

Jan. 3, 1967

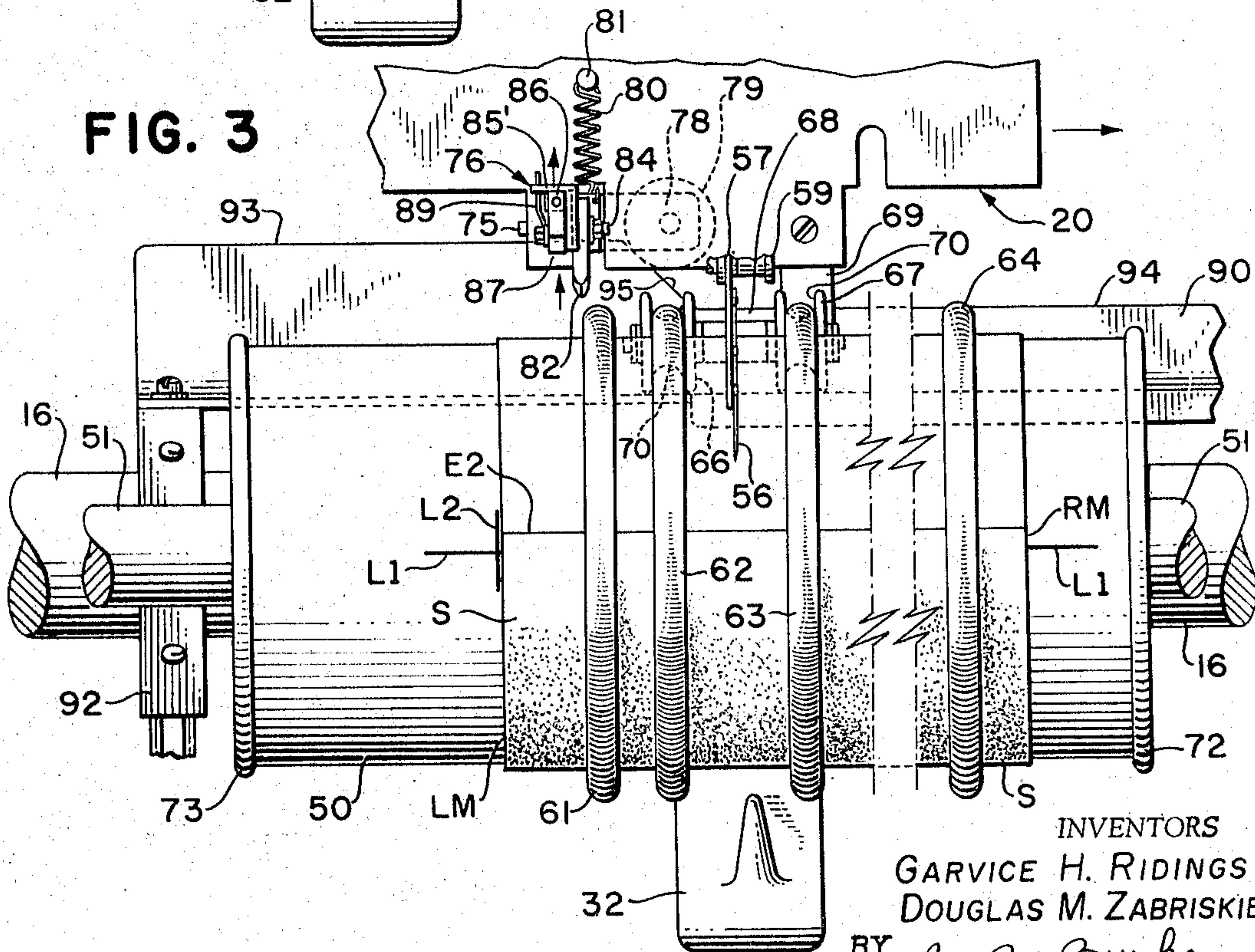
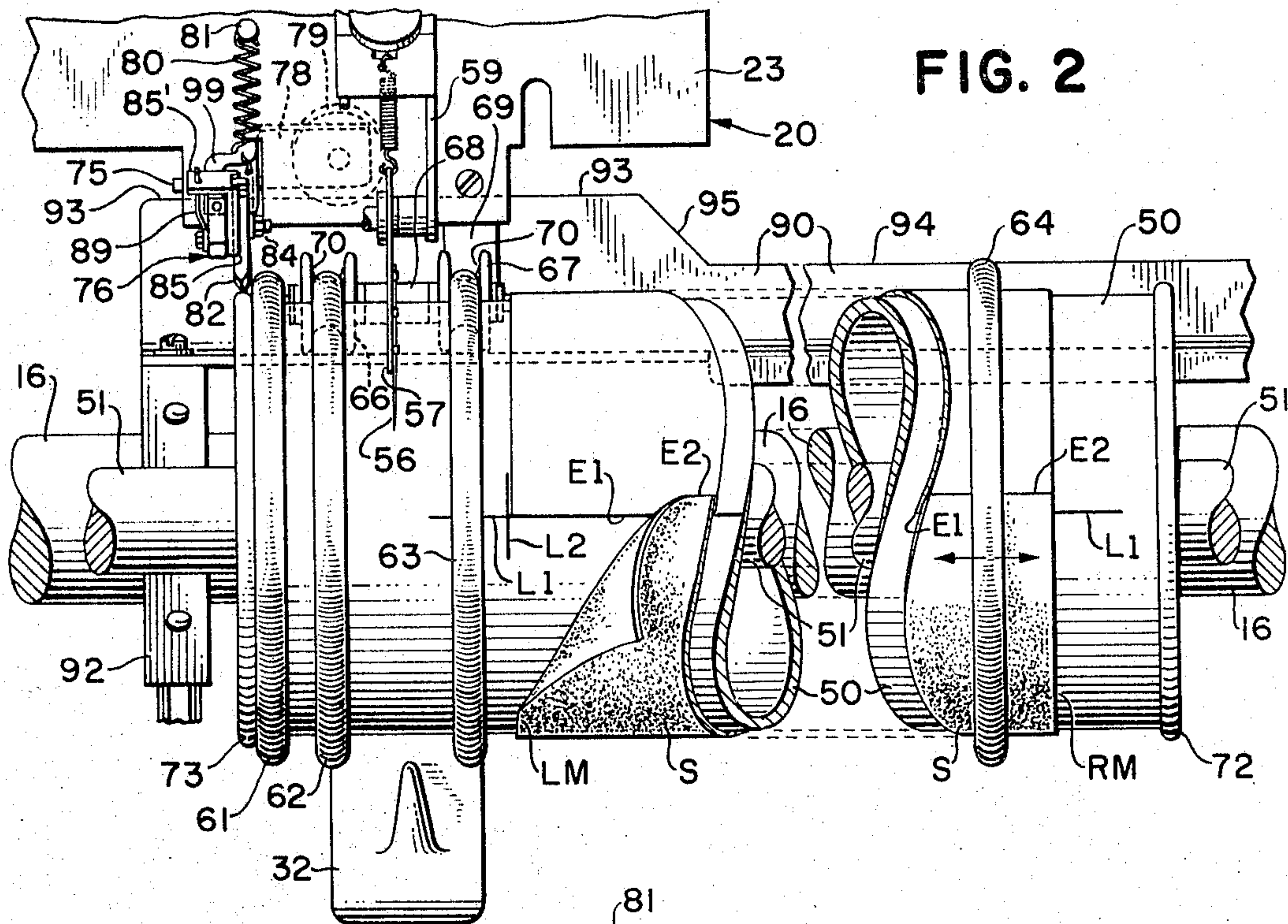
G. H. RIDINGS ETAL

3,296,622

SHEET HOLDING AND RELEASING ASSEMBLY FOR FACSIMILE SCANNER DRUM

Filed Feb. 1, 1965

3 Sheets-Sheet 2



INVENTORS
GARVICE H. RIDINGS
DOUGLAS M. ZABRISKIE
BY *J. B. Burke*
ATTORNEY

1

3,296,622

SHEET HOLDING AND RELEASING ASSEMBLY FOR FACSIMILE SCANNER DRUM

Garvice H. Ridings, Summit, and Douglas M. Zabriskie,
Northvale, N.J., assignors to The Western Union Tele-
graph Company, New York, N.Y., a corporation of
New York

Filed Feb. 1, 1965, Ser. No. 429,547

8 Claims. (Cl. 346—138)

This invention concerns a mechanism for holding a copy sheet on a drum of a facsimile scanning device and for automatically releasing the copy sheet from the drum.

According to the invention an axially horizontal rotatable drum of a facsimile scanning apparatus is provided with four circumferentially extending spring garters, an extreme left end garter and extreme right end garter being located at opposite ends of the drum and movable thereat. An intermediate pair of the garters are spaced apart by rollers and arranged to be shifted from left to right during a scanning procedure while the end garters remain in place. The intermediate garters are held in spaced position by rollers and are moved by a slidable carriage which carries an optical scanning system and/or a stylus recording system. The carriage also carries a tiltable drop garter lever arranged to advance the left end garter a predetermined distance along the drum to engage the left margin of a copy sheet wrapped around the drum and held at its right margin by the right end garter. When the carriage reaches its end of travel at the right end of the drum, a roller engaging the right garter of the intermediate pair moves the right end garter off the right margin of the paper copy sheet. The carriage can be moved back manually to the left end of the drum. The roller holding the left garter of the intermediate pair will then move the left end garter off the left margin of the copy sheet to release the sheet.

The tiltable lever has a roller moving along the edge of a guide rail. This rail has a camming step which tilts the lever to cause it to retract at its upper end and clear the left end garter to leave this garter at a predetermined position on the drum engaging the left margin of the copy sheet. It sometimes happens that during rotation of the drum or after scanning of the copy sheet is completed that the left end garter moves to the left on the drum beyond the position of the camming step on the guide rail. The drop garter lever moving to the left with the carriage will clear the displaced left end garter because the drop garter lever is provided with a spring biased pivotable finger which retracts as the lever passes the displaced garter. The roller holding the left garter of the intermediate pair then contacts the left end garter and moves it to the left off the left margin of the copy sheet to complete release of the copy sheet. The intermediate pair of garters move along the drum in fixed space positions and keep a narrow circumferential area of the copy sheet smooth between these two garters. This provides a smooth taut surface for recording upon by a stylus or for scanning by an optical system carried by the carriage.

It is, therefore, one object of the invention to provide a mechanism for holding a copy sheet on a rotatable drum in a facsimile apparatus, and for releasing the copy sheet from the drum.

Another object is to provide a mechanism for the purpose described, including four endless spring garters spaced apart axially of the drum and extending circumferentially around the drum, a carriage for moving an intermediate pair of the garters, and a tiltable drop garter lever carried by the carriage for advancing one end garter a predetermined distance along the drum to a certain location thereon for releasing the one garter at that location.

2

Still another object is to provide a mechanism as described wherein including a guide rail having a camming step for tilting the drop garter lever at the drum location where the end garter is released.

5 A further object is to provide a mechanism as described wherein the drop garter has a spring biased retractable finger to clear the end garter if it is located at a position where it blocks returning movement of the drop garter lever.

10 A still further object is to provide a mechanism as described wherein the intermediate pair of garters maintain a smooth narrow, smooth circumferential area of the copy sheet between them as the pair of garters move along the rotating drum.

15 The invention will be better understood from the following detailed description taken together with the drawing, wherein:

FIG. 1 is a perspective view of essential parts of a facsimile apparatus embodying the invention;

20 FIG. 2 is an enlarged fragmentary top view of the apparatus showing portions of the drum and carriage with parts broken away, the drop garter lever and garters being shown in one position assumed during the loading procedure for a copy sheet;

25 FIG. 3 and FIG. 4 are views similar to FIG. 2 with the carriage, garters and drop garter lever being shown in other positions;

FIG. 5 and FIG. 6 are left and right perspective views respectively of the drop garter lever.

30 Referring first to FIG. 1 there is shown a facsimile apparatus 10 adapted to serve as part of a facsimile transmitter system. The apparatus includes a frame 12 having two upright end plates of which only the right end plate 15 is shown. The left end plate is omitted from the drawing but is similar to the right end plate. The end plates are connected by the rigidly fixed axially horizontal parallel cylindrical bars 16, 18. A carriage 20 is movably carried by bars 16, 18. The carriage 20 has a generally rectangular frame 22 including a top plate 23. The carriage is supported by rear rollers 24 which ride on rear bar 18. Front rollers 26 support and carry the carriage on a straight rail 30 supported by the front bar 16. A handle 32 is secured to the underside of the carriage for manually moving the carriage. A motor 35 is attached to the underside of the carriage. This motor drives a gear 36 meshing with a rack gear 38 secured to bar 18 for advancing the carriage from left to right during operation of the apparatus.

40 On the carriage is a lamp 40 which projects a light through a window 41 and lens barrel 42 to a point on rotatable drum 50. Light is reflected from this point through a lens system 52 to a photoelectric cell 54. A guard plate 55 shields the cell 54 from the direct light of lamp 40. The carriage also carries a stylus 56 supported by movable arm 57 which can be tilted by an electrically operated motor 59 on the carriage. A slack flexible cable of wires 60 is connected between the lamp 40, photoelectric cell 54, motors 35, 59, stylus 56 and circuit components (not shown) of the apparatus. This cable flexes to permit the carriage 20 to move freely to the right and left on bar 18 and rail 30. Drum 50 is rotatably supported on a shaft 51 driven by a motor 53 via worm 55 and gear 57. To the extent described the construction of the apparatus is generally conventional.

65 Now according to the invention, there are provided four endless spring rings or garters 61-64. These garters extend circumferentially around the drum 50 and are axially spaced apart. The intermediate pair of garters 62, 63 are held apart a fixed distance or about three-quarters of an inch by two idler rollers 66, 67 supported on a shaft 68 integral with a bracket bar or plate 69 secured to carriage frame plate 23. The garters are en-

70

3

gaged in circumferential grooves 70 in the rollers 66, 67. Thus when the carriage moves horizontally to the left or right, the garters 66, 67 move axially along the drum. The right end garter 64 can be moved freely to the left or right axially on the drum. Annular end flange 72 at the right end of the drum normally holds this garter on the drum. Left end garter 61 can also be moved freely along the drum. Flange 73 is provided on the left end of the drum.

The carriage 20 carries a horizontal pintle 75 upon which is tiltably supported drop garter lever 76. As best shown in FIGS. 5 and 6, the lever has an intermediate hole 77 through which pintle 75 extends. The lever has a bottom laterally extending finger 78 carrying an axially vertical roller 79. A spring 80 is engaged in a hole 87 in the lever above hole 77 and pintle 75 so that the bottom roller is biased forwardly while the upper end of the lever is biased rearwardly with respect to the carriage and drum. The lever 76 is disposed a short distance to the left of roller 66 and slightly to the rear thereof.

At the upper end of lever 76 is a finger 82. This finger is adjustably held by a nut 83 and screw 84 on a hinge 85. The hinge is pivotable and is supported by an axially vertical pin 86. A wire spring 89 engages a rear bent end 85' of the hinge to bias the hinge to the closed position shown in FIGS. 2, 3, 5 and 6. The hinge and finger can be pivoted to the right against tension in spring 89 to the open position shown in FIG. 4 and indicated by dotted lines in FIG. 5.

A horizontal cam rail 90 is mounted below the drum and is supported by plate bracket plates 91, 92 on stationary bar 16. Rail 90 has a camming edge 93 portion which is offset to the rear of a forward edge portion 94. An intermediate camming edge portion or step 95 connects edge portions 93, 94. Edge portions 93, 94 and 95 are disposed in a horizontal plane with edge portions 93 and 94 parallel to the axis of the drum and of bar 16 while camming edge portion or step 95 is disposed obliquely at obtuse angles to edge portions 93, 94. Roller 79 rides along in contact with edge portions 93, 95 but spaced from edge portion 94. When the roller is at edge portion 93 the bottom portion of lever 76 is retracted rearwardly and the upper portion of the lever projects forwardly. This locates the tip of finger 82 close to the drum a distance less than the thickness of garter 61. When the roller 79 rides along camming edge portion 95 from left to right the lever 76 is tilted so that the upper end of the lever retracts and finger 82 clears the garter 61. When the lever is located to the right to step 95 an upper part of the rear edge 99 of the lever engages a forward edge portion of the top plate 23 of the carriage frame 22 so that the front and rear edges 97, 99 of the lever are substantially vertical and roller 79 is slightly spaced from edge portion 94. The lever 76 is biased against the top plate 23 of the carriage frame by spring 80. Spring 80 has its rear end engaged on a fixed pin 81 secured to the carriage frame plate 23.

In operation of the apparatus, an operator will manually wrap a copy sheet S around the drum 50 and will manually advance the right end garter 64 to the left past the right margin RM of the copy sheet to a position midway between lateral margins of the sheet. The operator will locate the copy sheet so that one end edge E1 is in registration with horizontal line L1 inscribed on drum 50 and the left marginal edge LM registers with circumferential mark L2 inscribed near the left end of the drum crossing line L1. The other end edge E2 of the sheet will overlap edge E1. The wrapped sheet will thus be held by the centered garter 64.

The carriage 20 will be located to the left of the wrapped sheet S as shown in FIG. 2. Now the motors 35 and 53 can be turned on by operating switch controls (not shown) together with selector switches for either scanning graphic copy on the sheet or for recording

4

graphic copy on the sheet. As the drum 50 rotates, the carriage 20 moves to the left and garters 61, 62 and 63 move with the carriage. Finger 82 pushes garter 61 along until the camming step 95 is encountered by roller 79 carried by lever 76 and the finger 82 at the upper end of the lever is retracted rearwardly. This clears garter 61 which is left at the position shown in FIG. 3 near the right end of rail edge portion 93. The carriage continues to move the two garters 62, 63 along the rotating drum while garters 61-64 rotates with the drum. The stylus 56 records graphic marks electrically on the rotating sheet S or the optical system scans a point on the rotating sheet fixed with respect to the optical system. The two garters keep the sheet S smooth in the area between the garters to minimize distortion of scanned or recorded copy. When the carriage reaches garter 64, roller 67 contacts garter 64 and pushes it axially to the right off of the right margin RM of sheet S. At this time recording or scanning is completed and the drum stops rotating automatically or the motors are turned off by the operator. The operator then manually grasps handle 32 and moves the carriage to the left. Garters 62 and 63 move to the left with the carriage and when roller 66 engaging garter 62 reaches a garter 61, it pushes this garter off the left margin LM of the paper sheet. The paper sheet, when finally released by garters 62, 63, opens and unwinds automatically due to its inherent springiness, and the operator removes the sheet S from the apparatus.

Generally the retracted finger 82 will pass the garter 61 if the garter has remained in its position axially of the drum where the garter was left at the start of operation of the apparatus. If for some reason garter 61 shifts to the left to the position shown in FIG. 4 before the carriage returns, then finger 82 will turn laterally to the right to open and clear the garter 61 as the carriage is manually returned. After passing the garter 61 to the left, finger 82 will return to its normal forward facing position shown in FIG. 2 and will be ready to move garter 61 to the right again the next time a copy sheet is mounted on the drum.

The invention thus provides a simple, effective, fool-proof mechanism for holding and releasing a copy sheet on a rotating drum and for releasing the sheet from the drum.

What is claimed is:

1. Means for holding copy sheet during scanning in a facsimile machine and for releasing the copy sheet after scanning is completed, comprising:

a cylindrical drum for supporting said sheet while the sheet is wrapped circumferentially around the drum; means supporting said drum for rotation on its axis; a carriage carrying a scanning device for scanning a point on said drum;

means movably supporting said carriage so that the carriage is movable in a path parallel to the axis of the drum;

first means for engaging said sheet encircling said drum, said first means being movable with the carriage axially along the drum;

a spring garter encircling said drum;

a lever arm assembly pivotally carried by the carriage;

a stationary rail disposed parallel to the axis of the drum, said rail having a camming edge portion contacted by a part of said lever arm assembly as the carriage moves along the drum;

spring means holding said part of said lever arm assembly in contact with said camming edge;

and a finger element carried by said lever arm to engage and move said garter to a predetermined position near one end of the drum to encircle a marginal portion of said sheet as the carriage moves along the drum in one direction;

said camming edge having a recessed step permitting the lever arm to tilt so that said finger releases the garter at said position, whereby the garter remains

5

at said position until the carriage is moved in reverse direction and said first means contacts the garter to move the same off the copy sheet.

2. Means for holding and releasing a copy sheet as claimed in claim 1, further comprising:

5 hinge means in said lever arm assembly pivotally supporting said finger to turn in said one direction; and other spring means biasing said finger to extend radially toward the drum, whereby said finger turns to clear said garter during return movement of the carriage in said reverse direction in the event that the garter is displaced axially away from said position toward one end of the drum after the second garter has been left in said position. 10

3. Means for holding a copy sheet during scanning in a facsimile machine and for releasing the copy sheet after scanning is completed, comprising: 15

a cylindrical drum for supporting said sheet while the sheet is wrapped circumferentially around the drum; means supporting said drum for rotation on its axis; 20 a carriage carrying a scanning device for scanning a point on said drum;

means movably supporting said carriage so that the carriage is movable in a path parallel to the axis of the drum; 25

a first endless spring garter for engaging said sheet, encircling said drum and movable axially thereon; roller means rotatably supported by the carriage holding said garter so that said garter moves with the carriage in one direction axially along the drum toward one end thereof while holding the sheet wrapped around the drum; 30

a second garter encircling said drum; a lever arm assembly pivotally carried by the carriage; a stationary rail disposed parallel to the axis of the drum, said rail having a camming edge portion contacted by a part of said lever arm assembly as the carriage moves along the drum; 35

spring means holding said part of said lever arm assembly in contact with said camming edge; 40 and a finger element carried by said lever arm to engage and move said second garter to a predetermined position near the other end of the drum to encircle a marginal portion of said sheet as the carriage moves in said one direction along the drum; 45

said camming edge having a recessed step permitting the lever arm to tilt so that said finger releases the second garter at said position, whereby the second garter remains at said position until the carriage is moved in reverse direction so that said roller means contacts the second garter to move the same off the copy sheet toward the other end of the drum. 50

4. Means for holding and releasing a copy sheet as claimed in claim 3, further comprising:

55 hinge means in said lever arm assembly pivotally supporting said finger to turn in said one direction; and other spring means biasing said finger to extend radially toward the drum, whereby said finger turns to clear said second garter during return movement of the carriage in said other direction in the event that the second garter is displaced axially away from said position toward the other end of the drum after the second garter has been left in said position. 60

5. Means for holding a copy sheet during scanning in a facsimile machine and for releasing the copy sheet after scanning is completed, comprising: 65

a cylindrical drum for supporting said sheet while wrapped circumferentially around the drum; means supporting said drum for rotation on its axis; a carriage carrying a scanning device for scanning a point on said drum; 70

means movably supporting said carriage so that the

6

carriage is movable in a path parallel to the axis of the drum;

four endless spring garters for engaging said sheet, encircling said drum and movable axially thereon, said garters being spaced apart axially of the drum; rollers rotatably supported by the carriage respectively engaging a center pair of the garters between two outermost garters so that the pair of garters move with the carriage in one direction axially along the drum until one roller engaging one garter of said pair contacts one of the outermost garters to move the same off the sheet toward one end of the drum; a lever arm assembly pivotally carried by the carriage; a stationary rail disposed parallel to the axis of the drum, said rail having a camming edge portion contacted by a part of said lever arm assembly as the carriage moves along the drum;

spring means holding said part of said lever arm assembly in contact with said camming edge;

and a finger element carried by said lever arm assembly to engage and move the other outermost garter to a predetermined position near said other end of the drum on said sheet as the carriage moves in said one direction along the drum;

said camming edge having a recessed step permitting the lever arm to tilt so that said finger releases said other outermost garter at said position, whereby the other outermost garter remains at said position until the carriage is moved in reverse direction and the other roller engaging the other garter of said pair of garters contacts the other outermost garter to move the same off the copy sheet toward the other end of the drum.

6. Means for holding a copy sheet and for releasing a copy sheet as claimed in claim 5, further comprising: hinge means in said lever arm assembly pivotally supporting said finger to turn in said one direction; and other spring means biasing said finger to extend radially toward the drum, whereby said finger turns to clear said other outermost garter during return movement of the carriage in said reverse direction in the event that said other outermost garter is displaced axially away from said position toward the other end of drum after said other outermost garter has been left in said position. 45

7. Means for holding a copy sheet and for releasing the copy sheet as claimed in claim 5, wherein the rollers have grooves rotatably holding said pair of garters spaced apart a fixed distance axially of the drum, the scanned point being located between said pair of garters, said pair of garters holding a circumferential area of the sheet therebetween in a smooth condition so that scanning of said point as the drum rotates is undistorted by wrinkling of the sheet. 50

8. Means for holding a copy sheet and for releasing the copy sheet as claimed in claim 7, further comprising: hinge means in said lever arm assembly pivotally supporting said finger to turn in said one direction; and other spring means biasing said finger to extend radially toward the drum, whereby said finger turns to clear said other outermost garter during return movement of the carriage in said reverse direction in the event that said other outermost garter is displaced axially away from said position toward the other end of drum after said other outermost garter has been left in said position. 55

References Cited by the Examiner

UNITED STATES PATENTS

2,302,827	11/1942	Wise et al.	346—138
2,718,547	10/1955	Wise et al.	178—6.6

RICHARD B. WILKINSON, *Primary Examiner*.