

June 29, 1937.

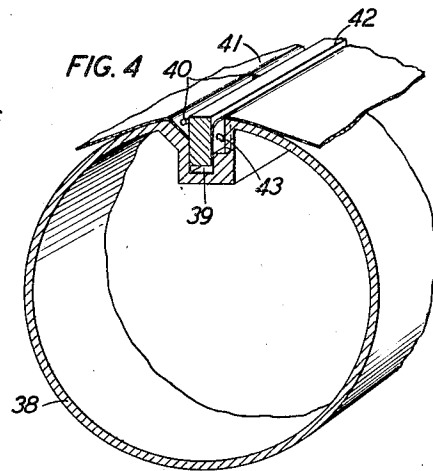
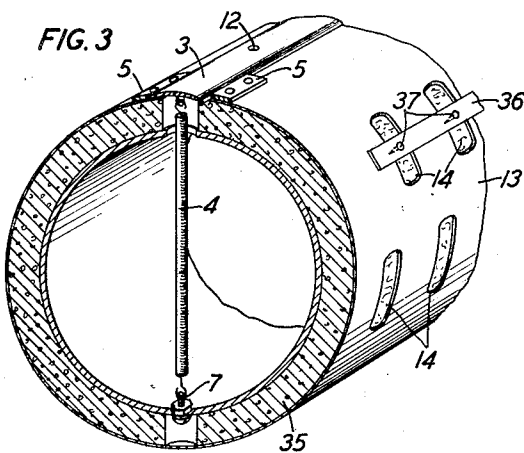
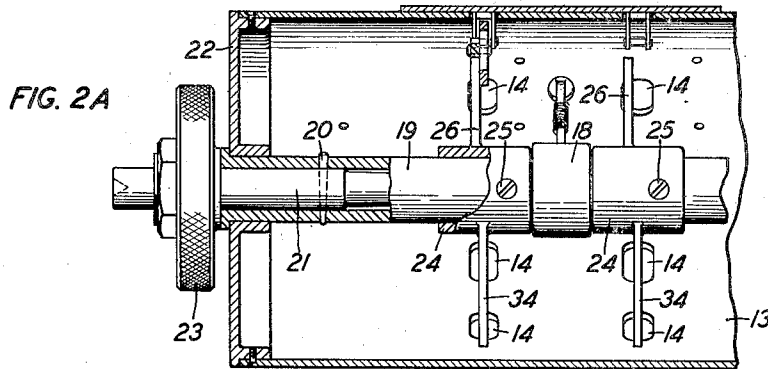
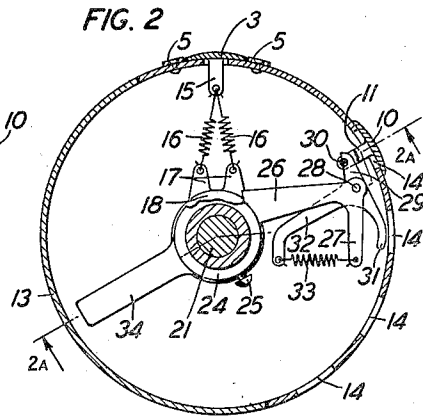
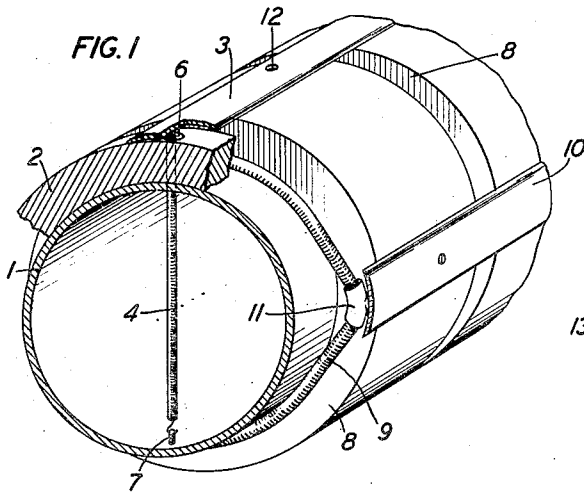
M. C. GAUTHIER

2,085,093

SHEET HOLDING MEANS

Filed Sept. 6, 1933

3 Sheets-Sheet 1



INVENTOR
M. C. GAUTHIER
BY *J. P. Mille*

ATTORNEY

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M. C. GAUTHIER

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3 Sheets-Sheet 2

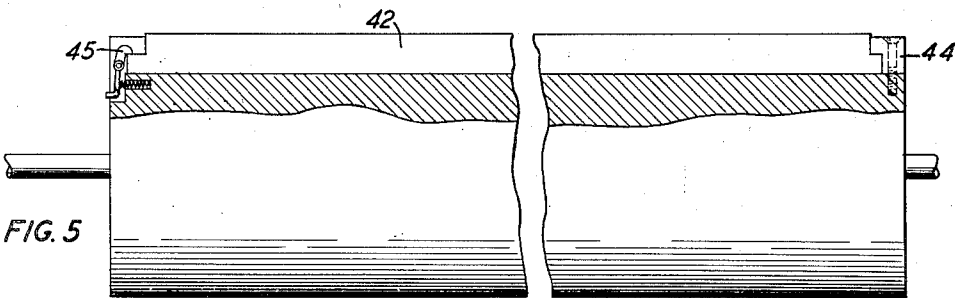


FIG. 5

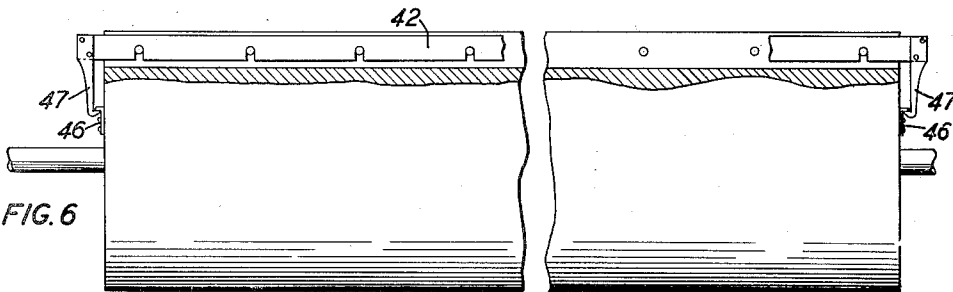


FIG. 6

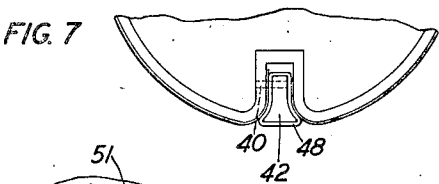


FIG. 7

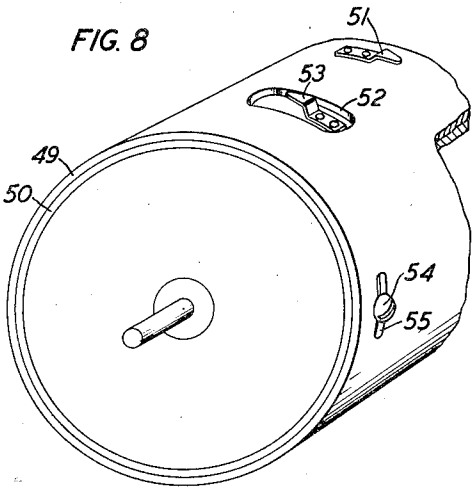


FIG. 8

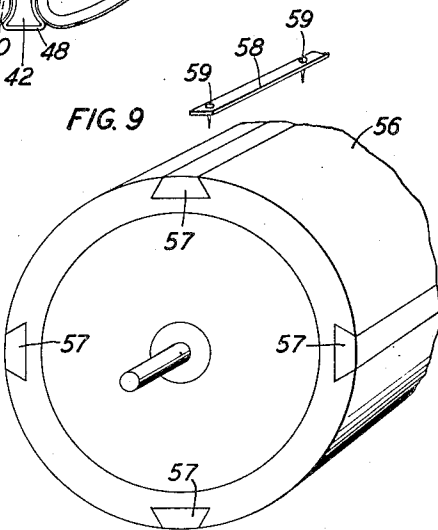


FIG. 9

INVENTOR
M. C. GAUTHIER
BY *T. M. Mille*

ATTORNEY

June 29, 1937.

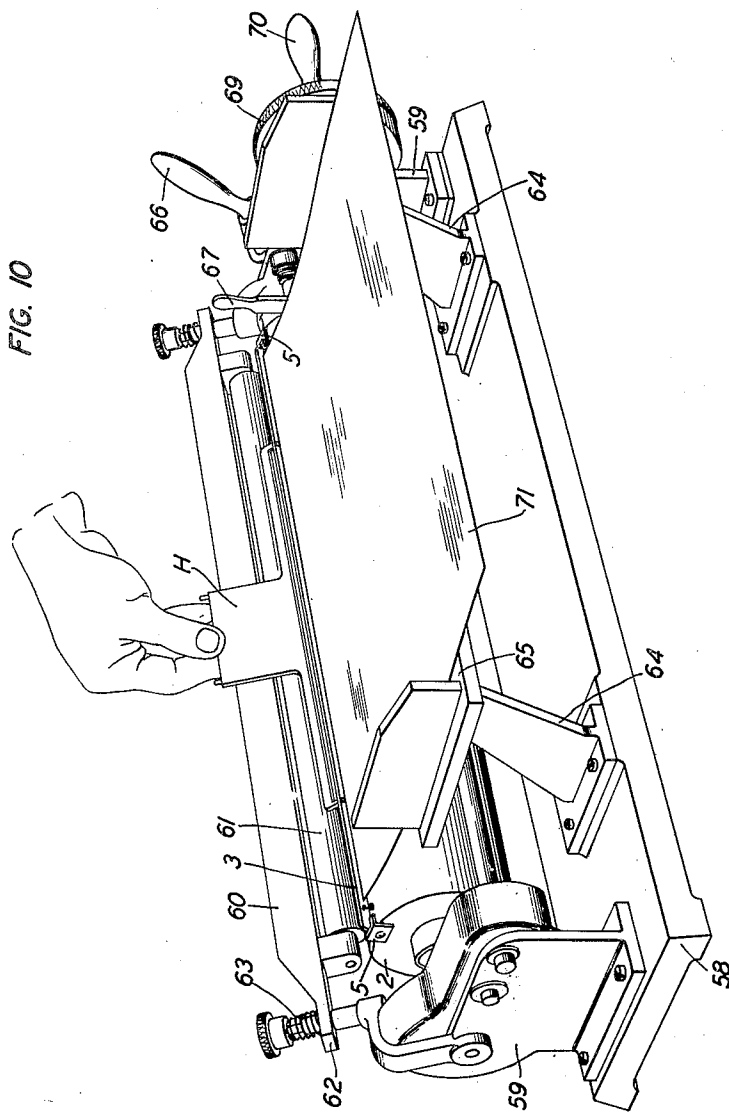
M. C. GAUTHIER

2,085,093

SHEET HOLDING MEANS

Filed Sept. 6, 1933

3 Sheets-Sheet 3



INVENTOR
M. C. GAUTHIER
BY *J. A. Neville*

ATTORNEY

UNITED STATES PATENT OFFICE

2,085,093

SHEET HOLDING MEANS

Marcel C. Gauthier, Montclair, N. J., assignor to
Bell Telephone Laboratories, Incorporated,
New York, N. Y., a corporation of New York

Application September 6, 1933, Serial No. 688,329

13 Claims. (Cl. 178—5)

This invention relates to sheet holding arrangements and more particularly to methods of and means for mounting sheet material on a cylindrical surface in definite relationship thereto.

5 The prior art includes sheet mounting devices in which each end of the sheet is provided with a metallic strip, at least one of which has on one of its faces projecting pins which extend through openings in the cylinder, and on the other face
10 both strips are provided with projections or hooks which are engaged by resilient means for holding the sheet in intimate contact with the surface of the cylinder.

15 It has heretofore been proposed to provide a sheet of material with a set of apertures spaced apart along the length of both ends or edges, which are adapted to extend into a longitudinal groove in a cylinder, into which groove extend a plurality of sets of projections or fingers, the
20 ends of which occupy a position intermediate the depth of the groove and are adapted to pass through the sets of apertures respectively provided in the ends of the sheet. One set of fingers is substantially stationary with respect to the cylinder, while the other set is carried by a member
25 mounted on but movable with respect to the cylinder. This member is controlled by a spring to maintain the fingers carried by it in a position remote from the stationary fingers, but it is adjustable to move the fingers toward the stationary set to apply a uniform tension to the sheet, which is thereby drawn into firm contact with the periphery of the cylinder. A ratchet and pawl are provided to lock the member in adjusted
30 position.

35 It has also been proposed to provide a cylinder with two longitudinal grooves adjacent each other and with two spring controlled members pivoted on the cylinder. One member carries an offset head which, because of the spring, is moved into engagement with one end of the sheet and forces it into one of the grooves in which it is securely held; while the other member carries a roller,
40 which, because of the spring control, serves to wrap the sheet smoothly on the surface of the cylinder and then forces the other end of the sheet into the second groove and holds it securely therein.

45 The present invention contemplates a cylindrical support and an arrangement for securely mounting thereon sheet material the ends of which are neither apertured nor provided with reinforcing strips, and also a simplified means for the same purpose adapted for use with sheet
50 material having apertured ends.

In one aspect, the invention comprises a cylindrical support and a narrow strip which extends longitudinally thereof and is secured thereto by springs adapted to hold it in contact with the outer surface of the cylinder but permit it to be tilted about its respective edges; whereby a sheet of flexible material may be wrapped around the support and have its ends inserted between the latter and the spring controlled strip which thereby serves to securely hold the sheet in fixed
5 position on the support. Preferably the cylinder is provided with circumferential grooves, spaced apart longitudinally thereof, and each enclosing a spiral spring extending completely around the section of reduced diameter. These springs
10 are adapted to be engaged by hooked projections carried by auxiliary strips, which are thereby held in contact with the outer surface of the cylinder but are adjustable to any position circumferentially thereof, whereby there is provided means
15 which cooperate with the main strip for securing to the surface of the cylinder sheets of a width equal to or less than the length of the cylinder and of any length less than that of the circumference of the cylinder.

20 In another arrangement for use with a cylindrical support and adapted for mounting sheets of different lengths, less than the circumference of its surface, the cylinder is provided with sets of aligned slots at different circumferential distances from the main strip, and, in one embodiment, a number of adjustable spring controlled
25 pawls are rotatably mounted interiorly of the cylinder so that they may be moved into alignment with any set of slots to engage projections carried by an auxiliary strip and inserted through the slot. The auxiliary strip is thereby held in contact with the outer surface of the support. In
30 a second embodiment the slotted cylinder encloses a cork cylinder, and an auxiliary strip is provided having pins or thumb tacks which project through slots of any set and into the cork. In each of these embodiments auxiliary strips may cooperate with the main strip to secure on the support sheets of a width equal to or less than
35 its length and of different lengths less than its diameter, or a plurality of auxiliary strips may be used for the same purpose. However, such embodiments will only accommodate sheets of fixed lengths, i. e., lengths determined by the distance of the respective sets of slots from the main strip or between two sets of slots.

40 A third arrangement comprises a cylinder having a longitudinal groove into which project pins mounted on one of its walls and adapted to en-
55

gage a set of perforations in one end of a sheet, a set of perforations in the other end of the sheet is engaged by pins carried by a bar, which is inserted in the groove and locked therein.

5 A fourth arrangement comprises a support made up of two concentric cylinders each provided with a set of pins for engaging perforations in the respective ends of the sheet, the cylinders being rotated to draw the sheet into intimate
10 contact with the surface of the outer cylinder around which it is wrapped, and then locked in adjusted position by a set screw. One set of pins is carried by the outer cylinder, which is provided with slots through which project the
15 set of pins carried by the inner cylinder.

An object of the invention is to provide a unitary member which cooperates with the cylindrical support to securely hold sheet material thereon.

20 Another feature relates to the provision of means, adjustable with respect to the support and adapted to cooperate with a unitary member, for securing to the support sheets of different lengths.

25 Still another feature relates to means adjustably mounted on the support for securing thereto sheets of any length less than its circumference.

A further feature relates to the provision of a radially actuated member for securing sheet material to a cylindrical support.

30 The invention will be described in detail in connection with the attached drawings as applied, by way of example, to the revolving picture or film carrying drum of a picture transmission system.

35 Fig. 1 is a perspective view partially in section of a portion of a picture drum having spring controlled main and auxiliary strips;

40 Figs. 2 and 2A are end and longitudinal sectional views, respectively, of portion of a drum provided with a second type of securing means for the main and auxiliary strips;

Fig. 3 is a perspective view, part in section, illustrating thumb tack auxiliary strips;

45 Figs. 4 to 6 show a drum provided with means for securing thereto sheet material having apertured ends;

50 Figs. 7 to 9, respectively, illustrate means, somewhat different from those shown in the preceding figures, for securing sheet material on a cylinder; and

Fig. 10 shows an apparatus for applying the sheet material to the cylinder.

55 Referring to Fig. 1 there is shown in perspective and partially in section a portion of a cylinder or drum comprising an inner tube 1 surrounded by and having secured thereto an outer tube 2 which may be of any desired diameter and length, determined by the nature of the apparatus in which it is to be used, the purpose for which it is designed and by mechanical considerations.

60 A bar or strip 3 extends longitudinally from one end of the cylinder to the other and is held in contact with its outer surface by a series of springs 4 only one of which is shown. Each end of the cylinder is provided with a pair of cleats 5, shown in Figs. 2 and 3, adapted to engage the edges of strip 3 and thereby prevent its movement peripherally of the cylinder. The springs 4 are spaced apart along the length of the cylinder, each has one end connected to the bar or strip, passes through an aperture 6 in the cylinder, and has the other end connected to any eye
75 or projection 7 mounted on the interior wall of

tube 1 opposite the opening 6. Spaced apart along the length of the cylinder, the outer tube 2 is provided with circumferential grooves 8, two of which are shown. Each groove is provided with a spiral spring 9 of such length that it completely
5 surrounds the section of reduced diameter and is under tension when in engagement with the bottom of the groove.

Auxiliary strips 10 are provided and carry depending hooks or projections 11 which may be
10 inserted into two or more of the grooves and engaged with two or more of the spiral springs 9. These strips may be of the same length as the strip 3 or of a lesser length.

The main strip 3 and auxiliary strips 10 are
15 provided with apertures 12 into which pins carried by a hand tool H (Fig. 10) may be inserted for the purpose of tilting the strip about its edges, whereby the ends of a sheet may be inserted between the cylinder and the strip.

20 A sheet of material which is substantially equal in length to the circumference of the cylinder, i. e., less than the circumferential length by an amount sufficient to clear the springs 4, whether it is of a width equal to or less than the length
25 of the cylinder, may be securely mounted thereon by tilting strip 3 about one edge, inserting one end of the sheet between the cylinder and the raised edge of the strip and allowing the latter to return to its normal position, thereby gripping this end in place; after wrapping the sheet smoothly around the cylinder, strip 3 is tilted about the edge already in engagement with the sheet, the other end of the sheet is inserted between the cylinder and the raised edge of the strip and the latter is permitted to return to its normal position whereby this end is gripped and hence the sheet is firmly held in engagement with the surface of the cylinder. Under the conditions described above, no auxiliary strip is used.

30 A sheet of material of a lesser length than the circumference of the cylinder may be mounted thereon by securing one end of the sheet to the cylinder by means of the main strip 3, as described above, the projections 11 carried by an auxiliary strip 10 are engaged with two or more of the springs 9 and the strip is adjusted circumferentially of the cylinder to a position, removed from the main strip, by a distance equal to the length of the sheet. The auxiliary strip is tilted
50 about its edge remote from the main strip and the other end of the sheet is inserted between the cylinder and the raised edge of the auxiliary strip, which is permitted to return to normal position under the action of the springs 9.

55 If it is desired to mount a second short sheet in line with the first, the auxiliary strip is tilted about the edge in engagement with the first short sheet, the end of the second sheet is secured by permitting the auxiliary strip to return to its normal position and the other end of the sheet is secured by applying, adjusting and manipulating a second auxiliary strip 10 in the manner described above, or by manipulating the main strip 3 as described above. The auxiliary strips, being
65 readily associable with the springs 9 and freely adjustable circumferentially of the cylinder, provide means which permit sheet material of any length less than the diameter of the cylinder and of any width equal to or less than its length, to be secured on the cylindrical surface either in alignment with each other peripherally of the cylinder or in nonrelated positions.

70 In Figs. 2 and 2A there is shown a cylinder 13 provided with a series of slots 14 longitudinally

aligned to constitute sets and a main sheet securing strip 3, maintained in peripheral position by cleats 5 and provided with lugs 15 adapted to be engaged by one end of springs 16. The other ends of the springs 16 engage lugs 17, carried by a sleeve 18 loosely mounted on a second sleeve 19, which is connected by a key 20 to a shaft 21 adapted to extend beyond the end plate 22 of the cylinder. The projecting end of the sleeve 19 is provided with a button 23. The sleeve 19 carries a series of short sleeves 24 each coupled to sleeve 19 by a set screw 25 and each provided with a radial arm 26 having a right angle extension 27. A substantially T-shaped element is pivoted at 28 on the outer end of the arm 26. One arm 29 of the T-shaped element is provided with notch 30, the other arm 31 is adapted to engage the inner surface of the cylinder and the main member 32 of the T-shaped element has an offset end connected by a spring 33 with the right-angular portion 27 of the arm 26. The sleeves 24 are each provided with a second arm 34 for a purpose to be described later.

A sheet of circumferential length is mounted on the cylinder 13 in the manner described above with respect to the cylinder of Fig. 1. To secure a short length of sheet material on the cylinder the button 23 is rotated, for example, in a clockwise direction to position the arms 26 with their pivoted elements or pawls slightly beyond the desired set of slots 14, an auxiliary strip 10 is applied to the cylinder with its lugs 11 projecting through the set of slots 14, and the button 23 is reversely rotated to cause the notches 30 of arm 29 to engage the lugs 11. The springs 33 serve to hold the auxiliary strip in contact with the outer surface of the cylinder 13, so that the strip may be tilted about its edges.

Having secured one end of the short sheet in place by means of the main strip 3, the auxiliary strip is tilted and the other end of the sheet is inserted between the cylinder and raised edge of the strip which is then released to engage the underlying end of the sheet. To remove an auxiliary strip 10 after a short sheet held thereby has been used, a hand tool is inserted through a set of slots, other than that with which the auxiliary strip is associated, to engage the arms 34 which are actuated to rotate the sleeve 24, whereby the pawl is released from engagement with the lugs 11.

The arms 26 may be adjusted to a position opposite any set of slots and hence an auxiliary strip may be used in conjunction with the main strip for securing to the cylinder a sheet of any one of a series of fixed lengths, less than the circumference of the cylinder, and of any width equal to or less than the length of the cylinder.

The construction shown in Fig. 3 is similar to that shown in Fig. 2, except that the cylinder 13, having slots 14 and provided with the spring-held strip 3, surrounds a second cylinder 35 of cork or similar material. Sheets of any one of a series of fixed lengths, less than the circumference of the cylinder and of a width equal to or less than the length of the cylinder, may be secured thereto by the main securing strip 3 in cooperation with an auxiliary strip 36 provided with brads or thumb tack 37 which project through the slots in the outer cylinder and into the material of the inner cylinder.

According to Fig. 4, the cylinder 38 is provided with a groove 39 into which project a series of pins 40 adapted to engage a series of apertures in one end of the sheet 41. A bar 42 is provided on one face with a series of pins 43 which engage aper-

tures in the other end of the sheet. After the pins 43 engage the apertures, the bar is forced into the groove 39 and locked in place to apply an even tension to the sheet and hold it in contact with the surface of the cylinder.

Figs. 5 and 6, respectively, illustrate different means for locking the holding bar 42, shown in Fig. 4, in place. According to Fig. 5, one end of the cylinder is provided with a clip 44 adapted to be engaged by one end of the bar. The other end of the cylinder is provided with a spring pressed pawl 45 adapted to engage the other end of bar 42 and hold it in position within the groove 39. In Fig. 6 each end of the cylinder has mounted thereon a catch 46 and the bar 42 is provided at each end with a pawl 47. The pawls 47 engage the respective catches 46, to lock the bar in place in the groove 39.

According to the arrangement shown in Fig. 7, the bar 42 is covered with rubber or other frictional material 48 and is provided along its lower edge with notches to accommodate the pins 40 carried by the cylinder. In this case but one end of the sheet is provided with apertures to engage the pins 40, and the sheet is forced into good contact with the surface of the cylinder by the frictional engagement of the material 48 with the other end of the sheet.

Fig. 8 comprises two concentric cylindrical surfaces 49 and 50, the outer being provided with a series of clips 51 and a series of slots 52 through which project a series of clips 53 carried by the cylinder 50. The cylinder 50 also carries a set screw 54 which projects through a slot 55 in cylinder 49.

With the cylinders in the position shown, a sheet of material is mounted on the surface of the outer cylinder 49 by engaging the clips 51 and 52, respectively, with apertures in the respective ends of the sheet, the two cylinders are then relatively rotated to draw the sheet in intimate contact with the surface of the cylinder and the set screw is tightened to hold the cylinders in adjusted position.

Fig. 9 illustrates a cylinder 56 provided with longitudinally extending bars 57 of cork or other similar material, spaced apart peripherally and a securing strip 58 having thumb tack 59 adapted to pass through the ends of the sheet material and project into the cork bars 57.

The apparatus of Fig. 10 comprises a base plate 58 provided with a pair of standards 59 having bearings for the cylinder and a bar 60 carrying a roller 61. The bar 60 is carried by the standards 59 in bearings 62 controlled by springs 63 to maintain the roller 61 in contact with the cylinder.

The base 58 is also provided with a pair of brackets 64 supporting a table 65 for accommodating a sheet to be mounted on the cylinder. The standards 59 carry contact bearings, one of which is spring pressed into contact with a center bearing in the end plate of the cylinder or in the end of a shaft carrying the cylinder. The spring controlled bearing may be adjusted by a lever 66 to permit the cylinder to be readily inserted and withdrawn from the apparatus. A second lever 67 is provided with a pawl to hold the cylinder firmly in a desired fixed position while the hand tool H is being used to tilt the securing strips 3 and 10, as described above. This pawl may be of any well known design, for example, it may consist of a spring having a projecting pin adapted to engage any one of a series of apertures in the end plate of the cylinder. One of the brackets 64 or, if desired, a separate standard mounted

on the base, is provided with a stub shaft carrying a gear wheel 69, provided with a handle 70 and meshing with a gear carried by one of the bearings for the cylinder, whereby it may be rotated.

5 With a cylinder in position in the bearing, the above described apparatus is operated as follows to mount a sheet of flexible material thereon. The sheet 71 is placed on the table, the lever 67 is operated to lock the cylinder, hand tool H is
10 used to tilt strip 3, the end of the sheet is inserted and the strip restored to its normal position to secure it to the cylinder, the latter is unlocked and rotated to withdraw the sheet from the table 65, the roller 61 engages the sheet to
15 maintain it in smooth and even contact with the cylinder while it is being rotated to the desired position when the locking mechanism is actuated to hold the cylinder in fixed position until the other end of the sheet is secured thereto, after
20 which the locking means is released, the lever 66 is actuated to withdraw the spring controlled bearing and the loaded cylinder is removed. At this time an unloaded cylinder may be inserted in the loading apparatus.

25 For daylight operation of a picture system, the film loading operation is effected in a dark room, each loaded cylinder is inserted in a lightproof container provided with a narrow slot extending its full length and closed by a shutter, which is
30 withdrawn when the container enclosing the film loaded cylinder is properly positioned in the picture receiving apparatus.

While the sheet securing means has been described above as applied to the terminal apparatus of a picture transmitting system and may
35 be used either in connection with the transmitter or receiver, it will be apparent that such means may be used to secure sheet material to a cylindrical support to be applied to a great variety
40 of other uses.

What is claimed is:

1. A device for mounting sheet material on a cylinder comprising said cylinder provided with a plurality of circumferential grooves, a ring-shaped resilient member enclosed by each of
45 said grooves, a longitudinally extending member resiliently held in contact with the surface of said cylinder, and an auxiliary member held in engagement with the surface of said cylinder by
50 means carried by said member for engaging at least two of said ring-shaped members to permit movement of said auxiliary member circumferentially of said cylinder.

2. Means for mounting sheet material on a cylindrical support comprising a longitudinally extending element resiliently held in contact with the surface of said support, a member adjustable
55 circumferentially of said support, and resilient means for holding said member in contact with said surface at any desired position thereon.

3. Means for mounting sheet material on a cylindrical support comprising a longitudinally extending element resiliently held in contact with the surface of said support, members adjustable
65 circumferentially of said support, and resilient means for holding each of said members in contact with said surface and respectively in any desired position relatively to said element and said
70 other members.

4. Means for mounting sheet material on a cylindrical support comprising a plurality of circumferential grooves in said support, a plurality of members for engaging said material, resilient
75 means in said grooves, and means carried by each

of said members for engaging said resilient means.

5. Means for mounting sheet material on a cylindrical support comprising a longitudinally extending element resiliently held in contact with the surface of said support, a plurality of circumferential grooves in said support, a plurality of
5 members for engaging said material, a coiled spring extending longitudinally of each of said grooves, and means carried by each of said members for adjustably engaging at least two of said
10 springs.

6. Means for mounting sheet material on a cylindrical support having a plurality of portions of lesser diameter spaced apart longitudinally thereof comprising resilient means encircling
15 said portions of lesser diameter, and a member for engaging the surface of said support and having means extending therefrom for engaging said resilient means whereby said member may be adjusted to any position circumferentially of said
20 support.

7. Means for mounting sheet material on a cylindrical support having a plurality of sections of reduced diameter spaced apart longitudinally thereof comprising a plurality of resilient means
25 respectively carried by said sections of reduced diameter, and a member for engaging the surface of said support and provided with means extending therefrom for adjustably engaging a plurality of said resilient means.
30

8. Means for mounting sheet material on a cylindrical support provided with sections of reduced diameter comprising resilient means carried by said sections of reduced diameter, a plurality of members for engaging the surface of said
35 support and provided with extensions engaging said resilient means so as to permit free adjustment of said members with respect to said support.

9. A picture apparatus comprising a picture drum, means for mounting light sensitive sheet material on said drum including a plurality of circumferential grooves in said drum, a plurality of members for engaging said material, a coiled
40 spring extending longitudinally of each of said grooves, and means carried by each of said members for engaging at least two of said springs.

10. A picture apparatus comprising a picture drum, means for mounting light sensitive sheet material on said drum including a plurality of circumferential grooves in said drum, a plurality of members for engaging said material, a coiled
50 spring extending longitudinally of each of said grooves, and means carried by each of said members for adjustably engaging at least two of said
55 springs.

11. Means for mounting sheet material on a cylindrical support comprising a longitudinally extending element resiliently held in contact with the surface of said support, a member held in engagement with the surface of said support by means comprising a plurality of grooves in said support, resilient means in each of said grooves, and means carried by said member engaging a
65 plurality of said resilient means.

12. Means for mounting sheet material on a cylindrical support comprising a longitudinally extending element resiliently held in contact with the surface of said support, a member held in engagement with the surface of said support by means comprising a plurality of grooves in said support, resilient means in each of said grooves, and means carried by said member and adjustably engaging said resilient means for holding
70 said member in contact with said surface.
75

13. A picture apparatus comprising a picture drum and means for mounting light sensitive material on said drum comprising a longitudinally extending element resiliently held in contact with the surface of said drum, and a plurality of members held in contact with said surface by means comprising a plurality of grooves in said drum, a coiled spring extending longitudinally of each of said grooves, and means carried by each of said members for engaging at least two of said springs.

MARCEL C. GAUTHIER.