Oct. 19, 1943. J. E. WACK 2,331,947

APPARATUS FOR DIRECTING WEBS

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FIG. 1

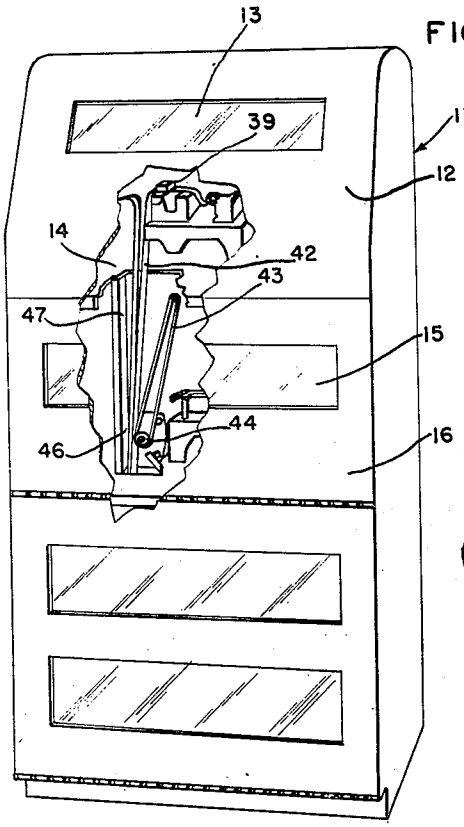


FIG. 2

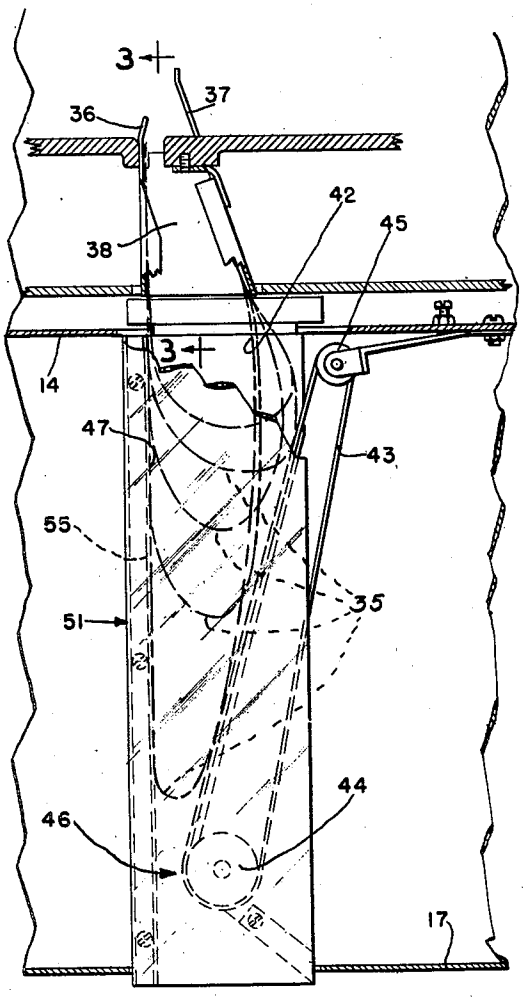
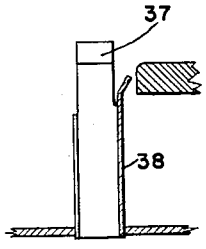


FIG. 3



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FIG. 4

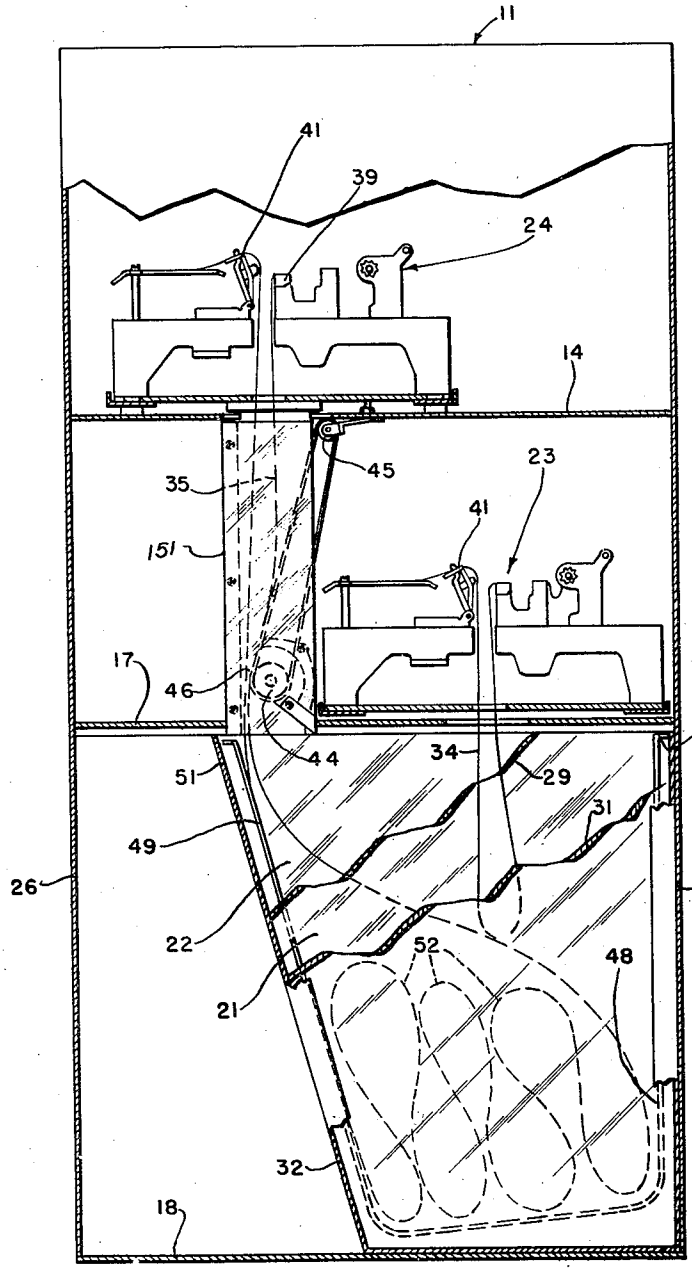
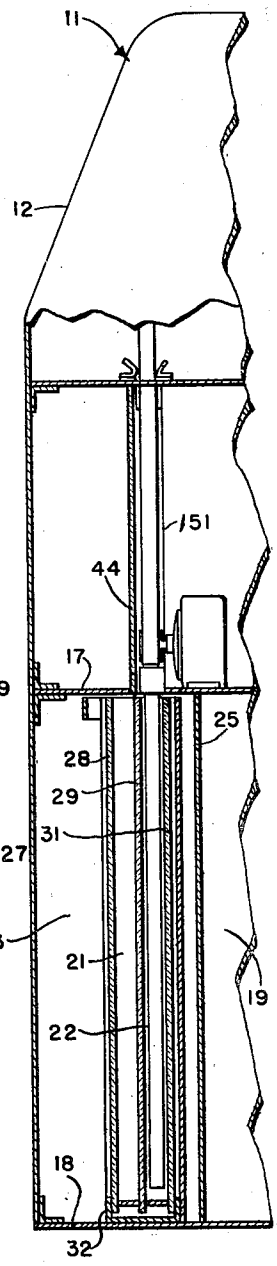


FIG. 5



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APPARATUS FOR DIRECTING WEBS

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Application July 18, 1942, Serial No. 451,439

7 Claims. (Cl. 178—42)

The present invention relates to control form apparatus and more particularly to form directing and intermediate storage devices for accommodating a control form following its preparation and until subsequently when it is presented to and fed through a signal transmitting apparatus.

The present invention contemplates a control form preparing apparatus and a signal transmitting apparatus of the type illustrated in copending application, Serial No. 412,829 filed September 29, 1941, in association with an enclosure cabinet adapted to support two or more such form preparing and signal transmitting apparatuses. A number of apparatus cabinets of this type may be arranged at a central office telegraph exchange for the reception and retransmission of signals from a plurality of outlying or subscribers' stations. The lines of communication between subscribers' stations and the central office may be insufficient to accommodate peak load traffic requirements. Under such circumstances, it is advantageous to prepare control forms bearing the incoming messages and to store such forms in an intermediate or temporary storage compartment to await the availability of an idle outgoing line.

Also, by storing the prepared forms in intermediate compartments, retransmission may be effected in a more efficient manner through utilizing fully all of the outgoing line time, notwithstanding that interruptions and delays may intervene during preparation of the tape. This economy is especially important where the principal line of communication extends over a long distance or which for any other reason is costly in maintenance or of excessive line time value.

Accordingly, the principal object of the present invention is to provide tape preparing and retransmission apparatus with means which will readily and efficiently store prepared tape in readiness for immediate use for signal retransmission.

In the attainment of this and other objects of the instant invention, there is utilized an enclosure cabinet adapted to hold two complete perforating and retransmitting units of the type featured in the U. S. copending application mentioned above. In such apparatus a tape is prepared with perforations or semi-circular slashes distributed transversely in accordance with the permutation components of a signal code. The cabinet structure is divided longitudinally into three compartments separated by two horizontal supporting shelves. One of the perforator re-transmitter units is carried upon the top shelf and another upon the second shelf, the lowermost compartment being utilized as a storage space for the tapes or control forms of both units following preparation and before retransmission as well as a receptacle for containing the tape after it has been used for transmission. Between the tape preparing and retransmitting apparatuses, the tape is permitted to gather in the form of a loop. As the loop becomes enlarged due to the continuous feeding out from the perforator while the transmitter is quiescent, means have been provided comprising a vertical wall section and a cooperating inclined endless belt, which supplies traction to the tape loop. In this way a greater quantity of tape than otherwise is caused to be packed into the intermediate storage chambers or compartments.

For a more comprehensive understanding of the present invention reference may be had to the accompanying drawings and to the following detailed description in which like reference characters designate corresponding parts throughout and in which,

Fig. 1 is a perspactive view of an apparatus cabinet designed in accordance with the principles of the present invention but having a portion of the front panel broken away to reveal the interior apparatus;

Fig. 2 is an enlarged front elevation of a detailed mechanism associated with the apparatus illustrated in Fig. 1;

Fig. 3 is a fragmentary detailed section taken approximately on line 3—3 of Fig. 2;

Fig. 4 is a front elevation of the cabinet with portions of the forepanel broken away to reveal details of the interior construction; and

Fig. 5 is a side elevation partially in section of the apparatus illustrated in Figs. 1 and 4.

Referring now more particularly to the accompanying drawings, the reference character 11 designates generally a cabinet structure of rectangular horizontal cross section and having an inclined top panel 12 fitted with a glass lined viewing aperture as at 13 through which an observer may see the apparatus supported upon the top shelf 14 as well as the control form issuing therefrom.

A similar but more vertically disposed transparent viewing panel 15 carried by the middle pivoted front door panel 16 similarly exposes to view the apparatus supported upon the second shelf 17, Fig. 4. Between the second shelf 17 and the bottom or floor wall 18, there is provided a multiple storage space comprised of a general

waste compartment 19 into which the perforated tapes are directed following their emergence from their respective tape transmitters but in the foreportion of this chamber there may be noted two glass lined subcompartments 21 and 22 that constitute intermediate storage spaces for the respective control tapes of the lowermost and uppermost units designated 23 and 24, and where these tapes may be confined before use in connection with their respective transmitters.

This storage chamber is furthermore divided into two principal divisions by a transverse wall 25 that extends from side wall 26 to the opposite side wall 27, Fig. 4, and from the shelf 17 to the bottom wall 18. The intermediate storage compartments 21 and 22 consist of two spaced chambers located between three glass partitions designated 28, 29, and 31. These chambers are but slightly wider than the tapes which they receive and for this reason their adjacent glass plates prevent buckling, twisting, and tangling of the loose folds during the tape storage operations as will be explained. For assembling convenience, these glass plates are held within a frame 32 defining a trapezium-shaped assembly disposed to the right of the forward subchamber 33 so as to lie respectively in the same planes as do the two loop formations 34 and 35 which descend from the two perforator-transmitter units 23 and 24.

Accordingly, the two units 23 and 24 are not in the same vertical alignment but instead the lowermost one 23 is disposed somewhat in front of the other one 24 so that their respective loop formations 34 and 35 as they descend downwardly do not conflict with one another but tend to enlarge within separate vertical planes.

The transparent partitions 28 and 29 are preferably tinted so that the tape which gathers in the space 21 appears to be of one color or color density different from that of the tape which gathers in space 22. This makes it readily discernible to an operator viewing through the transparent walls 28 and 29 which of the two chambers may become full so as to require special attention to prevent overloading.

In Figs. 2 and 3 there may be noted certain form guide elements 36 and 37 integrally associated with a sheet metal triangular guide assembly which is disposed in the path of the form loops as they begin to shape out in a downward direction as the form emerges from the perforator mechanism 39. This guide equipment tends to direct the perforated control form intermediate the preparing and transmitting apparatus of each unit downwardly to effect the formation of storage loops 34 and 35, Fig. 4.

Concerning the lowermost unit 23 whose control form loop 34 preferably aligns with the forward one 21 of the intermediate storage compartments, but little or no resistance to the direct feeding of its loop 34 into and within the storage chamber 21 has been experienced. Augmenting devices to assist in the proper arrangement and disposition of the formations of loop 34 within said compartment are not so essential as in the case of loop 35. With regard to the loop 35 that extends from the uppermost unit 24, it has been found advantageous to provide means for guiding and directing the loop formation downwardly through the vertical distance occupied by the intermediate unit between the shelves 14 and 17 and thereafter into the storage compartment 22 which is situated at a considerably greater distance from the source of emergence of the tape and is therefore subjected to greater frictional resistance in its travel. It is believed that static charges induced, for example, as a result of the perforating operations, may also cause the tape to adhere to the sides of inert guide tubes and this effect is hereby largely offset.

To overcome these effects there have been provided several elements each serving a distinct purpose but all cooperating towards the end of effecting a proper feeding and storage of the tape loop 35 after the manner, generally speaking, of the illustration in Fig. 4. A triangular arrangement, Fig. 2, features particularly the guide members 36 and 37. The upper extremity of guide member 36 will be noted to be bent inwardly at a slight angle while the guide member 37 is bent outwardly with respect to the ingress opening through the triangular guide assembly 38. The outward flare of guide 37 helps to direct the downwardly forming loop into the innermost portion of the guide assembly 38 and since, in forming the loop the tape emerges from the perforator portion of the unit 39 while the transmitter portion 41 of the unit which may not be operating holds its end of the tape relatively inert, a condition obtains whereat the flared guide 37 assists in directing the tape loop rightwardly, Fig. 2, permitting it to bulge outwardly into a larger radius formation as it approaches the maximum space at 42. At this point the tape loop will achieve its maximum radius before encountering the constricting effect of a guide belt 43 which rotates in a counterclockwise direction about its driving pulley 44 and its idler shaft wheel 45, and an inert wall section 55, Fig. 2, with which the adjacent leg of the endless belt forms an angle of approximately twenty degrees.

At this time attention will again be given to the other guide element 36 whose upper extremity is bent inwardly so as to engage and deflect the inert terminal of the loop and to assist in holding it away from the side wall of the guide assembly 38. A freedom of action thus obtained is important in the consideration of the travel of that end of the tape upwardly during retransmission. When the tape loop engages the adjacent straightaway of the belt 43 which, on the side engaging the tape loop, travels downwardly, the end of the loop becomes restricted and smaller as the tape is forced downwardly towards a point of maximum restriction 46. The angle formed by the inner leg or straightaway of the feeding belt 43 with the vertical wall section 47 and into which the tape loop is driven by the movement of the belt 43 is one of critical proportions since its effectiveness is dependent upon two components, the rigidity of the form material and its traction surface engaged by the belt 43. Accordingly, a proper and satisfactory design giving the best results was obtained by the rise of an angle as shown in Fig. 2, which arrangement has proved effective for use with commercially standard weight of control form material.

After the loop has been fed beyond the point 46 and thereafter enters the intermediate storage compartment 22, it is again permitted to become enlarged and to begin to occupy more fully the internal space accommodations of its compartment 22.

Here again a problem in connection with the storage space itself is encountered in that the tabs of partially or slash perforated tape extending slightly beyond the surface at an angle tend to be engaged or obstructed by slight irregularities within the storage chamber's internal perim-

eter. Accordingly, it has been found advantageous for preventing this effect to line the compartment internally with a specially shaped defining wall member 48, Fig. 4, which is secured to the framework as at 49 and 50 and which is polished and of material with no surface impairments such as lap joints, rivets, etc.

As a result the tape is permitted to form into meandering folds after the manner illustrated in Fig. 4 and to become relatively compact within this space. Sometimes the volume of tape thus stored requires maximum storage conditions but even so it must not interfere with the freedom of withdrawal when the leading edge 49 of the tape begins its progress upwardly under the pull of the retransmitting apparatus 41.

In connection with the first-mentioned tape loop 34 whose performance during perforation and subsequent retransmission is generally similar to that of tape 35, it is sufficient to say that because of its close proximity to the storage compartment 21, satisfactory conditions of tape movement may be obtained without the aid of the belt feeding equipment. It is to be noted that the guide mechanism serving the unit 24 and located adjacent to unit 23 comprises a motor driven pulley 44, the guide frame assembly 151, Fig. 2, and the spring tensioned idler pulley 45, arranged in such a manner as not to interfere with the working of the transmitter apparatus of unit 23 from which other tape, after passing through the transmitter 41, must continue before being received within the general storage compartment 19.

The general storage compartment 19 mentioned above receives the tapes discharged from both units 23 and 24 after said tapes have performed their ultimate functions of controlling their respective transmitter units 41. Accordingly, precise orderliness in the storage of these tapes is not as important for the reason that the tapes after having performed their transmitting functions are usually discarded as waste material. Accordingly, tape discharged into the disposal compartment may be wound upon a frictionally driven take-up reel adjusted to slip when all of the supply has been gathered. A suitable opening at the rear of the cabinet serves as a means of access to compartment 19 from which the gathered tape may be periodically removed. In the intermediate storage compartments 21 and 22, however, the respective tapes must be maintained in parallel alignment so that when the terminal 49 of the loop begins to move upwardly, the slashes or part perforations will not interfere with the compacted loops 52 but instead will permit the orderly unraveling of said loops. As much as twenty minutes of continuous tape perforation storage may thus be stored with the type of storage compartment 21 illustrated.

While the present invention has been explained and described in contemplation of a specific embodiment, it is to be understood nevertheless that numerous variations and modifications of this structure may be made without departing from the essential spirit or scope thereof. Accordingly, the invention is not intended to be limited by the specific language of the foregoing detailed description nor by the particulars of the accompanying illustrations except as indicated in the hereunto appended claims.

What is claimed:

1. In a tape perforating transmitter apparatus, an intermediate tape storage device comprising parallel side walls spaced in accordance with the transverse width of a tape, a pair of guide elements flared downwardly and outwardly to permit the formation of a tape loop, and a further tape loop directing means comprising a vertical inert wall and an endless driven belt one of whose legs is angularly disposed with respect to said wall for engaging said tape loop at a point just below said guide elements for constricting it and directing it by a space formed between said inert wall and an extremity of said belt.

2. In combination with a tape advancing apparatus, an intermediate storage device comprising parallel side walls spaced in accordance with the transverse width of a tape and a continuous peripheral lining element, a pair of guide members disposed downwardly and outwardly to permit the formation of an enlarged tape loop, and a further tape loop directing means comprising a stationary wall and one leg of an endless belt angularly disposed thereto and driven to constitute a downwardly propelling wall surface for engaging said tape loop at a point just below said guide members and for constricting said loop to rigidify said tape to overcome buckling tendencies.

3. In an apparatus for propelling a loop of tape, the combination comprising a chute, means for forcing a loop of tape through said chute, and means for directing and confining the loop of said material comprising an inert wall section and a movable wall section angularly disposed thereto in a downwardly and inwardly direction and consisting of an endless belt and pulley wheels around which said belt is driven, spaced from said inert wall section, so as to constrict but not collapse said loop.

4. In an apparatus for guiding a loop of tape, the combination comprising a chute, means for feeding a loop of tape material through said chute, and means for directing and confining said loop of material comprising an inert side wall section and a movable side wall section angularly disposed to said inert section and consisting of an endless driven belt spaced from and angularly approaching said inert wall section so as to constrict said loop into a small tense formation.

5. In a cabinet for housing telegraph apparatus, an upper floor section, a lower floor section, a tape preparing and transmitting apparatus positioned on said upper floor section, a tape preparing and transmitting apparatus positioned on said lower floor section in offset relationship to said upper section tape transmitting apparatus, means for forcing downwardly an intermediate tape loop formation between the tape preparing and tape transmitting portions of said lower section apparatus, means for forcing downwardly a loop formation between said tape preparing and transmitting portions of said upper section apparatus, and a device for extending said loop formation from said upper apparatus through the distance occupied by said lower section apparatus comprising an inert wall section and an endless driven belt supported so as to form an angle with said inert wall section downwardly and inwardly but spaced at its lowermost extremity from said wall section so as to admit and pass a restricted loop of said tape.

6. In a tape transmitting apparatus, a device for propelling a tape loop formation comprised of a pliable tape material one end of which is held inert and the other end of which is fed as code markings are successively applied compris-

ing an inert wall section adjacent said inert end of said tape loop, and a driven belt disposed at an angle with respect to said inert wall section sloping inwardly and downwardly but spaced from said inert section so as to constrict the radius of said loop formation within the tensile limits of said pliable material.

7. In combination with an enclosure cabinet for tape transmitting apparatus, an upper supporting floor in said cabinet, a tape preparing apparatus supported on said upper floor, a tape transmitting apparatus supported on said upper floor in plane alignment with said tape preparing apparatus, means for directing a tape loop downwardly from said tape preparing apparatus to a remotely lower level of said cabinet comprising the combination of a triangular guide assembly having a flared wall member extending downwardly and outwardly, an opposite wall member extending downwardly and having an upper portion bent inwardly, an inert wall section continuing in a vertical direction from said assembly, and a movable wall section comprised of an endless belt supported to form an angle substantially at twenty degrees from said vertical wall section and driven so that its adjacent leg moves downwardly towards said inner wall section and around a pulley spaced at a distance with respect to said wall section so as to avoid collapsing the leading loop of a tape form passing therethrough.

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