

Oct. 4, 1966

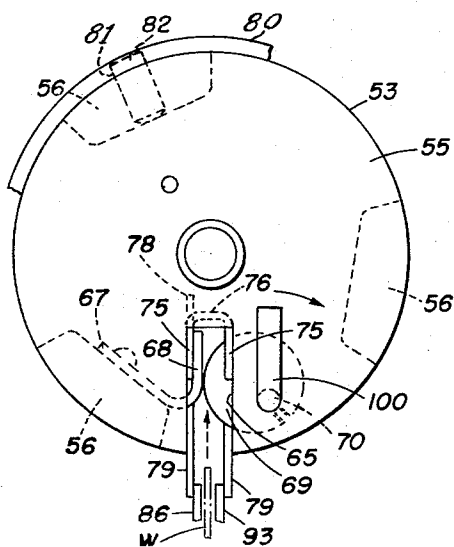
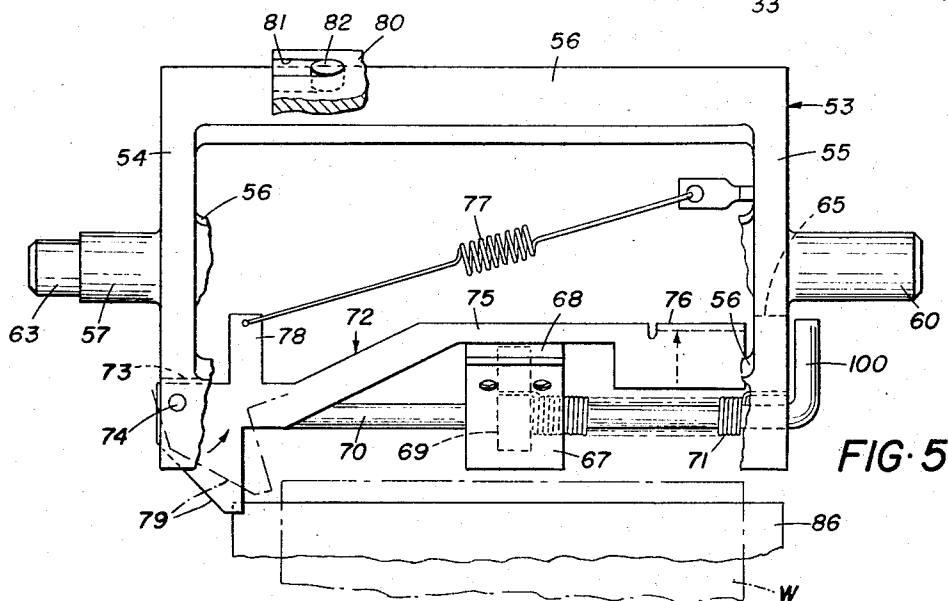
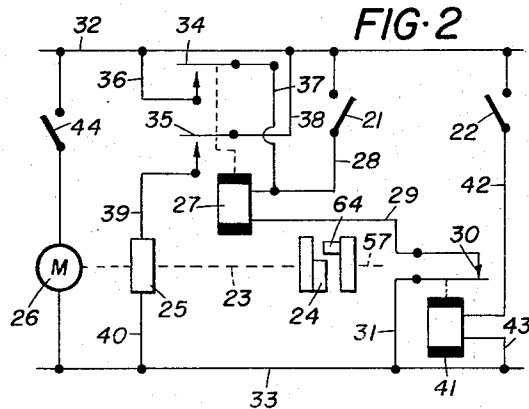
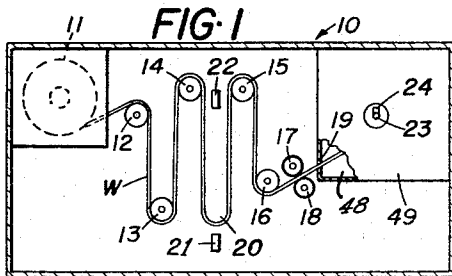
D. N. SCHWARDT

3,277,007

PAPER TAKE-UP MAGAZINE

Filed Dec. 21, 1964

2 Sheets-Sheet 1



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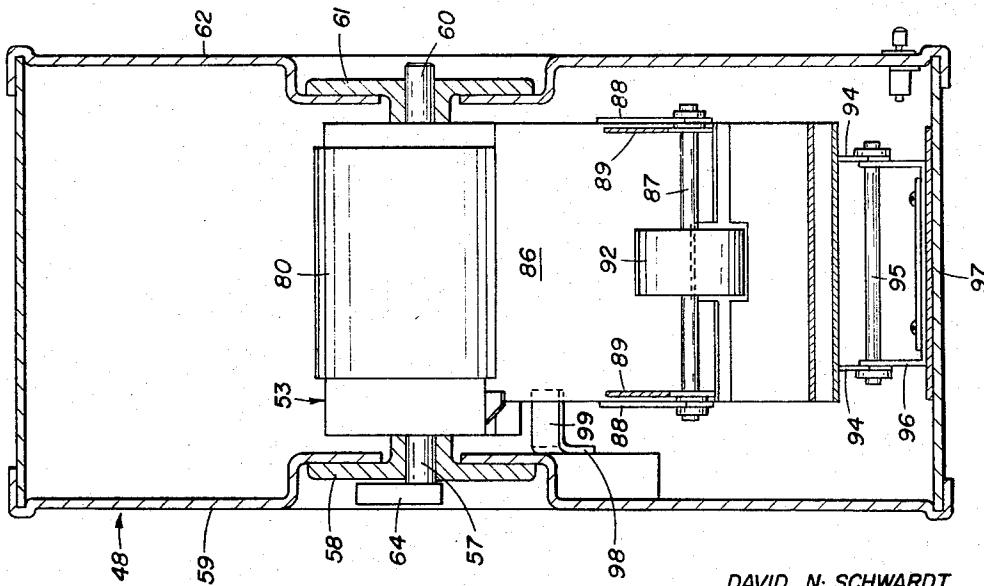
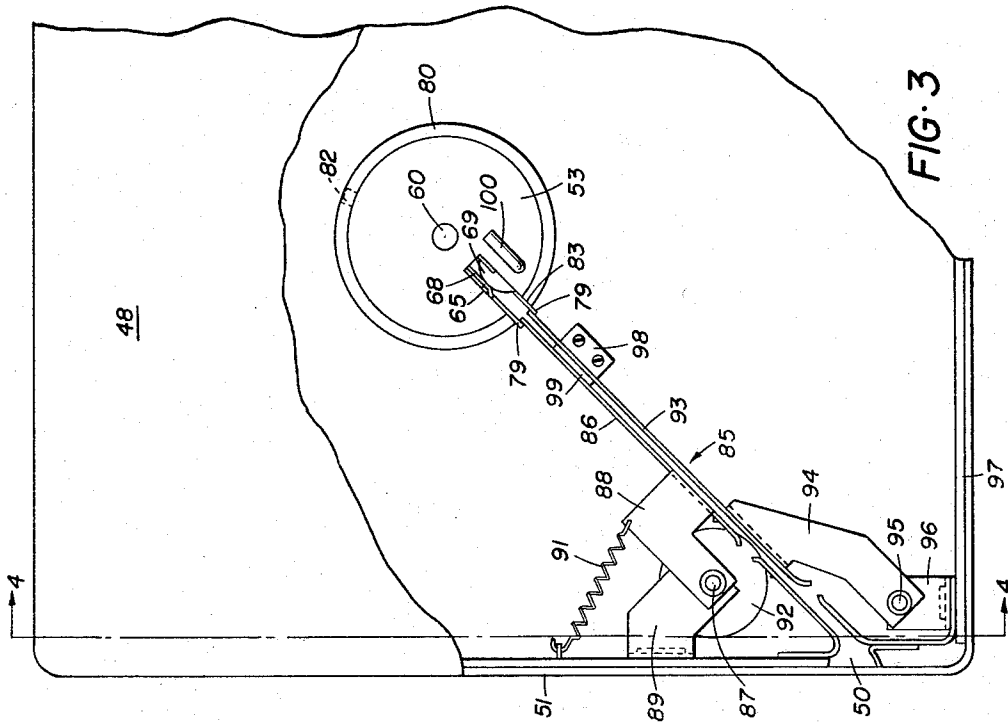


FIG. 4

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3,277,007

PAPER TAKE-UP MAGAZINE

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Filed Dec. 21, 1964, Ser. No. 419,914
12 Claims. (Cl. 242—74.1)

The present invention relates to a device for attaching the leading end of a moving web to a rotatable member on which the web is to be wound and more particularly to such a device that cooperates with a guideway to hold the rotatable member against rotation until after the leading end of the web has been engaged for attachment at which time the guideway is automatically released.

While it is well known to attach the end of a web or a strip of material to a core or hub on which the web is to be wound, the web is usually provided with longitudinally spaced perforations adjacent one or both edges, one or more transverse slots adjacent the leading end, or some unique configuration at the leading end which can be engaged by one of several correspondingly shaped members on or within the core. Such a web can be manually secured to the core when it is stationary or automatically, as the core is rotated. In either case, the core is usually located with respect to the entry position of the web so that the free or leading end of the web can fall freely into engagement with the core. When the core is arranged within a small magazine, this same relationship usually exists. In instances where the core is positioned at a relatively great distance from the support position of the web and the web is not a relatively heavy nor wide material a flexible or pivotally mounted member is used to guide the leading end of the web to the core, the guide member being moved away from the core by the increasing diameter of the web as it is wound on the core.

When a moving web that is to be wound on a core is of a length such that a large diameter of convolutions is formed on the core, it is necessary that the core be positioned at a considerable distance from the exit slot of the apparatus or the last roller engaging the web. If this distance is relatively large and the web is a material such as a heavy, wide paper, a flexible or pivotal guideway does not provide sufficient support the web because of the weight of the long leading end. It therefore becomes necessary to provide a rigid guideway that can be readily removed after the leading end has been secured to the core and before the web is wound on the core.

In the present invention a web of material is wound on a sleeve that is carried by a hollow rotatable member. The sleeve is provided with an axial slot that is aligned with a mechanism arranged within the rotatable member. The leading end of the web is secured when the rotatable member is stationary, and the mechanism within the member cooperates with a guideway to hold the member against rotation until the leading end is secured. Since the web is moved toward the core, the arrangement for securing the leading end is such that it permits the leading end to move beyond the securing point to actuate the mechanism to release the guideway. The guideway is formed by two separable members, each of which moves in an opposite direction upon being released.

The invention overcomes the disadvantages of the prior art in that it can be used with a web that is wound into a roll of substantially large diameter and can be used in conjunction with a rotatable member that is without or within a magazine or receptacle. Since the guideway and the release mechanism are preset, the leading end of the web is always secured before the rotatable member is released for rotation. Further, since the web is wound on a removable core, only one mechanism is required

when it is used in conjunction with the apparatus in that the mechanism functions as a part of the apparatus. When the mechanism is used in a magazine or receptacle, it is not separable from the magazine or receptacle and can be preset before the sleeve is positioned on the rotatable member.

The object of the invention is to provide a mechanism for securing the leading end of a moving web to a core and for initiating winding of the web only after the leading end has been secured.

A further object of the invention is to provide a magazine for receiving a moving web and automatically attaching the leading end hereof to a take-up core which is released for rotation after the leading end has been secured thereto.

Still another object of the invention is to provide a magazine having a mechanism within a rotatable member for cooperating with a guideway to hold the rotatable member against rotation and to direct the leading end of a moving web to the mechanism for securing it to the rotatable member.

These and other objects and advantages will be apparent to those skilled in the art by the description which follows:

Reference is now made to the accompanying drawings in which like reference numerals designate the like parts and wherein:

FIG. 1 is a schematic elevational view of apparatus with which the invention can be incorporated;

FIG. 2 is a schematic wiring diagram for controlling a tendency drive system;

FIG. 3 is a side elevational view partly in section of a magazine having the invention incorporated therein;

FIG. 4 is a sectional view taken substantially along the line 4—4 in FIG. 3;

FIG. 5 is a side elevational view of a rotatable member with a portion thereof broken away for showing a securing and releasing mechanism within the rotatable member; and

FIG. 6 is an end view of the rotatable member and the mechanism shown in FIG. 5.

Reference is now made to FIGS. 1 and 2 wherein apparatus designated by the numeral 10 is disclosed in which the invention is embodied. Such apparatus can be any requiring that a web W be wound either intermittently or continuously. By way of example, such apparatus can be a paper processor in which a supply roll 11 of photographic paper is moved over a series of rollers 12, 13, 14 and 15 to a series of guide rollers 16, 17 and 18 to an exit slot 19 in the apparatus. Between rollers 14 and 15, the web forms a loop 20 on either side of which is arranged limit switches designated by the numerals 21 and 22. To the right of the apparatus a shaft 23 having a radial driving lug 24 is driven by an electromagnetic friction or tendency drive clutch 25 which, in turn, is driven by a motor 26, these elements being shown diagrammatically in FIG. 2. The clutch 25 is such that slippage can occur when shaft 23 is held against rotation. The web is first threaded through the apparatus and a drive means, not shown, rotates the rollers 12—15 to increase the size of loop 20. As the loop increases, it finally reaches a length such that it engages switch 21 to close it and thereby energize the clutch 25 to drive the take-up shaft 23.

With reference to FIG. 2, let it be assumed that switch 44 has been closed to energize motor 26 so that loop 20 is increasing in length. Closing of switch 21 energizes solenoid 27 via line 28, line 29, switch 30 and line 31 which places the solenoid across the main lines 32 and 33. With the energization of solenoid 27, switches 34 and 35 are closed, the former holding in solenoid 27 via lines 36 and 37 to line 28 and connects clutch 25 for energization across lines 32 and 33 via line 38,

switch 35, line 39 and line 40. The shaft 23 then continues to rotate until the loop 20 decreases in size and actuates switch 22 to a closed position. When switch 22 is closed, solenoid 41 is energized via switch 22, line 42 and line 43. Solenoid 41 then opens switch 30 which causes de-energization of solenoid 27 and as a result, switches 34 and 35 return to an open position and clutch 25 is de-energized. The loop 20 then is permitted to again increase in size until the switch 21 is again actuated and the cycle repeated.

A take-up magazine 48 in which the invention is embodied, is positioned in the area designated by the numeral 49 in FIG. 1 such that an entry slot 50 in the wall 51 of the magazine is adjacent the exit slot 19 in the apparatus 10. A hollow member 53 comprises a pair of spaced flanges 54 and 55 which are joined by a member of axial ribs 56. The flange 54 is formed integral with a shaft 57 that is journaled in a bearing plate 58 secured to the side wall 59 of the magazine. A similar shaft 60 is formed integral with the flange 55 and journaled in a bearing plate 61 secured to the side wall 62 of the magazine. The end 63 of shaft 57 carries a radial member 64 that is engaged by the radial lug 24 on shaft 23 when the magazine is positioned in the area 49. By this construction, the rotation of shaft 23 by clutch 25 is transmitted to the hollow member 53. A releasable means comprises a plate 67 that is secured to one of the ribs 56 and formed so as to have a portion 68 thereof arranged in a substantially radial direction, as shown in FIG. 6, and a roller 69 that is eccentrically mounted on a shaft 70 and urged toward portion 68 of plate 67 by a spring 71 having one end fixed to roller 69 and the other end fixed in flange 55. The relationship of the axis of roller 69 to the axis of shaft 70 is seen in FIG. 6, and it can be readily appreciated that as the web W is moved into the bite of portion 68 and roller 69, that the latter will be rotated in a clockwise direction and if the web W is moved in the opposite direction, the roller 69 will clamp it against portion 68 to prevent its withdrawal.

A holding means comprises a lever member 72 which is pivotally mounted in a slot 73 in the flange 54 at 74 and substantially in a radial direction with the bite of portion 68 and roller 69. This member comprises two spaced parallel extensions 75 that are joined by a cross piece 76 at the end adjacent flange 55. As shown in FIG. 5, the member 72 is shaped so that the cross piece 76 lies beyond the line at which roller 69 engages portion 68. A spring 77 connects a leg 78 to the flange 55 so that the member 72 is normally biased in a clockwise direction about its pivot 74. At the lefthand end of member 72, a pair of spaced projections or lugs 79 extend beyond the periphery of the member 53. The flange 55 is also provided with a radial slot 65 that is aligned with projections 79 on member 72, the slot being sufficiently deep to permit withdrawal of the leading end of web W therethrough in an axial direction.

A sleeve 80 is positioned on the member 53 and provides the core or hub on which the web W is wound. The sleeve is provided with a short axial slot 81 which engages a pin 82 carried by one of the ribs 56 to provide means for properly orienting an axial slot 83 in the sleeve with the projections 79 and the line of engagement of the web W by roller 69. It will be noted from FIGS. 3 and 4 that the projections 79 are of a length such that they extend not only beyond the periphery of member 53 but also beyond that of sleeve 80.

A guideway, generally designated by the numeral 85, comprises an upper member 86 that is pivotally mounted for movement about a shaft 87 by means of a pair of brackets 88, each of which is secured at one side of member 86 or formed integral therewith. The shaft 87 is journaled in a pair of spaced brackets 89 that are secured to the wall 51 of the magazine. A spring 91 normally biases the upper member toward the wall 51. A roller 92 is mounted centrally of the shaft 87 and serves to direct

the web toward the guideway 85. A lower member 93 is secured to a pair of spaced brackets 94 that are pivotally mounted on a shaft 95 journaled in a bracket 96 secured to the bottom wall 97 of the magazine. Inasmuch as lower member 93 is pivotally mounted as shown in FIG. 4, it is free to fall of its own weight toward bottom wall 97.

Before the take-up magazine 48 is positioned in the area 49 of the apparatus 10, upper member 86 and lower member 93 are brought together into a position as shown in FIG. 3. At the same time, the member 72 is moved in a counterclockwise direction by pushing against the projections. Upon release of the projections, the end of the upper and lower members 86 and 93 will be positioned between the projections 79 and held in this position to provide a guideway for directing the leading end of the web W into the bite of portion 68 and roller 69. A right angle plate 98 is secured to side wall 59 and has the leg 99 thereof positioned such that it lies between the members 86 and 93 as shown in FIG. 4. By this arrangement with the ends of members 86 and 93 between the projections 79, member 53 is held against rotation in the winding direction by the radial lug 24 and the radial member 64. After the elements have been so arranged, the sleeve 80 can be inserted on member 53 and its slot 83 will be properly oriented with respect to projections 79 when pin 82 is aligned with and engages the slot 81.

With the magazine in position, the web entering slot 50 is directed into guideway 85 by roller 92 and the leading end is then directed into the axial slot 83 in sleeve 80. Further movement of the leading end of the web brings it into engagement with the bite of portion 68 and roller 69 and causes the latter to rotate in a clockwise direction against the action of spring 71. As long as the web is being moved, the leading end continues to be moved beyond roller 69 and finally abuts the cross piece 76 and with continued movement causes member 72 to move in a counterclockwise direction about its pivot 74. As member 72 moves in this direction, the projections 79 are moved inwardly and away from the end of members 86 and 93 until they reach a point where the guideway is free to separate, the upper member 86 being biased away from sleeve 80 by spring 91 and the lower member falling by gravity against the bottom wall 97. With release of the guideway 85, the member 53 is then free to be rotated by engagement of the radial lug 24 with the radial member 64 to wind the web on the sleeve 80.

In order to remove the web that has been wound on the sleeve 80, it is necessary to sever web W adjacent slot 19, to remove magazine 48 from the apparatus, to remove side wall 62 and to release the leading end from engagement by the roller 69. This later step is accomplished by moving the finger portion 100 on the end of shaft 70 in a clockwise direction as seen in FIG. 6. With release of roller 69 from engagement with the web, the sleeve 80 and the web wound thereon can be readily removed from the member 53 merely by lifting the sleeve 80 and the web wound thereon in an axial direction, the unattached leading end being moved through slots 65 and 83.

The invention has been described in detail with particular reference to a preferred embodiment thereof, but it will be understood that variations and modifications can be affected within the spirit and scope of the invention as described hereinabove and as defined by the appended claims.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A device for attaching the leading end of a moving web to a rotatable member having at least one axial slot, comprising in combination:

a movable guideway adapted to be held in a position for guiding said web to said slot and for holding said member against rotation;

first means arranged within said member and substantially aligned with said slot for engaging said leading end to prevent withdrawal thereof from said slot; and

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second means pivotally mounted within said member and substantially aligned with said slot for holding said guideway in said position, said second means being engaged and moved by said leading end into a position for releasing said guideway after said moving web has been engaged by said first means.

2. A device in accordance with claim 1 wherein said movable guideway comprises two separable members, each of which is movable in an opposite direction upon release thereof by said second means.

3. A device in accordance with claim 1 including means coupled to said first means for disengaging the latter from said leading end.

4. A device in accordance with claim 1 wherein said first means comprises a plate mounted within said member substantially in alignment with said slot and an eccentric roller biased into engagement with said plate in a direction opposed to that of the movement of said web.

5. A device in accordance with claim 1 wherein said second means comprises a lever having a first part extending through said slot and without said member for holding said guideway and a second part within said member and positioned beyond said first means in the path of movement of said web for engagement by said leading end.

6. A take-up magazine having an entry slot for a moving web and a rotatable member on which said web is wound and provided with at least one axial slot, comprising in combination:

a guideway pivotally mounted within said magazine and adapted to be held in a position for guiding said web from said entry slot to said axial slot and for holding said member against rotation;

releasable means arranged within said member and substantially aligned with said axial slot for engaging the leading end of said web to prevent withdrawal thereof from said axial slot; and

means pivotally mounted within said member and substantially aligned with said axial slot for holding said guideway in said position, said holding means being engaged and moved by said leading end into a position for releasing said guideway after said web has been engaged by said releasable means.

7. A take-up magazine in accordance with claim 6 wherein said guideway comprises two separable pivotal members, one of which is biased for movement in one direction away from said web and the other of which is free to move in the other direction away from said web.

8. A take-up magazine in accordance with claim 7 wherein said holding means comprises a lever biased toward said axial slot and having a pair of spaced lugs extending through said axial slot and without said rotatable member and between which said two separable pivotal members are retained to form said guideway and a portion axially displaced from said lugs and positioned beyond

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said releasable means in the path of movement of said web for engagement by said leading end.

9. A take-up magazine having an entry slot for a moving web and a rotatable hollow member provided with at least one axial opening for supporting and rotating a removable core on which said web is wound and which is provided with an axial slot aligned with said axial opening, comprising in combination:

a guideway pivotally mounted within said magazine adjacent said entry slot and adapted to be held in a position for guiding said web from said entry slot to said axial slot and for holding said member and said core against rotation;

releasable means arranged within said member adjacent said axial opening and substantially aligned with said axial slot for engaging the leading end of said web to prevent withdrawal thereof from said core and said member; and

means pivotally mounted within said member and substantially aligned with said axial slot for holding said guideway in said position, said holding means being engaged and moved by said leading end into a position for releasing said guideway after said web has been engaged by said releasable means.

10. A take-up magazine in accordance with claim 9 wherein said guideway comprises two separable pivotal members, one of which is biased for movement in one direction away from said web and the other of which is freely movable in the other direction away from said web.

11. A take-up magazine in accordance with claim 9 wherein said releasable means includes a manually operable member coupled thereto for releasing said leading end when said core is removed from said member.

12. A take-up magazine in accordance with claim 10 wherein said holding means comprises a lever pivotally mounted within and at the end of said member and biased toward said axial opening, said lever having a pair of spaced lugs extending through said axial slot beyond the peripheral surface of said core and between which said separable pivotal members are retained to form said guideway, and a portion adjacent the other end of said member and arranged beyond said releasable means in the path of movement of said web for engagement by said leading end.

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