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Savage et al.

[11] **3,834,638**

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[54] **ASSEMBLY FOR SPOOLING AN AUDIT TRAIL IN A DATA TERMINAL**

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[73] Assignee: **The Singer Company**, New York, N.Y.

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[52] **U.S. Cl.** ..... **242/67.1 R,** 242/75.1

[51] **Int. Cl.** **B65h 17/00**

[58] **Field of Search** ..... 242/67.1 R, 75.1

[56] **References Cited**

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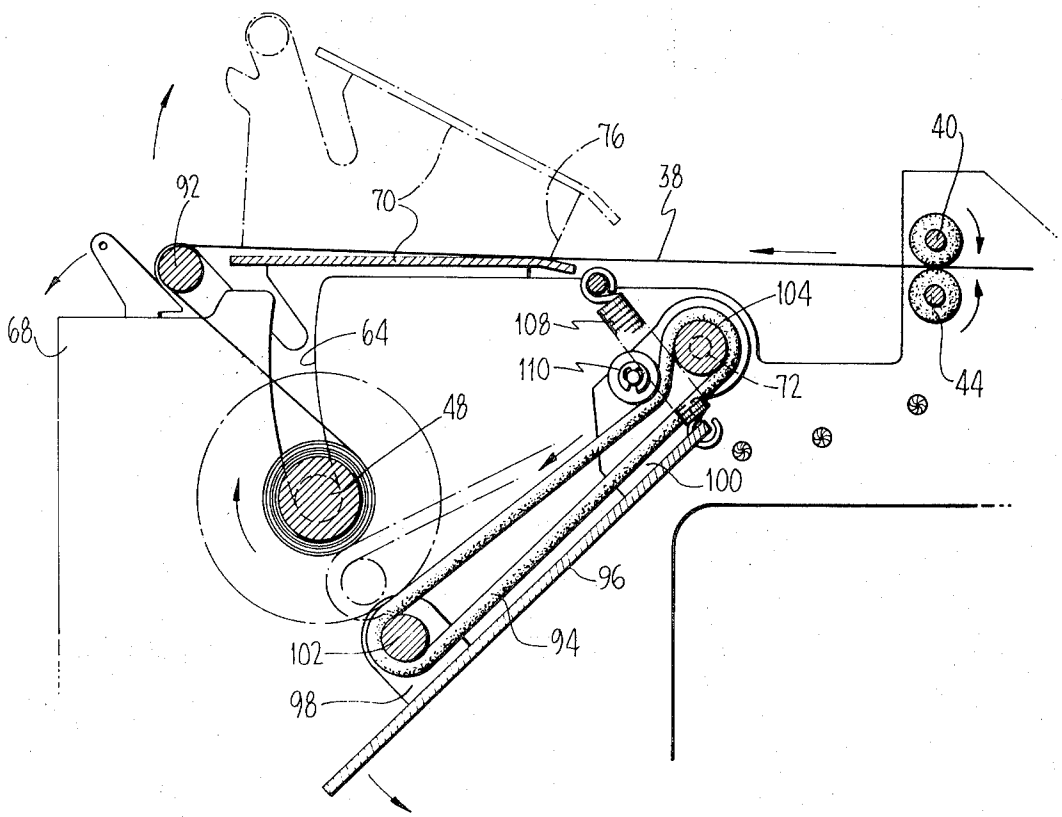
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Assistant Examiner—Edward J. McCarthy
Attorney, Agent, or Firm—Edward L. Bell; Joseph R. Dwyer

[57] **ABSTRACT**

An assembly for facilitating spooling of a roll of record media, such as paper, to provide a permanent record of all transactions entered into a point-of-sale terminal comprising a movable belt engageable with the paper to rotate the paper and spool to wind the paper onto the spool, thus automatically compensating for the change of diameter of the roll.

4 Claims, 3 Drawing Figures



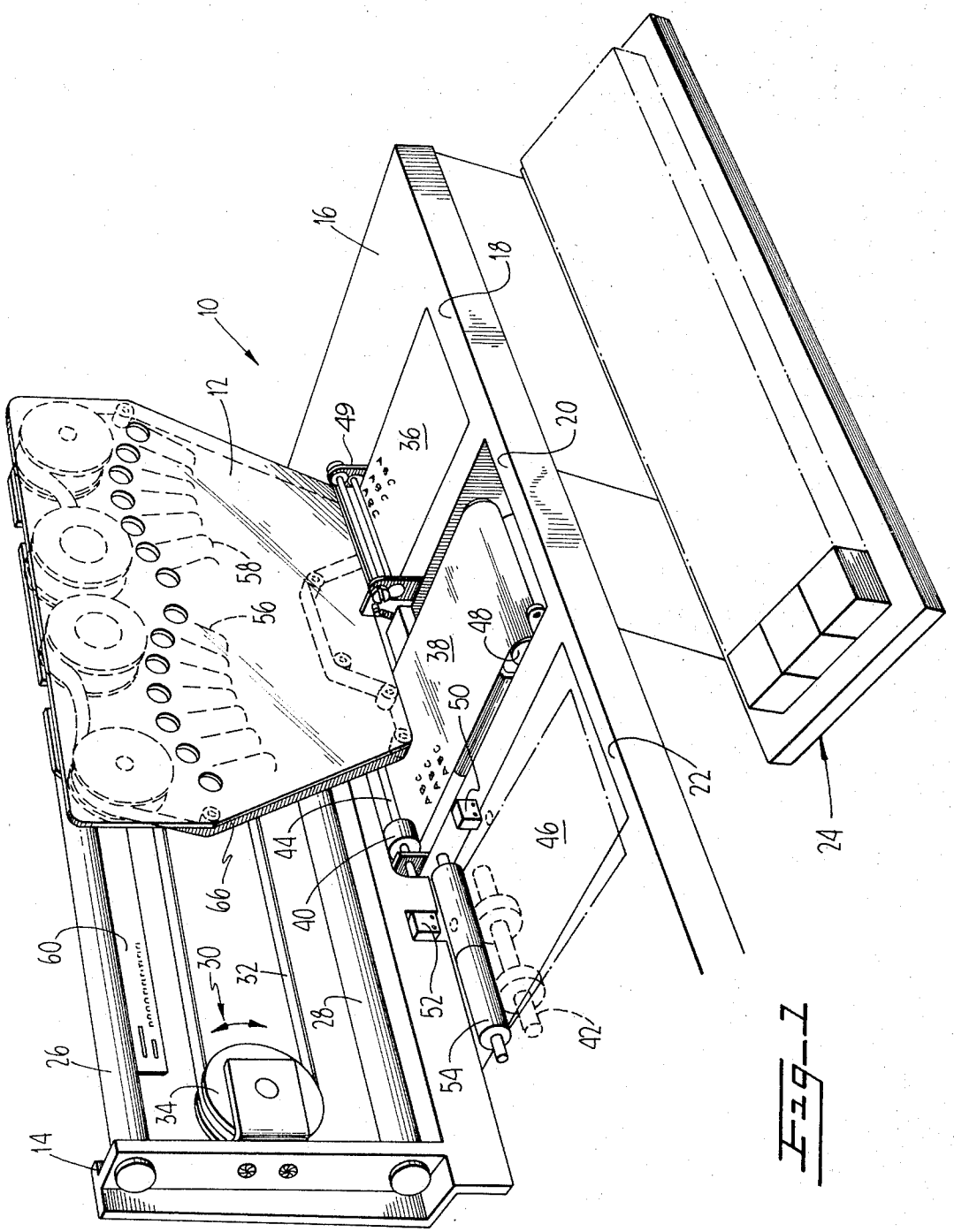
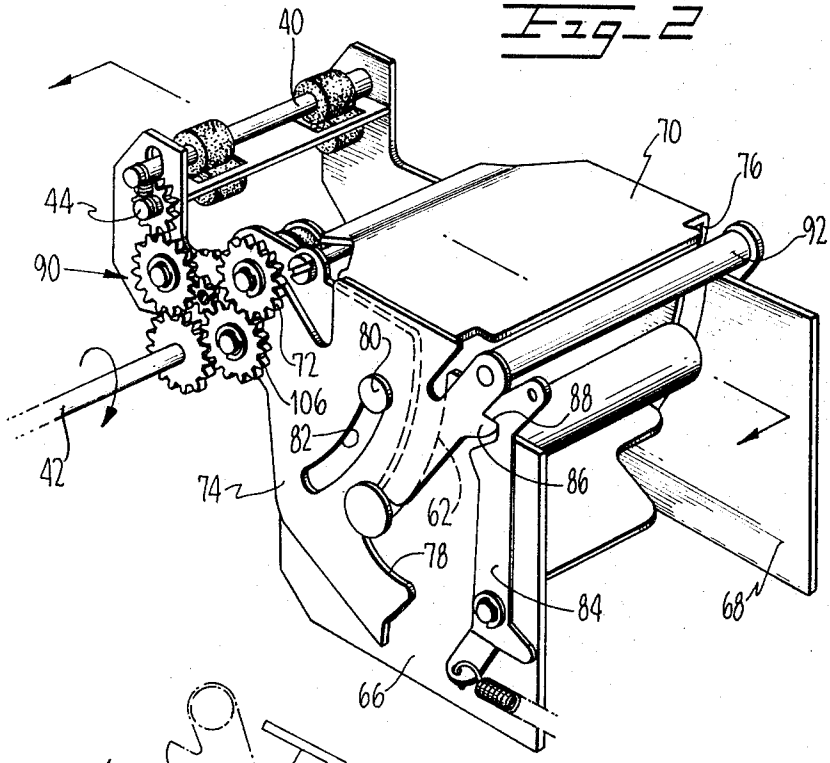

10
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16
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32
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48
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58
60
66

Fig. 1

Fig_2


40
70
76
44
92
90
80
72
106
88
82
42
74
86
62
78
84
68
66

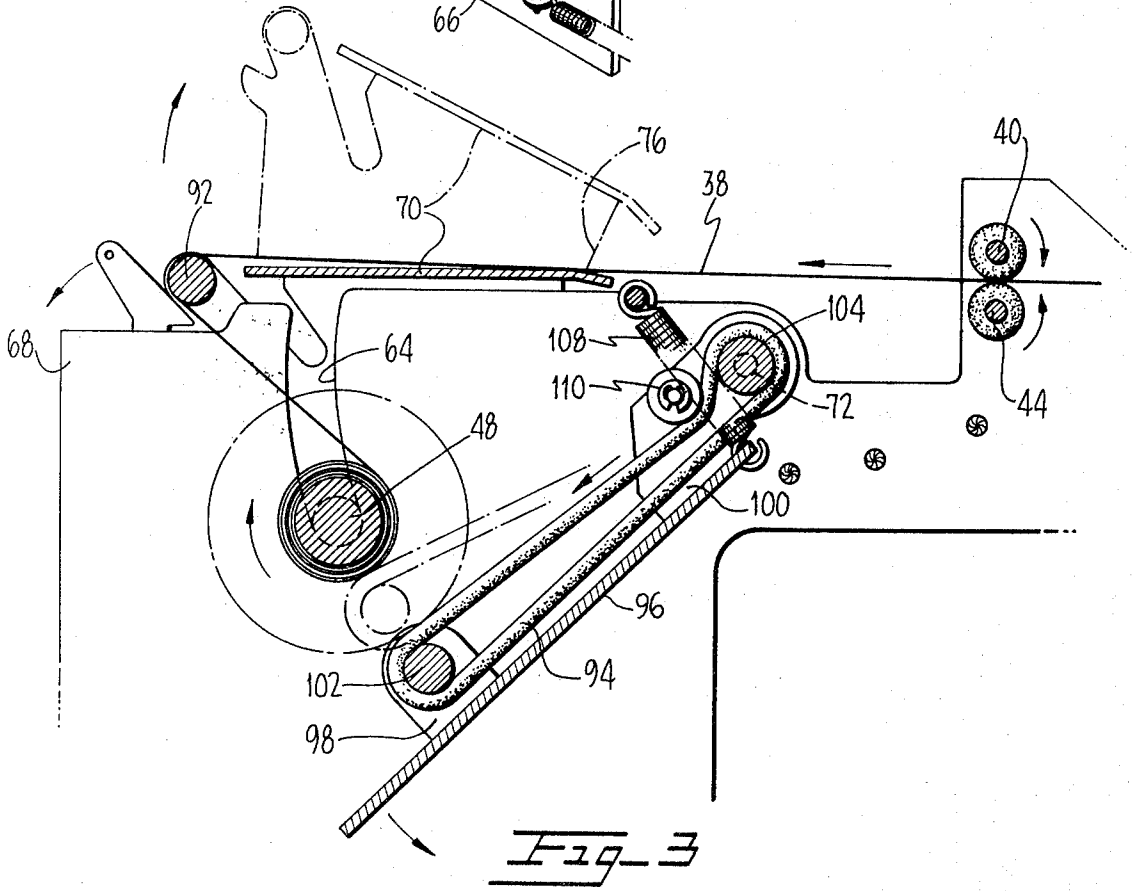

76
40
92
70
38
104
68
64
108
110
72
44
48
100
96
94
102
98

Fig_3

ASSEMBLY FOR SPOOLING AN AUDIT TRAIL IN A DATA TERMINAL

CROSS-REFERENCES TO RELATED APPLICATIONS

U.S. application entitled "Character Strobing in a Data Terminal" of Hartley M. Naas, Julian C. Sutherland and Dale D. Nesbitt, filed Jan. 5, 1973, Ser. No. 321,177;

U.S. application entitled "A Data Terminal with Dual Three-Station Printing" of Howard R. Cederberg and Charles W. Wiedeman, filed Jan. 5, 1973, Ser. No. 321,176.

BACKGROUND OF THE INVENTION

1. Field of Invention

This invention relates, in general, to an improved assembly for spooling a roll of record media, usually paper, to form a record of all of the transactions entered into a point-of-sale terminal, such as a cash register or electronic data terminal.

2. Description of the Prior Art

Present cash registers and point-of-sale terminals have a roll of record media, usually a roll of paper, which records the transaction involved as entered into the cash register or point-of-sale electronic terminal by the sales person. This paper is then rolled on another spool to form a permanent record of the transaction. This permanent record, called an "audit trail" is useful for editing or auditing the transactions made during the day. One problem with the conventional spool on which the audit trail is wound has been the difficulty in the manner of attaching the lead end of the paper to the spool. Numerous devices have been devised, including partially disassembling the spool, or providing a pin or rod which formed part of the spool and which gripped the end of the paper to hold it to the spool, but in general, the sales person had to spend more time than seemed necessary to make the data terminal operable. Another difficulty inherent in prior art terminals in which the paper roll is rewound on a spool is the complexity of compensating for the change in linear velocity of the paper as the roll of paper increased its diameter sometimes caused tearing of the roll between the take-up roll and supply roll.

SUMMARY OF THE INVENTION

This invention comprises a belt which cooperates with the spool upon which the roll of paper is to be wound, and which is pivotally mounted so as to engage the paper to wind the paper and to rotate the spool as the paper is wound around the spool. Since the belt drives the spool through the paper and the spool is not independently driven, the increase in size of the diameter of the roll as the paper winds on the spool does not affect a change on the linear motion of the paper, thus not increasing the pull on the paper from the supply roll. Too, in this invention the spool is rotated opposite from the conventional direction to facilitate initial loading of the spool.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective of a cutaway portion of a data terminal schematized to illustrate the relationship of the audit trail spool in cooperation with the work level surface and the rest of the data terminal, including the matrix printer, upon which the record is printed, as the roll of paper is wound on the spool;

FIG. 2 is an enlarged detailed view showing the audit trail spool as it cooperates with the data terminal;

And FIG. 3 is a cross-sectional view showing the details of the means of winding the audit trail onto the spool, taken along the line 3—3 of FIG. 2 and looking in the direction of the arrows.

DESCRIPTION OF THE PREFERRED EMBODIMENT

To illustrate a data terminal, in which the present invention for facilitating the spooling of the audit trail may be used, a general description of the terminal is described first.

In FIG. 1, the data terminal **10** (with cover removed for purposes of clarity) is shown as comprising, overall, a carriage **12** movable laterally with respect to a frame **14**, a work level surface **16** having three print stations **18, 20** and **22,** and an appropriate keyboard **24.** The three print stations **18, 20** and **22** are, respectively, a receipt station where the customer's receipt is printed (if a receipt is required), an audit station where the storekeeper's record (audit trail) of all transactions are printed, and a form station where the customer's order form or bill of sale is printed, if required.

By this arrangement, the carriage **12** will move, not only from the printing position shown, viz, at the audit station and receipt station, but to the form station and audit station was well as traversing each pairs of stations so that appropriate rows and columns of data entered into the data terminal at the keyboard **24** is appropriately printed out. The carriage **12** is mounted on a pair of bars **26** and **28** to hold the carriage in parallel relationship with the work level surface **16** and the rest of the data terminal and traverse movement on the parallel bars is accomplished by a suitable drive mechanism **30** including a belt **32** attached to carriage **12,** and pulley means **34** motivated by a reversible motor (not shown).

In the embodiment shown, a receipt **36,** if required, is printed in the receipt station **18** and an audit trail **38** is printed in the audit station **20** when the carriage **12** is in the position shown as the two record media (paper) are moved forward, i.e., in the direction of the keyboard **24,** and forms a suitable supply, such as a roll of paper, by a suitable roller feed mechanism **40** driven by a motor and clutch means **42** coupled to shaft **44.** When the carriage **12** is positioned to the left from that shown, a form **46,** such as a customer order form or bill of sale, is printed in station **22** at the same time the audit trail **38** is being printed.

The audit trail **38** is rolled onto a spool **48** partially shown in FIG. **1,** while the receipt **36** is severed, when a complete transaction is recorded, by a suitable cutting mechanism, indicated in its entirety as **49.** Also, the forms station is provided with a pair of electronic sensing means **50** and **52** which determine when a form **46** is properly located in the forms station, otherwise the terminal is inhibited from operating; suitable electronics being provided for this purpose. Rollers **54** feed the form in a direction opposite from the direction of travel of the audit trail by suitable gearing to couple the rollers to shaft **42** which moves the form and audit trail or audit trail and receipt, or audit trail alone, as the case may be, incrementally, in response to and in combination with printing mechanisms to form rows and

columns of data as determined by the input to the keyboard **24.**

The carriage **12** is also provided with a pair of matrix printers **56** and **58** capable of printing on two of the three stations at the same time, viz, the receipt station and the audit station, or when the carriage is positioned to the left from that shown on the form station and audit station.

For the proper positioning of the rows and columns of the characters on the record media, the combination of a mechanical strobe means **60** and suitable electronics cooperating therewith are provided but are described and claimed in a copending application in more detail.

Furthermore, a suitable ink supply means for the dual matrix printer located in the carriage are shown in FIG. **1** only schematically, since the ribbon, its novel inking supply arrangement and other details to improve the operation of the matrix printers and data terminals generally are described and claimed in a copending application.

No description of such mechanical strobe means and electronics for properly aligning the characters on the record media nor in the ink supply means for the printers will be described herein since this invention is directed to the means for spooling the audit trail, which will now be described in more detail.

It should be noted at this time, however, that one of the many advantages of matrix printers in the data terminal is the ability to print legibly through several copies of forms, in the form station and, also, by suitable electronics described and claimed in the copending application, supra, the printing on the receipt is upside down relative to the printing on the audit trail and form. This upside down printing on the receipt enables the complete transaction, such as a sale, to be recorded and totaled in the manner in which any transaction is normally read, i.e., top to bottom, for the benefit of the customer. This is also true of the form printed at the form station since the form moves in a direction opposite to the direction of travel of the receipt. This is not true, however, for the printing on the audit trail, which is stored in the machine to be used by the vendor.

Turning now to FIGS. **2** and **3,** it can be seen that the audit trail **38** is wound around spool **48,** which is nestled for rotation in the bottom of a pair of arcuate slots **62** and **64** formed in the sidewalls **66** and **68** forming part of the enclosure or container for the audit trail. Arcuate slots **62** and **64** are open at the top to facilitate removal of the spool.

A cover **70** pivotally mounted about shaft **72** is provided with sidewalls **74** and **76** telescopingly cooperating with the sidewalls **66** and **68** and are provided with open arcuate slots (only slot **78** being shown) which cooperate to hold the spool for rotation in the bottom of the slots **62** and **64.** These slots, such as **78** of the cover, also facilitate the removal of the spool when the cover is pivoted upwardly by forcibly moving the spool, but the movement of the cover is limited by interaction by a pin **80** attached to sidewall **66** and slots **82** in sidewall **74** (FIG. **3** shows the cover at or near its upper position).

During operation, the cover **70** is latched by a springactuated latch arm **84** biased to receive the projection **86** within the slot **88** formed in the latch arm. To remove the cover, movement of the latch arm outwardly, i.e., away from the cover and against the bias spring, will permit the upward movement of the cover **70** as shown by the arrows in FIG. **3.**

To feed or transport the audit trail and wind it onto spool **48,** the pair of rollers previously mentioned in connection with FIG. **1** as **40,** are coupled to the main drive shaft **42** by a gear train **90.** The audit trail, after passing through the rollers **40,** is passed over the top of the cover **70,** which also forms a guide to roller **92** mounted at the far end of the cover and adjacent the latch arm, around the roller **92** and onto the spool **48.**

It is to be noted that the spool is not itself driven by any gear train but is driven through a belt **94** which only engages the spool when the spool is empty, but serves to rotate the spool through the paper as the paper is wound therearound. This arrangement does not increase the linear motion of the paper regardless of the size of the roll thus not increasing the pull on the paper from the supply roll.

To do this, the belt is mounted on a pivoted plate member **96** having a pair of lugs or ears **98, 100** (two only shown in FIG. **3**) to hold a pair of rollers **102** and **104** in parallel alignment with the spool **48.** Roller **102** is the driven roller, i.e., driven by the belt **94** and roller **104** is the driving roller which is mounted on shaft **72** (previously mentioned as the pivot for the cover **70**) which, in turn, is coupled to the main drive shaft by a gear train **106** located adjacent gear train **90** and driven off the same main drive **42.** The plate member **96** is biased in the direction of the cover by a spring **108** fastened at one end to the sidewall **66** in FIG. **3** and at the other end to the plate member **96** in a position to resiliently urge the plate member and belt toward the spool **48.**

It is to be noted that, as the audit trail is wound around the spool **48,** the belt **94** will gradually be urged away from the spool as the diameter is increased by the roller of the paper and the spring **108** permits this until the linear motion of the paper does not change. Further, the plate member **96** is also provided with a free-running roller **110** which engages the belt for the proper tension. It is also noted, too, that the speed of rotation of the belt is slightly greater than the paper is fed so that the paper can be rolled onto the spool tightly and that the face of the audit trail upon which the printed matter is placed is faced inwardly on the spool so that there will be no smearing by the belt.

From the foregoing it can be seen that all a sales person need to do is to lift the cover, initially roll the paper up around the spool, and over the roll **92** and insert the spool in the slots **62, 64** and close the cover **70.** Thereafter, the belt **94** will urge the paper around the spool.

The spool and roll, it will be noted, is rotated by the belt **94** in a direction which would appear to be difficult since it maximizes the distance between the roller **92** and spool **48,** but this direction of rotation facilitates initial loading of the spool since it is the face-up direction that the sales person would naturally roll the paper over the spool, thus facilitating the loading of the roll onto the spool.

What is claimed is:

1. An assembly for spooling an audit trail of a record media from a source of supply comprising:

a spool upon which said audit trail is to be wound and rotatably mounted in a pair of side walls and cover means, said cover means having means for holding

said spool in position and a roller and guide for directing the audit trail from the supply to the spool, and

means for winding said audit trail around said spool at a uniform linear velocity regardless of the increase in diameter of the combination of the spool and audit trail as the latter is wound thereabout,

said winding means comprising a carrier resiliently biased in the direction of said spool and having a rotatable belt mounted thereon which engages the audit trail and drives the audit trail and spool to wind said audit trail on said spool.

2. The Assembly claimed in claim **1** wherein said cover means is pivotally mounted for removal of the spool.

3. The Assembly claimed in claim **2** wherein the printed matter defining the audit trail is located on the side of the spool not engaged by said belt to prevent smearing of the printed matter thereon.

4. The Assembly as claimed in claim **1** wherein said belt is driven faster than the source of supply may release said record media to ensure a tight roll on said spool.

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