Dec. 5, 1944. C. J. YOUNG 2,364,580

FACSIMILE APPARATUS

Filed July 14, 1942

Fig. 1.

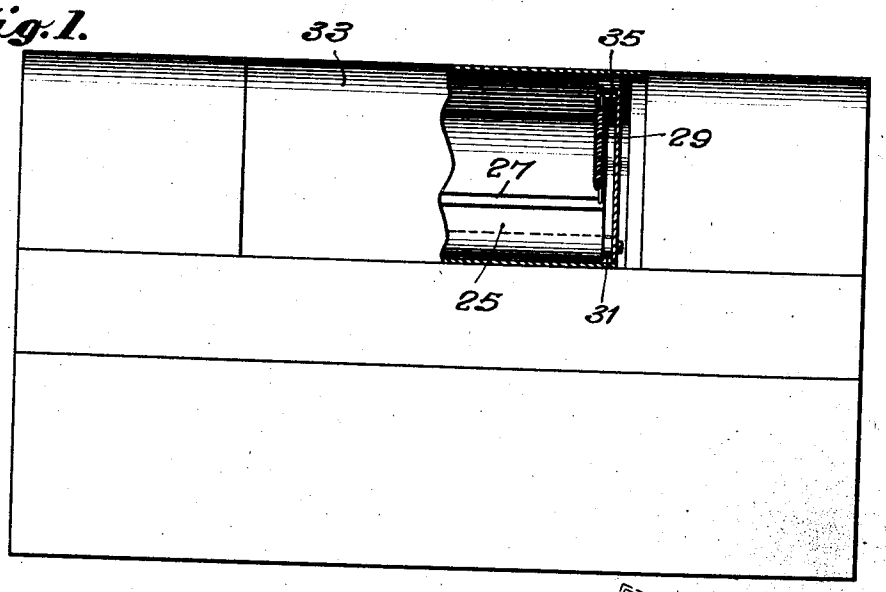
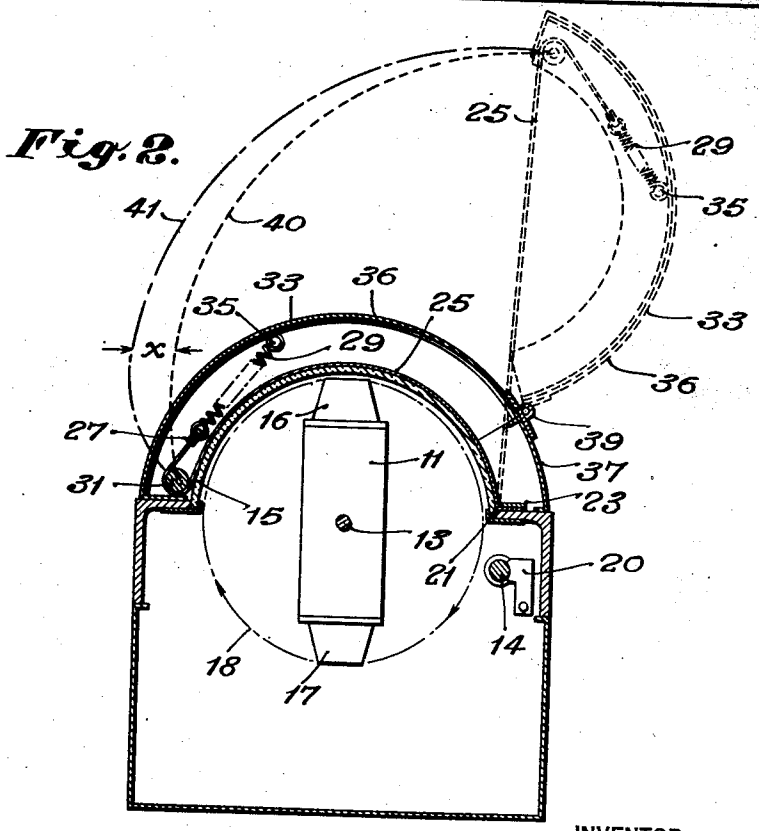


Fig. 2.



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FACSIMILE APPARATUS

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Application July 14, 1942, Serial No. 450,855

1 Claim. (Cl. 178—7.6)

This invention relates to facsimile apparatus and is concerned primarily with the transmitting type of such apparatus, although the invention is also applicable to certain forms of receiving apparatus.

The particular invention which is set forth by this disclosure is directed primarily to ways and means by which the record subject of which the electro-optical reproductions to be produced at a receiving point or the record subject upon which recordings of transmitted signals are to be produced at the receiving point, are held and securely fastened with reference either to a scanning or a recording element.

In facsimile apparatus which is designed with a special view to portability and light weight in equipment, as well as for the utmost rapidity in loading and unloading, it is desirable that the subject matter of which the image representation is to be transmitted or the subject matter as recorded be capable of being quickly inserted and removed from the machine, and, at the same time, securely held in the machine at all other periods.

In facsimile apparatus many and various systems have been provided for supporting the record subject relative to the scanning instrumentality, but, in most instances, these arrangements require that the subject itself be clamped or otherwise secured to the holder.

The present invention is so constituted that the record subject is adapted to be so placed or positioned relative to the supporting surface at which the scanning action takes place, that a mere closing of the cover of the scanning apparatus will cause subject matter to be held securely in place.

My co-pending application, Serial No. 440,923, filed April 29, 1942, for an invention entitled "Scanning apparatus," discloses but does not claim a form of arrangement whereby the record subject may be suitably held and supported relative to the scanning head by means of a pliant or flexible supporting sheet or wrapper arranged to be wound or drawn about the supporting surface and thereby to hold the record strip relative to the surface.

It has been found, in many instances, that the use of a flexible or pliant wrapper to secure the subject relative to the scanning head is unsuitable because the pliant material must be stretched when the cover is closed in such a manner as to hold the record material tightly against the supporting drum, and when the cover is open, it has been found that the variation in position of the strip of material is such as to make it very difficult, if not wholly impossible, to position and support the wrapper within the cover portion of the drum.

The present invention has, therefore, as one of its objects, that of providing an efficient and compactly designed holder arrangement for a message adapted to be supported in predetermined location relative to a scanning instrumentality in facsimile apparatus.

A further object is to provide a simplified form of record supporting element which will provide for rapid loading and unloading of the record sheet when the apparatus is in use.

Other objects of the invention are to provide an easily operated and efficient record holder, and at the same time to provide a record holder arrangement which overcomes one or more of the above mentioned and other defects found in the prior art.

The invention in its preferred form is schematically illustrated by the drawing, of which,

Fig. 1 is a front elevational view with the cover portion partly broken away, and

Fig. 2 is a transverse sectional view.

If reference is now made to the drawing, and also to the co-pending application herein referred to, it may be assumed that the scanning instrumentality 11 is adapted to rotate about a shaft 13, as shown, and in such manner that the scanning instrumentality together with its driving motor (not shown herein but illustrated more specifically by my co-pending application Serial No. 440,923, and also by my other application filed concurrently herewith as Ser. No. 450,856) shall be capable of being moved longitudinally, (that is, into and out of the plane of the paper, as illustrated by the cross sectional view) relative to the record supporting surface 15 as the scanning instrumentality rotates. The motion of the scanning head 11 is provided by means of the feed screw 14 engaging the feed nut 20, as explained particularly in my application Serial No. 440,923. The feed means per se forms no specific par' of this disclosure.

In a preferred arrangement, the scanning instrumentality 11, for use with the facsimile apparatus of the type disclosed, has contained therein an illuminating source which directs its light in each of two directions so as to strike and pass through optical elements or lens elements, conventionally represented as within each conical portion 16 and 17 of the scanning head 11. The drive means for moving the scanning device or scanning head longitudinally is not shown, but

it is to be understood that it comprises also a suitable prime mover which may or may not be controlled in its speed under the influence of suitable controlling signals.

The scanning head arrangement 11 is carried within a supporting housing and adapted to rotate, as indicated by the arrow, on the circumferential path 18, relative to the record supporting surface 15 which is adapted to carry a record strip upon which is the subject matter of which the image is to be transmitted, or which may be the surface upon which recording action is adapted to take place if the device is used for recording rather than transmitting.

The supporting surface 15 is preferably of a plastic nature so as to be substantially transparent to light, with the result that light generated by the light source, not shown, is adapted to pass through optical system in the ends 16 and 17 of the scanning device 11 to pass through the plastic material 15 to strike the record surface as held upon the plastic material which then serves as a supporting drum. In the case of a transmitting apparatus, the light which has passed through the plastic drum member 15 is then reflected back through the plastic material by reason of reflection from the subject to reenter the optical system of the scanning head, and, by being appropriately controlled in its path, to vary the current flowing through a suitable form of photo-electric cell and amplifier (not shown) so that current variations proportional to the intensity of light and shadow at elemental areas of the material for transmission as illuminated by the scanning head shall be produced, or, in the case of receiving apparatus, the light which is projected toward the record surface is adapted to be modulated under the control of received signals and then to cause preferably the production of a latent photographic image which is then removed from the scanning device and appropriately developed. Generally speaking, however, the disclosed instrumentality is more particularly adapted for use in the transmission of pictures, and the like, due to its simplicity and portability and because it is then unnecessary to provide light-tight shielding for inserting and removing the photographically sensitive record strip.

The record subject upon which the image is to be reproduced, or from which the image signals are derived, is adapted to be clamped or secured about the semi-cylindrical plastic supporting member 15 in such a manner that the one end or the other of the scanning head 11 is always adapted to scan the subject as the scanning head rotates. Thus, the record strip shall preferably wrap substantially 180° about the semi-cylindrical plastic supporting member 15 and, accordingly, shall be brought to bear upon the stop member 21 which is arranged to extend substantially longitudinally of the semi-cylindrical support.

At one side or edge portion of the semi-cylindrical support is a fastening member 23 for securing one end of a wrapper member 25 which is pliant and flexible, but substantially unstretchable, and which is of a width corresponding to the length of the semi-cylindrical plastic support. The other end of the wrapper member is secured to a clamp member 27 which, in turn, is fastened at its opposite end to a resilient member 29. A suitable guide pulley means 31 is secured at one end of the housing cover 33 and provides a convenient means by which the wrapper may be drawn almost completely about the semi-cylindrical record support to hold the record thereto. The opposite end of the resilient member 29 from that fastened to the wrapper is rigidly secured or anchored by a pin 35 to the cover member for the housing proper, and likewise, the pulley member is supported within the cover portion so as to appropriately hold the wrapper member.

The cover portion for the housing is formed in two sections 36 and 37 so that the one section 36 is in the nature of a sector-shaped portion which extends upwardly from the main housing support, as indicated. The other section 37 of the cover which is adapted to support the wrapper member is an enlarged section which has one edge pivoted along the hinge 39 to the upper end or edge of the sector-shaped portion, and the other end is adapted to rest upon and to be appropriately secured to the housing proper.

As the cover opens, the roller 31 follows the substantially circular path shown by the line 40. At the same time, the free edge of the subject copy, whose other edge is held by the wrapper close to clamp 23, follows an epicycloidal path 41. From this diagram it will be seen that the opened cover and wrapper give just the right area of support when the subject copy is placed in position for loading; and, what is more important, the general conformity of the two curves shows that only a small change in wrapper extension need be absorbed by spring 29 which is represented by distance x in Fig. 2. This results from the unique positioning of the hinge 39 with reference to the plastic cylinder 15. At the same time, the tensioned wrapper can completely open without interfering with hinge 39. Other positions of hinge 39 are not practical as they demand much greater variations in wrapper position and more space in the cover for the take-up springs.

It thus can be seen that the resilient spring member 29 which fastens to one end of the wrapper 25 may easily be located and secured within a limited space within the cover member section 36, and that it provides an adequate range of extension such that when the cover member is open and is pivoted about the pivot or hinge member 39 extending longitudinally of the cover at the junction of the two cover sections, there will be provided a suitable means by which the record material proper may be removed and a new record strip interposed.

It is, of course, apparent that when the cover section is closed about the hinge, the closing of the cover causes the wrapper 25 to be drawn tightly around the semi-cylindrical record support element 15, and with the complete closing of the cover, tension is exerted upon the resilient member so that the wrapper member is held in very close contact with the record and the upper or outer surface of the transparent semi-cylindrical plastic support member. With this arrangement it is, of course, apparent that the scanning element, as it rotates within the semi-cylindrical support member, shall preferably be mounted so that its axis of rotation is at the center of the semi-cylindrical support, and in this way, alternate or opposite optical elements of the scanning head are always beneath the support element, so that the record material is either being scanned or a record is being produced, assuming, of course, that the record strip shall extend throughout the entire surface area of the support.

In the selection of a wrapper material it is important that consideration be given so that the

wrapper shall be formed as a pliant and flexible member but shall be substantially non-stretchable, since any sliding contact on the surface of the plastic support element will tend to scratch it and thus require replacement for satisfactory use in the facsimile transmission.

Suitable means may be provided for rigidly securing the cover portion to the housing proper to prevent opening of the cover at times during the transmission or reception of the picture images.

What I claim is:

A scanning device comprising a partially-cylindrical transparent support surface for supporting on its external surface area a record subject to be scanned, a scanning element adapted to be moved internally of the support member for scanning the supported record subject, a pliant wrapper member secured at one of its ends to substantially one edge portion of the said partially-cylindrical support member, a cover member for housing the said partially-cylindrical support and the said wrapper member, means for securing the opposite end of said wrapper member to the cover portion of said housing so that when the cover portion is closed the said wrapper member is adapted to wrap about the partially-cylindrical support member and to cover substantially the entire area thereof, said fastening means to said housing comprising a resilient means whereby the pliant wrapper member may be tightened over the outer surface of the said record support member, and a cover hinge means supported externally of the outer surface of the said partially-cylindrical support member for hinging the said cover, said hinge being located in a position such that the wrapper member is substantially tangent to the partially-cylindrical support member when the housing is open, and so located that opening of the housing will result in a minimum variation in length of the wrapper member between open and closed positions of the said cover member.

CHARLES J. YOUNG.