

July 11, 1950

J. SCHAUER
SHEET HOLDING MECHANISM FOR FACSIMILE
RECORDERS AND THE LIKE

2,514,974

Filed June 25, 1948

2 Sheets-Sheet 1

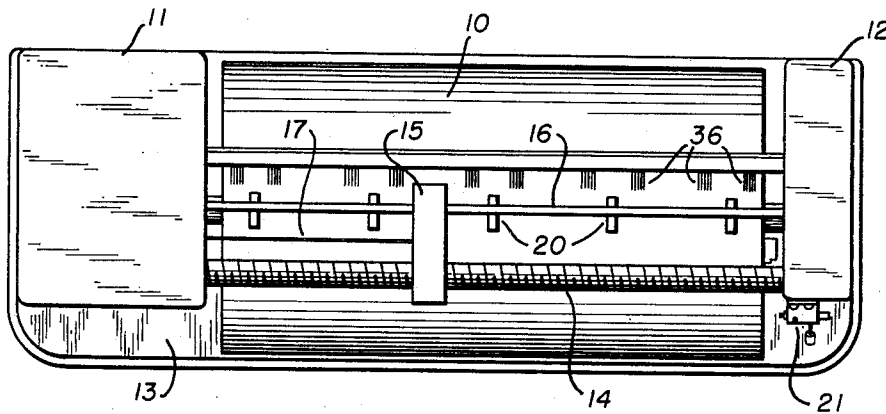


FIG. 1

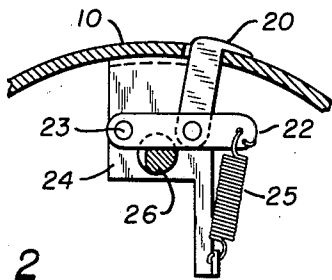


FIG. 2

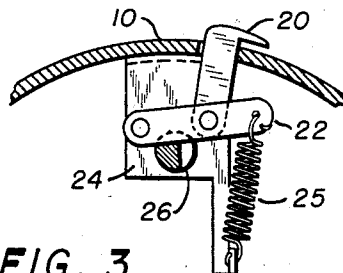


FIG. 3

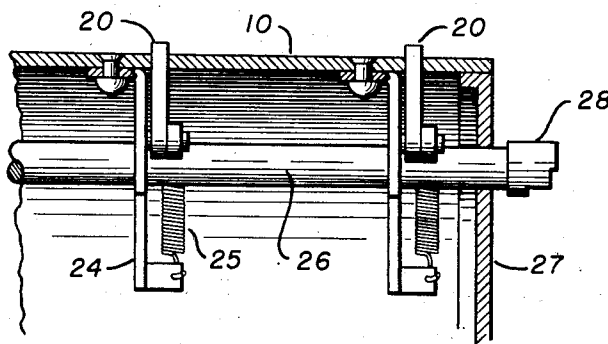


FIG. 4

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FIG. 5

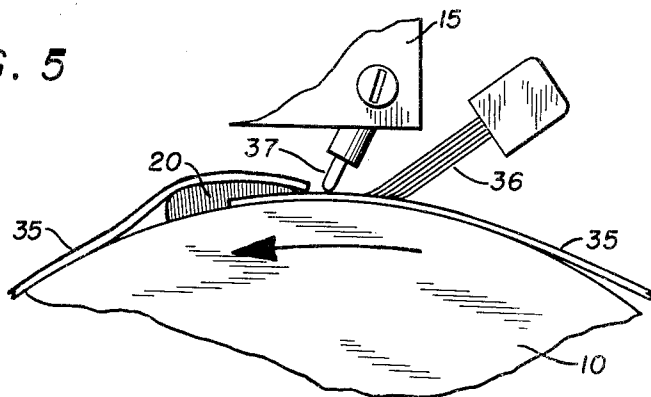


FIG. 7

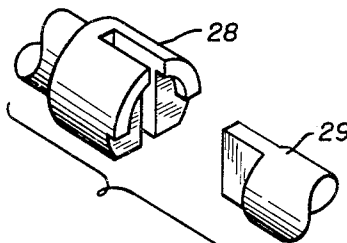
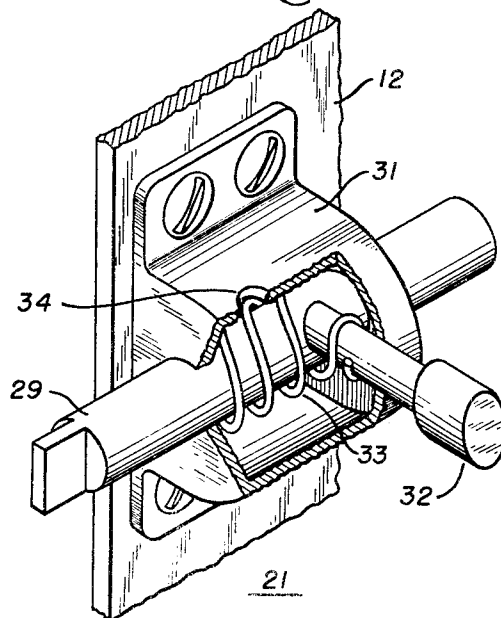


FIG. 6



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2,514,974

SHEET HOLDING MECHANISM FOR FAC-
SIMILE RECORDERS AND THE LIKE

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Application June 25, 1948, Serial No. 35,150

6 Claims. (Cl. 346—138)

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This invention relates to improvements in sheet-holding mechanism for facsimile recorders and the like, and more particularly to mechanism designed to facilitate the loading or mounting of the recording sheet on the movable carrier or drum.

In drum-type recorders, it is necessary to secure the sensitized film or paper tightly on the drum without wrinkles or bulges. Heretofore the recording sheet has usually been clamped at both ends, as by a clamping bar on the face of the drum. In loading the drum with this arrangement, it is necessary first to clamp one edge of the sheet and then rotate the drum, pressing the sheet tightly with the fingers against the drum surface. Then the free edge of the sheet is tucked underneath the clamping bar while it is held tight, the drum being held with one hand while the sheet is maintained smooth and clamped. Considerable manipulative skill is required to mount the sheet properly and rapidly with such an arrangement. It is also desirable to reduce rubbing of the sheet to a minimum to avoid smudging or smearing the surface. In general terms, the object of the present invention is to provide an improved construction which will permit the recording sheet to be secured properly upon the drum quickly and easily by an unskilled operator.

Another object of the invention is to provide improved means for locking the drum against rotation when the clamping means is actuated, thus leaving both hands free for handling the sheet. This is especially helpful in the case of some varieties of stylus recording paper which are light and flimsy, tending to curl up at the edge where it is to be clamped or lie unevenly upon the drum, particularly where a large sheet is used. Often both hands are required to mount such a sheet properly upon the drum.

Another object of the invention is to reduce the weight and complexity of the sheet-clamping mechanism carried by the drum.

Still another object of the invention is to provide a releasable sheet-holding arrangement which will enable recording to be effected around the entire periphery of the drum. Heretofore a considerable part of the drum periphery was covered by the clamping bar, which might be from one-half to one inch wide, for example. In this case, if during transmission the recorder drum was not properly phased with the drum of the transmitter, as sometimes happens, the recorder might fail to reproduce a portion of the transmitted copy. This drawback is avoided by em-

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ploying a recording sheet which covers the entire surface of the drum. In general, this can be accomplished by clamping the sheet at one edge only across the width of the drum, with the free opposite edge overlapping the clamped edge. In accordance with the invention, the preferred clamping means consists of several claws, each independently mounted inside of the drum with only the tip ends projecting through the drum to engage one edge of the recording sheet, and brushes or other stationary pressure devices to hold the free end of the sheet against the surface of the rotating drum. On account of the small size of the exterior portions of the claws, the recording sheet contacts the surface of the drum over substantially its entire area, and recording may be effected over the entire recording sheet except underneath the lapped edge.

Other objects and advantages of the invention will appear from the following description of the preferred embodiment thereof shown in the accompanying drawings, wherein

Fig. 1 is a top or plan view of a facsimile recorder of the drum type;

Figs. 2, 3 and 4 are detail views to an enlarged scale of the claws and their supporting and actuating mechanism;

Fig. 5 is a detail view showing the relation between the clamping means, stylus and pressure brushes in one angular position of the drum;

Fig. 6 is a perspective view of the manually operable control device for locking the drum against rotation and actuating the cam bar; and

Fig. 7 is a fragmentary view of the opposed cooperating ends of the control member and of the cam bar carried by the drum.

Referring to Fig. 1, a facsimile recorder is shown having a rotatable drum or cylinder 10 serving as a carrier for the recording sheet. The drum 10 is rotatably supported between a motor housing 11 and an upright frame member or housing 12 mounted on a base 13. The housing 11 encloses the conventional motor driving mechanism (not shown) as well as the synchronizing and control mechanisms for the drum 10. A threaded leadscrew 14 is mounted above the drum 10 parallel to the axis thereof and adapted to engage a movable stylus carrier 15 to which current is supplied through the conducting bar 16. In the embodiment shown, the stylus carrier 15 is adapted to traverse the drum 10 from left to right as the screw 14 turns during recording; when released from the feedscrew, the stylus carrier 15 is returned to its normal or starting position by the usual spring means acting through

a cord 17 attached to the carrier. The detailed construction of the recorder, except for the drum and paper clamping mechanism forms no part of the present invention except as elements thereof are used in connection with the drum and associated parts.

In the preferred embodiment of the invention, a plurality of separate claws 20 are mounted on the drum for clamping one edge of the recording sheet on the surface thereof. The drum itself as well as the claws 20 are arranged to be controlled by a drum-loading control device or actuator 21 mounted on the vertical front face of the frame member 12 (see Figs. 1 and 6). As shown more clearly in Figs. 2, 3 and 4, the claws 20 are each pivoted on a rocker arm 22 which in turn is pivoted at the point 23 on a fixed bracket 24 secured to the inside of the drum 10. The rocker arms 22 are normally urged toward the center of the drum by means of springs 25 but may be lifted to raise the claws above the surface of the drum by turning a notched cam bar 26 to the position shown in Fig. 3. In this position the cam elements of the bar 26 raise the claws 20 so that one edge of the recording sheet may be inserted beneath the claws and will be clamped securely to the drum when the operating cam bar 26 is turned to its alternate position shown in Fig. 2. The separate mounting of each of the claws 20 insures the positive engagement of each claw with the edge of the sheet irrespective of variation in the surface of the drum 10 or of the size or configuration of the claws 20, rocker arms 22 or the cam bar 26. Another feature of the construction shown is the detent formed by the flat-bottomed notches in cam bar 26, tending to hold the claws 20 in their raised position until the cam bar is positively actuated to the clamping position.

The cam bar 26, as shown in Fig. 4, extends through the end bell 27 of the drum and is provided at the outer end with a socket member 28 adapted to be engaged by the key or flat end of manually operable actuator or control bar 29 of the actuator device 21. The actuator bar 29 is rotatably and slideably mounted in a stationary housing or bracket 31 as shown in Fig. 6. The bar 29 is further provided with an operating handle or thumbpiece 32 projecting through the front of the housing 31 and normally urged downwardly to the position shown by a spring 33. The handle 32 projects through an L-shaped slot in the housing 31, the top of which is shown at 34 in Fig. 6. Normally the bar 29 is out of the path of the socket 28 on the bar 26 which rotates with the drum. However when the bar is projected to the left by sliding the handle 32 with the fingers, rotation of the drum will cause the socket 28 of the cam bar 26 to move into locking engagement with the key formed on the bar 29, thereby stopping the rotation of the drum; or the drum may be turned by hand until the bar engages the socket 28. When the handle 32 is then lifted against the upper end of the slot 34, the turning of the bar 29 actuates the cam bar 26 to lift the claws 20 from the surface of the drum. The claws, cam bar and actuator are releasably held in the actuated position by the detent formed by the flats on the cam bar as described above. In this position and while the drum is locked against rotation, the recording sheet 35 can be removed from or a fresh sheet inserted under the claws 20. The manually operable actuator device is then returned to normal by pressing down on the thumbpiece 32 and the bar 29 withdrawn

from the socket 28 by pushing the handle to the right or releasing it for return by the spring 33. This operation clamps the sheet at one edge to the drum and releases the drum for rotation during the recording operation. Preferably the spring 33 is arranged to effect clamping of the sheet and to reset the actuator by merely touching the handle 32 to overcome the detent action which holds the arms 22 and claws 20 in raised position.

As shown in Fig. 5, the sheet 35 is preferably held at only one edge by the claws 20, the trailing edge of the sheet being controlled sufficiently to prevent it from flapping away from the drum, particularly adjacent the stylus, by one or more series of stationary brushes 36. The stylus 37 is detachably supported on the carrier 15 so as to engage the recording sheet with a light, uniform contact or pressure as required for optimum results with electric-current recording while at the same time the stylus is arranged to ride over the slight protuberances formed by the claws 20. Since the claws only project slightly above the surface of the drum, the pivotal or retractable mounting of the stylus needle does not offer any particular difficulty, and may be, for example, similar to that used in standard military equipment described in technical manual TM11-2258 or as shown in the prior application of P. L. Grafstein and A. G. Cooley, Ser. No. 781,090, filed October 21, 1947. The length of the recording sheet 35, as indicated in Fig. 5, may be sufficient to overlap at the ends. This arrangement has the advantage that if the drums of the transmitter and recorder are not accurately phased during the recording cycle, no reproduction is lost because of the failure to provide registration of the clamping devices on the respective units. A shorter sheet for smaller copy may also be employed, if desired, since a particular length of sheet is not required for the clamping arrangement described.

It will be apparent that by the use of the invention a sheet or film of any length within reasonable limits may be quickly mounted on the drum 10 without the exercise of a high degree of manipulative skill. The drum is stopped and locked in position by the control device 21 at the initial stage of the loading operation. If the drum is not being rotated by the driving motor, it may be turned by hand until the socket 28 on the cam bar engages the end of the actuator bar 29. When the bar 29 is turned by the handle 32 to operate the claws 20 to the "open" position, the elements 26, 28 and 29 are yieldingly held in the actuated position by the detent against the returning force of the spring 33. After the edge of the paper or film is slipped underneath the claws 20 on the stationary drum, the handle 32 is flipped downward, thus depressing the claws 20 to clamp the sheet and releasing the drum.

While the invention has been described in connection with the detailed construction of a facsimile recorder, obviously it may be used in connection with any similar type of machine in which a sheet has to be secured in position upon a drum or other carrier. For example, the invention may be applied to a facsimile transmitter, but is of particular value in the electric-current type of recorder employing a stylus needle riding in contact with the recording sheet since special problems are encountered in the use of an ordinary paper clamp with a machine of this particular type, where the needle may strike the clamp as the drum rotates. Various modifications in the detailed construction shown and de-

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scribed above will occur to those skilled in the art and may be made without departing from the scope of the invention as set forth in the appended claims.

I claim:

1. In a facsimile recorder of the character described, a stationary support or frame, a rotatable drum thereon for supporting the recording sheet, means including a movable clamping member for detachably securing one edge of the sheet on said drum, cam means on said drum for lifting said clamping member and manually-operable means on said support or frame for actuating said cam means to clamp and release said sheet, said cam means and manually operable means having engageable key and socket elements.

2. In a facsimile recorder of the character described, a support or frame, a rotatable drum thereon for supporting the recording sheet, means for detachably securing the sheet on said drum, said means including an operating element projecting from one end of said drum, and an actuator for said securing means, said actuator being mounted on said support or frame and movable to engage said operating element and lock the drum against rotation at a predetermined point in the rotation of the drum.

3. In a facsimile recorder of the character described, a stationary support or frame, a rotatable cylinder or drum thereon for supporting the recording sheet, a sheet-clamping member for holding one edge of a sheet on said drum, said member being movable into sheet-holding and releasing positions respectively, a clamp-operating bar for moving said clamping member, said bar being mounted on the rotatable drum and projecting beyond one end of the drum, and manually operable means on said support or frame adjacent one end of the drum for actuating said operating bar, adapted when operated to engage said operating bar at a predetermined point in the rotation of the drum and to control the movement of said sheet-clamping member from the holding to the releasing position.

4. In a facsimile recorder of the character described, a stationary support or frame, a rotatable drum thereon for supporting the recording sheet, a series of movable claws arranged along the length of the drum for holding the recording sheet on the drum, a movable claw-operating bar

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on the drum provided with cam surfaces for simultaneously controlling the jaws to clamp or release the sheet and a stationary control device on said support or frame adjacent one end of said drum and having a slidable key portion disposed in a position to engage and actuate said operating bar at a predetermined point in the rotation of the drum.

5. In a facsimile recorder of the character described, a stationary support or frame, a rotatable drum thereon for supporting the recording sheet, a sheet-clamping member for securing one edge of the sheet on said drum, a movable clamp-operating bar on said drum for actuating said clamping member, said operating bar being provided with a socket on one end adjacent one end of the drum, and a movable key-shaped control member on said support or frame mounted so as to be movable into engagement with the socket on said clamp-operating bar to lock the drum against rotation and control the sheet-clamping member.

6. In a facsimile recorder of the character described, a support or frame, a rotatable drum thereon for supporting the recording sheet, means for detachably securing one edge of the recording sheet on said drum, a movable operating bar for actuating said securing means mounted on and projecting from one end of said drum and a controlling device on said support or frame for controlling said operating bar to clamp or release the sheet from the drum, said controlling device comprising a slidable plunger and a spring normally tending to hold said plunger in a retracted position, said plunger being mounted and arranged to engage said operating bar at a predetermined point in the rotation of the drum.

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