of power supply has one line running to switch contact 55 and thence from the magnetic armature member 54 to a connection common to the winding of magnetic members 40 and 41. The other terminal of the windings in each case is connected to a switch contact member, the winding of the member 40, for instance, being connected to switch contact member 45, and the winding of the magnet 41 being connected to switch contact member 46. The other terminal of the source of power supply is connected to the lever arm 43 joined to the U shaped member 42.

There is also provided a tray 70 into which may be folded or leaved the paper or other recording medium as it is indented or pressed by the co-operative action between the two L shaped members 30 and 31.

The action of the device is as follows. The length of paper from the presser bar 11 to the L shaped member 30 is made exactly the length of one page. At the completion of a page of recording a special signal is sent from the transmitter which, by suitable selective circuits, is impressed onto the control electrode of tube 50 so as to give a pulse of current in the plate circuit thereof, which current passing through the winding 52 causes the attraction of the armature 54, thus closing the circuit formed by the armature and switch contact 55. Since such selective circuits are well known per se it is not necessary, for the purposes of this invention, to show such a selective circuit, particularly in view of the fact that no particular form of selective circuit is claimed. Assuming that the U shaped member 42, with its lever arm 43, is in the position illustrated in the figure so as to close the circuit comprising the lever arm 43 and the switch member 45, power will be impressed onto the windings of the magnet 40. This will attract the pivoted lever arm 32 and simultaneously press the male section of the element 31 into co-operative relationship with the female section of the member 30, thus causing an indentation in the paper. The member 43 then simultaneously will be forced against the switch contact 46 due to the action of lever arm 32 pushing against one of the sides of the U shaped member 42, and when the next special page signal is received again armature 54 will close against switch contact 55, but this time it will be the windings of the magnetic member 41 which will be energized since the arm 43 will be pressing against the switch contact 46. This time the lever arm 32 will move in such a direction that the female section of the element 31 will be forced into operative relationship with the male section of the element 30, thus identing the paper oppositely to the direction in which it was intended when the previous signal was received, and hence the indentations will be such that the paper will go into the tray 70 in the form of a folding set of leaves.

It will be appreciated by those skilled in the art that while the exemplified embodiment of the invention illustrated herein shows the use of a so-called carbon type of recording, the invention is in no wise limited to the use of such recording but finds ready adaptability to all of the present known systems, since these systems in general all record a single sheet or frame of an image to be recorded at any particular time.

Also, the coacting members 30 and 31 described herein are termed hereinafter in the claims as dies since a definite impression is made on a material thereby, and this terminology is used for convenience, even though each has both a male and female section.

It will be appreciated also that since there is a distance between the male and female sections of each of the dies 30 and 31 and, further, since these sections alternately affect the recording medium, if the special signal received by the facsimile receiver in the form of a control signal is equally spaced with regard to time, then the length of the material indented between indentations will vary, that is, all of the sheets will not be of equal length. It will be appreciated, therefore, that to compensate for the alternate inequalities in distance between the indenting means and the recording drum, the time intervals between the special signals should be unequal, and thus the length of the indented material may be made substantially constant.

For purposes of convenience, the actuating means for the presser bar 11 has been shown purely schematically since these means per se do not form the invention herein disclosed.

It will be appreciated that alternate time intervals between special signals will be the same with an arrangement as disclosed herein.

It will be appreciated that there may be departures from the particular showings of this disclosure without departing from the spirit and scope of the invention, and accordingly I claim all such departures which fall fairly within the spirit and scope of the invention as defined in the hereinafter appended claims.

What we claim is:

1. Facsimile apparatus comprising a recording drum and means for passing an elongated recording strip relative to said drum and moving said strip so that the strip and drum have at least tangential peripheral contact, means for marking said recording strip at the point of contact with said drum under the control of received signalling impulses, a recording strip folding means for folding said recording strip alternately in opposite directions of fold, said folding means comprising a pair of die members each having a male and a female section alternately positioned relative to each other, electro-magnetic means for moving at least one of said die members relative to the other, means for passing the recording strip between the die members so that the longitudinal distance on the recording strip between the point of tangential contact with the drum and

the die members is equal to the spacing between folds of opposite direction in the recording strip so that when the die members are moved relative to each other the said strip material is creased, and means responsive to received signalling impulses for magnetically causing the die members at the time of receipt of signals to be moved relative to each other to engage each other with the recording strip interposed so as to determine the fold.

2. Facsimile apparatus comprising signal receiving means for receiving a series of signals representing signal intelligence transmitted over a predetermined period of time and for receiving subsequent to the said series of signals separate control signals following in time the complete group of said signals, a picture recording drum and a recording strip, means for moving the recording strip relative to the picture recording drum so that the said strip contacts the drum in a tangential manner, means for recording the said received signals on the said strip at the point of tangential contact with the record drum, a pair of die members positioned substantially adjacent the said picture drum, and means for moving the said record strip between the said die members, the spacing between the die members and the drum being such that the recording strip as it is moved relative to the drum normally moves from the point of tangential contact with the drum to the die members in the time interval intermediate successive controlling signals, said die members each including a male and a female section alternately arranged relative to each other so that upon motion of the die members relative to each other the paper passing therebetween is alternately folded in opposite directions, magnetic means for controlling and shifting the position of the die members relative to each other alternately, and electromagnetic means responsive to the control signals for actuating said magnetic means.

3. Recording apparatus comprising a cylindrical drum member, means for continuously feeding an elongated sheet of material over the drum surface so that the material and the drum have at least tangential peripheral contact, means for recording marking indicia on the sheet of material in the area of tangential contact between the drum and the material, a material creasing element for alternately creasing the material in each of two directions of fold, and a control means for controlling the periods of operation of said folding mechanism, said control means being actuated in predetermined relationship to and in accordance with the operation of the indicia marking mechanism so that folding of the sheet in a selected one of its two directions of fold occurs following predetermined time durations of recording on the sheet during its continuous motion relative to the drum.

4. Facsimile apparatus comprising a recording drum and means for continuously passing an elongated recording strip relative to said drum and moving said strip so that the strip and drum have at least tangential peripheral contact, means for marking said recording strip at the point of contact with said drum under the control of received signalling impulses, a recording strip folding means for folding said recording strip alternately in opposite directions of fold, said folding means comprising a pair of die members each having a male and a female section alternately positioned relative to each other, electromagnetic means for moving at least one of said die members relative to the other, means for passing the recording strip between the die members so that when the die members are moved relative to each other the said strip material is creased, and means responsive to receive signalling impulses for controlling the operation of the die members whereby folds are placed in the strip material following predetermined recording periods.

5. Facsimile apparatus comprising signal receiving means for receiving a series of signals representing signal intelligence transmitted over a predetermined period of time and for receiving subsequent to the said series of signals separate control signals following in time the complete group of said signals, a picture recording drum and a recording strip, means for continuously moving the recording strip relative to the picture recording drum so that the said strip contacts the drum in a tangential manner, means for recording the said received signals on the said strip at the point of tangential contact with the record drum, a pair of die members positioned substantially adjacent the said picture drum, and means for continuously moving the said record strip between the said die members, the spacing between the die members and the drum being such that the recording strip as it is moved continuously relative to the drum normally moves from the point of tangential contact with the drum to the die members in the time interval intermediate successive controlling signals, said die members each including a male and a female section alternately arranged relative to each other so that upon motion of the die members relative to each other the paper passing therebetween is alternately folded in opposite directions, magnetic means for controlling and shifting the position of the die members relative to each other alternately, and electro-magnetic means responsive to the control signals for actuating said magnetic means.

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