Oct. 21, 1941. A. DRENKARD, JR 2,259,517

TAPE ACCUMULATOR

Filed April 6, 1939 2 Sheets-Sheet 1

FIG. 1

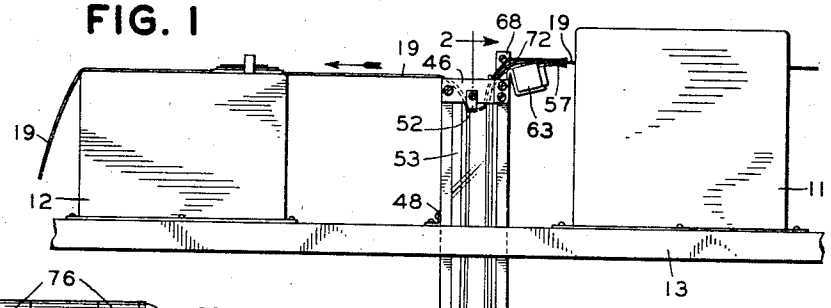
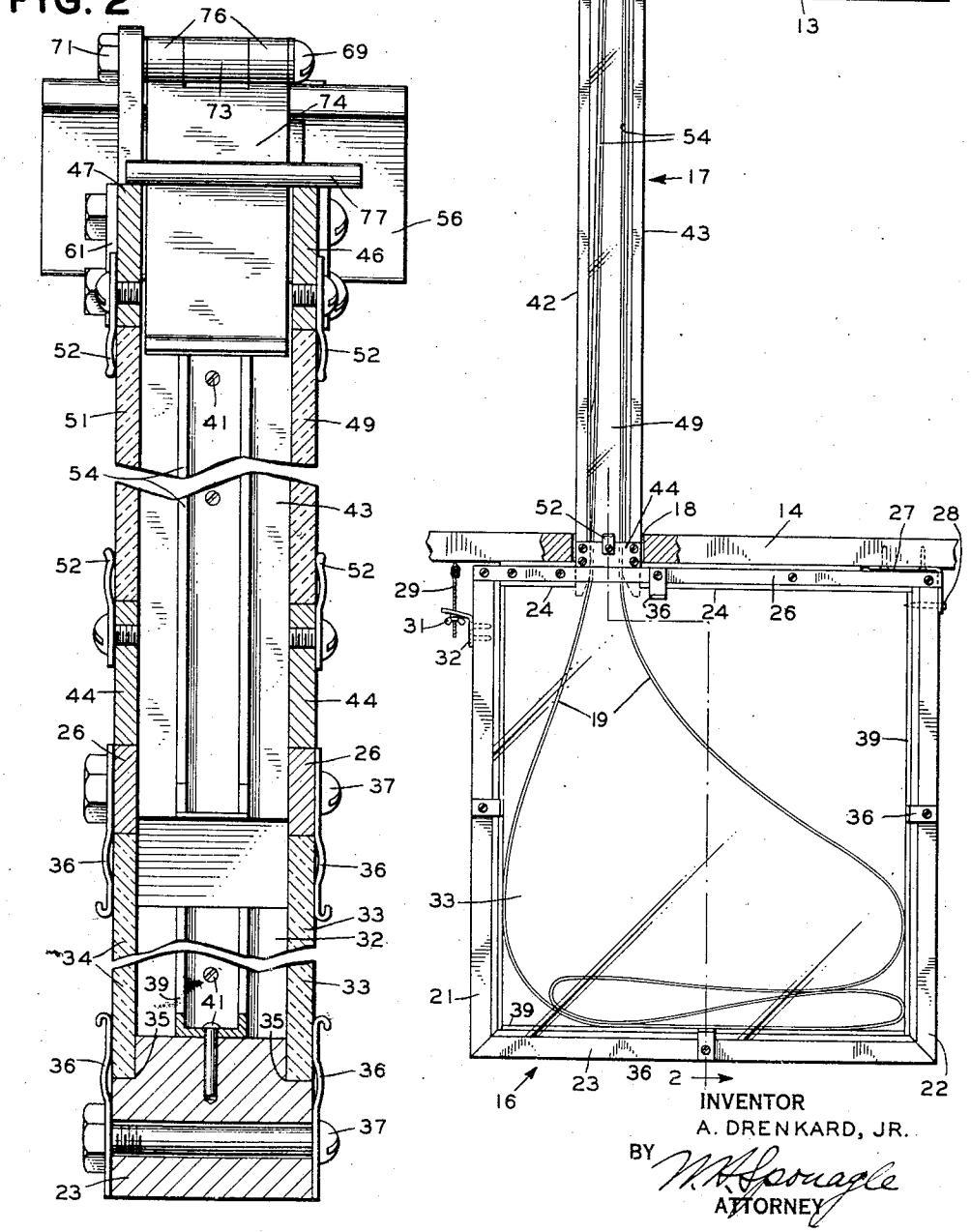


FIG. 2



INVENTOR
A. DRENKARD, JR.
BY
ATTORNEY

Oct. 21, 1941. A. DRENKARD, JR 2,259,517

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Filed April 6, 1939 2 Sheets-Sheet 2

FIG. 3

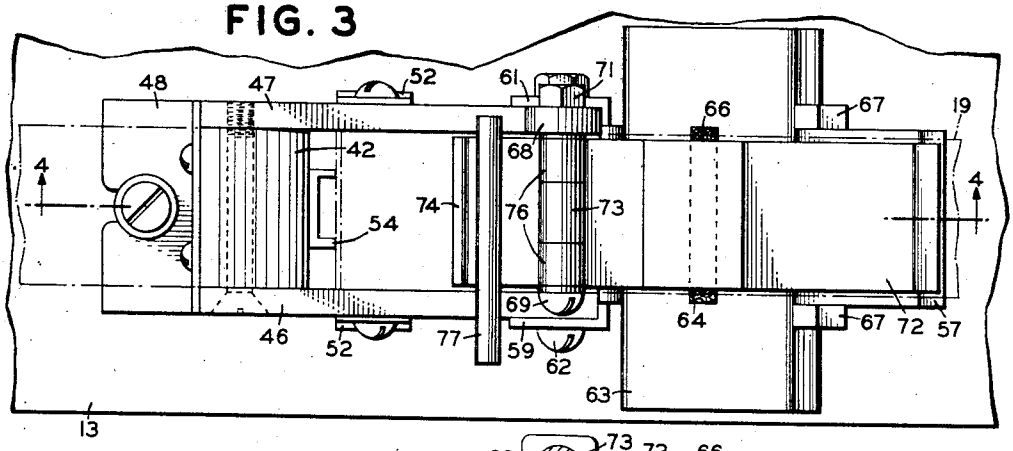


FIG. 4

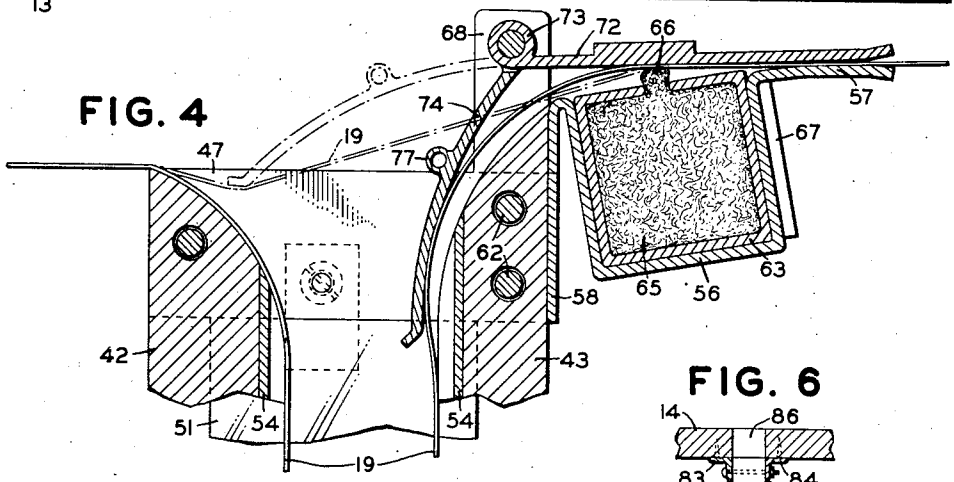


FIG. 5

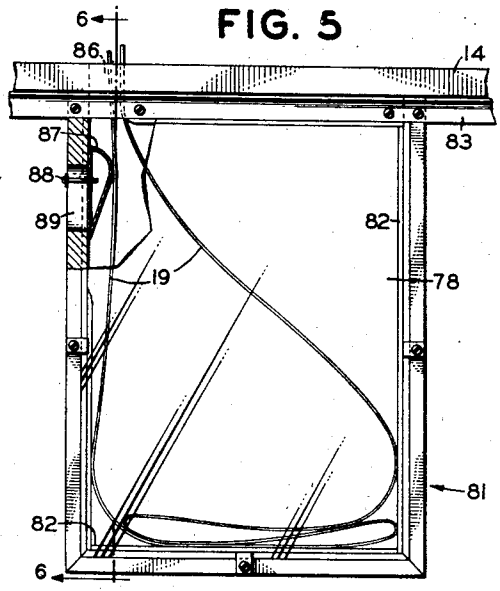
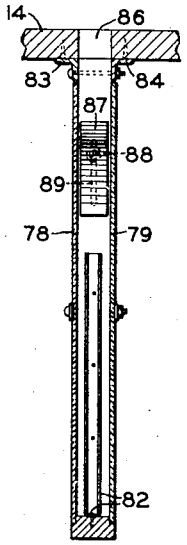


FIG. 6



INVENTOR
A. DRENKARD, JR.

BY W. A. Gonzalez

ATTORNEY

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UNITED STATES PATENT OFFICE

2,259,517

TAPE ACCUMULATOR

Adam Drenkard, Jr., Grantwood, N. J., assignor to The Western Union Telegraph Company, New York, N. Y., a corporation of New York

Application April 6, 1939, Serial No. 266,276

20 Claims. (Cl. 178—17.5)

This invention relates to telegraph apparatus and has particular reference to novel means for the storage of loose tape.

In certain types of telegraph systems, in order to eliminate the manual retransmission of messages originating at a plurality of lightly loaded points and destined for any one of a plurality of main offices, each message is recorded on perforated tape at a switching center. The messages are thus stored in tape until a circuit to the point of destination becomes available, at which time the tape is fed through a transmitter and the message forwarded. It will be apparent that, at times, a considerable amount of tape may accumulate before any particular channel over which it is to be retransmitted becomes available.

Hence it is an object of the instant invention to provide means for temporarily storing in an orderly fashion an appreciable amount of perforated tape.

The invention has for another of its objects the provision of means for guiding the tape loop, formed between a perforator and a transmitter, into a storage compartment which may be located at some distance from the telegraph apparatus.

Another object of the invention is to provide means within the storage compartment and the guideway leading thereto to permit the orderly withdrawal of tape from the compartment.

Still another object of the invention is the provision of means for preventing the accumulation of a charge of static electricity by the tape.

A further object of the invention is to furnish the storage compartment and the guideway with means affording a view of the tape contained therein.

The functioning of the means provided for the attainment of these and other more specific objects of the invention will be understood from the following description taken in conjunction with the accompanying drawings, of which:

Fig. 1 is an assembly view of the storage apparatus in elevation, showing the relation of the storage compartment and its connecting guideway to the associated telegraph apparatus;

Fig. 2 is an enlarged sectional view taken on the line 2—2 of Fig. 1;

Fig. 3 is a top or plan view of the mouth of the guideway showing some of the details associated therewith;

Fig. 4 is a sectional view of the upper end or mouth of the guideway taken on the line 4—4 of Fig. 3;

Fig. 5 is a view in elevation of a modification of the storage compartment; and

Fig. 6 is a sectional view taken on the line 6—6 of Fig. 5.

Having reference first to Fig. 1, there is shown a tape perforator 11 and a tape transmitter 12, mounted on a shelf or platform 13. Mounted on the underside of a second shelf or platform 14, located at some distance below the shelf 13 and which may have installed thereon similar or other apparatus, is a rectangular storage compartment 16. A guideway 17 extending upward from the storage compartment 16, through a suitable opening 18 in the shelf 14 and a corresponding opening in the shelf 13, is so proportioned and arranged that the upper end thereof is situated between the perforator 11 and the transmitter 12 in line with the tape-handling facilities of thesee pieces of apparatus. When there is an accumulation of tape between the perforator and the transmitter, a loop is formed and is guided by means of some of the instrumentalities comprising the instant invention into the guideway 17 and, if the accumulation is sufficiently large, into the storage compartment 16.

The storage compartment 16, shown in Figs. 1 and 2, is formed by a framework comprising sides 21 and 22, a bottom 23 and a top 24. The two sides are joined to the bottom member in any conventional manner. The two spaced members 24 which comprise the top of the compartment are fastened to the upper ends of the side members 21 and 22 by means of two bars 26 and a plurality of suitable screws. Attached to the underside of the shelf 14 by means of screws is an angle 27, the depending leg of which is provided with a hole. Adjacent the upper end of the side member 22 is a projecting pin 28. The storage compartment 16 is attached to the underside of shelf 14 by inserting the pin 28 into the hole in the depending leg of the angle 27 and is detachably held in position by means of a screw 29 attached to the shelf 14 and a wing nut 31 engaging a bracket 32, which is attached to the side member 21 and provided with an extending lug having a slot into which the screw 29 may be inserted. The front and rear walls of the compartment are formed by transparent glass panels 33 and 34, which are set in suitable recesses 35 formed in the framework so that the outer surfaces thereof are flush with the outer surfaces of the framework members. The glass panels are held in position by means of a plurality of clips 36, which are fastened to the framework by screws 37 and 38. The spacing between

the inner surfaces of the glass panels is slightly greater than the width of the tape 19.

A plurality of channel sections 39 are affixed to the inside of the framework along the two sides, 21 and 22, and to the bottom 23 thereof by means of a plurality of escutcheon pins or small wood screws 41. The channels 39 are mounted in the framework so that the open sides thereof are directed inwardly, thereby forming two continuous ribs extending around the two sides and bottom of the compartment.

The connecting guideway 17 is formed by two side members 42 and 43 which are fastened together in spaced relation at the bottom by two plates 44 and at the top by two plates 46 and 47. The lower plates 44 are arranged so that they are in contact with the bars 26 of the compartment 16 thereby providing a support for the guideway 17 at the lower end thereof. The guideway is attached adjacent the upper end thereof to the shelf 13 by means of an angle 48. The front and rear walls of the guideway 17 are formed by glass panels 49 and 51 which are mounted in a manner similar to the panels 33 and 34 and fastened in place by a plurality of clips 52. A tapering portion 53, having its wide end at the top, is formed on the inside of the side member 42, thus producing a guideway having a cross-section which increases as the lower end is approached. The inner surfaces of the members 42 and 43 are provided with channels 54 mounted similarly to those of the storage compartment 16. In this, a preferred embodiment, the guideway 17 communicates with the storage compartment 16 at a point remote from either of the sides 21 and 22 thereof.

Referring to Figs. 2, 3 and 4 the details associated with the top or mouth of the guideway are shown. A holder or retaining member 56 is formed with a recess which is open at the top. This holder also is provided with a tape guide 57 located near the top thereof and extending in the direction of the tape perforator. Forming a unitary structure with the holder 56 is a supporting member 58 which is provided with flanges 59 and 61. These flanges are disposed on opposite sides of the guideway member 43 and are attached thereto by means of two bolts 62. A tape moistening device 63 is mounted in the recess formed in the holder 56 and has an elongated form, a cross section of which is substantially rectangular. It also is provided with an opening 64 in the top surface thereof. The device is filled with moistened wick material 65, a portion of which 66 protrudes slightly through the opening 64. Two guide bars 67 are attached to one side of the moistening device 63 and serve to position the device in the holder 56.

One of the guideway spacing bars 47 is provided with an upwardly extending arm 68, adjacent the upper end of which is a tapped hole into which a screw 69 is threaded and locked in position by means of a nut 71. A tape guide 72, provided with a hinge 73, is arranged to pivot on the screw 69 and, in its operating position, extends laterally in the direction of the tape perforator in cooperative relation with the stationary tape guide 57. An arcuate tape guide 74, provided with a hinge 76, is also pivoted on the screw 69. The guide 74 is disposed on the opposite side of the pivot screw 69 with respect to the guide 72 and is arranged so that the free end thereof follows a normal cycle of movement within the mouth of the guideway. A rod 77 is attached to the upper surface of the guide 74 laterally thereof. This pin or rod extends on either side beyond the edges of the guide 74 and is adapted for engagement with the plates 46 and 47 thereby limiting the downward movement of the guide.

That portion of the tape 19 projecting from the perforator 11 is inserted between the guides 57 and 72 and underneath the guide 74 before it is inserted into the transmitter 12. The threading of the tape through the various guides is accomplished by lifting, to a substantially vertical position, the guides 72 and 74. With the guides in these positions, the threading operation may be easily effected. The guides are then allowed to assume the positions shown in Fig. 4, thus bringing the tape 19 into contact with the moistening wick 66. When there is no accumulation of tape between the perforator and the transmitter the tape is drawn relatively tight between these two pieces of apparatus and takes the position shown by the dotted lines of Fig. 4. It will be seen that in such a position the curved guide member 74 is carried upward by the tape into the position shown dotted. In addition to serving as a stop for the guide 74, the rod 77 may effect the operation of a contact by which the operation of the transmitter may be controlled.

If the transmitter 12 is inoperative by reason of the line circuit associated therewith being unavailable to this transmitter or for any other reason, and additional tape is perforated by the perforator 11, the small tape loop formed in the mouth of the guideway 17 is increased. That portion of the tape which is located between the two sides of the guideway mouth is carried down further into the mouth by the weight of the guide 74. When this guide has reached the limit of its downward travel the loop of tape will be well disposed within the mouth of the guideway. Ejection of tape from the perforator 11 causes the tape 19 to be propelled between the closely spaced guides 57 and 72 and across the moistening wick 66. It should be noted that the weight of the guide 72 is only sufficient to force the tape 19 into relatively light contact with the moistening wick 66. It has been found that it is necessary to moisten the tape before it is inserted into the guideway in order to eliminate the effect of static electricity. The presence of such a condition produces a tendency for the tape to adhere to the walls of the guiding structure, thereby preventing proper functioning of the apparatus.

It will be apparent that any appreciable amount of friction between the tape and any of the guiding structures will prevent the apparatus from functioning. Hence, it is important, in a device of this nature, to minimize the area of contact between the tape and the guiding and storage devices in order to reduce friction and static effect. This is accomplished in the instant invention by use of the channels 54 in the guideway and similar channels 39 in the storage compartment. Thus the tape surface only comes in contact with the relatively small ridges formed by the channels. It also has been found that, in order to force the loop of tape down through the long guideway 17, the cross section of the guideway must be increased as the distance from the mouth thereof increases.

When the loop of tape has been forced through the entire length of the guideway 17, it is permitted to enter the large storage compartment 16. The tape accumulates on the bottom of the

compartment 16 and, as more and more of it is forced into the compartment, it becomes arranged in folds or layers. It is apparent that a very large quantity of perforated tape may thus be stored in the compartment 16 which, because of its confining nature, maintains the store of tape in a very orderly manner.

When the transmitter 12 becomes connected with a circuit and starts to draw tape from the accumulated supply, this tape must be drawn from the bottom of the pile disposed within the storage compartment 16. Here again the importance of the channels 39 and 54 becomes emphasized. Since the depth or thickness of the compartment is only slightly greater than the width of the tape, it will be seen that even though the withdrawal of tape from the bottom of the pile has a tendency to disturb the upper portions of the accumulation, the tape will have very little tendency to twist or become distorted in any way which would interfere with the withdrawal thereof.

In most telegraph systems where a device of this nature is used, spare facilities for transmitting are often maintained so that if a particular circuit is engaged for any length of time while another perforator is preparing substantial amounts of tape for transmission over that circuit, the accumulated material may be rerouted over the spare circuit. It is principally for this reason that the accumulator and its communicating guideway are provided with glass panels affording a view of the tape contained therein. Hence an attendant, noticing a considerable accumulation in one or more compartments, may detach any desired amount of the accumulated tape and transmit it over the spare facilities. The glass panels also are of value in observing the functioning of the accumulator.

A modified form of storage compartment is shown in Figs. 5 and 6 to which reference may be had for the following portion of the description. The glass panels 78 and 79 are mounted in a framework 81 substantially similar to the device previously described. The inner surfaces of the two sides and the bottom of the compartment are provided with channels 82. The compartment is mounted on the underside of the shelf by two angles 83 and 84 and is provided with an opening 86 leading into the compartment in one of the upper corners thereof. In order to prevent a possible clogging of the opening 86 by several folds of the accumulated tape as it is being withdrawn from the compartment, a deflector 87 is located directly below the opening. This deflector is mounted by means of a screw 88 extending through a slot 89 formed in the side of the compartment, and thereby provides an adjustment by which the deflector may be positioned at an elevation producing maximum effectiveness thereof. As the tape is withdrawn from the compartment, it is drawn over the deflector 87 and, if other folds of the tape adhere to that portion being drawn into the guideway, they are deflected into the center of the compartment by means of the deflector.

Although there has been illustrated and described what is at present considered to be a preferred embodiment of the invention, it will be apparent to those skilled in the art that various changes and modifications may be made therein without departing from the spirit of the invention or from the scope of the appended claims.

What is claimed is:

1. In apparatus for handling a loop of tape, a storage compartment for said tape loop, and a guideway having one end thereof in communication with said compartment, and means whereby said communicating end serves jointly as the entrance and exit of said compartment for said tape.

2. Apparatus for storing a loop of tape comprising a pair of spaced members forming a part of a guideway for said tape, a storage compartment disposed at one end of said guideway and in communication therewith, and a loop forming member disposed at the other end of said guideway.

3. Apparatus for storing a loop of tape comprising a pair of substantially vertical spaced members forming a part of a guideway, a storage compartment disposed at the lower end of said guideway and in communication therewith, and a deflector disposed adjacent the upper end of said guideway and extending into the mouth thereof.

4. Apparatus for storing a loop of tape comprising a substantially vertical guideway having two diverging sides, a storage compartment disposed at the lower end of said guideway and in communication therewith, and a direction changing tape guide disposed adjacent the upper end of said guideway and leading into the mouth thereof.

5. Apparatus for storing a loop of tape comprising a substantially vertical guideway having two diverging sides and two parallel sides spaced slightly in excess of the width of said tape, a storage compartment disposed at the lower end of said guideway and in communication therewith, and a deflecting member pivoted adjacent the upper end of said guideway and depending into the mouth thereof.

6. Apparatus for storing a loop of tape comprising a substantially vertical guideway formed in part by a pair of opposed spaced members, a storage compartment disposed at the lower end of said guideway and in communication therewith, a deflector pivoted adjacent the upper end of said guideway and extending into the mouth thereof, and a pair of flat guides disposed adjacent the upper end of said guideway and extending outwardly therefrom.

7. Apparatus for storing a loop of tape comprising a storage compartment, a guideway communicating therewith, a hinged member pivoted adjacent the mouth of said guideway and having the free end thereof supported in said mouth by a predetermined length of tape, means including said hinged member for guiding more than said predetermined length of tape into said guideway, a shoulder formed on said hinged member, and means including said shoulder for restricting the movements of said hinged member to predetermined limits.

8. In apparatus for storing a loop of tape, a compartment comprising a four-sided framework having an opening formed adjacent one of the upper corners thereof, two transparent panels mounted in said framework to form the front and rear walls of said compartment, a plurality of continuous ribs lining a substantial portion of the inside of said framework, and a downwardly pointing wedge-shaped deflector mounted directly under said opening on one side of said framework.

9. In apparatus for storing a loop of tape, a compartment comprising a framework formed of

a top, bottom and two sides, two transparent panels mounted in said framework to form the front and rear walls of said compartment, said panels being spaced apart slightly more than the width of said tape, the top of said compartment being provided with an opening intermediate the sides thereof, a guideway communicating with said opening and characterized by upwardly extending and converging sides, front and rear transparent walls, and channels affixed to the inner surfaces of the sides of said guideway, the bottom and sides of said compartment and forming ribs thereon.

10. The combination of a tape conditioning device, a tape utilizing device, and apparatus for storing unused conditioned tape in excess of a predetermined amount comprising a storage compartment, a guideway communicating therewith, and a loop-forming hinged member pivoted adjacent the mouth of said guideway and having a normal cycle of movement within the mouth of said guideway.

11. In combination a source of tape, a narrow elongated passageway, means for feeding said tape from said source and into said passageway, and separate means for withdrawing said tape from the same end of said passageway through which it entered.

12. The combination of a tape conditioning device, a tape utilizing device, means including an enclosed receptacle disposed intermediate of said tape conditioning device and said tape utilizing device for storing variable amounts of tape between said two devices, said receptacle being provided with a single opening, and means whereby said opening forms a combined entrance and exit for said tape.

13. The combination of a tape conditioning device, a tape utilizing device, means including an enclosed receptacle disposed intermediate of and remote from said tape conditioning device and said tape utilizing device for storing variable amounts of tape between said two devices, said receptacle being provided with a single opening, and means whereby said opening forms a combined entrance and exit for said tape.

14. The combination of a tape conditioning device, a tape utilizing device, means including an enclosed receptacle disposed intermediate of said tape conditioning device and said tape utilizing device and remote from said tape conditioning device for storing variable amounts of tape between said two devices, said receptacle being provided with a single opening, and means whereby said opening forms a combined entrance and exit for said tape.

15. The combination of a tape ejector, a tape puller, a storage receptacle for said tape disposed intermediate of said ejector and said puller and provided with a narrow opening, means for guiding the ejected tape through said opening into said receptacle, and means including said tape puller for withdrawing the tape from said receptacle through said opening.

16. Tape storage mechanism comprising a storage receptacle, means for directing tape into said receptacle, and means for reducing static charges on said tape prior to its passage into said receptacle.

17. Tape storage mechanism comprising a storage receptacle, means for directing tape into said receptacle, and means for moistening said tape prior to its passage into said receptacle.

18. In combination, a tape conditioning device, a tape utilizing device, means including a tape chute for storing variable amounts of tape between said tape conditioning device and said tape utilizing device, said tape having the characteristic of accumulating electrostatic charges during movement of the tape, the charged portions of the tape tending to cause it to stick to said tape chute, and means for preventing the tape from sticking to the chute comprising means for eliminating the electrostatic charges from the tape.

19. In combination, a tape conditioning device, a tape utilizing device, a storage receptacle for accumulating variable amounts of said conditioned tape, means including a chute for guiding said conditioned tape into said receptacle, said tape having the characteristic of accumulating electrostatic charges during movement of the tape, the charged portions of the tape tending to cause it to stick to said chute and to said receptacle, and means for preventing the tape from sticking to the chute and to the receptacle comprising means for eliminating the electrostatic charges from the tape.

20. Apparatus for storing a loop of tape comprising a storage compartment, a guideway communicating therewith, a tape moistening device disposed adjacent the mouth of said guideway, a pair of hinged guides pivoted adjacent the mouth of said guideway, one of said guides having one face thereof flat and normally extending from said guideway, the other of said guides having one face thereof concave and normally extending into said guideway, means including said flat-faced guide for effecting contact between said tape and said moistening device, and means including said concave-faced member for deflecting the tape into said guideway.

ADAM DRENKARD, JR.