C. M. EDWARDS.

TELEGRAPH APPARATUS.

APPLICATION FILED SEPT. 14, 1912.

1,068,749.

Patented July 29, 1913.

2 SHEETS—SHEET 1.

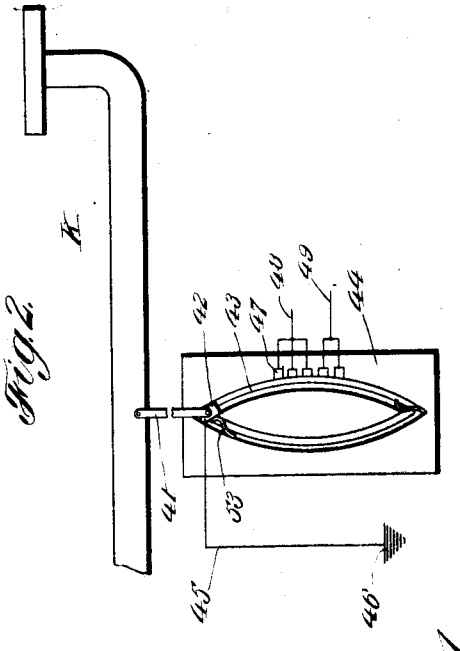


Fig. 2.

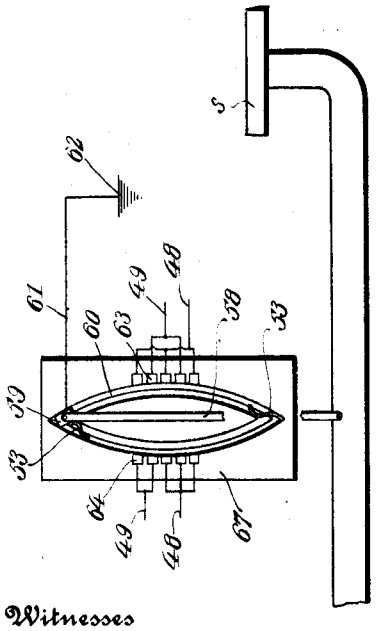


Fig. 3.

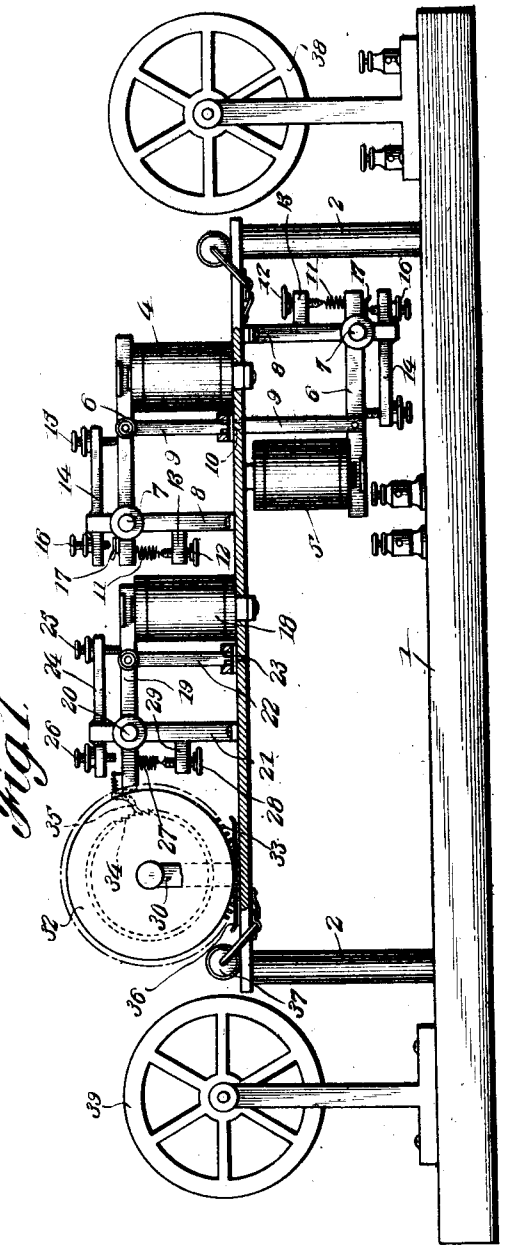


Fig. 1.

Witnesses

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2 SHEETS-SHEET 2.

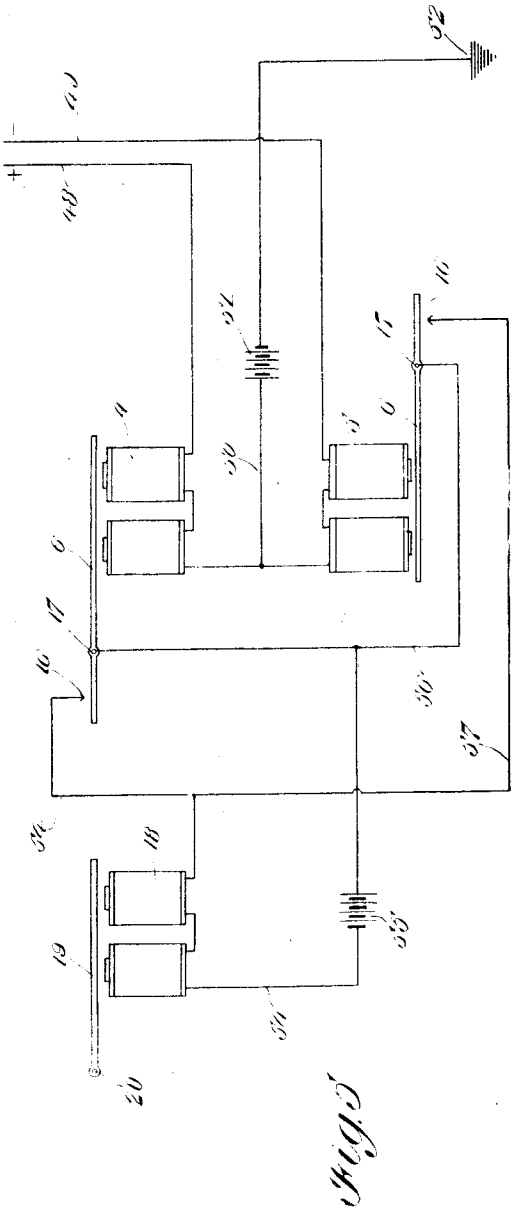


Fig. 3.

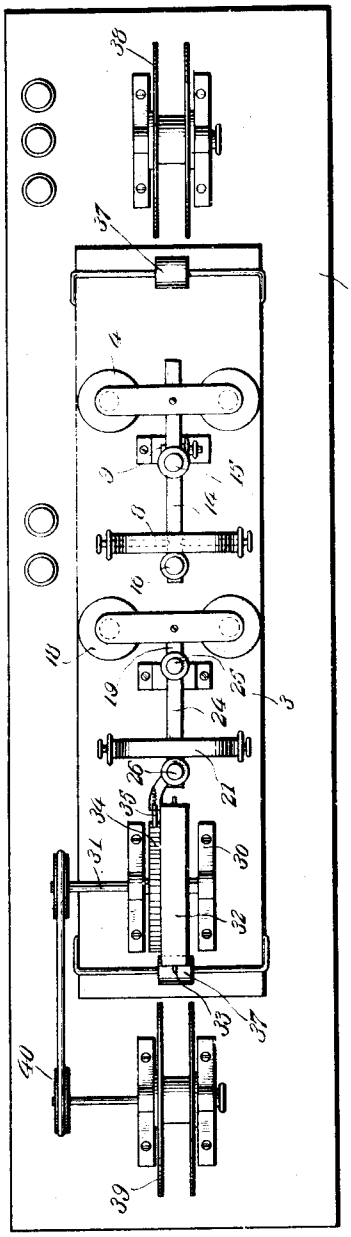


Fig. 4.

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UNITED STATES PATENT OFFICE.

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TELEGRAPH APPARATUS.

1,068,749. Specification of Letters Patent. Patented July 29, 1913.

Application filed September 14, 1912. Serial No. 720,354.

To all whom it may concern:

Be it known that I, CLAUDE M. EDWARDS, a citizen of the United States of America, residing at Galveston, in the county of Galveston and State of Texas, have invented new and useful Improvements in Telegraph Apparatus, of which the following is a specification.

This invention relates to improvements in telegraph apparatus and has particular application to a recording mechanism whereby a tape may be acted upon in such manner that when applied to the sender of a selective telegraph system positive or plus and minus or negative impulses may be directed into the selective receiving apparatus of such system, and is designed for use in conjunction with the systems or apparatus disclosed in my copending applications filed April 9, 1912 and September 6, 1912 and bearing Serial Numbers 689,460 and 718,836 respectively.

In carrying out the present invention, it is my purpose to provide a recording apparatus whereby a permanent record may be made from a typewriter or the like machine and said record applied to the telegraph sending instrument or transmitter of a selective telegraph system whereby the selective receiving apparatus of such system may be actuated in the desired manner.

It is also my purpose to provide a telegraph apparatus wherein by means of a recording mechanism and an actuating mechanism operable from a typewriter in the writing operation for operating the recorder mechanism, a tape may be punched in such manner that when applied to the sender or transmitter of a selective telegraph system, positive and minus impulses will be sent over the line to the receiving apparatus, the perforations in the tape representing the various impulses being arranged in groups.

With the above and other objects in view, the invention consists in the construction, combination and arrangement of parts hereinafter set forth in and falling within the scope of the claims.

In the accompanying drawings: Figure 1 is a side elevation of the recording mechanism. Fig. 2 is a side elevation of the actuating mechanism operable from the writing keys of a typewriter for operating the recorder mechanism. Fig. 3 is a similar view of the actuating mechanism operable from the shift keys of the typewriter for operating the recording mechanism. Fig. 4 is a top plan view of the recorder mechanism, and Fig. 5 is a diagrammatic view of the recorder mechanism.

In the present instance, my recording mechanism is designed to be operated from the keys of a typewriter and embraces an electrically actuated mechanism operable in the manipulation of the typewriter keys for writing purposes to reproduce the matter written upon the typewriter upon a ribbon or tape, so that a permanent record may be made upon the tape whereby, in the application of the tape to the transmitter of a selective telegraph system, the matter written upon the typewriter may be reproduced at the receiving end of the system for the desired purpose.

In the embodiment of my invention selected for illustrative purposes, the recording apparatus, illustrated in detail in Figs. 1 and 4 of the drawings, includes a suitable base 1, upstanding from which adjacent to the opposite ends thereof are supporting posts 2 carrying at their upper ends a female die or punch plate 3 arranged in parallelism with the base 1. Suitably secured to the upper and lower surfaces of the plate 3 adjacent to one end thereof and disposed in parallel vertical planes are magnets 4 and 5 respectively, each controlling an armature secured to a lever 6 pivoted adjacent to its free end as at 7 upon a post 8 and carrying between the post and the respective magnet a die or punch 9 movable through a suitable guide if desired and adapted to enter an opening 10 in the die plate 3.

The punches or dies 9, 9 are disposed at the relatively opposite sides of the respective levers 6, 6 and as a consequence are arranged at the opposite sides of the longitudinal center line of the die plate 3, the openings 10 coöperating with the punches or dies 9 being similarly located so that in the operation of the punches or dies under the action of the magnets, a tape or ribbon will be perforated adjacent to its opposite side edges. Suitable tension devices are employed to hold the levers 6, 6 in normal or inoperative positions so that the armatures carried thereby will be normally spaced apart from the poles of the respective magnets. In the present instance, each tension device is composed of a coiled contractile spring 11 having one end suitably secured to an adjusting screw 12 disposed within a

lug 13 carried by the respective post 8, and the opposite end fastened to the respective lever 6 beyond the pivot 7 thereof. At the free end of each post 8 is an appropriate form of bracket 14 equipped at one end and to one side of the respective post with an adjusting screw 15 whereby the movement of the respective lever 6 may be controlled, and at its opposite end on the other side of the post with a contact screw 16 adapted to be engaged by a contact 17 carried by the adjacent end of the respective lever 6. Also mounted upon the upper surface of the die plate 3 and suitably secured thereto and at an appropriate distance from the magnet 4 is a magnet 18 having disposed within the influence thereof an armature carried by a lever 19 pivoted adjacent to one end as at 20 upon a post 21 and carrying between the post 21 and magnet 18, a die or punch 22 movable within a suitable guide and coöperating with an opening 23 formed in the die plate immediately below the adjacent end of the punch or die. This punch or die 22 and its coöperating opening 23 are located in a plane approximately centrally of the die plate and between the dies 9, 9 controlled by the magnets 4, 5 so that a center row of perforations may be punched into a tape or ribbon whereby said tape may be fed through the transmitter of the telegraph system for sending purposes. To the upper end of the post 21 a bracket 24 is fastened and carries at one end an adjusting screw 25 controlling the movement of the lever 19 about its pivot 20, while the opposite end of such bracket carries an adjusting screw 26 disposed in the path of movement of the free end of the lever 19 and controlling the movement of such lever under the action of the magnet 18, when the latter is energized. An appropriate tension device is utilized to hold the lever 19 in normal position, such device, in this case, comprising a coiled contractile spring 27 having one end thereof fastened to the respective end of the lever 19 and the opposite end secured to an adjusting screw 28 carried by a lug 29 on the post 21.

At a point behind the free end of the lever 19 are brackets 30, 30 suitably secured to the upper surface of the die plate 3 and spaced apart in parallel relation and provided with alining bearings rotatably holding the shaft 31 upon which is journaled, between the brackets, a drum 32 provided upon its periphery with radially disposed pins 33 and equipped at one side with a ratchet wheel 34 the teeth of which are engaged by a spring actuated pawl 35 carried upon the free end of the lever 19 and at all times in engagement with the teeth of the ratchet wheel. In the present instance, a guide plate 36 is fastened to the upper surface of the die plate 3 and is provided with a slot through which the pins 33 on the drum 32 work. Bearing upon the upper surface of the die plate adjacent to the opposite ends thereof are suitable tension rollers 37, 37, while mounted upon the base 1 of the recording mechanism adjacent to what may be termed the forward end thereof is a tape carrying reel 38, and at the rear end thereof a tape take-up reel 39, the latter being rotated through a suitable belt and pulley device 40 operated from the shaft 31 of the drum 32. The drum 32 constitutes the feeding device of the recording mechanism and the teeth 33 thereon are designed to engage the center row of perforations formed in the tape by the die 19 so as to feed such tape longitudinally of the die plate from the reel 38 onto the reel 39, as will more fully hereinafter appear.

Each type bar operating key of a typewriting machine is equipped with an actuating mechanism through the medium of which the magnets 4 and 5 may be energized to punch the tape in accordance with the letter or character controlled by the key so that when the tape is applied to the sending apparatus or transmitter of a selective telegraph system, the receiving apparatus of such system will be actuated in accordance with the letters or characters represented by the perforations in the tape. In the drawings, only one key k of a typewriter is shown, such being thought sufficient for the purpose of illustration, and depending from each typewriter key, as k, is an arm 41 having pivotally connected to its free end a block 42 disposed within an elliptical groove 43 formed in a plate 44. Terminally connected to the block 42 is a conductor 45 grounded as at 46, and arranged in one side of the groove 43 are a plurality of contact blocks 47, five being shown in this instance, to which are terminally connected conductors 48, 49 leading to and extending through the windings of the magnets 4 and 5 respectively and terminally connected to a common conductor 50 including a source of energy as a battery 51 for instance and grounded as at 52. Extending across the groove 43 at the relatively opposite sides of the apices of such groove are guide springs 53, 53. The key k, which is a type bar controlling key, is shown to be in its normal or inactive position, and in this position of the key the block 42 rests within the groove 43 at the upper extremity thereof. In the downward movement of the key, the block 42 travels downwardly in one side of the groove and upon reaching the lower end of said side posts the guide spring 53, which yields or gives for this purpose and enters the opposite side of the groove, the guide spring at this end of the groove causing the block to travel in the opposite side thereof.

The perforations adjacent to one side edge of the tape represent plus impulses, while those adjacent to the opposite side edge represent minus impulses. We will assume, for the purpose of illustration, that the three blocks 47 toward the upper end of the groove 43 are adapted to produce plus impulses and are connected to the wire 48, and the two remaining blocks connected to the wire or conductor 49 produce minus impulses, three plus and two minus impulses being the code symbols of the letter or character operable from the key *k* of the typewriter. Upon the depression of the key of the typewriter, the block 42 is moved downwardly within the respective side of the groove 43, thus alternating the closing and opening of the circuit to the magnets 4 and 5 respectively to energize and deënergize the same to retract and release their respective armatures to actuate the punches to perforate the tape adjacent to both edges thereof, it, of course, being understood that the blocks of each group are insulated from one another and from those of the adjacent group. Thus, three plus impulses are recorded at one side of the tape and two minus impulses at the opposite side of the tape, the perforations, indicating the impulses, being arranged one behind the other owing to the tape traveling longitudinally of the base board, as will presently appear. It will be understood, of course, that the blocks 47 of each type bar manipulating key are connected in multiple or parallel with the respective conductors 48, 49 so that the magnets 4, 5 may be operated from each key of the typewriter in accordance with the arrangement of the blocks 47.

In order to energize the magnet 18 each time one or the other of the magnets 4, 5 is energized, so that the feeding device will be operated to move the tape longitudinally of the die plate for the purpose of disposing the perforations in the tape one behind the other and to perforate the tape centrally by means of the punch 22, said magnet 18, is connected in a circuit composed of a conductor 54 having one of its terminals connected to the contact 16 and its opposite terminal connected to the contact 17 on the lever 6 of the magnet 4, and a source of energy as a battery 55 arranged in such conductor. Multiplied to this circuit are a pair of conductors 56, 57, the former having its free terminal connected to the contact 17 on the lever 6 controlled by the magnet 5, while the latter has its free terminal connected to the contact 16 cooperating with the last-mentioned contact 17. Thus, it will be seen that when either one of the magnets 4, 5 is energized, the circuit will be closed to the magnet 18 to energize the latter and so swing the lever 19 about its pivot 20 to actuate the punch 22 to form a center hole in the tape. Upon the deënergization of the magnet 18, the tension device 27 acts to restore the lever to its normal position and advance the drum 37 of the feeding device, incident to the pawl 35 engaging the teeth on the ratchet wheel 34. By means of this construction, it will be seen that the tape or strip is fed longitudinally in a step by step manner and remains stationary while the punches 9 9 and 22 are operating.

Each shift key of the typewriter is also adapted to actuate the magnets 4, 5 for the purpose of perforating the tape to indicate capital letters and figures when the respective shift keys are depressed for this purpose. The return of the shift keys to their normal positions also actuates the magnets 4, 5 to perforate the tape so that the receiving apparatus of the selective telegraph system may be actuated in such manner as to facilitate the receiving of small letters. For these purposes the left shift key of the typewriter is used only for figures, while the right shift key is used for capital letters or conversely, if desired. In Fig. 3 of the drawings, I have shown only one shift key and as each shift key is equipped with a similar mechanism, it is thought that a disclosure of one will suffice for both. To accomplish the aforementioned results, each shift key as *s* is provided with an upwardly extending arm 58 carrying at its free end a block 59 disposed within and adapted to ride around an elliptical groove 60 formed in the plate 67 fixed to a suitable part of the typewriter frame in proximity to each shift key. A conductor 61 has one terminal thereof secured to the block 59 and the free terminal grounded as at 62. Suitably fastened to the outer wall of the groove 60 at each side of such groove are a plurality of contact blocks 63, 64, five blocks being shown in each group in the present case. To the end and center blocks of the group 63 is wired the positive conductor 48, while to the remaining blocks of such group is wired the negative conductor 49. On the other hand, to the two topmost blocks of the group 64 is wired the negative conductor 49, while to the remaining blocks of this group is wired the conductor 48, the guide springs 53, 53 extending across the groove 60 substantially as and for the purpose hereinbefore set forth with respect to the actuating mechanism controlled by the type bar manipulating keys. The shift key *s* is shown to be in its normal inactive position and in such position of the key the block 59 rests within the groove 60 at the upper extremity thereof and travels downwardly in one side of the groove upon the depression of the shift key. In the downward movement of the shift key, the group of blocks 63 are bridged by the block 59 on the arm 58 to close the circuit to the

magnets 4 and 5 so as to perforate the tape to indicate that the following letters are "capitals." Upon the release of the shift key, the block 59 travels upwardly and in the opposite side of the groove 60 and so closes the circuit to the magnets 4 and 5 through the group of contact blocks 64, thereby causing the tape to be perforated in such manner that, when the tape is applied to the sender of the telegraph system, the selective receiving apparatus of such system will operate in accordance with the impulses to denote or facilitate the transmission of small letters.

The arrangement of the various groups of contact blocks herein shown is merely for the purpose of illustration and it will be understood that the blocks of each group may be arranged in any desired relative positions and in different positions from the blocks of remaining groups, so that the magnets of the punches will be operated properly to punch the tape.

From the foregoing description taken in connection with the accompanying drawings, the construction and mode of operation of my invention will be readily apparent. It will be seen that each key of the typewriter causes the energization of the magnets controlling the impulse punching dies in a manner different from the remaining keys so that the tape is punched in such manner that, when applied to the sender of the telegraph system, successive groups of impulses representing various letters, characters and figures are sent over the line and to the selected point.

In my copending applications hereinbefore referred to, I employ a selective telegraph system including a series of actuating devices and means whereby an electric current may be directed to any predetermined or selected actuating device. Each actuating device is in the form of a circuit closer and each of certain of said devices controls a local circuit in which is arranged a group of operating devices. These operating devices are for the purpose of operating the keys upon the key board of a linotype machine and each group embodies three of such operating devices, owing to the key board of a linotype machine being divided into three banks of keys, one bank being the capital letters, while the two remaining banks embrace the small letters and figures and other symbols respectively. In order that only one of the group of operating devices controlled by the energized actuating device will operate at a time so that the desired key on the key board of a linotype machine may be depressed, a master or key selector is employed and is under the control of certain of the remaining actuating devices. Thus, should it be desired to print a capital letter, certain impulses will be sent through the selecting means of the receiving apparatus to actuate the particular actuating device and so close the respective local circuit to the key selector thereby causing the latter to operate as desired. The impulses representing the capital letters are now sent through the selecting means of the system to the respective actuating device to close the local circuit controlling this particular group of manipulating devices, one of such devices controlling the A in the bank of capital letters, while the two remaining devices control the *a* in the bank of small letters and the numeral 1 in the other bank, respectively, for instance. But, as the master selector has been actuated to "capital letter" position, the operating device controlling the A will be operated, while the remaining devices remain inactive. From this, the reason for perforating the tape to indicate capital letters, small letters and figures, will be readily apparent.

While I have herein shown and described one preferred form of my invention by way of illustration, I wish it to be understood that I do not limit or confine myself to the precise details of construction herein described and delineated, as modification and variation may be made within the scope of the claims and without departing from the spirit of the invention.

I claim:

1. In tape punching apparatus, a recording mechanism whereby a tape may be punched, said mechanism including punching dies, electrically controlled devices for operating said dies, electric circuits including said devices, and an actuating mechanism operable from each key of a typewriter and controlling said circuits to alternately energize and deënergize said devices whereby the tape will be punched in accordance with the symbol represented by each key.

2. In tape punching apparatus, a recording mechanism whereby a tape may be punched, said mechanism including punching dies, electrically controlled devices for operating said dies, electric circuits including said devices, an actuating mechanism operable from each key of a typewriter and controlling said circuits to alternately energize and deënergize said devices whereby the tape will be punched in accordance with the symbol represented by each key, and means for feeding the tape through said recording mechanism.

3. In tape punching apparatus, an electrically operated recording mechanism whereby a tape may be punched for telegraph sending purposes, said mechanism comprising electrically actuated punching dies disposed adjacent to the opposite sides of the path of movement of the tape to punch the latter, an actuating mechanism operable from each key of a typewriter in

the writing operation to cause the operation of said punching dies in accordance with the symbol represented by each key, said last-named mechanism comprising normally open electric circuits for each punching die, and contact blocks under the control of each typewriter key whereby the circuits controlling the punching dies may be alternately opened and closed to actuate the dies to punch the tape, a second punching die for punching a center row of perforations in the tape, and means controlled by the first dies for causing the operation of the last-mentioned die.

4. In tape punching apparatus, a recording mechanism whereby a tape may be punched, said mechanism including electrically operated punching dies, electric circuits including said dies, an actuating mechanism operable from each key of a typewriter and controlling said circuits to alternately energize and deënergize the same whereby the tape may be punched in accordance with the symbol represented by each key, a second punching die for punching the tape for feeding purposes, and feeding means for feeding the tape through said recording mechanism.

5. In tape punching apparatus, a recording mechanism whereby a tape may be punched, said mechanism including electrically operated punching dies, electric circuits including said dies, an actuating mechanism operable from each key of a typewriter and controlling said circuits to alternately energize and deënergize the same whereby the tape may be punched in accordance with the symbol represented by each key, a punching die for punching the tape for feeding purposes, and means controlled by the first dies for causing the operation of the last-mentioned die immediately succeeding the operation of either of the first dies.

6. In tape punching apparatus, a recording mechanism whereby a tape may be punched, said mechanism including electrically operated punching dies, electric circuits including said dies, an actuating mechanism operable from each key of a typewriter and controlling said circuits to alternately energize and deënergize the same whereby the tape may be punched in accordance with the symbol represented by each key, a punching die for punching the tape for feeding purposes, means controlled by the first dies for causing the operation of the last-mentioned die immediately succeeding the operation of either of the first dies, and feeding means under the control of the last-mentioned die.

7. In tape punching apparatus, a recording mechanism whereby a tape may be punched, said mechanism including electrically operated punching dies, electric circuits including said dies, an actuating mechanism operable from each key of a typewriter and controlling said circuits to alternately energize and deënergize the same whereby the tape may be punched in accordance with the symbol represented by each key, a punching die for punching the tape for feeding purposes, means controlled by the first dies for causing the operation of the last-mentioned die immediately succeeding the operation of either of the first dies, and a feeding drum rotatable from said last-mentioned die succeeding the operation thereof whereby the tape may be fed through said recording mechanism.

8. In tape punching apparatus, a recording mechanism whereby a tape may be punched, said mechanism including a number of dies for punching the tape, an actuating mechanism operable from each key of a typewriter in the writing operation, and connections between said dies and said actuating mechanisms, whereby each of said dies may be rendered operative and inoperative alternately independently of one another.

9. In tape punching apparatus, a recording mechanism whereby a tape may be punched, said mechanism including a number of dies for punching the tape, an actuating mechanism operable from each key of a typewriter in the writing operation, and electric circuits controlling said dies and controlled by all of said actuating mechanisms and adapted to be alternately opened and closed by any one of said mechanisms to operate said dies in accordance with the symbol represented by the respective key.

10. In telegraph apparatus, a recording mechanism whereby a tape may be punched for sending purposes, said mechanism including a number of dies for punching the tape, actuating mechanisms each operable from a key of a typewriter in the writing operation, connections between said dies and said actuating mechanisms whereby each of said dies may be rendered operative and inoperative alternately independently of one another, and means operable from the shift keys of the typewriter for operating said dies to punch the tape to indicate capital letters, figures, and small letters.

11. In telegraph apparatus, an electrically operated recording mechanism whereby a tape may be punched for sending purposes, said mechanism comprising electrically actuated punching dies disposed adjacent to the opposite sides of the path of movement of the tape to punch the latter to represent various impulses, and an actuating mechanism operable from each key of a typewrite in the writing operation to cause the operation of said punching dies in accordance with the symbol represented by each key, said last-named mechanism comprising a normally open electric circuit for each punching die, and contact blocks under

the control of each typewriter key whereby the circuits controlling the punching dies may be alternately opened and closed to actuate the dies to punch the tape.

12. In tape punching apparatus, an electrically operated recording mechanism whereby a tape may be punched, said mechanism comprising electrically actuated dies, actuating mechanisms each operable from a type bar key of a typewriter in the writing operation, electric circuits controlling said dies and controlled by said actuating mechanisms and adapted to be alternately opened and closed by any one of said mechanisms to operate said dies in accordance with the symbol represented by the respective key, and means operable from the shift keys of the typewriter for operating said recording mechanism to punch the tape to indicate capital letters, figures and small letters.

In testimony whereof I affix my signature in presence of two witnesses.

CLAUDE M. EDWARDS.

Witnesses:
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BENNETT S. JONES.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."