July 6, 1943. W. J. ZENNER 2,323,438

TELEGRAPH SWITCHING APPARATUS

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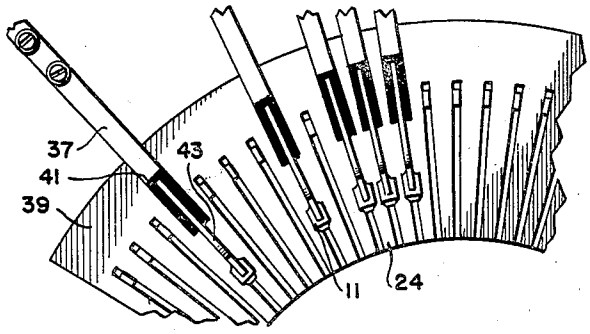


FIG. 1

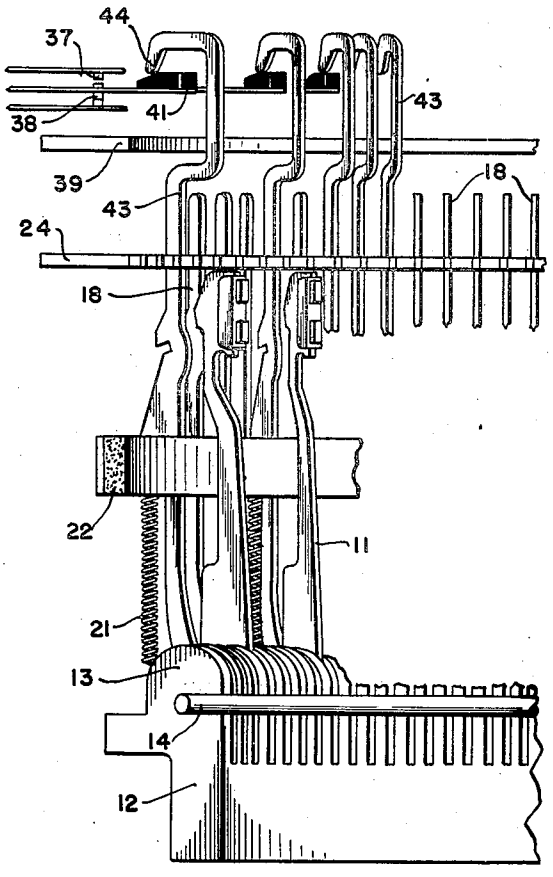


FIG. 2

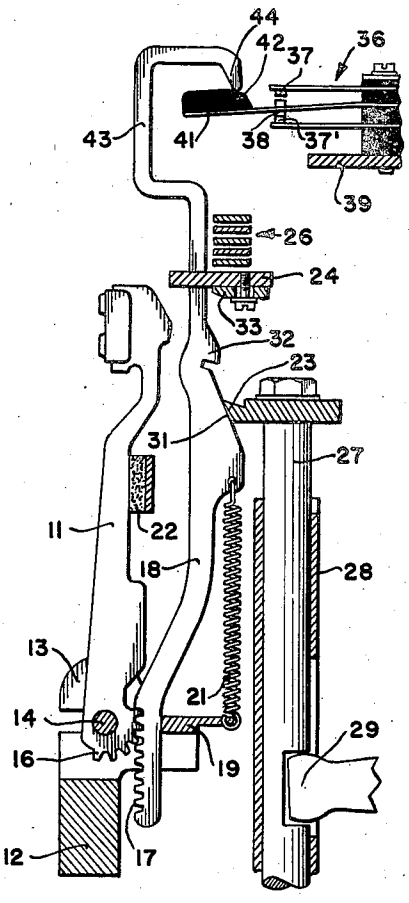


FIG. 3

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TELEGRAPH SWITCHING APPARATUS

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1 Claim. (Cl. 178—23)

This invention relates to printing telegraph apparatus and more particularly to printing telegraph apparatus for selectively operating switching mechanisms.

It is an object of this invention to provide a simple and reliable switching mechanism responsive to the operation of printing telegraph apparatus for selecting and conditioning telegraph circuits.

Another object of this invention is to provide an automatic switching mechanism for telegraph apparatus which is selectively operable in response to received code signal combinations and which operates immediately upon the reception of a switching code signal combination to afford increased switching periods.

This invention is particularly useful in connection with typing and nontyping telegraph apparatus including selectively operable pull bars and switching contacts associated with and operated by certain or all of the pull bars. It has sometimes been the practice in the past when incorporating pull bar operated contacts in a printing telegraph unit to mount the contacts above the pull bars with the movable element of the contact pile up projecting into the path of its associated pull bar. With such an arrangement when a given pull bar is selected in response to a received predetermined code signal combination, it is elevated in the cycle of operation of the printer and in ascending, it engages and operates its associated contact pile up maintaining the contacts thereof closed until in the course of the printing cycle the pull bar is lowered permitting the contact to open.

A salient feature of the present invention lies in the provision of pull bar operated contacts that are conditioned immediately upon the selection of their associated pull bars, increasing the switching time by operating the contact immediately upon selection of the pull bar rather than some time after the selection of the pull bar.

Another feature of this invention resides in the provision of pull bar operated contacts which do not introduce a load upon the pull bars and thus impede their operation.

In accordance with the features of this invention, a printing apparatus including a signal responsive selector mechanism is provided with a plurality of all metal pull bars some of which have a hook shaped projection. Each pull bar has a restoring spring normally holding the pull bar in its lowermost position, and a pull bar operating bail is provided which in each cycle of the printing apparatus engages that pull bar which has been selected in response to the conditioning of the selector mechanism by a received code signal combination. Upon engagement of a pull bar by the bail, the bail elevates the pull bar to its uppermost position to cause printing or the accomplishment of a function. A contact pile up comprising a movable member is associated with each pull bar having a hook shaped projection, and their association is such that when the pull bar is in its lowermost position, it engages an inclined cam surface on the movable member of the contact pile up and maintains the contacts in one condition. When a pull bar is selected by the selector mechanism, its restoring spring rocks it into the path of the operating bail and off the cam surface of the movable element of the contact pile up permitting the contacts to assume another condition immediately for the purpose of accomplishing a switching operation. The bail then operates the pull bar in well known fashion. The restoring spring in returning the pull bar to normal, that is, to its lowermost position, restores the contacts to normal condition by the engagement of the hook shaped projection of the pull bar with the cam surface on the movable member of the contact pile up.

For a more complete understanding of the features and operation of this invention, reference may be had to the following detailed description which is to be interpreted in the light of the accompanying drawing, wherein;

Fig. 1 is a fragmentary plan view of a printing telegraph apparatus including the improved switching mechanism that is the subject of this invention;

Fig. 2 is a fragmentary front elevational view of the apparatus of Fig. 1; and

Fig. 3 is a fragmentary vertical sectional view taken through the center of the apparatus shown in Figs. 1 and 2, illustrating the improved switching mechanism in detail.

The printing telegraph apparatus represented in the accompanying drawing is illustrated and described in great detail in U. S. Patent No. 1,745,633 to S. Morton et al. which patent is incorporated herein by reference and to which resort should be had for the details of operation of the complete apparatus. Only those elements of the printer which are essential to a complete understanding of this particular invention are shown in the drawing and will be discussed hereinafter. Although the invention is illustrated and described in connection with a particular telegraph apparatus, namely, that disclosed in the Morton et al. patent, it is to be understood

that the apparatus is readily adaptable for use with any equivalent telegraph apparatus.

In the Morton et al. printing telegraph receiver, illustrated in the drawing, there is provided a plurality of type bars 11, carried by a segment 12 which is suitably supported by the base casting of the printing unit as is clearly illustrated in Fig. 12 of the above-identified pattent to Morton et al. The upper portion of segment 12 is slotted to provide a comb portion 13 in which is supported a pivot rod 14 upon which the pull bars are pivotally supported for guided movement through the teeth portions of the comb. The lower ends of the type bars 11 are formed into segmental gears 16 which mesh with rack sections 17 formed on the lower extremity of actuating or pull bars 18. A segmental bar 19 is secured to the segment 12 and serves to hold the actuating bars in position with their rack sections in mesh with the gear sections of the associated type bars, but at the same time permitting a slight pivotal movement of the actuating bars.

Pull bars 18, which preferably are all metal, extend from the type bar segment 12, and are urged downwardly and in a clockwise direction by springs 21 distended between the bar 19 and a spring anchoring projection located on an upper portion of pull bars 18, as viewed in Fig. 3, to retain them and type bars 11 in a normal position with the type bars engaging a segmental rest 22 and the actuating bars pressing lightly against the forward edge of a common operating bail or striker bar 23.

A segmental plate 24 is suitably supported in the receiver frame and its forward edge is slotted radially to form a guiding comb for the upper reduced sections of the actuating bars 18. The permutation bars of the selector mechanism 26 are slidably supported upon the horizontal plate 24 and are conditioned in varying permutations in response to received code signal combinations in a manner described in detail in the above-identified patent to Morton, which will not be repeated herein. When the permutation bars of the selector mechanism have been conditioned in accordance with a received code signal combination, the code notches thereof will be aligned with one of the actuating bars 18 permitting its spring 21 under the control of bail 23 to rock the selected pull bar in a clockwise direction on bar 19 as a pivot into the alignment presented thereto.

The operating bail 23 is segmental in form and is fixed to the upper end of the vertical plunger 27 which is slidably mounted in a guide sleeve 28. A lever 29 projecting through an aperture in guide sleeve 28 engages a slot in vertical plunger 27 for the purpose of operating the bail 23. Normally a cam (not shown) holds lever 29 and the bail 23 in their normal position as illustrated in Fig. 3 and in this position the forward edge of bail 23 engages inclined cam portion 31 on the actuating bars 18 and holds them in the position illustrated in Fig. 3 with their upper ends in front of but spaced slightly from the notched forward edges of the segmental permutation bars of the selector 26. When the permutation bars are set in accordance with any received signal combination, the cam (not shown) is rotated to permit a spring (not shown) to actuate lever 29 and elevate the striker or bail 23. As the bail 23 moves upwardly, the springs 21 move the bars 18 rearwardly against the notched edges of the permutation bars and one of the actuating bars, corresponding to the setting of the permutation bars, drops into aligned notches of the latter in a clockwise direction far enough to bring a rearwardly projecting lug 32 thereon into the path of movement of the bail 23. Upon the continued upward movement of the bail 23, its forward edge engages the lug of the selected bar 18 and moves it upwardly thereby throwing the corresponding type bar toward the printing point. In completing the printing cycle the cam (not shown) causes lever 29 to return the bail 23 to its lowermost position and in returning, the bail, through its engagement with the inclined cam surfaces 31 on the pull bars, rocks the unselected bars in a counterclockwise direction free of the notches of the permutation bars of the selector 26, releasing the permutation bars to respond to the next code signal combination.

The upward movement of the selected actuating bar 18 is, as has been pointed out above, under the influence of an actuating spring and as the bar 18 approaches the upper limit of its travel the upper, inclined faces of its rearwardly projecting lug 32 engage a striking bar 33 by which it is disengaged from the bail 23. Thereupon, the cam (not shown) starts to lower the bail 23 while the inertia of the pull bar is sufficient to cause continued upward movement of the pull bar to effect the printing and permit the restoring spring 21 to return its pull bar 18 thereafter to its lowermost position. The actuating bar in returning to its normal position, will again engage the bail 23 with its inclined cam surface 31 and be prevented from returning to its extreme clockwise position into aligned notches in the permutation bars. The apparatus up to this point is coextensive with the disclosure in the above-identified patent to Morton et al. and reference may be had thereto for a more complete description of the selection and operation of the actuating bars and their associated type bars.

For the purpose of accomplishing switching functions in response to switching code signal combinations received by the apparatus there is provided a plurality of contact pile ups 36 comprising a fixed contact element 37 and a movable contact element 38 supported upon a resilient element of the contact pile up. The switching contact pile ups 36 are suitably located upon and supported by a horizontally disposed segmental supporting plate 39 carried in any convenient manner by the frame of the telegraph receiver. The central element of the contact pile up extends beyond its associated spring elements, as is clearly indicated in Fig. 3, and carries at its outward extremity a block of insulating material 41, and the block is provided with an inclined plane surface 42, inclined toward the contact elements for a purpose to be hereinafter described. The switching contacts, as will appear presently, are conditioned by the actuating pull bars and, accordingly, each set of switching contacts is associated with one pull bar. In accordance with the switching facilities to be provided in the apparatus there may be one or many contact pile ups provided.

In order to operate the switching contacts, special pull bars 43 are provided which are identical in contour with the above-described pull bars 18 and are operated in precisely the same manner by means of bail 23 but each of the special pull bars is provided with a hook shaped projection extending from its upper extremity and terminating in a downwardly extending finger 44. The contact pile up is associated with its particular

pull bar 43 as shown in detail in Fig. 3; that is, when the pull bar is in its lowermost position, depending finger 44 thereof engages the inclined plane surface 42 on the block 41 and thereby holds the movable contact 38 out of engagement with contact 37. The plane surface 42 is inclined in such a direction as to aid the spring 21 to urge the selected pull bar 43 in its clockwise rotation as the bail 23 ascends and traverses the cam surface 31 of the pull bar. Accordingly, as the pull bar is rotated to its extreme clockwise direction, the finger 44 passes off the inclined plane surface 42 permitting contact 38 to shift into its operated position; that is, to bring movable contact 38 into engagement with fixed contact 37 to close a switching circuit for the accomplishment of a switching function. The switching circuit may, if desired, be associated with the lower contact element 37'. With this construction as the bail 23 is elevated, it permits a selected actuating bar to be rocked in a clockwise direction into the alignment of code notches on the permutation bars of the selector 26 and in rocking, the finger portion 44 of the pull bar is removed from blocking relation with the movable element of the contact pile up and permits the contact under the force of its own resiliency to move immediately into engagement with its associated fixed contact. This movement of the pull bar is coextensive with the afore-described rocking movement of the pull bar which brings the depending lug 32 of the selected pull bar into the operating path of the bail 23 to effect the printing function. It is therefore manifest that by the present invention an arrangement is provided by means of which the switching contacts are immediately operated upon the selection of a pull bar and furthermore, that by this arrangement, no extra load is placed upon the pull bars which otherwise might to some extent impair their operating efficiency.

After the contacts 37 and 38 associated with the selected actuating bar 43 have been permitted to close due to the rocking movement of the pull bar, the bail 23 operates the pull bar through its cycle of operations as outlined above and as outlined in more detail in the above-identified patent to Morton et al. At the conclusion of this cycle of operation the spring 21 is effective to restore the selected pull bar 33 to its lowermost position. The selected actuating bar 43 will, however, as it is being restored to unoperated or unselected position engage the bail 23 which holds the selected bar in its counterclockwise position to which it has been moved by the engagement of lug 32 with the striking plate 33 at the upper portion of the stroke of the pull bar so that the finger 44 is once again positioned above the insulating block 41 and when the actuating bar has been restored to its lowermost position, that finger engages the inclined plane surface 42 of block 41 and moves the movable central spring of the contact pile up to open the switching circuits completed through contacts 37 and 38.

Although a specific embodiment of this invention has been described hereinbefore and illustrated in the drawing, it is to be understood that the invention is not restricted thereto but is capable of many modifications and rearrangements of parts. Accordingly, the scope of this invention is to be determined by the appended claim.

What is claimed is:

In a printing telegraph machine, a plurality of selectable elements having a cam hook extension, a selector for selecting an element and allowing its movement in one direction, a contact member having a normal and an off-normal position, a cam member on said contact member normally engaged by said cam hook extension for retaining said contact member in its normal position and disengaged promptly from said cam hook extension upon its movement in said one direction whereby said contact member is operated to its off-normal position to complete electrical contact, and means for thereafter moving said selected element in another direction.

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