Jan. 24, 1939. A. G. COOLEY 2,145,072

TELEPHOTO APPARATUS

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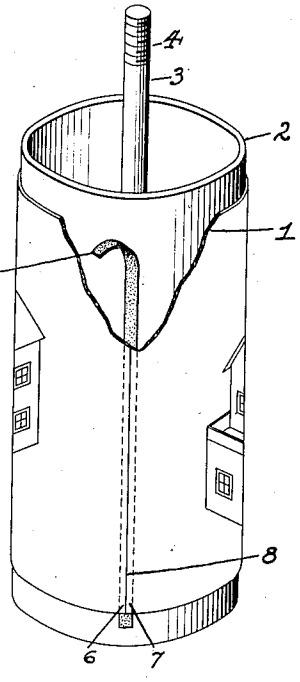
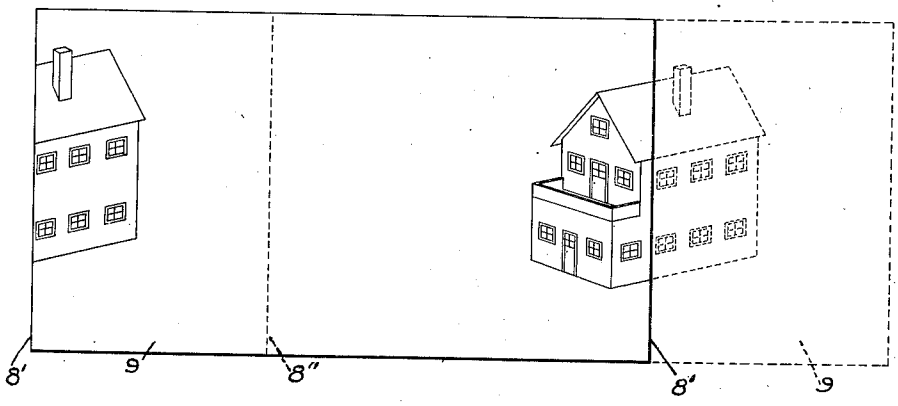


Fig. 2.

Fig. 3.



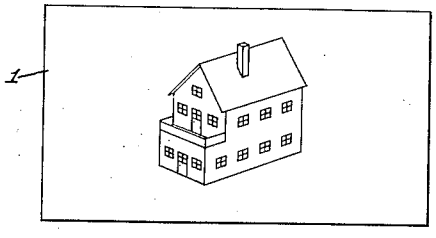


Fig. 1.

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TELEPHOTO APPARATUS

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4 Claims. (Cl. 178—13)

This invention relates to electrical facsimile systems and more particularly to systems of the type employing a rotatable scanning drum for carrying the picture sending strip or the picture receiving strip.

A principal object of the invention is to provide a simple and improved means for fastening a picture strip to a scanning drum.

A feature of the invention relates to the improved means for fastening a picture strip to a scanning drum whereby the entire surface of the film is available for scanning.

Another feature relates to a film fastening member in the form of a strip having adhesive material on both sides thereof whereby a picture strip may be loaded and removed from a scanning drum expeditiously.

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 will be described herein as applied to one particular form of scanning drum for tele-facsimile systems, it will be understood that any other well-known form of scanning drum may be employed. Furthermore while the invention is primarily advantageous as applied to a system of scanning by light reflected from the picture film, it also posseses advantages in systems of scanning by light transmitted through the picture film. Accordingly in the drawing,

Fig. 1 represents a typical picture strip or sheet which is to be reproduced at a distance.

Fig. 2 shows the strip of Fig. 1 fastened to a scanning drum in the manner contemplated by the invention.

Fig. 3 shows how the strip of Fig. 1 may be reproduced and assembled at the distant station.

Referring to Fig. 2 the picture or other visual representation to be transmitted to a distant point may be in the form of a sheet or picture film 1 preferably of the same length as the circumference of the scanning drum 2. The drum 2 is of any construction well-known in the facsimile transmission art and may be either of transparent or non-transparent material. Drum 2 is fastened in any suitable manner to a rotatable shaft 3 which is adapted to be rotated at the required rate, and also to be moved longitudinally by any well-known means as for example by a lead-screw 4. Associated with the drum is any well-known form of picture analyzing or scanning mechanism whereby the successive elemental areas of the picture 1 may be translated into corresponding electric currents. Preferably although not necessarily, the scanning mechanism is of the type whereby a small spot of light is projected on the film 1 as the latter is being rotated, and the light reflected from the film is projected on to a light-sensitive cell. For a disclosure of such a scanning and translating system reference may be had to Patent No. 2,015,742.

Heretofore it has been the usual practice to employ a film which has a slightly greater length than the circumference of the scanning drum so that the ends of the film could be overlapped when the film is wrapped around the drum. By suitable mechanical means such as clips, clamps or the like, the overlapped ends were held in place. In another known arrangement the picture film is of shorter length than the circumference of the drum and a clamping bar or the like engages the ends of the film to clamp them against the face of the drum. In both these prior arrangements there is therefore, a longitudinal strip which does not form part of the picture being sent, with the result that at the receiver the reproduction includes this "overlap" or non-transparent section. If it were possible at all times to be certain that the picture receiving surface is mounted on the receiving drum in exactly the same "phase" as the mounting of the picture sending surface on the sending drum, and if it were possible to be certain that the sending and receiving drums are started rotating and kept rotating in the same "phase", then the reproduced "overlap" would not be in the picture field and it could readily be removed without destroying any part of the reproduced picture. It is apparent therefore that these prior methods of fastening the sending and receiving films to their respective drums require extreme accuracy of phasing and positioning of the films. In many cases, particularly where the transmission is being effected over telephone, telegraph lines or the like, even though the utmost accuracy is achieved in starting the sending and receiving drums in phase, a slight interruption in the telephone or telegraph transmission may result in the drums running out of phase with a consequent loss of part of the picture at the receiver because of the non-phase relations between the overlap areas of the sending and receiving films.

The above-noted difficulty is considerable in those systems where the transmission is required to be effected without expert attendants or operators, such for example where a news reporter or photographer in the field must effect the transmission over the nearest available commercial telephone or telegraph line. I have found that by

fastening the films in the manner to be described, the above and other difficulties are entirely overcome, and furthermore no expert skill is required in loading the picture films on to their respective drums.

Thus prior to wrapping the picture sheet or film 1 (Fig. 1) around the drum 2, there is applied to said drum a strip 5 which has both faces covered with adhesive material. Preferably the strip 5 is flexible and of cloth or fabric base provided on both sides with adhesive coatings such for example as are customarily employed in so-called adhesive plasters. With this type of strip it is merely necessary to lay it longitudinally along the surface of the drum and by slight pressure it adheres to the drum surface. Preferably the strip 5 is placed on the drum parallel to the drum axis. The edge 6 of the film is then pressed against the exposed face of the strip 5 and the film is wrapped tightly around the drum whereupon the opposite edge 7 is also pressed against the strip 5. With this arrangement the film fits snugly around the drum and the opposed edges meet to form an almost invisible line 8. The reproducing film at the receiver is likewise fastened to its drum.

Should by any chance the sending and receiving drums start or run out of phase it would result merely in a different location of the line 8 in the received picture, however because of the fineness of this line it is possible to cut the received picture therealong and assemble the cut parts together to form the picture in its proper relation without deleting any noticeable part of the picture. Thus there is shown in full lines in Fig. 3 an extreme example of a picture reproduced in out-of-phase synchronism. If the picture had been reproduced in exact phase synchronism with the picture 1 at the transmitter, the line 8 at the transmitter would be at the edges 8' of the reproduced picture, however because of the out-of-phase synchronism this line is actually reproduced as indicated by the numeral 8''. When the completely reproduced picture is removed from the receiving drum it is then slit along the line 8'' and the section 9 is placed against the right hand edge of section 10 as shown by the dotted lines in Fig. 3 thus completing the picture. Because of the fineness of the line 8'' it is possible to assemble the two sections 9 and 10 without deleting any appreciable part of the picture, and this assembled picture may be used for reproduction by any of the well-known photographic processes.

While the above explanation has been given in connection with a picture film wherein the line 8'' is reproduced in a blank part of the picture field, it will be understood that where the picture covers the entire film, this line will cross the picture field and if ordinary overlap methods of fastening the films were employed the reproduced overlap area would blank out an appreciable strip of the picture. With the foregoing arrangement it is possible therefore to utilize substantially the entire area of the drum surface for picture transmission and reproduction.

While one specific embodiment of the invention has been illustrated, it will be understood that various changes and modifications may be made therein without departing from the spirit and scope of the invention.

What I claim is:

1. The method of mounting a picture sheet for facsimile scanning on a scanning drum through the intermediary of a strip of tape having adhesive material on opposite faces thereof which comprises, fastening the tape longitudinally of the drum solely by the adhesive on one face of the strip, then wrapping the picture sheet tightly around the drum so that the edges abut against each other, and pressing the abutting edges against the exposed adhesive on the other face of said tape.

2. The method of mounting a picture sheet for facsimile scanning on a scanning drum through the intermediary of a strip of tape having adhesive material on opposite faces thereof which comprises, attaching one end of the sheet to one face of the tape, pressing said tape against the drum surface to attach it thereto solely by the adhesion between the other face of the tape and the drum, wrapping the picture sheet tightly around the drum to bring the other end of the picture sheet into abutting relation with the first end and then pressing said other end against the exposed adhesive on said tape, whereby substantially the entire surface of the picture can be scanned.

3. In electro-optical apparatus, the combination of a scanning drum, a tape having adhesive material on both faces thereof and fastened longitudinally of the drum solely by the adhesive on one of said faces but in a readily removable manner, a picture sheet wrapped tightly around the drum with the edges in abutting relation and with the abutting ends fastened to said tape solely by the adhesive on the other face of said tape, whereby the entire area of the picture is available for scanning.

4. The method of facsimile transmission of a picture employing rotatable scanning drums at the transmitter and receiver which includes the steps of applying to each drum longitudinally thereof a removable member having adhesive material on opposite faces, wrapping the picture to be transmitted and wrapping the reproducing film tightly around their respective drums so that the edges of each film abut each other and are held in abutting relation by the adhesive on the exposed face of said members, whereby the entire area of the films is available for scanning, rotating the drums to reproduce the picture on the reproducing film then removing the reproducing film from the receiving drum, severing the reproduced film along the reproduced line corresponding to the line of abutment of the transmitted picture, and transposing the severed sections of the severed film to assemble them in the same order as the corresponding sections of the transmitted picture.

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