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KEYBOARD FACSIMILE TRANSMITTER
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2 Sheets-Sheet 1

FIG. 1

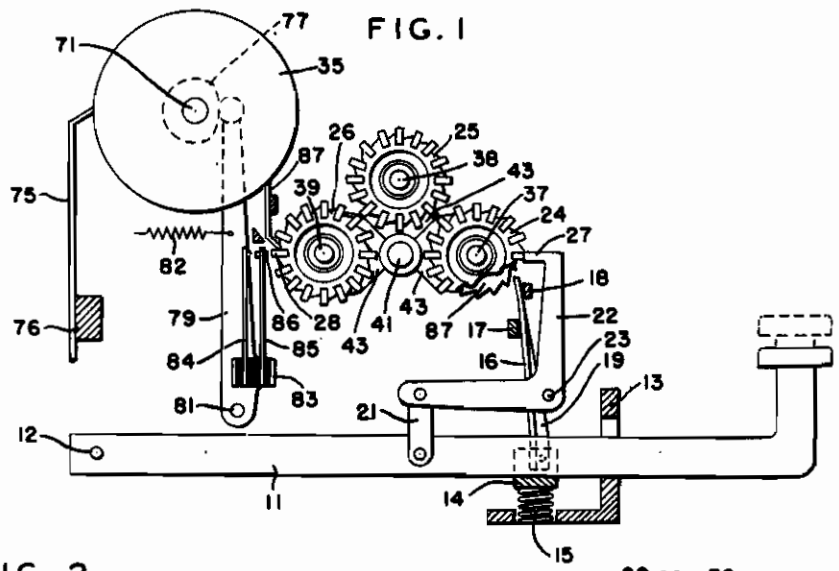
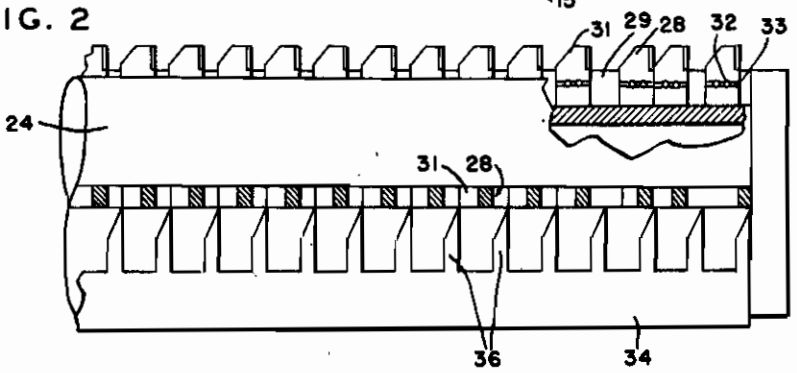


FIG. 2



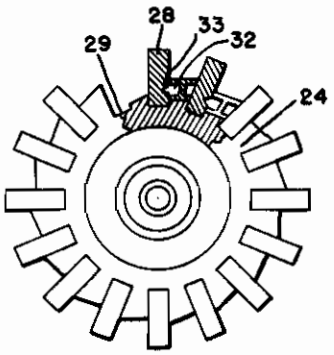


FIG. 3

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FIG. 4

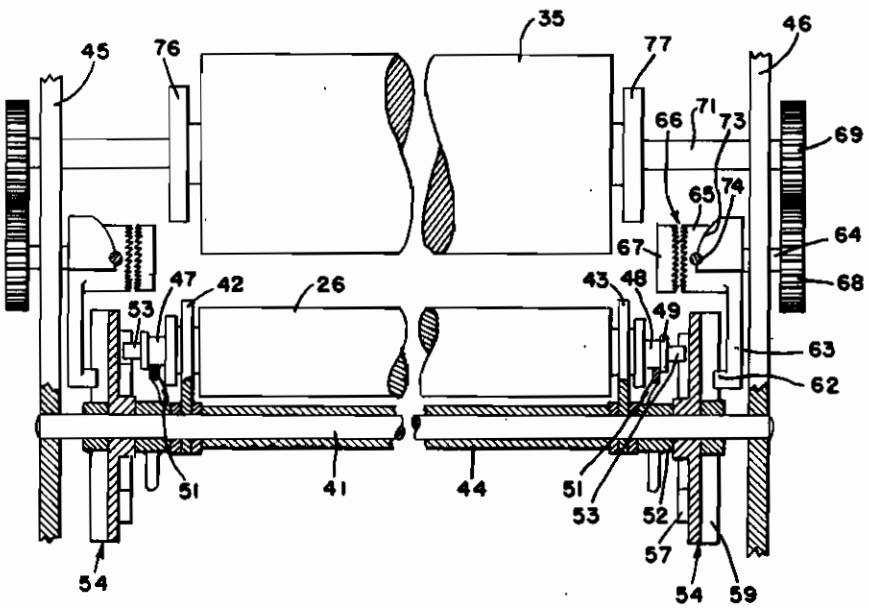
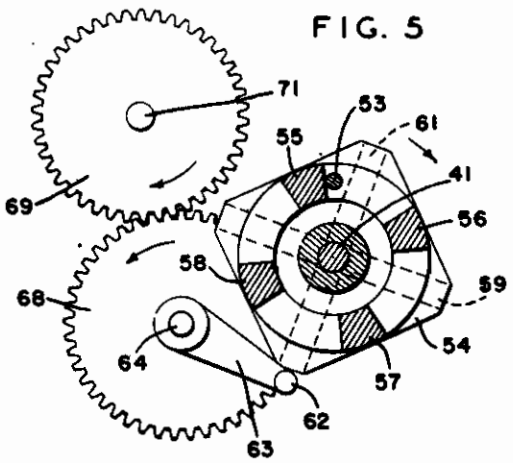


FIG. 5



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ALIEN PROPERTY CUSTODIAN

KEYBOARD FACSIMILE TRANSMITTER

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vested in the Alien Property Custodian

Application filed August 8, 1941

This invention relates to printing telegraph systems, and more particularly to telegraph systems and apparatus adapted to be operated under the control of key levers.

In telegraph systems involving apparatus for recording characters by a series of elemental areas of positive and negative surfaces, transmitting apparatus have been employed wherein each letter, symbol, or character is analyzed into a succession of constituent areas, and a code set of corresponding character embodiments are constructed, which embodiments then are selected under control of a keyboard. In accordance with such scanned or analyzed embodiments, electrical impulses are generated which cause corresponding operation of recording apparatus of the form disclosed in U. S. Patent No. 2,000,083 to form the characters in line.

The principal object of the invention is to provide a key controlled facsimile telegraph transmitter having facilities for signal storage.

Another object of the invention is to provide a keyboard facsimile transmitter having a plurality of signal storage drums and means for controlling the movement of said drums from the key operated signal storing position to the constantly operating transmitting position.

The above and other objects of the invention are achieved through the provision of a novel keyboard mechanism for controlling sensing members associated with constantly rotating code discs, and a plurality of accumulator drums for permitting the simultaneous operation of both said keyboard and said scanning mechanisms. The transmitter may be so arranged that on each of several accumulator drums there may be accumulated a word or a large number of individual characters. Another feature of the invention permits the providing of three accumulator drums which are rotatable about their own axes and in addition, can be swung about a common axis. These three accumulator drums may assume four positions, one of which corresponds to the key operating position. Another corresponds to the scanning position and the two remaining are waiting positions which lie between the key striking or operating position and the scanning position.

A better understanding of the present invention may be had from the following description taken in conjunction with the accompanying drawing in which

Fig. 1 shows a schematic side view of the transmitter according to the present invention;

Fig. 2 is a view of the accumulator drum according to the invention;

Fig. 3 is an end view, partially in section, of the accumulator drum;

Fig. 4 is a schematic plan view of the transmitter; and

Fig. 5 is a view showing the advancing mechanism for the accumulator drums.

Having reference to Fig. 1, a plurality of key levers 11 are pivotally mounted on a pivot rod 12, and are guided in their oscillatory movement by a guide comb member 13. Extending underneath all of the key levers 11 is a universal bar 14 which is normally urged upwardly by springs 15. To the bar 14 is fastened a pawl 16, which is operable between two guides 17 and 18, and is under the influence of a leaf spring 19.

Pivotally articulated to each key lever 11 is one end of a link 21, the other end of which is pivotally articulated to the horizontal arm of a bell crank lever 22. Bell crank levers 22 are pivoted on a common pivot rod 23. The levers 22 cooperate with the accumulator drums or storage devices 24, 25, and 26, and for this purpose, each of the levers 22 is provided with a projection 27.

The accumulator drums or storage devices 24, 25, and 26 are provided with a plurality of rows of accumulator segments or elements 28, which are adapted to be slidable in longitudinal grooves 29 provided in the periphery of the drums. Each of the elements 28 is provided with a beveled edge 31 which co-operates with the projection 27 of its associated bell crank 22, so that when the bell crank 22 is operated by its key lever 11, a camming action will result between projection 27 and the beveled surface 31, so as to cam or urge the element 28 operated upon rightwardly (as viewed in Fig. 2) to indicate a selected position. There are provided as many accumulator segments 28 in each longitudinal row as there are key levers 11. On the peripheral surface of the drum there are enough longitudinal rows of accumulator segments to provide for all possible words which may be accumulated on an accumulator drum. In the specific embodiment shown, the accumulator drum has sixteen such rows of segments. The segments 28 are held by detent pins 32 (Fig. 3) which extend into the notch 33. The segments 28 in their shifted position in the slot 29 designate or characterize the

letters selected in that particular series or longitudinal row of segments. A comb 34 (Fig. 2) cooperating with the segments 28 may be used for returning the segments 28 to their normal position after the segments have been scanned by the scanning drum 35. Comb 34 has teeth 36 which may engage with the side surfaces of the segment 28 at a certain angular position of the storage or accumulator drums 24, 25, or 26. Such position is indicated in Fig. 2 for a certain series of segments 28, only the designated segment or selected segment is returned, while the other segments are already in their normal position.

As indicated in Fig. 1, the storage cylinders 24, 25, and 26 are not only rotatable about their own axes or shafts 37, 38, and 38, respectiveily, but are also capable of rotation, as will presently appear, about a central shaft 41. Each accumulator drum 24, 25, or 26 may assume four positions; namely, a setting or selecting position indicated by the position of cylinder 24 in Fig. 1, a waiting position which is not shown by any drum in Fig. 1 but which would be the vacant position below shaft 41 to which the cylinder 24 indicated in Fig. 1 may be rotated. The next position is the scanning position which is illustrated in Fig. 1 by the accumulator drum 26, and a waiting position which is assumed in Fig. 1 by the drum 25. Each of the drums 24, 25, and 26 are independently supported at their ends by a pair of supporting bars 42 and 43 rotatably mounted on the shaft 41. Members 42 and 43 are held in proper spaced relation by a spacing member 44. Members 42 and 43 are freely rotatable on shaft 41, which is fixedly carried in side frames 45 and 46. Drums 24, 25, and 26 carry in their ends sleeve members 47 and 48, which are slidable therein, each of said sleeves having a flange 49 which cooperates with a camming member or guide 51 fixed to a sleeve 52 secured to the fixed shaft 41. Normally, sleeves 47 and 48 are adapted by spring means (not shown) to be pulled or retracted a predetermined extent into the drum portion 28 and by cooperation between the flanges 49 and cam guide 51, as will presently appear, the sleeves 47 and 49 are adapted to be drawn out or extended against the action of its retractile spring to bring pin 53 into cooperative engagement with portions 55, 56, 57 or 58 of a disc member 54. The cam plate or guide 51 extends around sleeve 52 and is so conformed on the face thereof that sleeves 47 and 48 of the respective drums 24, 25 and 26 are held retracted in the setting and scanning positions exemplified in Fig. 1 by drums 24 and 26, respectively, thus holding pins 53 out of engagement with disc 54. Moreover, the conformation of cam guide 51 is such as to cause sleeves 47 and 48 to be extended in the waiting positions (exemplified by drum 25 in one waiting position) to bring pins 53 into cooperative engagement with portions 55, 56, 57 or 58 of disc 54.

Thus, when disc 54 is rotated (in a manner hereinafter described), the drums 24, 25 or 26 which have their pins 53 projected into the path of portions 55, 58, 57 and 58 will be correspondingly revolved about shaft 41. Since the portions 55, 58, 57 or 58 and pins 53 are in cooperative engagement with each other only in the waiting positions, only those drums 24, 25 and 26 which are in a waiting position will be moved positively by portions 55, 58, 57 and 58. Hence, when there is another drum ahead of the drum in a waiting position, supporting bars 42 and 43 of the drum in the waiting position will press against the corresponding bars 42 and 43 of the next drum and will also carry this drum along. In the embodiment shown in Fig. 1, the drum 25 in the upper waiting position will be positively driven by disc 54, while drum 24 in the setting position will be driven by drum 25.

Disc 54 of which there is one at each end of shaft 41 is loosely mounted on shaft 41 and comprises a part of a Geneva movement. Disc 54 is provided on one face thereof with a series of cam portions 55, 56, 57, and 58 arranged 90° apart. (Figs. 4 and 5.) On the opposite face thereof disc 54 is provided with two channels 58 and 61 arranged at right angles to each other which cooperate with a stud 62 integral with a lever 63 fixed to a shaft 64 journaled in the side frames 45 and 46, respectively. Control lever 63 is integral with the driven portion 65 of a grab or toothed clutch indicated generally as 66, the driving portion 67 of which is fixed to the shaft 64. To the opposite end of shaft 64 is fixed a gear 68 which meshes with a gear 68 fixed to the shaft 71 on which the scanning drum 72 is carried. The driven clutch member 65 is provided with a cam portion 73 adapted to cooperate with a pin 74, which is carried by the side frame 46 in a manner not shown. As will presently appear, the scanning drum 72 is constantly rotating and hence gear 68 rotates continuously as does the gear 68. Accordingly, the driving portion 65 of clutch 66 is constantly rotating. In a manner not shown, the pin 74 is adapted to be moved out of engagement with the cam portion 73 by the operation of the space key lever, thereby permitting the driven portion 65 under spring pressure to be urged leftwardly (as viewed in Fig. 4) into engagement with the driving portion 67, thus initiating rotation of the lever 63. Upon rotation of lever 63, the projection 62 thereon enters the groove 61 (Fig. 5) to cause the rotation of the disc 54 through 90°. By this operation one of the cam portions 55, 56, 57, and 58 will cooperate with any of the pins 53 in the aforementioned waiting positions which are projected into the path thereof to cause the rotation of the accumulator drum associated therewith about the shaft 41 a distance of 90°.

The transmitting drum 35 comprises a plurality of scanning discs having their peripheries formed as shown in U. S. Patent No. 2,000,083. Of course, any equivalent method of providing alphabet patterns of conducting and insulating areas around the periphery may be employed. Associated with each disc on the transmitting drum 35 is a scanning contact or spring 75 which is secured to an insulating bar 78 and is continuously applied to the transmitting drum 35. Mounted on shaft 71 adjacent to the scanning cylinder 35 are a pair of similar cams 76 and 77 which cooperate with a follower lever 79 which is pivotally mounted on a shaft or pivot rod 81. Levers 79 are normally biased into contactual engagement with their respective cams 77 or 76 by biasing springs 82. Accordingly, levers 79 follow the contour of their cams 78 or 77 for each revolution of the scanning drum 35. The levers 79 are connected to each other by an insulating bar 83. Carried on the insulating bar 83 are a plurality of pairs of contact spring members 84 and 85, one pair for each scanning disc on the transmitting drum 35. When the levers 79 are swung clockwise by their cams 76 and 77, a projection 86 is brought against the operated segment 28 of the corresponding accumulator drum and contacts 84 and 85 are closed so that the selected symbol is transmitted.

The operation of the device according to the

present invention is as follows: At the beginning of the transmitting cycle or process, one of the drums **24**, **25**, or **26** is in the setting or selecting position, which in the present instance is exemplified by drum **24**. Drum **24** is detented or maintained in the position shown by detent means not shown. In Fig. 1 the key lever **11** is shown in its depressed or operated position. Thus, when the key lever is depressed from the normal dotted line position to the solid line position, it acts through link **21** to rotate bell crank **22** about pivot **23** to bring the projection **27** against the sloping surface **31** of the element **28** in register therewith, to cause the element **28** to be shifted, rightwardly, as indicated in Fig. 2, thus producing the space **29**, and placing the element **28** in the proper position for operating the scanning contacts **84** and **85**, as will presently appear.

Simultaneously, the universal bar **14** is lowered against the compressive action of springs **15**, thus bringing the pawl member **16** into cooperative relation with the ratchet **87** associated with the drum **24**. Upon its release, the key lever is raised to its dotted line position by the spring **15**, through the instrumentality of bar **14**. Also, through link **21** bell crank **22** is rotated clockwise to bring the projection **27** out of engagement with the element **28** which it has just operated. At the same time, pawl **16** is raised, and being guided by the members **17** and **18**, it engages a tooth on the ratchet **87** to rotate the drum **24** counter-clockwise one angular step, bringing the next row of elements **28** into cooperative relation with the alignment of projections **28** on the series of bell cranks **22**. Then upon another operation of a key lever **11**, an element **28** is shifted to its operative position by the associated bell crank **22**.

Thus, it is seen that upon successive operations of the key lever **11** one element in each row is selected, representing one letter of a word in the present instance. According to the specific embodiment shown, there are sixteen rows of elements **28**, thereby enabling the setting on a cylinder of words up to sixteen characters in length. After setting up a word on a cylinder or drum, such as **24**, the space key is operated which acts to disengage the pin **74** (Fig. 4) from the cam surface **73** of the clutch **66**, thus permitting engagement of the driving portion **67** with the driven portion **65** thereon to cause the control lever **63** to rotate, whereby, through pin **64** and grooves **59** or **61**, the disc **54** is rotated 90°. In this manner, after releasing the detent for the cylinder or drum **24** (not shown), the drum **24** is rotated clockwise about the shaft **41**, a distance of 90° into the lower waiting position. At the same time, the drum **25** in the upper waiting position may be rotated to the setting position and if the drum **26** in the scanning position has completed the transmission of the word set up therein, it may be moved to the upper waiting position. The drum **24** may then be moved to the scanning position which is that position exemplified in Fig. 1 by the drum **26**. The cylinders or drums **24**, **25**, and **26** are provided internally thereof with a spring (not shown) whereby as the scanning cylinders or drums **24**, **25**, **26** are rotated step by step, the spring is wound up so that after the cylinders are transferred from one position to another, they are automatically returned to the zero or beginning-of-word position.

Thus, upon movement of drum **24** into the lower waiting position, the holding pawl which has held the accumulator drum against counter-rotation is released (in a manner not shown), to permit drum **24** to rotate about shaft **37** back to its zero position. Disc **54** always rotates when no accumulator drum is "scanned" in the scanning position, because pin **74** as a function of the segment corresponding to the space symbol releases the clutch **66** for operation until an accumulator drum has been swung or advanced into the scanning position. Upon swinging accumulator drum **24** into the lower waiting position, the flanges **49** slide against the fixed cam guide plate **51**. Sleeves **47** and **48** are moved or pulled outwardly by the conformation of guide **51** thereby placing its retractile spring under tension and moves its pin **53** outwardly. The accumulator drum **24** upon movement of disc **54** is rotated another 90°. The accumulator drum **26** is carried along, and from the scanning position it reaches the upper waiting position. Now, the accumulator drum **4** is again in the scanning position. By a device not shown, coupling of clutch **66** is accomplished at the moment when the transmitting drum **35** is in its zero position so that at the moment when an accumulator drum **24**, **25** or **26** is swung into the scanning position, the contacts **84** and **85** are held, by the action of spring **82** upon lever **79**, in their open or leftward position, thus holding projection **86** out of the path of elements **28**.

The setting of additional words or text may take place on drums **25** and **26** while the words or text accumulated on drum **24** is transmitted by the transmitting drum **35**. The transmitting drum **35** rotates, and through levers **79**, against the action of spring **62**, the bar **83** moves contact members **84** and **85** against the drum **24**, **25**, or **26** in the scanning position. At the point at which a segment **28** is selectively displaced, the projection **86** is applied against this segment so that the contacts are closed and the corresponding symbol is transmitted. At the end of the cycle of rotation of cam **77**, levers **79** are actuated counterclockwise by springs **82**, whereby projection **86** is lifted away from the segment **26** of the drum in the scanning position, and accordingly the contacts **84** and **85** are opened, and in a manner not shown, drum **26** is advanced or rotated on its shaft **39** by one tooth by means of the pawl **97** and is held counter to the action of the wind-up spring by a holding pawl not shown. This process is repeated as long as accumulated symbols are present on the drum **26**. As soon as the space symbol on the drum **26** has been scanned, however, the pawl **87**, in a manner not shown, is made to disengage, and the coupling **66** is engaged so that the disc **54** of the Geneva movement is advanced through 90°.

When the drum **26**, for example, is swung out of the scanning position into the upper waiting position, the comb member **34** is operated so that when the drum turns back to its zero position, element **26** can be set back by the teeth **36**. When the adjustment or selection takes place so rapidly that no drum **24**, **25**, or **26** is in the waiting position, exemplified in Fig. 1 by the drum **25**, a key block or locking arrangement of familiar type is actuated in a manner not shown by means of which the keys **11** are blocked until a drum is ready for adjusting or setting.

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